



**The PAKISTAN  
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REVIEW**

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## Inaugural Address

SARTAJ AZIZ

Dr Asad Zaman, Distinguished Guests, Ladies and Gentlemen,

I am very pleased to return to this landmark event, the Annual Meeting of Development Economists, after a long interval and that also on the 30th Anniversary of PIDE. This gathering of intellectuals, economists, worthy panelists and other participants of the conference is important for the academic community and policy-makers alike, to debate current socio-economic challenges and their solutions.

The topics for discussion by many eminent scholars and policy-makers over the next 3 days are both important and topical. We would look forward to the recommendations emerging from the Conference, specially on topics like “Inclusive Growth”, “Addressing inequality”, and “Alternate Strategies of Poverty Alleviation”.

Ladies and Gentlemen;

Poverty as an issue has received unprecedented international attention in the past two decades; on the other hand, the number of people living in absolute poverty has increased dramatically. An estimated 3 billion, or half the world population, are living on less than USD 2 a day. About 1.2 billion people are extremely poor and have to subsist on only USD 1 a day. The most common indicator of poverty is a pre-determined *income level* below which a family cannot survive. Another useful concept is that of consumption based poverty, (minimum food per capita, access to clean drinking water, basic health facilities or primary education). The supplementary indicators of poverty are, of course, dependent on family income, but not entirely. In some countries a given level of per capita income may not be accompanied by a corresponding level of food security or access to basic needs. These relationships vary enormously from one country to another. A careful analysis of this relationship and the variation from one country to the other can provide a very good starting point for evolving a national strategy for poverty reduction.

While efforts are underway to reduce poverty across the globe, outcome has been very uneven. Since 1980, China alone accounts for most of the world's, decline in extreme poverty. Even though there has been a huge rise in income inequality within China, economic growth has been so strong that hundreds of millions of people have risen out of extreme poverty and the poverty ratio has plummeted. Sub-Saharan Africa, at the other extreme, has seen its poverty headcount continue to rise; the negative impact of low economic growth has far outweighed modest improvements in income inequality.

The root causes of poverty are deep and complex and spring basically from the power structure of a society, marked by skewed distribution of assets and an economic

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system often dominated by feudal, tribal or ethnic elites in most developing countries, The benefits of economic growth or improvement in agricultural productivity in such a society will inevitably accrue to those who own the land and have access to irrigation water, credit or markets. Continuing population growth further reduces the per capita land holding or other assets of the family. The poor in any society are not a homogeneous group, but an amalgam of different groups, each with its own social or ethnic handicaps and political alignments.

These inherent causes of poverty are often compounded by man-made policies that discriminate against the poor. A considerable proportion of the resources allocated for education and health services are, in practice, pre-empted by expensive schools, colleges and hospitals in urban areas for the benefit of relatively well-off members of the society. Macro-economic policies in most developing countries also have a persistent urban bias as they generally provide positive incentives and high tariff protection to industry and negative protection to agriculture, to provide cheap raw materials to industry and also to keep wages low through lower food prices. These adverse terms of trade not only affect overall agricultural incentives, but also have a devastating effect on the livelihood of small and marginal farmers.

Renewed international concern with poverty reduction, in the past decade, has coincided with the advent of globalization with its focus on the free market philosophy. Globalisation with its strong emphasis on reducing the role of state in almost every sphere of activity has not been very helpful in reducing poverty. The driving force of globalization is competition and by definition, poor people and poor countries are at the lowest rung of the competitive ladder. The inherent limitations of an unregulated market system and the resultant need to protect the consumer, the small businesses and the under-privileged communities are fully understood in the more advanced societies, leading to large scale state interventions in different sectors of the economy, but at the global level and in devising policies for the international financial institutions, these realities are often ignored.

The adjustment policies advocated to the developing countries by international financial institutions also have negative impact on the poor. By cutting down public expenditures, reducing subsidies, raising taxes and utility charges, these policies invariably lead to a bitter mixture of rising unemployment, growing inequality, and shrinking social services. In such conditions, the poor have to bear a disproportionate share of the burden in lean periods caused by an economic slowdown or a natural disaster. At the same time the developed countries sometimes do not practice what they preach, and are currently providing over \$300 billion a year as agricultural subsidies. As a result, there is no level-playing field for agricultural trade, with adverse consequences for millions of poor farmers in the developing world.

Empirical research on successful efforts to reduce poverty, has identified several pre-requisites for poverty reduction. These can be summarised as follows:

- (1) The pattern of land ownership, the degree of skewness and the prospects for land reforms.

- (2) The political power base of the government in power and the actual nexus between the power structure and major stakeholders and extent to which the country's elites are committed to development.
- (3) Extent of decentralisation of the governing structure and its nature. Is the governing structure at the provincial and lower levels bureaucratic in nature or is it the product of an electoral process?
- (4) Extent of power sharing and participation of the poor in governance and process of development, at different levels.
- (5) The degree of tribal, religious, ethnic or racial polarisation in the country.
- (6) Capacity of the administrative structure to implement economic and pro-poor reform programmes.
- (7) State of political rights and civil liberties in the country as a whole and effectiveness and independence of judiciary and media.
- (8) The relative terms of trade for the agriculture sector in relation to the industrial and urban sectors.
- (9) The proportion of budgetary resources for social sector expenditures like education and health that actually reach the poor.

It is unlikely that all these pre-requisites can be met simultaneously but a critical combination can vastly improve the prospects for the adoption and implementation of pro-poor policies, and that in turn would depend on one important factor i.e., the political power structure of a country which should be genuinely pro-poor.

In many countries today, the issue of inequality has come to the front burner of international and national discourse with a view to finding solutions. In addition to equity reasons, there are good economic and political reasons to be concerned about inequality, its various dimensions, and societal impacts. Indeed, many authors and commentators argue that income inequality is among the most pressing current problems of our era and show that income inequality has a dramatic impact on people's everyday lives. For example, greater inequality seems to lead to general social dysfunction; but in more equal societies homicide rates are lower and children experience less violence, people trust each other less in more unequal societies; and tend to do worse when it comes to health, education and general well-being.

Economic growth is created by the discovery of new resources, by more intensive use of existing resources, by the exchange of resources and services to maximise value, and by the development of more innovative ways to employ services and resources. The most important determinant of economic growth is innovation: conducting existing tasks in new and improved ways; organising and reorganising production to increase output with the same or fewer resources; expanding the value and resourcefulness of existing talents; creating new skills or products to provide value that had not existed before. Economic growth is enhanced in each of these ways, and is maximised where each citizen is given the opportunity to improve his or her economic contribution to the maximum. This, in my view, is the right approach for promoting inclusive growth.

I Thank You All.

## The Presidential Address

ASAD ZAMAN

Aslam-o-alaekum! Thank you very much for coming. I would like to welcome you all to the Conference and hope it would be of benefit to us, not just academically and intellectually but that it would be of benefit to billions of people on earth who are living in abject poverty. One of the important things to realise is that this is not inevitable but rather is a result of the choices we have made. What are these wrong choices and how can they be changed is the theme of this Conference. One of the things I would like to say is that world is a battle place of ideas and these are being played out on a large scale. In the start of the 20th century, growth was understood as the process of capital accumulation. Marx and Keynes and classical economists agree on this idea that growth is about getting more wealth. However, this idea has fallen into disrepute and the clear conclusion is that growth is about development of human capabilities. It is a multidimensional process. It has many components and just the accumulation of wealth is not the solution to the problems we face. Again, it was thought that development was about gaining technology and building industries but I think the realisation is growing stronger that it is all about human lives.

Enriching human lives is what makes the difference. How to develop capabilities is what matters as the capability approach also suggests. This requires a totally different kind of thinking than what is currently taking place. The concept was, and continues to be for the large extent, that if we grow, that is the method to alleviate poverty, that we acquire wealth and with this wealth we shall help the poor. This is a completely wrong concept at the correct formulation is what Mahbub Ul Haq said that if we concentrate on improving the lives of the poor, giving them lives of dignity, they would actually do the development; they would create the development that we desire. Again, it is the reversal of priorities from the traditional one, even to the one that is even being followed. In many areas, the thinking is changing to dimensions that were previously not considered important. There has been a lot of emphasis on the hardware of development, the factories, the machines, but actually what matters, as is being realised more and more, is the software. The software is building characters, trust and integrity. These are the things that make a difference and for these, there is currently no agenda, no idea about how to do this. For various reasons, in the historical process the idea that only scientific knowledge matters emerged and became popular and therefore these important things got lost.

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Julie Reuben, who is an educator at Harvard, has written a book on the making of the modern university and the marginalisation of morality. She writes that in the early 20th century if you look at the catalogue of Harvard and other universities you would find that they had explicit goal that we would build character, we would create people with strong personalities who will be leaders of the world and they will understand civic responsibilities and this was an explicit goal of universities. But for various reasons that she enlists, these goals were abandoned—the idea of building people was abandoned and only technology was left with the result that David Halberstam in the book “The Brightest and the Beast” documents. Halberstam documents how graduates of Yale University conducted the most ruthless campaign of killing women and children and doing all sorts of barbaric acts, even though they were trained at the finest universities. Even today you can be taught how to make an atom bomb but you are not taught that it is wrong to kill innocent people, which is not part of the training. In fact, the opposite training is being given.

Therefore, the first job, which is also incorporated in the first pillar of the Vision 2025, is to build people, we have to build human capabilities. In order to do that, we have to enable people to live decent lives and that basically is what poverty alleviation is all about. That is just one dimension, as the multidimensional literature shows, it is not enough as was thought earlier that you just provide them with money and that would take care of the problems. Actually, human lives are multidimensional and one has to provide support many different dimensions, which is why it is important to do the right kind of research to understand what the problems are and how to alleviate them.

Human development has three dimensions that are important. These are health, welfare, and education. All the studies show that the cost of finding the solution is low. It is not really the economic problem that we face. To eliminate all the hunger in the world is a trivial matter compared to the amount of money that is being spent. For example, somebody quoted an interesting statistic that the amount of money being spent to fight obesity in advanced countries and on the diseases associated with over-weight, is enough to eradicate all the hunger on this planet. It is not that we lack resources, it is that we lack the political will to solve the problem. Again, this is something that the economists do not realise as they are always talking about the problem of scarcity, that we do not have enough resources to solve the problem. The issue is not lack of resources, it is of lack of knowledge, right ideas, and spirit.

Some of the most interesting work has been done by Duflo and Banerjee, who have developed the New Poor Economics. Their basic idea is that poverty is not one big problem but a thousand small problems. This has a lot of radical implications, as we have to solve a lot of small problems in order to solve the main problem. It is not like there is a magic cure following which you can change the world. It is rather we have to struggle on many different dimensions. For example, regarding malnutrition the traditional wisdom is that people do not have enough food or that they do not have enough money to buy food. Actually, the research shows that it is not true for the vast majority. People have money and there is enough food available to provide for the nutritional deficiencies. What happens is that there is lack of knowledge regarding what is the right choice and people choose delicious food over bad-tasting but nutritional food. This is not a surprising result in retrospect but can be surprising in prospect. However, this means that

the designs of the programmes to deal with malnutrition must change focus. It is not an issue of providing money or rations but it is an issue of changing cultural norms of making the food more appealing and appetising. For example, tofu is a very good nutritional choice but it is not part of the Pakistani diet but it does not taste good, so it is not an easy solution for adopting it unless we work on changing cultural norms. However, this is not the standard approach.

Problems we face are not impossible—solutions are possible. In some countries, they have made a lot of progress in terms of reducing malnutrition. If the right strategies are adopted these are not hopeless problems to solve. It is just the question of doing the right things. Similarly, health is a very interesting issue and again the standard approaches based on the wrong type of information are likely to fail. Actually, the poor spend a large portion of their budgets on health but they spend it in the wrong ways. They spend it on ineffective remedies; they spend it on visiting quacks who have no knowledge and skills. The issue is why does this happen and how can we fix it. In health, most diseases cure themselves, so if you go to a quack and he gives you medicine, you will get treated and your experience will actually be misleading. You will come to believe that the quack gave you the right medicine when in fact the disease would have cured itself. Therefore, the issue is to provide the right kind of knowledge but even that is not enough. It has not come from a trustworthy source. So, building trust, gaining trust, and then providing solution is important. One of the most exciting developments in Pakistan is the Indus Hospital which is providing care to thousands of patients completely free for several years. It spends hundreds of millions of rupees. This is very much in accordance with the Islamic traditions.

Therefore, it is not that we need medicine, or that we need technology, what we need is the realisation, the recognition, the understanding, that if somebody is sick, it is my responsibility. As a culture, as a society, we take responsibility of the poor. This is what is needed to make the change. That is the software I am talking about. This is what is exemplified by the Indus Hospital. They have put up an institution where anybody can walk in and if you are sick you get treatment; they do not say to bring the money to start the treatment. This spirit and change is what is needed to solve the problem.

Education is a very important aspect of the problem and again the research shows very surprising results. It is not that we lack resources, it is not that the buildings are not there, we have ghost schools, or that our teachers do not know how to teach, rather it is all about the software. Parents do not believe in their children, teachers do not believe in their students, and children lack self-confidence, as they do not believe in themselves. So, if we can create teachers who are inspired, who believe that the children in front of them are the potential geniuses of tomorrow, that they are Ghazalis and Einsteins, that they are Galileos and Da Vincis, Ibn Rushds sitting among the 30 students in front of him, they would then deliver the performance. They know how to teach. The children, on the other, if they have the confidence, they can achieve the results. Therefore, again, it is all the software and not the hardware that matters.

One of the keys to change is the social norms. How to change the social norms? How to create the understanding that if there is a child uneducated in Pakistan, it is my responsibility. My responsibility is not to just educate my children but all of the children are my children. If this recognition exists, then a lot can be done and it was done. This

ties with the Islamic heritage. For thousands of years, every child who wanted to receive education, received it. The idea that one has to pay to receive education was alien to the Islamic culture. In fact, the person with knowledge had the responsibility to convey this knowledge to others and he believed that he would be questioned on the day of judgment if he fails to do this.

In nutshell, I would say that basically a lot of work is required. The Chinese experience with development was based on the motto "Let a thousand flowers bloom". Therefore, try a lot of things, do a lot of experiments because a lot of work is needed in a lot of different directions, and then harvest these ideas for success. Take the ideas that work. What I conclude is that the old methods, the ones that are currently being taught in textbooks for achieving growth and development, are wrong. We cannot focus on growth rates of GNP as this just does not work. It has been tried and it has failed. There are many new ideas on the surface, which are exciting, valuable, different and they give us directions to work that are fruitful.

These are interesting times to be living in. I hope you will catch some of this excitement from the research and be able to participate in the process of transforming both the nation and the planet. It will depend on ideas, not on the hardware but the software. Thank you.

## *The Quaid-i-Azam Lecture*

# **Fulfilling the Pakistan Vision of Quaid-i-Azam**

AKMAL HUSSAIN

## **INTRODUCTION**

In this lecture I will begin by suggesting that economic equality is one of the founding principles of Pakistan in terms of the explicitly stated view of Quaid-i-Azam Muhammad Ali Jinnah and also in the Constitution of Pakistan. I will in section-II indicate the analytical basis of growth policies followed by Pakistan's policy-makers in the decades after independence and the consequent inequality and mass poverty that persist till today. In the next Section-III, I will discuss recent research to lay the basis of an alternative perspective on economic growth which can provide the framework for fulfilling the Pakistan vision. In the final Section-IV, I will outline three main features of a new inclusive development strategy. It will be argued that if a prosperous future for Pakistan is to be achieved then a change in the institutional structure is required whereby all of the people rather than only a few have opportunities to fulfill their human potential. Thus Pakistan can be placed on a new trajectory of sustained and equitable growth.

## **I. A FOUNDING PRINCIPLE OF PAKISTAN**

The country's founding father, Quaid-i-Azam Muhammad Ali Jinnah regarded equality to be one of the foundational principles of Pakistan.

*"The great ideals of human progress, of social justice, of equality and of fraternity constitute the basic causes of the birth of Pakistan...."* (Jinnah's Address at the Public Meeting in Chittagong on 26 March, 1948).

The Constitution of Pakistan articulates this vision of Jinnah in article 38 (a), as follows:

*"The state shall secure the well being of the people irrespective of sex, caste, creed or race by raising their standard of living, by preventing the concentration of wealth and means of production and distribution in the hands of a few to the detriment of the general interest...."*

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## II. ECONOMIC POLICY AND ITS CONSEQUENCES

In contrast to the foundational vision of equality, Pakistan's economic policy was formulated on the principle of inequality.

For a long time mainstream economists had thought that inequality was the inevitable result of economic growth in at least the early stages of the economic development of a country.<sup>1</sup> Furthermore, it was believed that only the rich save and invest and so if growth was to be maximised the rich should be allowed to become richer. Of course in this conception the poor had to settle for the "trickle-down" effect of such growth. In Pakistan's policy making this postulate of mainstream economics was assiduously adopted ever since economic planning began in the mid 1950s. During the decade of the 1960s (during the Ayub regime), economic planners more systematically introduced policies designed to transfer real incomes from the poor to the rich in accordance with the orthodox view that economic growth could be maximised only through inequality. Let the size of the cake become bigger they argued before talking about income distribution.

It was not surprising that by the end of the 1960s, the rich became very rich with 43 families in West Pakistan producing 46 percent of value added in large scale manufacturing industry, controlling 84.4 percent of earning assets in banking and 75.6 percent in insurance.<sup>2</sup> Over the same period the per capita consumption of food grain by the poorest 60 percent of Pakistan's population declined in absolute terms.<sup>3</sup> Just as inter personal inequality increased sharply so did the economic disparity between regions. The former resulted in a mass movement in West Pakistan that overthrew the Ayub government and the latter phenomenon fuelled an independence movement in East Pakistan that resulted in the emergence of the new state of Bangladesh where the majority of Pakistan's population had earlier resided.

In spite of the explosive consequences of economic policy in the 1960s Pakistan's economic planners failed to grasp the fact that inequality can place unmanageable stresses on the political fabric as well as the state structure. Except for a brief period in the regime of Prime Minister Z.A. Bhutto, inter-personal and inter-regional economic inequality persisted. Today even after 68 years of independence mass poverty exists alongside great affluence. According to the latest estimate by the International Food Policy Research Institute (IFPRI) 39.7 percent of the population is living below the poverty line (it is an extreme poverty line defined in terms of an adult equivalent of only 2350 calories per person per day).<sup>4</sup> In terms of the poverty line of USD 2 per person per day (usually adopted in international comparisons), 60.3 percent of Pakistan's population is living below the poverty line.<sup>5</sup> This incidence of poverty estimate is consistent with the figures on malnutrition in Pakistan. According to the National Nutrition Survey 2011,

<sup>1</sup>Kuznets for example introduced the idea of the inverted U-shaped curve whereby inequality increased in the early stage of growth, then flattened out and in the third stage of growth inequality declined. See, S. Kuznets, Economic Growth and Income Inequality, *American Economic Review* XLV (1): 1-28, 1955.

<sup>2</sup>Akmal Hussain, Institutions, Economic Structure and Poverty in Pakistan, *South Asia Economic Journal*, Volume 5, Number 1, January-June 2004, SAGE Publications, New Delhi, 2004.

<sup>3</sup>Naved Hamid, The Burden of Capitalist Growth, A Study of Real Wages in Pakistan, *Pakistan Economic and Social Review*, Special Issue, 1976, XIV: 315-419.

<sup>4</sup>Sohail J. Malik, Presentation in the Distinguished Lecture Series, FC College University, Lahore, 5<sup>th</sup> November 2015.

<sup>5</sup>Poverty in Pakistan, Wikipedia.Org, [https://en.wikipedia.org/wiki/Poverty\\_in\\_Pakistan](https://en.wikipedia.org/wiki/Poverty_in_Pakistan), 7<sup>th</sup> November 2015.

43.7 percent of children under 5 years, were stunted and 36.9 percent were wasted.<sup>6</sup> If we take account of services such as safe drinking water, decent transport, adequate housing, quality health care, quality education and affordable access over justice, then we can say that the majority of the people of Pakistan are deprived of the minimum material conditions of dignified human existence.

Amidst mass poverty the elite are living in luxury. The inequality is acute: If we take USD 2 per day as the poverty line then the average annual income of the richest (over USD 200 per day) is about 100 times more than the average annual income of the poorest 60 percent of Pakistan's population. These stark numbers are palpable at a visceral level for those with a heart: the rich drive in their Mercedes limousines to grand banquets in the affluent neighborhoods of cities, while children in Tharparkar crawl to their deaths in starvation.

The prevalence of such acute income inequality is a key factor in perpetuating mass poverty. Research by Ravallion and others has shown that the greater the level of inequality to begin with the smaller the poverty reduction effect of given GDP growth rates.<sup>7</sup> Thus, the poverty elasticity of growth is lower, the higher the level of inequality. Accordingly Pakistan's relatively small trickledown effect historically, is now being virtually halted as GDP growth rate over the last seven years has declined sharply compared to the earlier period, while income inequality has increased.

### III. UNDERDEVELOPMENT OF PAKISTAN'S HUMAN POTENTIAL

In the face of the deprivation of the majority of the people of Pakistan, the government faces acute fiscal constraints which make it financially incapable of addressing the problem. At the same time there is a critical dependence of the government on loans such that the accumulated stock of debt has become unsustainable, with debt servicing amounting to over 50 percent of government revenues. Under these circumstances and within the existing institutional structure, the government is constrained from seriously addressing its Constitutional obligation to "secure the well being of the people irrespective of sex, caste, creed or race by raising their standard of living..."

To make matters worse, a significant percentage of society due to ignorance and inculcation of bigotry in many schools, have acquired narrowed identities, become intolerant and are prone to violence against the other. This has created divisiveness and conflict in society which the latest research has shown, is inimical to development.<sup>8</sup> Such intolerance and violence also undermine the fabric of a community which Sir Muhammad Iqbal had envisaged could lead humankind to new heights:

*Urooj e khaqi e Adam kay muntazir hein tamaam,  
Yeh kehkashan yeh sitaray yeh neelgoon aflaaq*

<sup>6</sup>"Stunted", refers to a condition of chronic restriction of growth in height indicated by low height for age. "Wasted", refers to a condition of acute weight loss indicated by a low weight for height ratio. See, *National Nutrition Survey 2011*, Planning Commission, Planning and Development Division, Government of Pakistan, Conducted by the Aga Khan University, Supported by UNICEF, Islamabad, 2011.

<sup>7</sup>Martin Ravallion and Shaohua Chen, What Can New Survey Data Tell us about Recent Changes in Distribution and Poverty? *World Bank Economic Review* 11:2, 357-82, 1997.

<sup>8</sup>W. Easterly, J. Ritzen, and M. Woolcock, Social Cohesion, Institutions, and Growth, *Economics and Politics* 18 (2), 103-120, 2006.

The rise of earthbound man is awaited  
by these mountains, these stars, these azure skies

Allama Muhammad Iqbal  
[Translation mine]

The irony is that these features of poverty, deprivation, aid dependence and human underdevelopment prevail in a country with the world's largest contiguous irrigation system, along with over 40,000 megawatts of hydro power potential in its main rivers alone; the world's largest deposits of copper; possibly the second largest deposits of gold; and deposits of gas, oil and coal that are yet to be quantified.

Perhaps the richest and most underdeveloped resource of the country is the over 60 percent of the population who are young, with a rich genetic structure evolved over seven millennia in this crucible of civilisations called Pakistan today. Over the last seven centuries folk cultures have emerged in each of the four provinces in the Pakistan area which carry one of the great intellectual traditions of the world: a tradition of universal spirituality that seeks God through a transcendent journey to the heart, whereby a consciousness of love, tolerance and human solidarity is developed. After over four decades of teaching youngsters and three decades of dialoguing with poor communities, I can humbly testify, based admittedly on a small sample, that some of our youth are gifted and can be reintegrated with this great tradition of love and enlightenment.

Finally, the institutional structure of the polity and economy is such that apart from a small elite, most citizens are denied opportunities to fulfil their human potential and bring it to bear to contribute to the development of society and economy.

#### **IV. TOWARDS A NEW TRAJECTORY OF DEVELOPMENT: INCLUSIVE DEVELOPMENT**

##### **(1) The Historical Pattern of Institutions, Governance and Growth**

The time has come to examine the causes and the cure for this incongruence between the very idea of Pakistan and the human condition that has been shaped by post independence policies. The key question in this context is why Pakistan has not been able to sustain a high per capita income growth over the long run? Seminal research in the field of New Institutional Economics (NIE), by Douglass C. North., has shown that the distinguishing feature between the developed and underdeveloped countries is that the developed countries are able to sustain their per capita income growth over the long run, while underdeveloped countries are unable to do so.<sup>9</sup>

The characteristic feature of underdeveloped countries is that they grow in spurts. The gains made in the high growth periods are largely lost during the subsequent periods of stagnation when per capita income growth approaches zero. Thus per capita income over the long run does not increase substantially resulting in persistent poverty. Pakistan is a typical example.

<sup>9</sup>Douglass C. North, John Joseph Wallis, Barry R. Weingast, *Violence and Social Orders: A Conceptual Framework for Interpreting Recorded Human History*. Cambridge University Press, New York, NY, 2009.

The recent work of North, Wallis and Weingast<sup>10</sup> and subsequently by Acemoglu and Robinson<sup>11</sup> has shown that the fundamental factor that determines whether a country achieves long term economic growth or not is the kind of institutional structure it builds. An institution is defined as “a set of formal rules and informal norms that together with their enforcement mechanisms structure human interaction”.<sup>12</sup> Since rules embody incentives and disincentives for human behaviour, therefore institutions shape the behaviour of individuals and organisations, and thereby the performance of the economy.

The developed countries have an “open access” or efficient institutional structure. This provides opportunities for open competition and associated incentives for selection based on merit, hard work, efficiency and innovation. Hence sustained growth is achieved. Aghion and Howitt, the pioneers of endogenous growth theory, have empirically established that the greater the depth and range of innovations the greater the long term growth of a country.<sup>13</sup> The underdevelopment of countries by contrast is rooted in an inefficient institutional structure which restricts competition as a means of generating rents for the elite. By rent we mean unearned income which accrues when a person gets a return on an asset (including skill) that is greater than what it could have earned (opportunity cost) under competitive conditions. Such a “limited access” institutional structure has incentives for selection based on nepotism and lacks incentives for hard work, efficiency and innovation. Consequently sustained economic growth in such an inefficient institutional structure is not possible.

Pakistan’s pattern of stop-go growth is typical of an underdeveloped country. Central to the failure to sustain growth is that in Pakistan, political power of individuals is constituted through rents by establishing patron-client relationships. The ruling elites appropriate state resources for arbitrary transfer as rents to selected individuals and groups. The rent based model originated under the British Raj in the 19th century when resource gratification for the agrarian elites was used to garner political support. But this support was mobilised not to build power for individuals in the government but for British rule in general.

Post independence the governance model and the underlying institutional structure continue to generate rents, although in a variety of new forms and for a coalition of elites that emerged in the post independence period. This rent generation is achieved through the exclusion of the majority of the people from access over productive resources, capital markets and high wage employment. Consequently inequality is built into the process of economic growth. At the same time this inequality prevents growth from being sustained because the process of investment is restricted to a small consumption oriented, state supported elite: an elite that has so far failed to generate adequate savings or sustained high investment for long term growth independent of foreign aid.

The constrained competition characteristic of such an institutional structure while generating rents for the elite, creates disincentives for diversifying exports into high value

<sup>10</sup>*Ibid.*

<sup>11</sup>Daron Acemoglu and James A. Robinson, *Why Nations Fail: The Origins of Power, Prosperity and Poverty*. Profile Books Ltd., London, 2012.

<sup>12</sup>Douglass C. North, *Institutions, Institutional Change and Economic Performance*. Cambridge University Press, Cambridge, United Kingdom, 2004.

<sup>13</sup>Philippe Aghion and Peter Howitt, *Endogenous Growth Theory*. The MIT Press, Cambridge, Massachusetts, 1998.

added goods. Thus two key constraints to sustaining high rates of economic growth have emerged: (1) A low savings rate that has locked the country into aid dependence, and (2) A slow export growth that cannot keep pace with the high import requirements of a high growth trajectory. This proposition is demonstrated by the fact that every high growth period, (under Ayub Khan in the 1960s, Zia Ul Haq in the 1980s, Musharraf in the first seven years of the new millennium) has ended with a balance of payments crisis that has forced down the growth rate.

It is time to turn on its head the conventional wisdom that inequality is a necessary concomitant of economic growth. A change in the institutional structure is required whereby the economy is opened up to the middle classes and the poor to provide access over investible resources and high wage employment. By broadening the base of competition, investment, productivity increase and innovation, an equitable and sustained high growth could be achieved. Thus sustained high growth could be achieved through equity.

## **(2) Elements of a Strategy of Growth through Equity**

The process of placing Pakistan on a sustained and equitable growth trajectory would have three essential elements:<sup>14</sup>

- (1) Providing the middle classes and the poor access over productive assets, credit and equitable access over input and output markets. In the rural areas an equitable growth strategy would require undertaking a new small farmer growth strategy which would involve providing land to the tiller through the distribution of government owned cultivable land to landless tenants. This would be combined with credit to purchase land. This initiative should be backed up by establishing a Small Farmer Development Corporation (SFDC) owned by small farmers and managed by professionals. The SFDC would provide land development services, credit, technologies, training and market access to enable small farmers to achieve high yields per acre and diversify their production base for a sustained increase in their incomes. Such an initiative could unleash the considerable yield potential of the small farm sector (less than 25 acres) which constitutes about 60 percent of the total farm area and 94 percent of the total number of farms.
- (2) Mainstream the poor into the structure of the economy by facilitating the establishment of large corporations with 100 percent of the equity owned by the poor and managed by professionals. These corporations could be set up in the fields of: (a) milk, milk products, meat and meat products, for domestic and export markets, (b) marine fisheries for export markets, (c) provision of specialised services to the middle classes and the poor to reduce malnutrition and support the development of small scale industries. These services could include provision of hygienically safe products containing essential micro nutrients (e.g. yogurt, chicken meat and chicken feed); solar powered tube

<sup>14</sup>For a detailed exposition of the proposed equitable growth strategy, see: Akmal Hussain, *Strengthening Democracy through Inclusive Growth*, chapter in, Akmal Hussain and Muchkund Dubey (ed.), *Democracy, Sustainable Development and Peace: New Perspectives on South Asia*. Oxford University Press, New Delhi, 2014.

wells and household electricity supply in the rural areas; provision of drip irrigation technologies for small farms; training in the design, manufacture and marketing of embroidered high end garments manufactured by poor women; provision of training and marketing in the field of software development for the middle classes and the poor.

- (3) Universal provision of basic services such as education, health and social protection. The evidence shows that in countries such as in Scandinavia, Britain, Germany, China, the provision of these basic services has been a major factor in achieving long term growth. This is because these services have enabled a healthier and educated labour force with a greater motivation and commitment to state and society. These services have also enabled social cohesion which research by Easterly and others has shown is a key factor in long term economic growth.<sup>15</sup>

The argument by some economists that Pakistan cannot afford the universal provision of basic services is untenable. This is because the evidence shows that a number of countries with universal provision of basic services had a per capita income at the time of giving the commitment that was lower than that of Pakistan today: for example, Germany under Bismarck in the 18th century, Japan under the Meiji dynasty in the 19<sup>th</sup> century, Scandinavian countries in the early 20th century and China in the mid 20<sup>th</sup> century. Moreover the very commitment for the universal provision of basic services by the state provides the political basis for broad based taxation mechanisms to finance the provision of these services.

## V. CONCLUSION

The undertaking of this proposed strategy of achieving sustained and high economic growth through equity and the provision of basic services would not only create a more dynamic economy but a just society. When all of the people rather than only a few have opportunities to develop their talents, when they can undertake enterprise and conduct innovation in all fields, then the creativity of the nation could be unleashed and human progress achieved. Thus the people of Pakistan could build a bright future and in so doing contribute to human civilisation. This could help fulfil the vision of the founding fathers, Jinnah and Iqbal.

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<sup>15</sup>W. Easterly, J. Ritzen, and M. Woolcock (2006), *op.cit.*

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## *The Allama Iqbal Lecture*

### **Child Poverty and Economic Growth**

DAVID GORDON

I would like to thank the organisers and the PIDE for giving me the honour to present this year's Allama Iqbal Lecture on the subject of Child Poverty and Economic Growth and the opportunity to talk to such well-informed and distinguished audience.

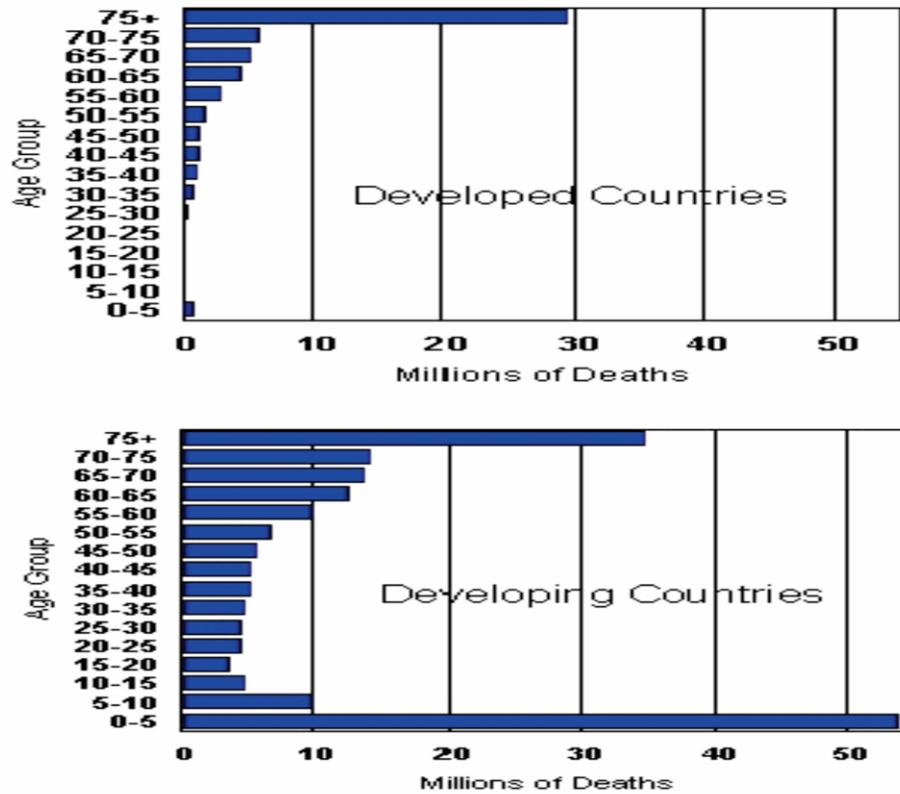
I believe that child poverty and economic growth is a subject that is rarely discussed but I think it is a crucial subject for the 21st century. I have only got a brief time to talk to you, so I will only be able to skim over the surface of many issues. If you want to go into a greater depth, there is a website for the Townsend Centre for International Poverty Research, where you can find more details about the issues to which I am going to talk.

Allama Iqbal was a great philosopher and a great poet and also one of the first people to translate some of the classic economic works into Urdu. He was also one of the ideological founders of Pakistan. In a famous letter he wrote in 1937, he set out his ideas about poverty and a need for a Muslim state. He argued that the question, therefore, is how it is possible to solve the problem of Muslim poverty and the whole future of the League depends upon it. He believed that there was a solution to the problem of Muslim poverty and that was the enforcement of laws of Islam and its further developments, and enlightened modern ideas. However, he came to the conclusion that in order for that to be successful, there needed to be a state of Pakistan. Therefore, in his mind, one of the key reasons for the need for a state of Pakistan was in order to provide subsistence to the people and this was the key way of achieving that.

Children are very important; they may represent only 45 percent of the Pakistani population but they represent the 100 percent of its future. Therefore, the issue of child poverty is key to the future of Pakistan. This rather dull statistical graphic (Figure 1), produced by the UN Population Fund (UNFPA), shows the world's greatest inequality. The top graph shows in 5-year age bands, the number of people who died between 1990 and 1995 in the developed countries of the world. Most of the people who died in the rich countries of the world, had reached the age of 75 between 1990 and 1995, 30 million people died over the age of 75. For the most part, they have had long and relatively healthy lives. However, in the developing countries of the world, where the 80 percent of the population lives, the chances of dying were not greatest when you are in old age but the greatest when you are a young child. Between 1990 and 1995, it is estimated that 55 million children died. In work published based on research, it is argued that the

underlying cause of the majority of those deaths was extreme poverty. The cause of those death were malnutrition, diarrhoea, pneumonia, and interventions costing less than US 1 dollar, would have saved most of these lives had the medical care been available. It is very hard to get an idea of the scale of this.

**Fig. 1. Age at Death by Age Group, 1990-1995**



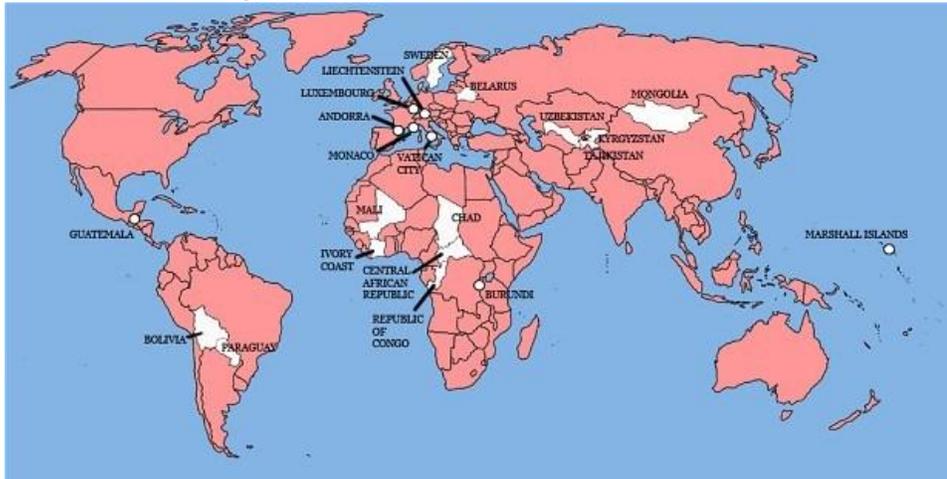
Source: *The State of the World Population 1998*.

The 20th century was the most violent and bloody in the world history. It started with the colonial atrocities in Congo, then there was the World War I, in which many people from the Punjab fought and died, the World War II, famines in China, purges in Russia, wars in India, Pakistan and Bangladesh, and the kinds of things that we learn at school. Everyone in the world knows about these terrible atrocities that led to so millions of deaths from newspapers and other media sources. However, what we often do not see in the media is the death toll resulting from poverty in children under five years of age. You can see that in 1990-1995, estimates plotted on the same scale, the death of the young children from poverty dwarfs the death toll from war and from atrocities.

Many of the long-term causes of those deaths are because of the very violent natures of the European societies, including the United Kingdom. This map in Figure 2 shows in red, all the countries that the Britain has invaded over the past 100 years. The colonial exploitations that followed these violent invasions is one of the underlying

causes of mass inequalities that we often see in the world today. Yet, it is often not realised the violent nature of the economy in the public mind. Even in the authoritarian countries, the economic nature of violence is often not perceived. It is the violence of the economy, which leads toward these child deaths. You can see some of the consequences. The figure shows the latest data from Pakistan on the targets for Millennium Development Goals (MDGs). Pakistan is to be congratulated that its first goal of halving extreme poverty was met several years ago, according to the national statistics. It is possible that by 2015, Pakistan may meet the goal of halving the proportion of people who do not have access to safe drinking water. Unfortunately, for all the other goals, it is unlikely on common trends that Pakistan would meet those goals by next year, which is only a week away. There is a lot of work still to do.

**Fig. 2. The Countries that Britain has Invaded**



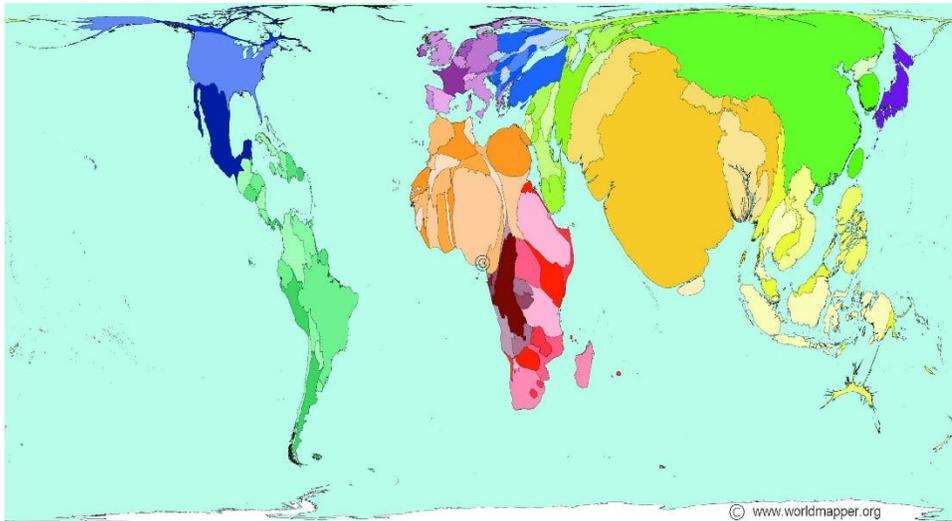
Source: Laycock, S. (2012) *All the Countries We've Ever Invaded: And the Few We Never Got Round to* London, The History Press.

If we look at the state of Pakistan's children, what we find is that about two-thirds of Pakistani children live in squalid living accommodation in dwellings with more than five people per room, which have a mud floor. This is from using the data released in 2012-13 from Demographic and Health Survey. In addition, a quarter of Pakistani children have no toilet facilities whatsoever, not even a hole in the ground. If they want to go to the toilet, they have to go to the bush or the fields and this can be dangerous, particularly for girls. Over 5 million Pakistani children are drinking water from open sources, such as rivers, ponds, or streams. Or they have to walk so far to get the water. It is not possible to take a 30 minute roundtrip to carry the 20 liters of water that is required to maintain health. About 5 percent of Pakistani children lack radios, telephones, televisions, newspapers, books, etc. at home. The only information they have is only that is available from family and community; they have no information otherwise about the outside world. Quite shockingly, a quarter of Pakistani children under five are severely food deprived, which is more than three standard deviations over the international reference mean. This is life-threatening levels of malnutrition. Although many of these

children would survive because of timely interventions, they are likely to be permanently—physically and mentally—impaired for the rest of their lives because this level of malnutrition have long-term health consequences. Sixteen percent of the children under five have never been immunised against any diseases whatsoever or had recent serious illness but did not receive any medical treatment. As far as we can tell from the survey data, they have never been in contact with medical services. And last but not the least, a fifth of Pakistani children of school age have never set a foot in a school. This is the current state of the children in Pakistan today.

If we look at the distribution of the world's children on a map which is called a cartogram (Figure 3), maps normally show the geographical size, a cartogram expands the size of a country based on a thematic variable, in this case the proportion of the world's children. What we can see is that most of the world's children live in Asia, particularly in the South Asian Subcontinent and in China. If we show the distribution of underweight children, what we see is that it is a particular problem for South Asia and Pakistan. Although many countries in the Sub-Saharan Africa are much poorer than India, Pakistan, and Bangladesh, the rates of malnutrition of children in these countries are much higher. This is often termed in the literature as the Asian Enigma, i.e. why should a country like Pakistan, which is relatively wealthy compared to Burkina Faso or Liberia, have higher rates of child malnutrition. The child malnutrition have long-term consequences for economic growth because if the children have poor health and their mental health is impaired because of severe malnutrition, then it is hard to get them to do well at school. Therefore, it has long-term consequences for the economic growth of any nation where the quarter of children are suffering from severe malnutrition.

**Fig. 3. Cartogram of the World's Children**



If we look at the 2010 data from the mix, for Balochistan, what you see in the green line is the international distribution of heights and weights for the international reference population of children. You would expect the Pakistani children to follow the green line but if you look at the figure, the children from Balochistan are three standard

deviations below the mean, to the left of this, children are at the risk of dying. It has long-term consequences for the economic development of that particular region.

How do we measure poverty? Why am I using these particular measures? How should poverty be measured in relation to human rights? You need a theoretical model of poverty in order to measure it and to test the validity and the model we use is one by one of my ex-colleagues, Professor Peter Townsend, the relative deprivation theory of poverty. He argued that poverty was to be defined as command over insufficient resources over time, if you do not have command over resources, income, and goods in kind over time, then you are poor and the result of poverty is deprivation. Therefore, deprivation is an outcome of a lack of resources.

The Human Rights Committee of the United Nations has argued that there is a minimum core obligation of human rights, which everybody on the planet, including every child and adult should have fulfilled. It is the responsibility of their governments to deliver these basic human rights. They argued that the state party, in which any significant number of individuals is deprived of essential foodstuffs, of essential primary health care, of basic shelter and housing, or of the more basic form of education is, *prima facie*, failing to discharge its obligations under the convention. They do not accept affordability as an argument for not delivering these fundamental core human rights. Every country in the world has signed up to these conventions and every country in the world has signed up to the United Nations convention on the rights of the child. These are not the Western values or Islamic values, these are universal world values to which every government and every person aspires.

In 2006, the United Nations adopted a definition of child poverty, which is the only international agreed definition of child poverty and all the governments of the world have agreed to this. Children living in poverty are deprived of nutrition, water and sanitation facilities, access to basic health-care services, shelter, education, participation, and protection. While a severe lack of goods and services hurts every human being, it is most threatening and harmful to children, leaving them unable to enjoy their rights, to reach their full potential and to participate as full member of the society. Again, this is Townsend's core inception of poverty and inability to participate in the society, which is unfulfilment of basic human rights.

People ask, when we measure child's poverty, why do not we use the World Bank's 1 dollar a day or 1.25 dollar a day poverty measures. There are a number of core reasons for doing this. First, little is known about the income and consumption needs of the children in most developing countries. Therefore, setting any income poverty threshold would be essentially arbitrary, given the current lack of knowledge. Household income-based poverty analysis usually assume equal share within the household and all the evidence we have from around the world shows that income is not shared equally between parents and children, particularly in poor families. Parents often sacrifice their own needs so that that their children do not suffer so much. The extent of child poverty is not just dependent on family income but crucially on infrastructure and services, such as health, education, and water supply. The extent of child poverty is not just about how much money your parents have but it is also about whether there is school, health care facilities, electricity, water, and sanitation. The internationally agreed definitions of poverty are all concerned with outcomes, the kind of deprivation outcomes that I have

already talked about, rather than the income. There are many technical problems with measuring income in poor families with children.

Therefore, many years ago for UNICEF, we developed a model in order to measure child poverty. We took the internationally agreed definitions of poverty that the Government of Pakistan and all governments have agreed to that poverty was basically severe deprivation of basic human needs in these key areas that are in the minimum core obligation in the international definitions of poverty. These include severe deprivation of food, water, sanitation, shelter, education, information, and access to services. Therefore, we ended up with eight dimensions of child poverty, which include three at the individual level, namely health, food, and education and the rest at the household level, which affect the child.

In order to err on the side of caution, to make sure the thresholds we used were so severe that no reasonable person would disagree with them, we took the internationally agreed thresholds on MDGs and we made them worse. Internationally, malnutrition is measured as being below two standard deviations but we use three standard deviations; safe water is taken as improved water source, we used open water sources; sanitation means improved sanitation, we use no toilet facilities whatsoever. Therefore, every single criterion we took, we used more severe level of measurement and yet we got tremendously high rates of child poverty. We constructed an index, using these measure and instead of using threshold of one, used the threshold of two again to err on the side of caution and when we did our initial work, we found that the third of children in the world were suffering from absolute poverty.

These methods have been used by UNICEF in most of the countries in the world. There was a global study, which involved 54 countries. They have been adapting and developing country-specific indicators in many other parts of the world. This was a recent report on Pakistan, which used these methodologies. If we look at the results for Pakistan from 2012-13, what we find is that child poverty in Pakistan is a largely rural phenomenon. It ranges from 60 percent in Balochistan rural areas to 4 percent in Islamabad. These kinds of break downs can be done for a whole range of variables. If broken down by languages, it shows how crucial it is to choose the right parents. If you are born to parents who speak in Urdu, you are unlikely to be poor. On the other hand, if your parents speak in Barhui, you possibly face the extinction of your community. Seventy-five percent of Baluchi and Brahui speaking parents have children who live in an absolute poverty.

There are surprises if you look at the child poverty in these very severe terms. There is very little difference in very severe and extreme child poverty between boys and girls, though one is slightly better off being a teenage boy than being a girl aged three. This is preliminary analysis but I suspect there is an overlap between all these categories. The relationship between child poverty and the number of adults and children in the household shows that more adults there are in general in the household, the lower the child poverty rates and more children there are, the higher the child poverty rates. This shows that you cannot just look at the numbers in the household when looking at the child poverty rates; you have to differentiate between adults and children. Another interesting finding is looking at the monogamous and polygamous households. Polygamy is often taken as socially beneficial, particularly in helping alleviate poverty but there are

little difference in the results of child poverty rates, when looking at the effect of monogamy, or polygamy, on the child poverty rates in Pakistan.

There are some key policy implications from this. A large number of children in Pakistan live in squalid conditions due to high rates of shelter, sanitation and water deprivation, particularly in rural areas. This has long-term consequences for their health and therefore their ability to be healthy and educated members of the workforce later in their lives. Severe malnutrition rates are very high in Pakistan and information deprivation is often missing from the policy agenda but it has key importance if you want well-informed population in the 21st century. The social protection programmes need to be expanded, particularly health and education programmes as many children in Pakistan have no contact with medical services and many never go to school. Child and family benefit programmes need to be introduced and expanded across Pakistan. They are relatively inexpensive and have been shown to be very effective at reducing child poverty. The pattern of severe deprivation varies within and between states in Pakistan. Therefore, different policy packages are needed in different areas to target the problems that are having the greatest harmful effects on children's lives.

What are the key reasons that people often argue that nothing much can be done as it costs too much to solve all these problems. However, what is often not discussed is the cost of not solving these problems. There are a very few good estimates on the costs of solving all these problems that I have been discussing. The first estimate that was produced by the UNDP in 1995 argued that providing basic education to every person in the planet would cost US \$ 6 billion per year for 10 years. In total, it would cost US \$ 40 billion a year for 10 years to provide all these basic social services, which lead to very high death tolls in children and very high impairment mobility tolls on the children. That is a lot of money but to put in perspective, it would cost US \$ 13 billion a year to provide basic health and nutrition to every person on the planet and in Europe we spent US \$ 12 billion a year on dog and cat food. We are not talking about a huge amount of money, we are talking about the dog and cat food budget of the Europeans in the 15 member states. These are easily obtainable, given the size of the global economy. It is important to remember that it is not the lack of money that is preventing these things from happening.

Of course, we are in an age of austerity. In 2008, everyone knows that banks gambled and lost. The top 50 banks before the financial crisis are a fraction of the value of these same banks after the financial crisis. The banks made a gamble and they lost vast sums of money carelessly. They lost more money than the equivalent of the GDP of the European Union and the United States combined. In order to stop the global financial system from crashing, huge rescue packages were required. For example in the U.K. the rescue package was almost equivalent to a 100 percent of the US GDP and similar in the US. This leads to indebtedness in many of the Western countries, i.e. in the big economies of the world, which consequently lead to a global recession. One of the reasons for this crash was the political economy reason that the share of income that has been going to population has been declining since the 1970s. Thus, in 1970 in the rich countries of the world, labour got about 57 percent of the national income, which by 2000 had fallen to 50 percent. If the world is producing more and more and the amounts of money going to the population is getting less and less, the only way the population can keep buying the goods, and therefore keep the engine of capitalism going, is if they become indebted.

When this increase in indebtedness happened in the late 1970s and the 20th century, it finally came off the rail and led to the financial crash.

In the Western countries, the population gets a higher share of the national income than they do in the other parts of the world. In Sub-Saharan Africa, the population only gets 30 percent of the national income, which is one of the reasons that there is more poverty in Africa as compared to what there is in, say, Europe. It is not just because of economic growth and that there is a bigger pie in Europe, but also because the population in Africa gets less of what there is. Indeed, Pakistan was not immune to this global financial crisis, which is shown by the economic misery index for Pakistan, which is basically inflation change plus unemployment, between 1972 and 2012. The economic misery in Pakistan has been increasing since 2008. It is strange that when employment and inflation are increasing so fast in Pakistan that income poverty still ceases to be fuelling according to the national statistics; when employment and inflation go up, poverty also tends to go up.

There have been a number of attempts to work out the long-term costs of poverty. According to a World Bank estimate, the school dropout in Uganda cost about 34 percent of its GDP and 3 percent of GDP is lost in India because of teen pregnancy. The World Bank argues that investing in children and youth is smart economics. The countries that produced skilled, healthy and productive workforce are in a better position in the global economy to achieve economic prosperity, political stability, and social well-being. Some models to estimate the cost of child poverty are fairly crude but there are also sophisticated models used in some other countries. A rather conservative econometric model from the U.K. looks at the costs in terms of social spending needed because of child poverty and also the lack of future income the poor children will achieve in their adult lifetime. The poor children tend to do worse in school, they do not get good education and qualifications and therefore they tend to get worse jobs that have lower pay.

This model looks at what will happen if we raise the children who are poor from below the poverty line to just above the poverty line. What it finds is that the cost of child poverty to the U.K. economy is about 25 billion pounds a year, which is 2 percent of the GDP. Because the child poverty has increased recently in the U.K., this cost has been basically estimated from the last year to be 29 billion pounds a year. The cost of eradicating child poverty in the U.K. is an equivalent order of the magnitude and getting rid of the child poverty and keeping it that way costs about the same in terms of economics. Of course, getting rid of child poverty has many other social benefits. Similarly, there are models from the U.S. and there is more child poverty in the U.S. It is estimated that the cost of child poverty in the U.S. is 4 percent of the GDP. In Ontario, Canada, the child poverty is estimated to be from 5.5 percent to 6.6 percent of GDP. In all of these countries, the cost of eradicating child poverty is the same as the cost of keeping it, or less than the cost of keeping it.

So, why do not the governments do it? The problem is that obviously investing in the children is a good idea because you will have huge economic returns if you reduce child poverty, the reasons governments do not do is that you have to spend the money today and you get the benefits in fifteen years time when the children grow up. In other words, governments do not like to think long-term. The economic case for doing it,

however, is very sound. The World Bank and many economists argue that in order to achieve economic growth, you need healthy and well-educated population in order to be competitive in the global market. The Preston curve shows how the relationship between GDP per capita and life expectancy for 2000 shows that small increases in GDP per capita leads to large increases in life expectancy. However, when you get to the levels of China, increases in GDP per capita, have less effect on life expectancy. These kinds of analyses have often lead people to argue in the world that health equals wealth. If the country is healthier, it is wealthier, will go for economic growth and all the problems will disappear. The U.K. in history is often cited as an example of that. The U.K. was the first country in the world to have the industrial revolution, and there were tremendous increases in health during the 19th century.

That story, however, is not quite correct. Analysis by economic historians at Cambridge has shown that between 1820 and 1870, the height of the economic boom and industrial revolution life expectancy in England and Wales did not change at all. In the cities, where the economic boom was going ahead, life expectancy actually fell. It is only after the industrial revolution happened that life expectancy began to rise rapidly. They also argued, why did Britain have the industrial revolution and not the other countries because Britain was hardly cleverer than other countries and it certainly was not the world's biggest or the brightest economy, France and the Netherlands had much bigger economies. What they argued was that because of historic circumstance, England had an effective social security system from 1601, the old Poor Law, which broke the link between famine and starvation. This allowed the peasants working on the land to take the chance of moving to the cities in order to look for better jobs. If things did not work out, they knew they and their families would not starve because they could rely on the Poor Law to prevent starvation. Therefore, the social security system, which cost about the 2 percent of the GDP, allowed mobility of the rural population to go to the urban areas. As a result, when the technology of the Industrial Revolution came along, there was already an urban workforce in the United Kingdom, which did not exist in the Netherlands and France, which were still largely rural. That is why Britain benefited first from these technologies. The lesson of British history, economic historians argue, is that if you want economic growth, you often need social security system in place first and not after.

If we look at the Tiger economies the ones that grew the fastest in the second half of the 20th century, we find that they had a very low level of development, instigated developmental welfare state policies to have healthy and well-educated populations. Therefore, Taiwan, Indonesia, Malaysia, Philippines, South Korea, China and Thailand all brought in the second social insurance law that extends the insurance to the population rather than to just the elites and the military when less than half of their workforce was working in the urban area and the majority of their workforce was working on the land. This is in contrast to the 19th century European experience where they waited until urbanisation to take place before social security coverage was expanded. The countries that expanded social security coverage and invested in the health and education of their populations had rapid economic growth in the second half of the 20th century.

Excessive inequality has become a defining in economics recently. President Obama says that inequality is the defining issue of our time and according to the Director of the IMF, Christine Lagarde, excessive inequality is corrosive to growth; it is corrosive to society. The

economics profession and policy community have downplayed inequality for too long. And the economist at the IMF said, we find that longer growth spells are robustly associated with more equality in the income distribution. Reduced inequality and sustained growth may thus be two sides of the same coin. So, you can economic growth for short periods by doing a whole range of things but to sustain it, you need reduced inequality.

The IMF researchers have recently in 2014 looked at the effects of inequality and redistribution on economic growth and what they find is that increase in inequality just from the 50th to 60th percentile, or GINI coefficient deteriorating from 30 to 42, reduces growth in all the countries they have studied by about half a percentage point, on average. On the other hand, redistribution by the about the same amount increased growth by about half a percentage point. One of the key ways of redistributing and alleviating poverty and therefore getting the economic benefits that it brings is through the ILO social protection programme. This is an international agreement from 185 countries, not just the Government of Pakistan but between the workers organisations and the employers. It provides universally agreed guidance on how to set up social security guarantees, which is one of the most effective ways to alleviate poverty. Some people argue that inequality is natural. The argument is that we all have different natural endowments and therefore inequality is inevitable. I will leave you with the words of one British scientist who knew a lot about the laws of the nature. "If the misery of our poor be caused not by the laws of nature, but by our institutions, great is our sin". Charles Darwin.

## *The Mahbub Ul Haq Memorial Lecture*

### **Global Multidimensional Poverty Index**

SABINA ALKIRE

Ladies and gentlemen, and friends, Asslam o alaeekum! It is really a joy and an honour to be here at the PIDE Conference and also to be able to speak in the lecture that carries the name of Mahbub Ul Haq. I was honoured to do the doctoral fieldwork affiliated with the Human Development Centre (HDC) in Islamabad. I did my D.Phil fieldwork in 1996 and 1997 and of course then participated in the activities of the HDC at that time. It was really the vision of Mahbub Ul Haq, his eloquence, passion and commitment to the work, which gives one a sense of gravity and a sense of potential importance of gathering communities of people to debate issues about which we perhaps do not agree but which are so important to the society. I hold that memory very much in the mind.

What I would do today is to speak a little bit about multidimensional poverty not as an end in itself but, as we have heard in all of the presentations in this Conference, as the reason to address poverty, inequality, or inclusive growth to use the tools of our trade as agents of change. I begin with the quote from John Dreze and Amartya Sen that positive change have often occurred and yielded some liberation when the remedy of ailments has been sought actively and with vigour. I think one of the distinguishing features of the academic conferences it that we get space and time to really try to crystallise some of the issues that lies at the heart of these topics.

First of all, I would set forth very briefly the methodology that we have developed and explain it using the example of a global multidimensional poverty index (MPI), which we compute this year for 108 countries. Then I will go down to the level of national context and address the nine reasons for which national governments are trying to build official national multidimensional poverty measures, which like national income poverty index are adapted to the their context, to the survey instruments, and to the policy priorities, so that they carry more of the texture of the debate and the values of those societies. I will also share briefly about a network of countries that are exploring, or are developing, or have developed such measures. I will also give in particular the case study of Colombia, which released its national MPI in 2011. At the end, I will share a little bit of draft MPI, which has been cooperatively developed by many and is under discussion in Pakistan.

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If you begin by thinking simply about income poverty, the word poverty can either mean income poverty or different deprivations that batter poor people's lives at the same time. It is a matter of terminology and preference how you define the particular word poverty. Some people use disadvantage or deprivation for a multidimensional concept. Let us begin by thinking about income or consumption poverty. As you will know, there are at least two main types of such poverty measures. One is internationally comparable, which is \$ 1.25 a day poverty measure, which is used to compare 112 developing countries at the moment, using data from 2000 to 2010 and the figures are released by the World Bank. The advantage is that it can affect comparisons, so it is meant to catalyse healthy competition, cross-learning and also some evaluations of comparative contexts.

In a similar way, there can be a global MPI, or a multidimensional poverty index, which can be compared across different countries. The MPI published by UNDP is one example of this, which we have produced over time for a 115 countries. However, clearly the policy energy of any country is not aimed at reducing \$ 1.25 a day poverty and measures that are produced in Washington, D.C. Rather, at present they are focused on national measures of poverty, whether these are income or consumption measures. Nearly every country has their own national income poverty measures, which are also reported by the World Development Indices. They are also now one of the proposed targets of the sustainable development goals. In a similar way, it is also possible to develop national multidimensional poverty measures, where the specifications reflect the national definitions, policy priorities, priorities of the communities and other voices, as well as the data limitations and possibilities. As we will see, perhaps these can complement the monetary measures of poverty and used for policy.

Therefore, there are two different measures—the global and the national. I will begin with illustrating the methodology of the global but spend most of the time speaking about the national measure. The first step, and in a sense a key step, in defining any measure is to select the relevant parameters. In the multidimensional sense, this means a number of dimensions, or organising concepts; it means a number of indicators, which are columns in a matrix that you are going to work with in identifying who is poor and creating the poverty measure. For each indicator, you also define a deprivation cutoff. Thus, in the case of global MPI, there are three dimensions, which are health, education and living standard, which are equally weighted. Also, there are 10 indicators. You are deprived in nutrition, if any member of your household is malnourished; in child mortality if a child has died; in years of schooling if no member of your family has completed 5 years of schooling; in school attendance if a child is not attending school at the age at which they would complete class 8; you are deprived if you cook with dung, wood, or charcoal; if you do not have improved sanitation by Millennium Development Goals (MDG) definition, or if it is shared; if you do not have safe drinking water by MDG definitions, or have to walk more than 30 minutes to obtain it; if you do not have electricity; if you floor is dirt, sand, or natural; and if you do not own more than one of a set of assets, which are radio, television, telephone, bicycle, motorcycle, and refrigerator. If you own a car or a truck, you are not deprived in assets.

This is, in a sense, the structure of the multidimensional poverty measures. These indicators can vary and, as we will see, they do vary in countries. What is distinctive about this methodology is that rather than beginning with the aggregate averages of these

10 indicators, we begin at the individual or at the household level. The global MPI uses the household level. For example, Natalie, a 20 year old woman in the northern Ares of Cameroon is deprived in both health indicators and in all six living standard indicators and her weighted deprivation score is 67 percent, or two-thirds. This enables us to see the situations that Duflo and Banerjee describe in their influential work. These are complicated, overlapping, rainstorm of deprivations that people experience together because responses to those very deprivations are interconnected and are also often need to see the different profile of deprivations.

However, we are also working with the very real data - data which are often messy and where preferences vary, the climactic conditions vary, and data accuracy varies. Therefore, in the case of global MPI, for example, we do not consider that any single deprivation constitutes poverty. If we would, more than 90 percent of the people would be poor in over 40 countries. Rather, we identify a person is poor if they are deprived in some proportion of these weighted indicators, which in this case is the third. Therefore, Nathalie is poor because she is deprived in one-third of the weighted indicators. On the other hand, if they are not, we do not consider them poor and we do not take into account their deprivations in the measure. Technically, we run this measure for every value of deprivations.

The MPI, then, is a very simple poverty-gap style measure, which is computed as the follows. It is the percentage of the people who are poor because they are deprived in one-third, or more, of the indicators at the same time. It is then multiplied by a new figure, which is called intensity. The intensity is the average proportion, or average percentage, of the deprivations that poor people experience in that country. The formula is given by  $MPI = H * A$ . It is adding this new term 'A' to the longstanding practice of the accounting tradition, which gives this measure some very desirable properties. This methodology I was happy to develop with James Foster and therefore, very naturally, it is an extension of Foster-Greer-Thorbecke (FGT) set of indices. Because we are adding a new factor of intensity, we are able to break the indicator down into a set of consistent partial indices for each of the 10 indicators. Just like the FGT is the mean of a censored vector, the MPI is the mean of a censored matrix. There are other consistent indices that can be computed if data are cardinal. However, when we are working on poverty usually many indicators contain ordinal or even binary data. Consequently, we stick with the  $M_0$  (ordinal data) formulation. This naturally satisfies a number of desirable axiomatic properties, which we could speak about but the ones that I will show are subgroup decomposability and subgroup consistency and also dimensional break down disability after I identify the poor to break down the poverty measure into the consistent dimensional indices.

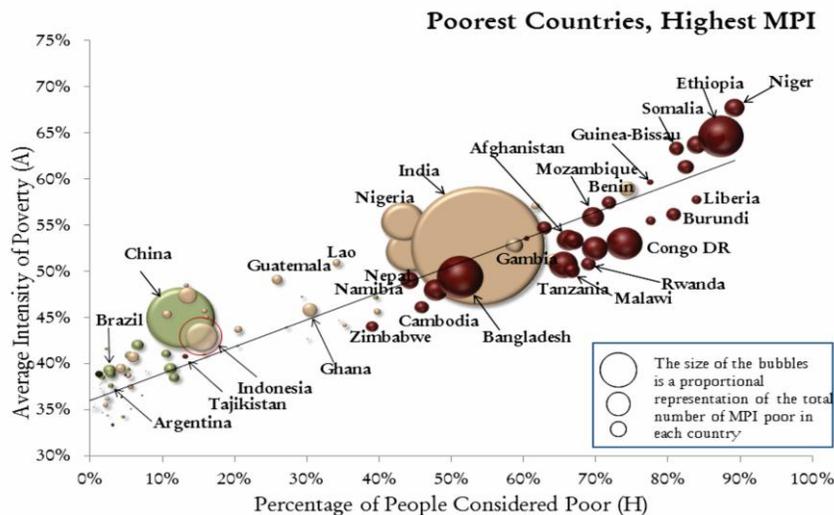
That was a very simple overview of a global MPI. By that global MPI of the 5.4 billion people who are citizens of those 108 countries, 1.6 billion, or 30 percent, are poor. However, the headcount varies from 0 percent to 89 percent in the poorest country of Niger. In the 43 sub-national regions, the headcount is above 90 percent. Of those 1.6 billion people who are poor, 52 percent of them live in South Asia and 71 percent of them live in middle-income countries. Therefore, these kinds of very crude comparisons can be made with the global measure and this does have at the moment some play; it is proposed as one of the Sustainable Development Goals (SDGs). For textured policies, however, we

have to do much better than that and really go in to create measures that reflect the values of each society.

Given that, I would like to present rather a hodgepodge of reasons why it can be useful to have a national multidimensional poverty index alongside, not replacing but complementing, a monetary poverty measure. One is to give a bird's eye view of the overlapping non-monetary dimensions of poverty. The Stiglitz-Sen-Fitoussi Commission in 2009 report, speaking about the quality of life acknowledged that while assessing the quality of life requires a consideration of plurality of indicators, there are strong policy demands for having a one number that journalists understand whether the poverty changed over time, how, and where. The second reason, as I mentioned before, is that we need a measure now that shows the overlapping deprivations, or the joint-distribution of disadvantages, that people experience. That, I think, is recognised by many as being the signal value-addition of this particular approach to multidimensional poverty measurement.

The third reason for the economists is that it is quite familiar. You will know the Foster-Greer-Thorbecke class of measures and this is very much like the poverty-gap measure, i.e.  $H * I$  was the headcount times the gap, mentioned both in Sen (1976) and Foster, Greer, and Thorbecke (1984). This is a straightforward extension in a three-dimensional space of this gap to look at the dimensional shortfall, or breadth of deprivations. The fourth reason is the one that starts to come near to policy and that, in a way, derives from the additive linear formulation of the index. We can speak about why, and I am sure we will, we have not curved it. It has to do with very policy relevant priorities of how it can be broken down.

First of all, as I said, the MPI gives one number that can be used to make comparisons over time between regions or districts. Second, clearly it is made up of the headcount and the intensity and so we can report the headcount and the intensity for each country. The headcount is, of course, for the journalists' understanding. In Figure 1 below, we have 108 countries lined up with Niger, the poorest on the right hand side. The countries are lined up by the headcount ratio and the height is the average intensity.



A lot can be learned from the fact that the poorest countries also have the highest intensity, which implies that each poor person is poor in a larger percentage of deprivations at the same time, which is a sad finding. Different regions, countries, and different levels of income can also be compared using this measure. These are shaded according to income status of the countries. Going further, we can disaggregate a national measure sub-nationally. This is shown as for global MPI but it can be done nationally. The MPI can also be broken down by 10 indicators to see the national profile of poverty, which kinds of indicators have contributed the most, and where there have been statistically significant changes over time in each of the component indicators as they have affected the poor populations. Finally, these different analyses can be combined and look sub-nationally at the composition of poverty, how it is evolving over time. This enables the measure to be used as a tool for policy coordination and use. For example, Mexico was the first government to release a national MPI in 2009. It has from 2009 released figures at the state level. Now it is the state governors who are really trying to understand the poverty profiles and work to reduce them most proactively.

Therefore, this tool can be a communication device between the different layers of the institutions. Finally, for people who are interested in this, there is an academic literature around this, which is developed. There is also a book, which we are very honoured to be able to produce and it will be published in June 2014. It is a very systematic treatment of multidimensional poverty comparisons, which also includes methodology, systematic both in theoretic and axiomatic properties. It also discusses empirical working, treatment of the data, standard errors of regression analysis, and changes over time in inequality among the poor. It also reviews other methodologies that have been implemented. It tries to give all of us, working in the area of multidimensional poverty, a bag of tools so that we understand which techniques to use when. However, it does not try to say that one technique can do everything because it cannot.

A sixth reason, which is certainly developing as the empirical literature comes forward is how the MPI differs from the income poverty measure in terms of policy change. Philippines released its official MPI in 2013 but they used data are from its release and they it calculated back to 1988. From the year 2000 to 2009, Philippines have been growing strongly but the income poverty was static, which is partly because they had allocated considerable fiscal expenditure to the social sectors. Therefore, MPI in the case of Philippines was able to show the effect of growth on the other eye of poverty. If the income is the one eye and the other dimensions of the poverty are the other, then you have a 3-D perspective to show different kinds of policy changes and their effect on poverty.

There are a suite of robustness tests that look for the poverty cut-off and standard errors, then you can do a kind of a dominance test for changes over time and changes across regions for all values of the poverty cut-off. The comparisons between Colombia and Philippines, for example, enable us to understand how sensitive different rankings of regions, for example, are to changes and specifications of the measure. Similar tests are done for the weights, for the choice of indicators and for the associations—the redundancy or similarity—among the indicators within each measure.

The eighth reason is perhaps the first time that I was surprised. The reason is an empirical one and it is that what we have found through the empirical work is that the

measure does complement income poverty in a surprising way in that it does not identify the same people as poor. For example, Bhutan's national MPI for 2013, which was first released in 2010, shows that the incidence of poverty was 12.7 percent in Bhutan. Bhutan's national income poverty measure identified 12 percent of the population as being consumption poor. However, in the case of Bhutan, both of these variables came from the same dataset, so we could cross to see who is poor in both the measures. Therefore, both the measures give roughly the same results. But what we found was that only 3.2 percent of the population was poor by both measures, and three-quarters of the income poor were not multidimensionally poor and vice versa. This is a call for anthropologists and sociologists, to please explain this phenomenon to us whether it is the seven day recall, lumpiness of consumption, addiction, or is it people having good or bad shopping patterns. We need to understand much more but at least this is bringing new information into the problem. We have done this now on 15 or 16 datasets for different countries and we always get surprising magnitudes.

This draws on larger European literature, which predates us. For example, in Table 1 below, these are chronic poverty numbers and chronic material deprivation numbers for nine European countries. The table shows that on average 20 percent of the people were income poor, 20 percent of the people were materially deprived, but only half were both, even though both deprivations were economic.

Table 1

*Distribution Across Combined Income Poverty and Deprivation  
Persistence Variable by Country*

	Neither Persistently Income Poor nor Deprived	Persistently Income Poor Only	Persistently Deprived Only	Persistently Income Poor and Deprived
Denmark	82.8	6.9	8.9	1.4
The Netherlands	78.8	7.1	7.3	6.8
Belgium	73.0	9.3	8.8	8.9
France	70.8	11.6	8.5	9.0
Ireland	64.8	11.4	9.7	14.0
Italy	68.8	9.2	11.3	10.7
Greece	68.8	11.2	9.9	10.1
Spain	72.7	9.2	8.7	9.4
Portugal	64.5	12.0	11.3	12.2
All	70.7	10.4	9.2	9.7

This overlap motivated Europe's move in 2010 to multidimensional poverty measure. All the countries look sub-nationally at the income and multidimensional poverty ranks. It is quite interesting in the case of Bhutan that the poorest district, Gasa, by multidimensional poverty, was the least poor by income poverty, which is quite a stark contrast. It was because they had these caterpillars, which gives them great income. However, it is a 15-day walk from a road and they do not have electricity, health, or education facilities.

When these changes happen over time, it does animate the discussion quite a bit. In the case of Mexico, for example, when they updated their measure in 2008 after the financial crisis, being neighbour of the U.S. subject to exogenous shock, both in terms of

the income poverty and food prices, they saw a rise in their income poverty and a rise in their food security. Nevertheless, they were able to show that, using their multidimensional poverty measure, which includes income, in 5 out of 6 social dimensions, social policy had effected a reduction in poverty, despite the exogenous shock. Therefore, it gives us a more nuanced picture.

The final, and the ninth reason, is that although it can be a bit concerning that it might confuse the press to have two poverty measures, or to have income and other dimensions of poverty together. These countries that already have official poverty measures have found some kinds of efficiency in their communication with the press. These are some of the reasons for using multidimensional poverty measure. I share them because not they are necessarily definitive but just because they have come out from the partners that we work with as we are learning more and more about how to use measures effectively and to, of course, address poverty and not just for the sake of measurement, and publication.

At the moment, four governments have official national MPIs and more will be launched soon. The Ho Chi Minh, Vietnam, will be the first city to have city measure of MPI. I would like to share just one example of Colombia. Colombia has two measures, the income measure, as Latin America uses income measure, and the multidimensional poverty measure. They describe income poverty measure as the indirect channel of poverty reduction through growth. On the other hand, they describe social protection and the MPI as reflecting the direct channel of fiscal allocation, proactive social policies, conditional cash transfers and geographical targeting. They have established both the MPI and income poverty as the official measures and they combine them. The MPI is used for two primary purposes, which are monitoring and measuring. Measuring is done by their planning commission, which is called Departamento Nacional de Planeación (DNP). The monitoring, on the other hand, is done by the President of Colombia, which is the same situation as in Mexico. In Mexico, the president has advisors and they use MPI to coordinate and monitor progress. In the case of Colombia, they have 15 indicators that reflect their national plan, which means that they have a national plan with political will behind it. They simply took the national plans, used the deprivation targets to set the deprivation cut-offs. They use the measures as tool towards realising their national policy. They had problem in their income series and around that time, they moved towards multidimensional poverty measure. They are able to compare the trends, both in income and multidimensional poverty. Because the statistics office of Colombia had a problem with income series, there was some concern about the poverty numbers and it helped to restore the confidence.

Colombia uses the MPI for policy in four ways. One is to look at the objectives from the social policy, the other is monitoring, and the third is for coordination. The last one is interesting and which is to provide alerts on annual basis as they have an annual survey to update it and it affects allocation in the next year. Therefore, they use MPI for targeting, for deciding what to put in their targeted programmes, and for setting the parameters of graduation from conditional cash transfer programmes. They also have public-private sector partnership where they make the results of the MPI available online on a social map. The private sector has been very proactive in investing in different regions where they have factories, manufactories or services to do their bit for common social good.

The case of Colombia shows how they use the alerts. For example, in 2010 there were problems with school achievements, income generation and early childhood care, so they had some responding policies in terms of tuition fees and a strategy for childhood care. In 2011, there was a housing problem, so they looked at the subsidised housing solution. In 2012, there was urban-rural gap, so in 2013 they had higher investment in CCTs in rural areas. This gives the idea that how Colombia is using MPI for policy intervention.

These four countries are part of the network that was launched in 2013 in Oxford, to which Pakistan pertains. The launch was marked by participation by President Santos of Colombia and the lecture by Amartya Sen. In the last meeting in Berlin, the participation doubled to about 32 countries. This also includes China, which has targeted 90 million people using MPI. The network also includes institutions, including Islamic Development Bank, OECD, the SDG actors, and a number of other countries. These groups are creating peer network with ministers, or vice ministers, participating from each country as well as statistics offices, which is very useful in helping to translate the numbers into policy.

Finally, on behalf of a much larger group, I will share a little bit of early ideas on MPI in Pakistan. Regarding the process, we did a two-week training in March 2015 in Islamabad in which a number of participants from different institutions and provinces, and both academic and government agencies participated. The participants were of very high calibre and highly motivated and it was impressive what they managed to learn and accomplish within a very short time period. Both before and after the training, there was a development of candidate measures using the district waves of the Pakistan Social and Living Measurement (PSLM) dataset. The selection of indicators was first done on 47 indicators that could be had from the dataset and shortlisted those that seemed to be coherent with the emerging Vision 2025. Early results were presented in April at a national conference, with UNDP and the Planning Commission co-organising it. The trial measure was refined from input in that conference. There have also been consultations in Karachi, Lahore, and Peshawar and there will be others. I believe that the plan is to have a national conference to conclude the MPI design, which is very much the work of the Planning Commission and the UNDP but it has certainly been a privilege for me to be a part of this process.

In terms of this trial measures, there are three dimensions, namely health, education and living standard. There are 15 indicators for the case of Pakistan, four for health, four for education, and seven for living standard. The weights are equal across dimensions and variable across the education and health indicators, with the living standards being equally weighted. In the case of education if no male over 10 years has completed 5 years of schooling, the household is deprived; if no female over 10 years of age has completed 5 years of schooling, the household is deprived; if the school aged child from 6 to 11 is not attending school, or if the child is not attending school because of the quality issues, or if is attending but dissatisfied with the service, then the household is deprived. Thus, we have a preliminary variable on education quality, with a lighter weight because of the self-reporting nature. In terms of health, household is deprived if it does not use the health facility or use only once in a while and that is due to access constraints, it is too far, it is too costly, lack

amenities or staff, or does not have enough services. There are also three, light-weighted indicators that refer to sub-sections of the population, which are immunisation, antenatal care, and safe delivery.

If the walls of the house are made up of mud, *katcha* bricks, wood, or bamboo then the household is deprived in housing; if there more than 4 persons per room, they are deprived in housing; if the water does not meet MDG standards, or is away more than 30 minute round trip, the household is deprived. Similarly, for sanitation, for lack of electricity, and lack of clean energy indicators are developed. The asset index incorporates land and livestock, as well as small and large assets in order to make this relevant in rural areas.

That is the structure of the index. Very briefly, the trends show that the MPI decreased each year for all poverty cut-offs. The decrease in headcount ratio is statistically significant, not from 2004 to 2006, but from 2006 to 2008 and 2008 to 2010-11. The MPI changes are not statistically significant in the intervening years though across the periods, there is a significant decrease, which is for all values of  $k$ , choosing a  $k$  of 33 percent, which means that a person is deprived in one indicator. It should be noted that we have computed for the range of all of the relevant  $k$ 's. We can see that in many indicators, there has been a reduction in the indicator-specific deprivations but not perhaps in the health indicators to the same extent.

Comparing rural and urban areas, unsurprisingly, rural poverty is far greater than the urban poverty, in 2010-11. Regarding composition of poverty, the educational deprivations, access to health facility, and cooking fuel have the largest contribution to overall poverty at this moment, given the structure. Without any surprise, although Baluchistan is home to only 5 percent of the total population of Pakistan, it is by far the poorest of the provinces, not only in 2010-11 but also in each of the other periods. Nevertheless, thankfully, Baluchistan did reduce poverty in the 7 year period covered. Finally, as I talked about the distribution of countries across very different MPIs, but it was interesting given the conversation on inequality, when I decomposed PSLM by districts, we also see a great variation between districts from 4.8 percent headcount in Islamabad to 96.6 percent in Dera.

This is an indicator for discussion, for criticism, and for exchange. It is by no means perfect and it is limited by the datasets, and we need to have comparability across time, but it may at least introduce some of what this methodology could contribute. That has been really what I wanted to share, including a little bit of methodology, how an MPI is constructed, and using the global MPI that can be compared across countries. But what I really wanted to focus was on national MPIs and how these add value to an income poverty measure. If you get something in your eye and have to put a patch on your eye, then you only see without depth. It may be that if we only look at income or only non-income dimensions, we do not really get the full 3-D insights into poverty. Therefore, perhaps it is by using both monetary measures, be it income of consumption, and looking at the other dimensions that we get a bit of a more balanced view of both of the levels and of the changes and comparisons across time. I would like to offer MPI, perhaps as a small step in a long journey and little by little, step by step, we can make incremental progress.

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### Comments

Let me start with a disclaimer—I am not someone who calculates poverty, or even works on poverty per se. But as a Chinese proverb go, “bystanders see clearer than players”, I’ll try to make use of this outsider’s advantage that I have by not being a player in the whole poverty debate. A debate that in recent years has become less academic and increasingly unpleasant. Poverty is as much an economic issue as it is a social or political one. In recent years, however, the discourse over poverty has drifted more towards raising doubts about the credibility and reliability of the official poverty numbers, and the methodology used to calculate it, than on actually dealing with reducing poverty. Only time can tell if the Multidimensional Poverty Index, the MPI, proposed by Dr Alkire and her team, resolves the controversy surrounding poverty estimation but it shares some of the same issues that make other methodologies questionable.

The basic problem confronting all researchers measuring poverty is how to define poverty. Traditionally poverty has been defined in terms of some monetary measures of income, like the World Bank’s \$1 or \$2 per capita per day but inevitably such simplistic measures were bound to be questioned. What about the nutritional requirements, health needs, housing demand, educational wants? The calorie base approach took care of the nutritional requirements but ignored the others. The *cost of basic need approach* is the nearest any measure has got to include many factors in measuring poverty while using an income-based or money metric approach, but to some it still does not capture many non-income dimensions of poverty. The MPI is one such metric that attempts to measure poverty through its non-income dimensions.

The MPI is sort of a mirror image of UNDP’s HDI. While the HDI increases as development indicators improve, the MPI goes up as the value of the deprivation indicators increase. Apart from looking at the reverse, the HDI after years of improvement is a much better measure of estimating human development than what MPI is at present in measuring poverty. As we just saw, the MPI groups together 10 indicators, mainly picked up from the MDGs, in three categories to measure poverty, that is health (expressed by child mortality and nutrition), education (gauged by years schooling and child enrolment), and standard of living (that includes access to electricity, safe drinking water, improved sanitation, flooring, cooking fuel and some basic assets). Along with the fact that there are many other important non-income dimensions, like decent employment, social positioning, empowerment, protection from violence and conflict, access to public services, that are linked to poverty but not included in the Index, there are issues with the variables that are included as well, especially the way they are constructed. Some of my concerns are:

- (1) Given the very nature of the indicators, the poverty rate for any region would hardly ever increase. Any country or region had to go through a prolonged period of socio-economic downturn for its MPI to increase.

- (2) The MPI is unlikely to respond to economic fluctuations. The ten indicators included in the MPI would not capture the impact on the poor of economic shocks, like the food inflation in Pakistan experienced in the later years of the last decade. Despite the economic crunch the poverty levels would show a consistent trend because most of the indicators in MPI would not be affected in the short term.
- (3) All the methods being used to measure poverty or to decide upon the poverty line are riddled with theoretical and statistical assumptions, and data caveats but the weights assigned to the selected indicators in the MPI are too discretionary, and no objective rationale is provided for giving similar weights to very different factors. The Alkire Foster method does give the option of using different dimensions, indicators, weights and cut offs to measure poverty in different societies and situations but that only makes the measure even more discretionary, and open for misuse.
- (4) The dichotomous values given to the ten selected indicators do not seem to be a useful idea. Like for education, what if some children in the household are going to school and some are not? Likewise, what if some household members have five years of schooling while others not? Why categorise households in all or none terms? Likewise, the way the child mortality indicator is constructed has issues as well. A household gets labelled poor if “Any child has died in the household”. What if the death has taken place ten years back? How does a death taking place in the past necessarily reflect a household’s current poverty status?

I was looking at the rather harsh critique Martin Ravallion had written on the MPI. Among some justified and some unjustified objections on the MPI he also mentions, “Being multidimensional about poverty is not about adding up fundamentally different things in arbitrary ways”, and that the MPI puts together totally different indicators in one place. There is no poverty measure that is free from arbitrariness, including the one subscribed to by Ravallion, but when the proponents of MPI in their defence say that their composite measure can be broken down into its components I find a problem with it. I can’t think of an index in which the sub-indices can’t be decomposed or be disaggregated. It’s the parts, the sub-indices, that are making the whole, the index, so decomposing them and tracking them separately should not be an issue for any index.

Since the next session is a panel discussion dedicated to the “Issues in Measurement of Poverty in Pakistan: The way forward” I would not go into details but the recent controversies about the varying estimates of poverty based on different poverty lines and methodologies have raised serious questions about the whole concept of poverty. The trends shown by the social indicators in Pakistan are difficult to square with the poverty estimates. This has resulted in raising doubts about the poverty line being used that corresponds to a minimum bundle of goods and services for a normative subsistence level. Much like other methods there are issues of subjectivity and arbitrariness in this measure as well, for instance who is to set the norm and how.

If we really want to think out of the box to have an alternative measure of poverty we need to focus not only on the incidence of multiple dimensions—but on the determinants of these dimensions. Poverty can be a function of earlier conditions, like a

child born into a poor household, or economic or social isolation or marginalisation of a population. Poverty is influenced by inequality of opportunity as well as inequality of aspirations and effort. For an effective poverty reduction strategy, we surely need an alternative measure of poverty- one that probably also includes the constraints rather than only symptoms of poverty.

Would the MPI be able to tackle all these problems and come up with an estimate that is not just scientifically robust but also acceptable to all? I have my doubts. We all agree that poverty is multidimensional and goes beyond mere income, what we need to do is to find a way that combines the income and non-income factors in such a manner that is acceptable. But are there any poverty related factors that are actually non-income? A person with enough income is likely to have better health, better housing conditions and in possession of more assets. In short, what is the probability of a person with money being deprived on the indicators included in the MPI? I really hope Dr Alkire and her team are open to the idea of adding an income indicator in their multidimensional index as income is a very important, if not the most important, dimension of poverty.

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## *Keynote Video Lecture*

# **Why Nations Fail?**

DARON ACEMOGLU

First of all, it is a great pleasure to be here. Thank you for inviting me. Given that communicating from a far is not the easiest thing to do, what I have decided to do is to give a quick overview of the arguments that have emerged from the book that James and I wrote. In fact, this book is a synthesis of about 16 years of research that James and I did. I think it is fair to say that a lot of economic development and economic growth is motivated by patterns that are reported in the book. In particular, this is data from Angus Madison's life's work, which is not entirely uncontroversial, but the overall pattern here is fairly uncontroversial.

The patterns that we observe have actually been in the background of many attempts to understand long patterns of economic development. I think they also point out that it is going to be very difficult to understand why certain parts of the world that were either on par with, say, Asia, in particular the Indian Subcontinent and China, have increased their income per capita and their prosperity so much in 500 years leading to today, particularly from the period around early 1800s to essentially to the end of the World War II, where there is this big divergence taking place. The trends in economic development show that United States of America, Canada, New Zealand and Australia have pulled so much ahead of, say, Asia, where both India, the Indian Subcontinent in this case, and China more or less show the same picture, where there is not much growth going on until the end of the World War II.

I think, the sort of the approaches that economists have made a lot of mileage with, which is trying to understand that economic growth is a process of physical capital accumulation, human capital accumulation, and technological change are obviously a part of the story. When you look at the details, for example in the 19th century United Kingdom or the United States, there is capital intensive, human capital intensive, and technology intensive growth where people are taking up patents, coming up with new technologies, and rationalising production. However, the question is, why? Why is it that this process is taking place at this specific point in time and in these specific countries and not in the rest of the world? Moreover, then why as a result of this, it has been associated with such a huge increase in inequality around the world, both across people and between countries? There are numerous theories on this and it would be totally disingenuous to say that people have not thought about it at all. Indeed, they have been thinking about it, one way or another, although perhaps sometimes the economic growth literature going in some other direction may not pay as much attention.

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But these sorts of questions have been at the background of many social science inquires, including many economic theories. But I think, still by and large, the theories that have been influential over the last, say, 40, 50 years are not entirely satisfactory. That was the starting point that James and I had in our thinking about this question, in particular, this question about the evolution of prosperity. In addition, we also had the question of the evolution of institutions, which are the formal and informal rules of the society, how they function economically, politically, and socially. However, the emphasis often is on things like geography and it is very common both among economists and other social scientists, and even physical scientists, to see things like climate topography, resource and disease environment as important determinants of long-run economic development.

Other views go back to Max Weber's seminal work on contrasting protestant and catholic values as foundation for capitalist development, where Max Weber argued that protestant values were much more conducive to capitalist development than catholic ones. The catholic-protestant distinction is perhaps not the most popular one today but if you want to look at both popular and somewhat scientific articles, you will see them full of statements about how to understand different paths between Africa and Europe, or between Latin and North America, or between India and Pakistan and Western Europe—all of those statements sometimes come to the role of religion, attitudes and values. I think, when you dig deep, you see some aspect of social, economic, and political life that of course interact with these factors. To say that religion plays no social, economic, and political role in Pakistan, for example, would be a laughable statement.

However, the question is that does the interest Pakistan has in religion compared to, say, Switzerland, is that the reason why Pakistan is much poorer than Switzerland? Again, I think just like geography, this does not seem to be fully relevant for understanding the big picture, or for understanding questions, why there are 30, 40, or even 50-fold differences between the richest and the poorest nations in the world today.

The one view that is perhaps more popular among economists is what we call the ignorance hypothesis in the book. Or you can call it good and ignorant leadership hypothesis, which is that policies are important. Of course, if you adopt a policy that discourages innovation and also discourages investment, that is going to have an impact, but it could also be the case that perhaps those policies are adopted by leaders that are largely unconstrained, which means that the leaders have the capability and freedom to choose good and bad policies. According to this view, prosperity follows from good policies and poverty follows from bad policies. However, the leaders sometimes end up choosing good polices and sometimes bad policies. The reason why this view is so ingrained into economics is that economics as a science has developed both as a positive and normative science. On the positive side, we have many of the crowning achievements of the economics discipline, for example, trying to analyse how markets work. However, on the normative side, there is always talk of things like market failure and solution of the market failures. Therefore, economics naturally is inclined to the sort of view that if there are bad decisions, we can solve them, we have capability to do it. And of course, there is another bias for us to like this view, which is that it is not really leadership, economists often play the role of advisors, and we tend to think that good advisors matter a lot, so this view that prosperity and poverty follow from good and bad advice, I think, is quite appealing. However, again, I am going to argue, this is not very relevant.

What I want to do today is not go so much into the details of the argument that we lay out in the book; rather I want to try to explain, where we come from. Put another way, I want to explain why we think these particular approaches are not so convincing and in the process I will also mention a little bit about the statistical work. I want to do it through a story. Therefore, let me first explain the alternative that James and I have proposed and, of course, this is not just our view. It builds on research by others, particularly on the research of Douglas C. North, who was one of the influential economic historians who have developed similar ideas, on which we build and extend. The best way of thinking about that is actually going back to our first ever economics class or you could just go back to the economic classes that you teach in introductory courses.

Therefore, in that first principles of economics course we do not really talk so much about institutions. I have done this myself as I have taught such classes and have also written books about principles of economics. If you think about it, you would realise that there are very specific types of institutions embedded in our rhetoric about how markets work. In particular, we start with an idealised view of the market, where there are no entry barriers or political connections that help you have a monopoly in any industry. Similarly, in standard textbooks, there are very secure property rights because firms can sell stuff and enjoy all the profits they make, they can undertake investments, and benefit from those investments. Sometimes you even might be adventurous enough to talk about innovation and patents in a principles course, which again is totally undergirded by set of institutions, such as patents or intellectual property rights that make it worthwhile for innovators to innovate. There is also an underlying set of institutions that we take as given. They are often insured by the state and the public institutions that underpin a legal system. We have a legal system that will actually enforce contracts that we write. And we can actually write a contract with our supplier, or with our workers, or with the bank. In the standard rhetoric, we have a level-playing field, whereby people can actually choose their occupations, their vocations based on their comparative advantage. We have an education system, a state that provides roads and other amenities that will enable people to take part in economic activities. All of those are implicit; we do not even question them in our basic principles courses.

All of these things present in an idealised way, James and I call, “inclusive” economic institutions. The key thing here is that inclusive economic institutions, and the word inclusive is supposed to emphasise that good institutions are not only those that provide secure property rights and such things, but they provide them in a way that is inclusive, that is, they are broad based. The access to opportunity for participating in economic activities, opening business, going and taking patents, etc. all of those are a part of the inclusive economic institutions. But, the catch is that the most societies throughout history and even today, if we look around, we would find that are not really ruled by inclusive economic institutions. Therefore, I think, at some level, the principles of economics courses get it right about what these economic institutions should be but they do not get it quite right about what they really are in the world. In the world around us, things are more complicated. If you go back in history and in some societies today, they are in fact pretty close to the polar opposite of the inclusive economic institutions. They are, I am going to call them, “extractive” economic institutions and not just exclusive

economic institutions because I want to emphasise that these things—insecure property rights, entry barriers, regulations preventing functioning of markets, individuals choosing occupations that are lucrative, creating a non-level playing field and so on and so forth—are the opposite of inclusive economic institutions.

All of these things, I will argue, are not there by mistake, they are not the brainchild of some deluded economist or a bad leader. They are there for a reason of creating a society, which is unequal in a specific way. Unequal in a way in which the elite and the politically powerful actors in the society are benefiting, directly or indirectly, by extracting resources from the rest of society. Benefiting directly involves, for example, sometimes grabbing the property right of others; think of how early colonisation went in much of the world. The colonisers went there and grabbed valuable metals, grabbed land, pushed away the native populations that were located on that land. The powerful actors also sometimes benefit directly. For example, think of how apartheid state worked in South Africa. It worked by excluding 80 percent of the population that was black from most of the occupations that were lucrative; the black were excluded, or they were excluded from skilled labour, engineering, artisanship, craftsmanship, etc. As a result, and also because of particular organisation of the township places that also made it impossible for them to have valuable agricultural output, pushed the black to have low wages and that indirectly benefited the politically powerful. So, that is just a very quick overview of what we try to mean by extractive economic institutions.

I want to give a relatively short, brief speech here and open it up for questions and discussion but if I have time, I will come back and try to illustrate that extractive economic institutions, by virtue of being in the negation of inclusive economic institutions, often sometimes come in different forms. As I have already indicated, you can have extractive economic institutions where there is direct grabbing or you can have extractive economic institutions where what is going on is that you are not grabbing anybody's output, anybody's innovation, or anybody's investment but you are manipulating market prices and benefiting from them. Let us think of a specific case of extractive economic institutions that would hopefully not only slightly clarify what I have in mind but would also lead to a very important point that I want to make.

Let us pick an example of Barbados. In the 17th century, Barbados is one of many societies that are based on quintessential extractive economic institutions, such as slavery. Slavery has all of the features that I have indicated as defining characteristics of extractive economic institutions, such as insecure property rights. In Barbados, more than 80 percent of the population was slave. They did not even have property rights on their own bodies or, alternatively, on their human capital, let alone on physical property. It absolutely created non-level playing field as these slaves were not given education nor the healthcare. In fact, most of them died before the age of 30 because of the gruelling work that they were given, combined with undernourishment. The lives of the slaves were characterised by total inability to have any sort of incentive or access to security of any sort that would encourage them to increase their productivity or increase the productivity of their activities. In fact, slaves in Barbados and many other slave societies were explicitly banned from investing in their human capital. Indeed, all of this is based on a very non-market mechanism and coercion. The slaves were not allowed to choose their occupation on the basis of their comparative advantage or their wishes. They did not even

have any ability to negotiate or decide anything on their wages. Rather, they were coerced to work on sugar plantations and their wages were set by their masters by coercion at the level that would just as be essentially at the level of some subsistence. It is safe to say that the slaves were not the one who were choosing that system. Needless to say, this was not a very happy slave society where slaves were in a paternalistic relationship with their owners. There was no such society, although the US South sometimes created the myth perpetrated by the slave-owners that that was such a society. We do not believe it.

At any rate, Barbados certainly was not such a society. You could see that from simple statistics. There were slave revolts with great regularity. How did Barbados really maintain a system like that for almost over 100 or 200 years? Barbados was able to maintain a system like that because it was built on military coercion or at the barrel of a gun. You see the political force but how does that political force is exercised? Let us think about how the Barbadian society actually looked like. The first thing you should actually know is that, as I said that more than 80 percent of the population was slaves, you might think that the remaining 19 or 17 percent, or whatever it was, were the slave-owners and were living the good life. Well, actually that was not quite true. Most of the fraction of the remaining population was actually either small artisans or middling occupations that were supporting the slavery system or soldiers. The real beneficiaries of this system were not even majority of the slave owners; many of them were quite small, holding a few acres of land. But only a few families, perhaps 40 or so families, were the largest plantation owners that employed the great majority of slaves and were paid almost all of the profits and that is why they became some of the richest families in Britain in later decades when they returned [to the Great Britain]. Therefore, this was an extremely distorted society with a very, very small fraction benefiting from the slavery system at the expense of at least 80 percent of the Island.

How did this system actually survive? It survived because that small fraction actually controlled all of the political power. The military as an institution was very important, as that was the institution that put down all of the slave revolts. The military was led by the people from these families mentioned before. The members of these families were top commanders. The laws of Barbados were the basis of the society's very non-level playing field, putting down the slaves and always finding them guilty of a lot of infractions. Unsurprisingly, the top judges on the Island also came from the same families. And perhaps, what is the most important, governors and the top politicians of the Island came from the same families. Therefore, those sort of political institutions, which concentrate economic power [in a few hands], I am going to call extractive political institutions. In particular, under such institutions, there is a monopoly of political power in the hands of a few and extreme lack of constraints and checks and balances on how that power is exercised. At the other extreme, I am going to call the other ideal type inclusive political institutions, where the political power is distributed in a broad way, and in an inclusive way.

Of course, all of these are very great simplifications. No society has a perfect set of distributional political power with great pluralism. However, these ideal types help us think about the issues and give us things to compare with. The key thing is that even though you will find societies that have extractive and inclusive institutions mixed in

various different ways. In particular, there are societies around us today that have types of extractive political institutions that concentrate political power but are making certain moves towards inclusive economic institutions. At the end, inclusive economic and inclusive political institutions create positive feedbacks on each other and support each other. As the Barbadian example illustrates, the extractive political institutions and extractive economic institutions support each other. In the case of Barbados that is fairly clear. If they did not have the extractive political institutions and had some voice for the slaves, the last thing they would have done is to choose to their own slavery.

The same thing goes for inclusive economic and political institutions, political institutions in particular and this is an important point, which is that if you have extractive political institutions but inclusive economic institutions, there will always be some forces pulling you towards the diagonal. This is because with the broad distribution of economic power there will be demands for more inclusivity on the political front. On the other hand, as is more often the case, those who dominate political power, slowly but surely, would start using their political power to create a more tilted playing field for their own benefit. It can only go so far by relying on various different implicit mechanisms or the goodness of the heart of the dictator so that they do not actually start messing about with the economic institutions of society.

The main thesis of the book is that the inclusive economic and political institutions create powerful forces towards economic growth, or towards inclusive economic growth, by encouraging investment because of well-enforced property rights; enabling a better allocation of resources in the right way. However, it does not mean totally unfettered competition on the market; rather it means that markets allocate resources much better than central planning but with the right sort of regulation and background for the markets. For example, the markets are not going to work very well if you make all allocations market-based but in such a way that only the very rich can get allocation. It means, in fact, supporting the market with allocations, or with other infrastructure, and with the right type of allocations, for example, limit risk-taking in the finance industry. Then markets have power to achieve better allocations as part of the inclusive growth. And what is the most important, in my opinion, is generating broad-based participation, education, free entry, growth-based property rights, property rights not for just a few but for many and enabling people to take part in occupations in a way they wish. For example, South Africa under apartheid could never have inclusive economic growth even if it encouraged investment by the Western firms or firms in the mining industry. Even if it had markets playing important rule in some consumer goods and other services, it could never have inclusive economic growth because it did not generate broad-based participation. On the contrary, it was excluding 80 percent of the population from many of the valuable economic activities. The key aspect of growth under inclusive institutions is that investment in new technology will create creative destruction, the term coined by Joseph Schumpeter. It means that there will be a constant process of new technology replacing or new firms replacing old or new skills replacing old. I will come back to that later.

One important thing I should highlight is that, and I am going to come back to it again, James and I are not claiming that economic growth is only possible under inclusive institutions. The claim is that inclusive economic growth, which tends to be the more

sustained type of economic growth, is possible under inclusive institutions. We are going to talk about growth under extractive institutions but we are going to see that it has a very different character. In general, it is not going to be long lasting; rather it is not only going to go in bouts but it also contains seeds of its own destruction, so to speak.

I think that perhaps the best way of trying to make an argument is going through a historical example, which I am going to make quickly. In particular, a lot of the book is devoted to how to apply this theory to today and I will not get into that for the lack of time. I think there is no better place to understand some of these things than look at the beginning of the colonisation of Americas. There look at the *conquistador*, Juan Diaz de Solis, who was not very famous. He started the colonisation of the southern end of the continent, where is Argentina today, in 1516. It was at the same time as Cortés was ruling Mexico. However, the colonisation effort by de Solis was a huge failure. Solis, actually, was duly put to death by a band of Charruas. The Charruas and the Querandi, which were the bands of Indians in Argentina, were not what the Spaniards were expecting. They were sparsely settled, highly mobile, non-sedentary, non-hierarchical, bands of Indians. They were very combative but most importantly, they were unable to be captured easily or in great numbers so that they could be put to work.

This was not what the Spaniards were expecting. They were actually hoping that they would be able to capture all the gold and the silver and put the native Indians to work. When the plans did not work, the period of starvation started, so they left the area and were just about to throw in the towel when another of the conquistadors, by the name of Juan de Ayolas, traveled up the Parana River, which takes it to Paraguay and found another band of Indians, known as the Guarani. The Guarani are not the Aztecs or the Incas but they were already quite different from the Charruas and the Querandi. They were what the Spaniards expected the Indians to be like as they were sedentary, they were more densely populated, and they had their own hierarchy with kings and princes. This was the sort of proposition that the Spaniards could deal with and immediately overpowered them. They declared themselves the elite, married their princesses, and put the Guarani to work, using the indigenous institutions, which were extractive, adapting them to their needs. The things like that would develop into *encomienda*—things such as land grants with forced labour, *mita*, coerced labour in the mines,—all of these things were starting to be developed at the same time in the Guarani, the Incas, and the Aztecs.

The economic institutions were extractive but they were also built on force. It was not only the ability of the Spaniards to use overwhelming force but then also to overtake the extractive political institutions, the very hierarchical institutions, with military power at the top that came from the Guarani, the Aztecs, and the Incas that enabled them to set up these things. But what about the United States? Was it the culture, was it the geography, or was it good leadership in the United States that led to its growth? To find the answers, let us look at the history. The key colonisation attempt, at some level, in the United States is the Virginia Company in Jamestown, Virginia, that started exactly 90 years after the colonisation of Juan Diaz de Solis. The Virginia Company itself was a profit-making enterprise in London, in which people put money so that they would actually make profits. They thought they would make profits because they were learning from the Spanish experience. The Spanish experience was that, as we saw, you could go

there (although now nobody remembers Juan Diaz de Solis, they remember the Aztecs and Incas) to exploit vast riches, such silver and gold and the hordes of people who would work for you for growing food and creating agricultural surplus. That is exactly what the Virginia Company had in mind and that is why they sent three ships in 1607 to Jamestown. These three ships were filled with the same type of people that Juan Diaz de Solis took with himself, which included soldiers and goldsmiths. Soldiers were needed to overpower the Indians and the native population and goldsmiths were needed to use the gold and silver found there.

However, again, just like the Spaniards in Argentina, they had a rude awakening. They came up against bands of sparsely settled, non-sedentary, non-hierarchical, and mobile Indians that would not cooperate with them. They went through their own starving time and almost all of them died. It was apparent that it was not going to work. The key reason that the same strategy did not work in the United States was that there were nothing like the Aztecs or the Incas, or the people like Guarani around that they could go to and get the place abandoned from them. Therefore, they thought they would totally abandon Jamestown in order to cut down the losses. Then they came up with a different idea. They thought that if they cannot capture and put to work the native population, they should bring their own low-skilled, coerced labour force to produce in very fertile areas around them. It would create surplus for the elite of the Jamestown as well as profits for the shareholders of the Virginia Company. It was the beginning of bringing in the indentured labour into the Americas. These people signed a contract for coming to America that the Virginia Company would bear their expenses and they would in return be obligated to work for a certain number of years for very low wages, under the control of the Jamestown colony.

This was not the sort of colony that you have in mind now when you read about the United States and pilgrims, etc. and such other things. Just to give you an idea of that, here is a quote by Sir Thomas Gates and Sir Thomas Dale, who were the governor and deputy governor of the colony, respectively: “No man or woman shall run away from the colony to the Indians, upon pain of death. Anyone who robs a garden, public or private, or a vineyard, or who steals ears of corn shall be punished with death. No member of the colony will sell or give any commodity of this country to a captain, mariner, master or sailor to transport out of the colony, for his own private uses upon pain of death”. Therefore, this was not a happy, shiny colony and pretty much anything you did was punishable by death. However, more importantly, what was punishable by death was something you did to hurt the profits of the Virginia Company, which included running away, because the slaves were very valuable asset to the Company as an indentured labour. Even worse was if someone traded with others on their own behalf because the Virginia Company told you what to produce and wanted to take away the entire surplus that was produced and that is how they were going to make money.

However, the open frontier, living with the Indians, and trading on the side were all much more attractive than the yoke of Sir Thomas Gates and Sir Thomas Dale. A mere 11 years after the founding of the colony, they threw in the towel. They realised that they were not going to be able to use either the native population or indentured servants, as it was simply not working. Therefore, they came up with a huge innovation, albeit unwillingly, as it was not their great intention. However, they had no other choice. They

thought they could not run this colony, so they did what had never been done in the Americas – North or South – before. The innovation was the introduction of private property. They let the people take the land based on the head-right system. Every indentured labour and every settler would be given some land and could do whatever they wanted to do with that land. There was one catch, however. Sir Thomas Gates and Sir Thomas Dale were threatening that if you sold the ear of corn that you produced you would be punished but now they were telling the people that they had property rights and they were the guarantors of that. Anybody would be excused if they were not fully credulous in such a situation. In short, in the year 1618, there was a disconnect between the economic and political institutions. The economic institutions were moving in the inclusive direction and now for the first time there was a move towards the inclusive political institutions and general assembly. These events are so eerily repeated in several other colonies as in Maryland and North Carolina, for example, exactly the same pattern is observed. The company that had a grant to set up a monopoly tried to set up extractive institutions but because the conditions were different than in South America they failed and were forced to concede more inclusive economic and political institutions.

Why did I go through this story, i.e. second hand history, as this is not a history lecture but it is an economics lecture? I went through this story because I think it is very important as it really illustrates that this is a pattern that you can see it in statistics, econometrics, and other historical evidence; the pattern is really there if you want to see. The pattern shows that it is not about culture and it is not about geography. The geography was not what distinguished the Jamestown colony, as the areas around Buenos Aires—the famous Pampas—were as productive, or perhaps were more productive, and that is the why there was so much population there. In fact, this is the basis of some econometric work that Simon Johnson, James Robinson and I did on the reversal of fortune, for example. Also, it certainly was not the leadership. Sir Thomas Gates and Sir Thomas Dale were failed leaders; they ran home with their tails between their legs. They did not plan with brilliance of leadership to introduce inclusive economic and political institutions. Rather, they were forced to do so. And they were failures because that is not what the Virginia Company wanted. The Virginia Company wanted political and economic power so that they could have a lot of people working for low wages. Therefore, this, James and I claim, is the beginning of the divergence.

These events, of course, did not last. It is not that you have a small holder society in the United States run by a general assembly of a few people. Neither do you have an *encomiendum* or the *mita* as in Latin America. However, it created a path of divergence between the two parts of the continent. You can see that in a very simple way. Look at what went on, for example, in the 19th century in Mexico and United States. The United States and Mexico, it looks very similar initially as there is a small gap between the two in 1700, perhaps slightly larger in 1800 but thereafter this gap becomes a huge one in the course of the 19th century. What is going on here is that there are industrialisation opportunities and the United States is taking care of them in a very inclusive way. It should be stressed that not everything is inclusive as there are many things going on, such as grabbing of land from the native Indians and creation of monopolies later towards the end of the 19th century. However, at the core of it has a very inclusive element and you can see that from a lot of new people coming up and taking patents, creating new

technologies, opening businesses, and opening new factories. However, you do not see a huge amount of continuity in who are the big industrialists, who are the big technologists of, say, the second half of the 19th century and the earlier part. It is this openness to new ideas that is really at the root of the United States American economic growth.

On the other hand, what is going on in the South? Let us look at Mexico, for example. Mexico is having a long period of stagnation under colonialism. Then colonialism comes to an end but it does not come to an end because of a popular revolution to create inclusive institutions. It is because of an elite coup wanting to create even more extractive economic institutions. The elite is led by the soldiers. In Mexico, there was a period in which 45 presidents changed, sometimes the same people becoming a president again, and most of them belonged to the military. During this period, the military might is creating instability and there is a total collapse of the Mexican economy. Then there is a period of economic growth under Porfirio Diaz but it is a very different type of economic growth, which I call “extractive growth”, which leads to the last point I want to make. It is extractive growth because it takes place under extractive institutions, especially under extractive political institutions. What we see in Mexico under Porfirio Diaz is that there is rapid industrialisation by Mexican standards. For the first time in the 19th century in Mexico after Diaz comes to power, following on about 50 years of stagnation, there is economic growth because of some stability and law and order.

However, if we look at the details, it is extremely different from what is going on in the United States of America. The economic growth in Mexico is based on monopoly as few companies dominate their respective sectors. For example, at that particular time, there are 20,000 banks competing in the United States but in Mexico there are only 2 banks operating, for all practical purposes and these two banks lend to politically connected firms, which means that everything goes back to Porfirio Diaz. The monopolies spearhead industrialisation and the monopolies are granted by Porfirio Diaz. Therefore, there is economic growth in Mexico but no productivity growth as it is the case in the United States. There is no productivity growth because such a growth does not lead to innovation and technological change. Most importantly, this extractive growth does indeed contain the seeds of its own destruction. This contends with unequally distributed gains of that economic growth. The fact that it comes at the expense of the people and benefits some people not because they are being innovative but it benefits them unfairly. Such a situation then leads to things like Mexican revolution and the Civil War.

This is a general pattern, which shows that sustained extractive economic growth is very difficult. There are much more examples of countries in history with extractive economic growth than countries with inclusive economic growth. The reason is that extractive economic institutions are much more common in history than inclusive ones. However, the economic growth under such institutions does not last. The Barbadian society, for example, was very rich because sugar was very valuable but it did not last, however, and it became a very anaemic economy once the sugar prices fell. It did not become industrialised, neither did it become technologically dynamic, and nor did it become human capital-intensive economy until way into the second half of the 20th century. Another example of extractive economic growth is that of Russia, both in the 19th century and under Stalin.

Some preconditions are needed, such as political centralisation to have extractive economic growth. There could not be extractive economic growth, for example, while 25 military generals were fighting each other in Mexico. On the other hand, extractive economic growth was possible under Porfirio Diaz because of political centralisation. The key thing is, however, that is only possible when political power holders in society deem it in their interest and this is where creative destruction comes in. Creative destruction means that they are not going to find it to be in their interest forever. I think the best case for that is China today. China is a typical example of what we have called growth under extractive institutions. It has grown as a poster child of institutional transformation. If you want to understand the Chinese economic growth, you have to start with colonist economic institutions that provided no incentive for anything, be it investment, productivity improvement, and even choice of crop in agriculture. It slowly transformed to the community responsibility system, partnership in village enterprises and ultimately private property in agriculture, entry of private firms, and restructuring of some of the state-owned firms in the industry. Today, you see widespread market incentives in China and anyone visiting China cannot help but be struck with how dynamic China is economically as the people are profit-driven, they are trying to be innovative and risk-taking but it is all within limits. It is all taking place under politically extractive institutions. The big concern of the leadership of the Chinese Communist Party is creative destruction and this is what we call in the book, “fear of creative destruction”.

Part of the reason why extractive institutions do not last is that they do not transform themselves into inclusive institutions. Ultimately, they are not a conducive set of arrangements for long run sustained economic growth because of fear of economic creative destruction. If we look at the speeches and behaviour of every single dictator, they would talk about stability and stability above all means that they do not want changes that would transform society in a way that destabilises their own power. Stability, however, is sometimes good as is the case in growth under extractive institutions; people would much rather have Porfirio Diaz’s dictatorship rather than military dictators killing each other and creating instability. However, it is not a recipe for long-run economic growth, which does need creative destruction and form of a society that is open to change and does not give the political power to tilt the level playing field.

In the end, I will give a brief introduction of the things that I have not talked about in the lecture. I have not talked about why is that such institutions exist. I told you about path-dependant change but that is very central. I talked about a very simple example of how is it that extractive and inclusive institutions emerge by colonial powers trying to impose the extractive institutions, working in some cases and not working in the North American case. However, if you want to have a view about long-run economic development from this viewpoint, you really need to have a theory of institutional change. We have tried to develop such a view in the book, which we know is not perfect. It is based on what we call conflict differential institutional drift, i.e. small differences that create divergence during particularly important political periods and critical junctures, which are economic and social events that destabilise the existing structure. We emphasise both the historically determined, i.e. path-dependant change and the contingent nature, which create small differences that matter.

The other things that I have not talked about is how to actually apply these ideas to the present. Because if we look at the simplest examples of the extractive institutions, such as slavery, much of these are not around; there is coercion, for example in Nepal and few other places, such as Uzbekistan but no country looks like Barbados today. However, the perspective in the book is that you can still identify these extractive institutions, or the extractive elements of these many institutions. If we look at Colombia, it has a core around Bogota and in Pakistan there is a core around Lahore and Islamabad, which looks very well-functioning. However, if we look at the outlying areas of Colombia, we find that one-third of the country is under paramilitary or guerrilla control and the elites rule everything, both politically and economically. Similarly, if we look at Pakistan, most of the country is very much different from what goes on in Lahore and Islamabad. Therefore, we have these mixtures of extractive and inclusive institutions.

At the same time, it is also important to think about how to actually chart a course of getting out of extractive institutions and getting into inclusive institutions. The perspective in the book it is much like taking one step towards that. We also have somewhat detailed discussion of how societies are able to break the chain of extractive institutions. But why does it not work sometimes? Why do we have a pattern of what we call “iron law of oligarchy”? People try to take one step towards inclusive institutions but something pushes them back and they may go further into extractive institutions. Finally, we have an extensive discussion, which is partly based on on-going research and partly on the book, that why it is that growth under extractive institutions is very different and does not create the same sort of innovation and technological change that would make economic growth more sustained. We also have some discussion on pitfalls of policy rather than clear, silver-bullet recommendations of how you can create inclusive institutions. It is a political process and there is not a formula of easy way of doing this. Lastly, there are some new ideas that are not in the book but are relevant and that is that you can also apply these things to questions like why is there middle-income institutional trap, which is relevant for many societies, including Pakistan, Turkey, Chile, Colombia, etc., some parts of which have become more inclusive but have huge economic and political structures that are maintaining each other.

The last thing that James and I want to imply is that we have the answers; we do not have the answers and “Why Nations Fail” is not the book that claims to have the answers. However, what the book does, and what I try to do, is that we claim that we have useful framework, which is much better than harping about geography, culture, leadership and market-failures, without taking into account the political institutional aspect. In a nutshell, it is a framework based on ideas that have come out of research. Many of these ideas build on econometric, theoretical and game-theoretic work and it is a framework that you can build upon. There are many things that James and I are ignorant about. For example, we do not understand the Pakistani society since it is not our expertise but I think that real question is that whether our framework gives us a better perspective for understanding Pakistan, or what is going on in Africa; and we think that this is the case. However, at the same time, it is very much a work in progress and research direction for the future.

## **Out-migration in Rural Pakistan: Does Household Poverty Status Matter?**

RIZWAN UL HAQ, AJMAL JAHANGEER, and AZKAR AHMAD

### **1. INTRODUCTION**

Movement of the people within the geographical and administrative boundaries of a country is known as internal migration. Researchers regard the movement to urban areas from both rural and less-advanced urban areas as more important, yet studying the dimensions of movement between rural areas is worth investigating. Scholars assert economic incentives as the main motive behind the rural-urban movement; various unforeseeable factors, however, may also stimulate the human flows. In Pakistan, the phenomenon of internal migration is as old as the inception of the country as Helbock (1975a) maintained, while studying life-time migrants in 12 largest cities of the country in 1961, that almost every 7th person residing in these cities had come from a different district.

We may split studies on migration into two categories: macro level studies that focus on flows, magnitude, and future forecast on migration; and micro level studies that lay emphasis on households or individuals and how decisions are made to migrate and what is the impact of such decisions on the well-being of the migrants, and those who are left behind. In the presence of a dearth of research on migration, we find most of the studies at the macro level indicators with a very few at the micro level in Pakistan [e.g. Khan and Shahnaz (2000); Arif (2005)].

In Pakistan, majority of the macro level studies relied on the census data that provide a detailed picture of the movement and trends of migration at the country level. Using the last census conducted in 1998, five studies focused on the migratory movements in the country: at national level Karim and Nasar (2003) conducted a study on the inter-district and inter-provincial movements; four other studies provided a detailed description of inter-provincial movements' pattern to prepare a socio-economic and demographic profile of the provinces [Khatak (2003); Chaudhry (2003); Naeem (2003); Rukanuddin and Chaudhry (2003)].

Apart from the census-based studies, a number of studies have used survey data to understand various dimensions of internal migration: Akram et al (2003) undertook a study on the migratory flows using the 1998-1999 Pakistan Integrated Household Survey (PIHS) data

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on the province of Punjab; Memon (2005) conducted a district-level study on migration using the Labor Force Survey (LFS) and (PIHS); Mahmud, *et al.* (2010) studied the impact of social sector development on internal migration using the LFS data; and Hamid (2010) used various LFS rounds for studying the gender dimension of internal migration.

Some studies focused on the migration pattern at the micro level using nationally representative data: Khan and Shahnaz (2000) analyzed the determinants of internal migration in the country using the 1996-1997 LFS data; Arif (2005) used the Pakistan Socio- economic Survey 2001-02, a nationally representative survey conducted by Pakistan Institute of Development Economics, to study the relationship between migration and well-being of a household. Others looked at the impact of migration at micro level using small surveys: Oda (2007) focused on Chakwal district; number of studies focused the determinants and impact of migration on migrants and those who were left behind in the district of Faisalabad [Farah, Zafar and Nawaz (2012); Farooq and Cheema (2005); Farooq and Javed (2009); Farooq, Mateen and Cheema (2005)].

## **2. HISTORICAL PERSPECTIVE REGARDING INTERNAL MIGRATION IN PAKISTAN**

In Pakistan migration is an old phenomenon, and dates back to the inception of the country. Soon after the division of India, huge migration took place from and to India. Extensive research work lacks on the migration flows within the country, although several data sets exist providing ample data on directional flows, incidence, income differentials of migrants and non-migrants, and determinants of migration.

Census data provides us a detailed picture of the pattern of inter-district and inter-provincial migration within Pakistan, although it encounters some shortcomings. Based on 1961 and 1972 census data, Helbock (1975b), while studying urban population growth in Pakistan, maintained that population of the country living in larger cities increase to 50.1 percent in 1972 as compared to 33.4 percent in 1961, thereby pointing at a rural-urban movement in the country during the study period. Irfan (1981), while studying the migration trends provided by Population, Labor Force and Migration (PLM 1979) survey, made a similar argument that internal migration is becoming rural-urban and long distance in Pakistan.

The most recent census data (1998) revealed that the volume of overall migrants has increased whereas the proportion of migrants in total population has decreased [Karim and Nasar (2004)]. This finding may be due to the weakness in the criteria of defining migrants used by the 1998 census which did not capture intra-district movement.

Results from various surveys conducted in Pakistan have also come up with the finding that the prevalent migratory flows in Pakistan are from rural areas and towards urban areas. PIHS 1998 data suggest that almost 40 percent of the male migrants are rural to urban followed by rural to rural movement [Memon (2005)]. Pakistan Socioeconomic Survey (PSES) data also show the direction of migration from rural to urban and rural to rural [Arif (2005)]. The PLM 1979, which is indeed quite an old data, indicated that movement between rural areas was prevalent among internal migrants in Pakistan. On the other hand, the LFS reveals that main flow of migrants in Pakistan is between urban areas. This data set, however, exclude population below 10 years of age while studying migratory flows.

Table 1

*Percentage Distribution of Internal Migrants by Direction of Move*

Direction of Move	2000-01 PSES (all ages-both sexes)	1996-97 LFS (Age 10 + - both sexes)	1998-99 PIHS (Male- Punjab both sexes)	1979 PLM* (all ages – both sexes)
Urban-urban	19.5	43.0	22.7	14.9
Urban-rural	5.9	6.9	6.8	13.9
Rural-urban	38.8	29.8	40.7	29.8
Rural-rural	36.2	20.3	29.7	41.3
All	100	100	100	100

Source: Arif (2005).

Among the provinces, urban areas of Sindh were found to be the main recipient of the internal life time migrants from rural areas of Punjab and Khyber Pakhtoonkhwa (KP), whereas their counterparts in the provinces of Balochistan and Sindh move quite less in numbers [Karim and Nasar (2004)]. The authors argued that from rural areas of Sindh there might be temporary migrants, which the census data was unable to capture. Khan and Shahnaz (2000) came up with the same finding using the multivariate analysis that residents of the province of Punjab are more likely to migrate.

Table 2

*Number and Percent of Life Time Migrants in Pakistan and Their Place of Origin, 1951-1998*

	Year				
	1951	1961	1973	1981	1998
Total Life-time Migrants	7,755,402	8,777,746	10,129,993	9,959,251	10,829,264
Total Internal Migrants	1,397,285 (100)	2,826,036 (100)	4,436,316 (100)	5,172,576 (100)	8,368,723 (100)
Within Province	953,074 (68.2)	1,937,052 (68.5)	2,578,734 (58.1)	3,436,086 (66.4)	5,705,447 (68.2)
Other Provinces	444,211 (31.8)	888,984 (31.5)	1,857,582 (41.9)	1,736,490 (33.6)	2,663,276 (31.8)

Source: Karim and Nasar (2004); Note: Figures in parentheses are percentages.

Using the LFS data, Memon (2005) found that majority of the migrants are family migrants or those who migrate due to marriage, whereas only 20 percent of the migrants move due to some economic reason. Arif (2005) using the PSES data came up with the finding that 61 percent of migrants moved due to economic reason, whereas for female the prevalent reason is marriage or joining family. Mahreen and Mahmood (2010) using the latest LFS data suggested that it is mainly the improvement of economic status which lead people to move as compared to public utilities.

Surveys focusing on migration generally include a question regarding the reasons for migration. Compiling various sources of migration data, Table 3 presents the reported reason of migration. As may be observed from the table the main reason for migration has been marriages and family reunion in Pakistan. Combining all the economic reasons reveal that almost one-fifth of the migrants moved due to some economic (monetary) incentives.

Table 3  
*Reported Reasons for Migration*

Reason for Migration	Percentage of Migrants			
	LFS 1996-97	PIHS 1998	LFS 1997-98	Census 1998
Job transfer	7.1	2.8	5.5	12.1
Finding a job	10.0	12.5	8.9	NA
Business	4.3	2.8	4.4	8.8
Education	0.9	1.1	0.5	1.2
Health	0.2	0.3	0.2	0.01
Marriage	26.1	41.2	26.1	17.0
With family	19.8	22.3	23.7	42.8
Return home	6.7	3.1	9.3	1.1
Independence	NA	8.4	NA	NA
Others	25.0	5.7	21.4	16.9
Proportion of economic migrants in migrants sub-sample	21.3	18.1	18.8	20.9
Proportion of economic migrants in full sample	2.3	4.7	1.7	1.7

*Source:* Khan and Shahnaz (2000); Memon (2005).

Considering the gender differentials among the migrants, 1998 census reveals that head of the household's spouses are the leading long-term migrants followed by the daughters. Among males migrants, one-third of the migrants are head of household's sons with one-fifth of the migrants are main bread-earner in the household [Karim and Nasar (2004)]. Regarding the gender dimension of migration, Hamid (2010) concluded using data from several rounds of the LFS that female migrants dominate all four types of moves; especially they outnumber their male counterparts in the urban-urban migration in the country. Almost half of the female migrants moved due to their marriages.

The majority of the male migrants moving towards urban areas have at least 6 years of schooling according to 1996-97 LFS survey [Khan and Shahnaz (2000)]. On the other hand majority of the people who move between rural areas have no formal education. Among female migrants, majority of those who move have no formal education. The pattern may be characterized as better educated people moving towards urban centers whereas illiterate people move to rural areas. Arif (2005) came up with the same pattern of migrants using the PSES data.

Regarding the age of the migrants, Arif (2005) found that young people mainly move towards urban areas whereas there is substantial percentage of older people – around 30 to 35 percent – who move to rural areas. These findings are in line with the earlier study by Irfan (1986) who noted that young and educated people move towards urban areas and illiterate people move towards rural areas.

Arif (2005) carried out occupational profile of migrants and non-migrants by using the PSES data. The author found that majority of the employed non-migrants was involved in agriculture, elementary occupations and service sector. In-migrants also participated in agriculture and elementary occupations along with crafts work.

Comparison of income profile revealed that in-migrants were slightly better off than non-migrants. Further, rural households received almost four times higher remittances as compared to their urban counterparts. The effect of internal remittances, however, was noted to be significantly marginal as compared to the remittances received by international migration. The socio-economic status of the rural-rural migrants remained unprivileged with higher percentage of stunted children as compared to non-migrants' children [Arif (2005)].

Using the PIHS 1998 data, Memon (2005) found land ownership among the important variable which reduces the probability of out-migration from rural areas of the country. The author argued that land ownership provide both economic and social capital, and hence increases both monetary and social costs of migration from rural areas for land owners.

### 3. THEORIES ON MIGRATION

While reviewing theories on migration, Massey, *et al.* (1993) divided theories on migration into three categories: micro theory provides the description at individual level; macro theory draws the picture at regional level; and miso theory presents the situation at household level.

Neoclassical economics provide the description of both micro and macro level theories. The micro level neoclassical migration theory regards migration an outcome of rational decision of a person based on cost-benefit analysis for positive return. Individuals include all sort of physical, emotional, and psychological costs and benefits while making their calculations. The macro level neoclassical economic theory states that wage differentials—an outcome of disproportionate labor and capital endowments — instigate migration between two regions. Due to migration the wage differentials tend to minimize and migration ceases up gradually as the wage differentials diminish. The new economics of migration provide miso theory of migration and argues that it is not the individual who takes decision based on personal cost and benefit rather all relevant people—families or household members—decide collectively about a migratory move.

Summing up, a number of studies have addressed the issue of migration in the country, yet some issues remained unexplored. First, all these studies used cross-sectional data which encounters some methodological shortcomings for studying the determinants of migration. The research on the determinants of migration in Pakistan lacks the use of the panel data despite the availability of sufficient information on this topic: two rounds of the PSES and three rounds of Pakistan Panel Household Survey (PPHS). Second, all studies addressed issues pertaining to the place of destination—in-migration—without any focusing on the place of origin—out-migration. Both above-mentioned data sets also provide a module on out-migration.

### 4. RESEARCH OBJECTIVES

The overall objective of this study is to investigate the determinants of out-migration in rural Pakistan. The study aims to address the following research questions:

- (1) Is there any influence of household poverty status on out-migration?
- (2) Do schooling, dependency ratio, household size, land ownership and place of residence have any significant association with out-migration?

- (3) What is the role of household characteristics on external and internal migration?

We embed our conceptual model of the study by combining migration-inducing factors at all three levels proposed in micro, macro and miso level theories: individuals decide to move while considering all factors at personal, familial and regional levels.

## 5. DATA AND METHODOLOGY

The data for this study is used from the Pakistan Panel Household Survey (PPHS). The survey covers 16 districts from all four provinces. Thus far three rounds of this survey have been completed. These rounds provide information on individuals and households residing in rural areas of the selected districts. The last round in 2010, however, also included urban areas in the sample. The PPHS provides detailed information on all types of migrants: internal, external and returned. This analysis uses information from two rounds of PPHS conducted in 2001 and 2010. However, as this survey targets only 16 districts, results cannot be generalized for all the country.

PPHS defines a person as a migrant who leaves his place of residence for a period of three months or more. The paper investigates out-migration-both internal and external. External migrants are persons who migrated overseas whereas those individuals who moved within country are referred as internal migrants. The sample households are located in rural areas only. The descriptive statistics reveal out-migration from rural to both urban and rural areas. The external migration is referred to out-migration of individuals to abroad/overseas.

For this analysis, we applied a widely used standard logistic regression model to look at association of household poverty status and other household characteristics with out-migration, taking place between 2002 and 2010 in rural areas of Pakistan. We have investigated the association of pre-migration household characteristics and individual's age with out-migration. Out-migration has taken place between 2002 and 2010, whereas the household characteristics- land ownership, poverty status and others are collected from 2001 wave of PPHS.

To investigate this association, we have used standard logistic analysis with pooled data. The logistic regression is a nonlinear regression (binary response) model specifically designed for binary dependent variables. The logistic regression uses cumulative standard logistic distribution. The coefficients of the logistic regression model are estimated by maximum likelihood. The logistic fit maximum likelihood models with dichotomous dependent variables coded as 0 and 1.

A general form of the model can be described as

$$\text{Logit } [P(y = 1)] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_k X_k$$

where  $y$  is a limited dependent/binary variable,  $\beta_0$  is constant,  $X_k$  is vector of independent variables, and  $\beta_k$  represents a parameter estimate for the  $k$ th independent variables. Dependent variable coded as 0 indicates the absence of the characteristic, whereas coded as 1 indicates presence of the characteristic. For instance, in this analysis, the dependent variable out-migration takes on two unique values, 0 and 1. The value 0 denotes a person is not a migrant, and 1 denotes a person is a migrant.

The multinomial logistic regression is applied to investigate the association of individual and household level characteristics with out-migration . The multinomial logistic regression applies to maximum likelihood models when dependent variable has more than two outcomes and the outcomes do not represent any natural ordering. In this study, the multinomial logistic regression is used to investigate the probability of migrating to external (overseas) or internal location (within the country) compared to no migration.

Let's assume that y is a dependent variable with three outcomes 1, 2 and 3. A set of coefficients,  $\beta_s$  ( $\beta_1$ ,  $\beta_2$  and  $\beta_3$ ) are estimated relating to each outcome. Then the mathematical form of the model for each outcome is as follows:

$$\Pr(y = 1) = \frac{e^{X\beta^{(1)}}}{e^{X\beta^{(1)}} + e^{X\beta^{(2)}} + e^{X\beta^{(3)}}$$

$$\Pr(y = 2) = \frac{e^{X\beta^{(2)}}}{e^{X\beta^{(1)}} + e^{X\beta^{(2)}} + e^{X\beta^{(3)}}$$

$$\Pr(y = 3) = \frac{e^{X\beta^{(3)}}}{e^{X\beta^{(1)}} + e^{X\beta^{(2)}} + e^{X\beta^{(3)}}$$

By setting any coefficient, say  $\beta^{(1)} = 0$ , the remaining coefficients  $\beta^{(2)}$  and  $\beta^{(3)}$  will measure the change relative to the  $y = 1$  and so forth. The three coefficients  $\beta^{(1)}$ ,  $\beta^{(2)}$ , and  $\beta^{(3)}$ , will vary because they have different interpretations.

## 6. RESULTS

### 6.1. Descriptive Statistics

Descriptive statistics on various characteristics of migrants and non-migrants are reported in the following tables. As seen in Table 4, overall only 2.6 percent of the household members (age 15+) migrated during the period between 2002 and 2010 which include only 11 females. The proportion of internal migrants is considerably more than the external migrants (1.7 percent vs. 0.9 percent). As reported in Table 5, majority of the migrants belong to younger age groups (under 30). The proportion of internal and external migrants is highest among 21-25 and 26-30 years old respectively.

Table 4

*Distribution of Out-Migrants by Gender*

	Non-migrants		External Migrants		Internal Migrants		Total Sample	
	No.	%	No.	%	No.	%	No.	%
Female	4572	99.8	1	0.0	10	0.2	4583	100.0
Male	4688	95.3	85	1.7	147	3.0	4920	100.0
Both Sexes	9260	97.4	86	0.9	157	1.7	9503	100.0

Table 5

*Distribution of Out-migrants and Non-migrants by Age at Time of Out-migration*

	Non-migrants		External Migrants		Internal Migrants		Total Sample	
	No.	%	No.	%	No.	%	No.	%
<20	4476	97.9	13	0.3	85	1.9	4574	100.0
21-25	893	93.9	23	2.4	35	3.7	951	100.0
26-30	692	94.9	24	3.3	13	1.8	729	100.0
31-40	1170	97.9	20	1.7	5	0.4	1195	100.0
41-50	894	98.7	4	0.4	8	0.9	906	100.0
51-60	598	99.5	2	0.3	1	0.2	601	100.0
61 & above	537	99.8	0	0.0	1	0.2	538	100.0
All ages	9260	97.5	86	0.9	148	1.6	9494	100.0

\*Non-migrants' age is as of 2001, whereas age of migrants is at the time of first migration.

The decision to migrate is not necessarily an individual level. It could be a household level decision as it has important implications for household's resources, composition and economy. We have included household level characteristics to examine their influence on out-migration. These characteristics are average household size, average years of schooling and average dependency ratio. As reported in the Table 6, household size of external migrants' households is considerably higher compared to households whose members migrated to internal locations. It seems that larger households can afford to send its members overseas compared to smaller households. In case of households' stock of human capital (average years of schooling), the evidence suggests that households with more (less) years of schooling send their members abroad (internally).

The household dependency ratio could also encourage households to send members out of home mainly for work. On average, there are more dependents (children and elderly) than working age members in the household as average dependency ratio of total sample is 105.0. The households having more working age members (15-64) than dependents (under 15 and 64+) are sending its members to overseas and internal locations.

Table 6

*Average Household Size, Years of Schooling and Dependency Ratio before Out-migration (in 2001)*

	Non-migrants		External Migrants		Internal Migrants		Total Sample	
	No.	Avg.	No.	Avg.	No.	Avg.	No.	Avg.
Average household size	9260	10.5	86	12.6	157	8.9	9503	10.5
Average years of schooling	9260	2.2	86	3.3	157	2.3	9503	2.2
Average dependency ratio	9241	105.7	86	79.7	157	98.1	9484	105.0

Household's economic (poverty) status is very important factor in migration related decisions. On one hand, poor individuals/households are expected to consider out-migration to explore better economic opportunities and mitigate the effects of poverty. On the other hand, poverty could also hinder the decision to out-migrate due to higher costs associated with it. As seen in Table 7 below, prevalence of out-migration is lower

among poor (1.9 percent) compared to non-poor (2.8 percent). Moreover, higher proportion of poor and non-poor decided to move to internal locations compared to moving overseas. However, the gap between moving overseas and internally is slightly wider in case of poor migrants.

Table 7

*Distribution of Out-migrants by Poverty Status in 2001*

	Non-migrants		External Migrants		Internal Migrants		Total Sample	
	No.	%	No.	%	No.	%	No.	%
Non-poor	7072	97.2	79	1.1	124	1.7	7275	100.0
Poor	2308	98.0	12	0.5	34	1.4	2354	100.0
All	9380	97.4	91	0.9	158	1.6	9629	100.0

In the rural areas, land is one of the most valuable and most important assets households aspire to hold. The results indicate that lack of ownership of land is associated with out-migration (see Table 8). Those with no land have higher prevalence of out-migration particularly to internal locations compared to those who own land.

Table 8

*Distribution of Out-migrants by Land Ownership Status before Out-migration in 2001*

	Non-migrants		External Migrants		Internal Migrants		Total Sample	
	No.	%	No.	%	No.	%	No.	%
No land	3715	95.5	65	1.7	109	2.8	3889	100.0
Own land	5433	98.8	20	0.4	45	0.8	5498	100.0
All	9148	97.5	85	0.9	154	1.6	9387	100.0

Geography/location of household also plays a vital role in out-migration. The residents in poor, deprived and under developed regions/areas are expected to out-migrate. The proportion of external and internal migrants is highest in Khyber-Pakhtunkhawa and Punjab provinces respectively (see Table 9). Surprisingly, no one out-migrated in Balochistan province, although the law and order situation in the province has deteriorated over the period.

Table 9

*Distribution of Out-migrants by Province of Origin*

	Non-migrants		External Migrants		Internal Migrants		Total Sample	
	No.	%	No.	%	No.	%	No.	%
	Punjab	3159	95.3	30	0.9	127	3.8	3316
Sindh	2787	98.8	9	0.3	26	0.9	2822	100.0
Khyber-Pakhtunkhawa	1975	97.4	51	2.5	1	0.0	2027	100.0
Balochistan	1330	100.0	0	0.0	0	0.0	1330	100.0
All	9251	97.4	90	0.9	154	1.6	9495	100.0

The comparison of out-migrants by land status of district of origin, contrary to our expectations, shows that more individuals out-migrated from agricultural districts compared to arid (3.1 percent vs. 1.4 percent) and particularly to internal locations (see Table 10). Amongst the districts, Bahawalpur has the highest proportion of out-migrants followed by Vehari and Attock (see Table 11). Both Bahawalpur and Vehari are agricultural districts unlike Attock. The comparison of migrants by place of destination illustrates that the proportion of external migrants is highest in Mardan followed by Dir and Attock, whereas proportion of internal migrants is highest in Bahawalpur followed by Vehari and Attock.

Table 10

*Distribution of Out-migrants by Land Status of District of Origin*

	Non-migrants		External Migrants		Internal Migrants		Total Sample	
	No.	%	No.	%	No.	%	No.	%
Arid	3103	98.5	32	1.0	14	0.4	3149	100.0
Agricultural	6173	96.9	58	0.9	140	2.2	6371	100.0
All	9276	97.4	90	0.9	154	1.6	9520	100.0

Table 11

*Distribution of Out-migrants by District of Origin*

	Non-migrants		External Migrants		Internal Migrants		Total Sample	
	No.	%	No.	%	No.	%	No.	%
Faisalabad	459	96.6	7	1.5	9	1.9	475	100.0
Attock	413	95.2	7	1.6	14	3.2	434	100.0
Badin	1030	99.1	1	0.1	8	0.8	1039	100.0
Dir	1108	97.8	25	2.2	0	0.0	1133	100.0
Hafizabad	635	96.2	5	0.8	20	3.0	660	100.0
Vehari	659	95.1	10	1.4	24	3.5	693	100.0
Muzaffar Garh	388	97.5	0	0.0	10	2.5	398	100.0
Bahawalpur	619	92.4	1	0.1	50	7.5	670	100.0
Nawab Shah	630	98.9	3	0.5	4	0.6	637	100.0
Mirpur Khas	409	97.8	2	0.5	7	1.7	418	100.0
Larkana	727	98.6	3	0.4	7	0.9	737	100.0
Mardan	617	95.8	26	4.0	1	0.2	644	100.0
Lakki Marwat	251	100.0	0	0.0	0	0.0	251	100.0
Loralai	468	100.0	0	0.0	0	0.0	468	100.0
Khuzdar	399	100.0	0	0.0	0	0.0	399	100.0
Gwadar	464	100.0	0	0.0	0	0.0	464	100.0
All	9276	97.4	90	0.9	154	1.6	9520	100.0

The analysis reveals that out-migration took place only for economic reason. Thus, reason for migration was not included in the analysis. Further, districts/regions like Swat and FATA which have observed internally displaced persons (IDPs) were not part of PPHS, hence no information is available on out-migration due to conflict.

## 6.2. Regression Results

We included various characteristics—socio-economic, demographic and geographic location of the household—to capture their influence on out-migration. These include household's average years of schooling, household size, average dependency ratio of the household, poverty status<sup>2</sup>, land ownership, land status of the district of origin, and place of residence before migration.<sup>3</sup> As some of the individuals could not be matched across the two waves of the survey, some of the individual-level variable, such as marital status, education, employment status, were not included in the analysis. We employed the logistic regression technique to find out predictive variables of out-migration. The results indicate that average years of schooling and household size have a significant positive association with out-migration. Individuals living in more educated and large households are significantly more likely to move out. Further, of household's poverty and land ownership statuses- both reflect economic position of the household, only land ownership turns out to be a significant negative determinant of out-migration. A person from a household with some owned land is significantly less likely to migrate compared to a person from a household with no land ownership.

Table 12

### *Logistics Regression Estimates of Out-migration in Rural Pakistan*

Out-migration	Coef.	Std. Err.
Age	0.284*	0.032
Age square	-0.005*	0.001
Average years of schooling	0.066**	0.031
Household size	0.025*	0.01
Dependency ratio	-0.001	0.001
Poverty status	-0.199	0.174
Household owns land	-1.376*	0.148
Sindh	-1.550*	0.192
Khyber-Pukhtunkhwa (KPK)	-0.842*	0.204
District status	0.645*	0.21
Constant	-6.238*	0.479

N= 9391; \*significant at 0.01, \*\* significant at 0.05 and \*\*\* significant at 0.10.

Reference categories are: non-poor, no land ownership, residence in Punjab, and in arid districts.

Further household characteristics related to geographic location also appear significant determinants of out-migration. Individuals residing in Sindh and Khyber-Pakhtunkhwa (KP) provinces are significantly less likely, whereas those residing in agricultural districts are significantly more likely to migrate compared to individuals residing in Punjab province, and arid districts respectively.

Further, we divided the move by destination: external (abroad) and internal (within the country). We applied multinomial logistic regression to investigate determinants of moving to external and internal locations. Results indicate that compared to reference

<sup>2</sup>As calculated by Arif and Shujat (2012).

<sup>3</sup>Average years of schooling, household size, dependency ratio, poverty status, land ownership and residence related characteristics are of 2001.

group (no move), people are significantly more likely to move abroad and internally with increase in their age, but for older people it is less likely to move. Moreover, in comparison to those who did not move, average years of schooling of the household members, household size, and dependency ratio play a significant role in moving to overseas but not in case of internal move. Increase in education level of the household proved to be helpful in taking a decision for one of the household's member to migrate abroad. Further, increase in household size also improves the chance of migrating abroad by any member of the household, whereas increase in dependency ratio in the household significantly reduces the probability of moving abroad.

Table 13

*Multinomial Logistic Regression Estimates of Out-migration in Rural Pakistan*

Characteristics	Move Abroad		Move Internally	
	Coef.	Std. Error	Coef.	Std. Error
Age	0.465*	0.067	0.249*	0.043
Age square	-0.007*	0.001	-0.005*	0.001
Average years of schooling	0.153*	0.047	-0.012	0.045
Household size	0.037*	0.011	0.007	0.02
Dependency ratio	-0.004**	0.002	0.000	0.001
Poverty status	-0.377	0.328	-0.110	0.217
Household owns land	-1.804*	0.258	-1.263*	0.194
Sindh	-1.361*	0.409	-1.793*	0.243
Khyber- Pukhtunkhwa (KP)	0.849*	0.273	-4.763*	1.027
District status	0.753*	0.268	0.110	0.32
Constant	-11.083*	1.052	-4.980*	0.645

N= 9378; reference category is no move; \*significant at 0.01, \*\* significant at 0.05 and \*\*\* significant at 0.10. Reference categories are: non-poor, no land ownership, residence in Punjab, and in arid districts.

People with owned land, and living in Sindh have a significant lower probability of moving abroad and within the country, whereas living in KP has a significant higher (lower) probability of moving abroad (within country) compared to reference groups. However, being a resident of an agricultural district compared to arid district significantly increases the probability of moving abroad.

## 7. CONCLUSION AND DISCUSSION

The objective of this research was to study the determinants of out-migration in rural Pakistan using the panel data. We embed our study in the new economic theories of migration which postulate that it is not an individual's decision in isolation to migrate rather it is a collective thought of family and household members. We therefore included variable at household level in the analysis.

People are more likely to migrate with increase in the age but for the older people it is less likely for them to move. This may imply that for people it is more convenient to move when they are young. Further, the analysis revealed that it is more likely for those households with higher average year of schooling to have an out-migrant to overseas. Similarly, greater household size also increases the probability of migration abroad of

any member of such households. Higher dependency ratio, on the other hand, reduces the chances of movement of any member of to overseas. Among the variables concerning the economic situation of the households, land ownership reduces the chances of migrating, whereas the poverty status of the household was found to have no role in migration decisions.

Among the variables at macro level, the results of the analysis revealed that those residing in other provinces are less likely to migrate as compared to those residing in Punjab. This trend might be due to the fact that Punjab is adjacent to all four provinces thereby movement from Punjab to other provinces becomes quite economical. People residing in the agricultural district were found to be more likely to migrate as compared to those residing in the arid areas. People migrating from the agriculture areas might be involved in agriculture labor. These results are in line with what was revealed by PIHS 1998 data that land ownership reduces the probability of migration as discussed by Memon (2005).

After reviewing recent research studies on internal migration in the country we have observed some research gaps. First of all push factors of internal migration have been ignored to some extent. Most of the research has been conducted from the place of destination with a very small focus on the previous or original place of migrants, thereby ignoring those factors which made people move from the place of origin.

Further, in most of the studies the study population, internal migrants in this case, has been studied from a distance—quantitatively—without finding out how did they adapt to the atmosphere in the place of destination; till now no qualitative study has been designed to study the effects of migration on the overall life conditions of the migrants. Further people who are left behind, the impact of migration on these people is still yet to be studied. Especially the effect of migration of male head of household on their spouses and children, who find no one to take care of them, is worth studying.

There are surveys which provide information on the place of origin, thereby making it possible to study return migration in detail. However, surveys like LFS which are conducted in succession should also include such modules as has been done in PSES, PLM and PPHS. For example, the inclusion of return migration, enables us to study those who return, especially those were unable to adapt to the destination environment. LFS provide information of migrants at their places of destination only tell us success story of those who successfully adjusted at their place of destination.

Various data sets came up with different results mainly due to inconsistencies in the definitions. For example, definition of urban and rural areas has been changed during various censuses, thereby causing difficulties in studying pattern of rural-urban movements [Arif (2003)].

Distance of migration has been the focus of some studies. Operationalisation of distance is, however, encountered by some limitations. For example inter-administrative unit—be it a district or province—is regarded as long distance movement without taking into account the actual distance covered by the migrants. Global Information System (GIS) along with other spatial econometrics techniques may be employed to get a valid measure of distance of movement.

Pakistan has faced natural disasters, for example earthquake in 2005, floods and the internally displaced movement due to military actions, quite frequently. In turn, the

shape and dimensions of internal movement in Pakistan might have disturbed a lot, and studying the determinants using the conventional lens may overlook some important features.

From the review it is somehow clear that migration has negative impact on the well-being of the rural-rural migrant households in the country, whereas there is hardly any evidence of economic benefit of migration for other internally migrated households. These findings point out that the decision to migrate was not based on a shrewd judgment, and people who move might have taken the decision haphazardly. The decision making process of migration that who decides to moves and how people decide regarding their destination is worth investigating.

Migration issue has not been taken up by the policy makers in the country. As the issue is closely related with poverty, Poverty Reduction Strategy paper (PRSP)—an official document regarding poverty reduction policy—does not address this issue substantially [Memon (2005)]. In the country the policy regarding internal migration and urbanization is a laissez-faire policy. The need of the hour requires a cogent proactive policy which not only gives incentives but also imposes restrictions. Policy makers should also intervene in the process of urbanization by giving incentives for the people so that the main streams of migration may be diverted from the main urban hubs. Establishing job opportunities and educational institutions in small and medium size cities may serve the purpose.

On the other hand there should be restriction on mobility of people. A lucid way of achieving this objective is to have a stringent registration system in contact. Everybody living in a locality should be registered at an address. Further jobs may be given to those people who belong to that particular area. As a matter of fact, provincial government jobs do have a restriction of domicile. Finally illegal squatter settlements should be discouraged. Above all, there is a need for strong political will for enhancing well-being the people and urban planning may simply be an offshoot of this policy framework.

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### *Comments*

The study provides a panel analysis of the out migration by using the Pakistan Panel Household Survey (PPHS). Also, the study proclaims that since the decision to migrate is done by a family; therefore it incorporates the household's level characteristics in the analysis. In particular, the focus is on the role of the ownership of land and the level of poverty in the decisions to migration. The paper studies an important issue in the sense that migration has become an important phenomenon in the Pakistani society, in particular after the recent surge of the Internally Displaced Persons (IDPs). However, one should be very careful in generalising the results of the study as it still lacks on several technical grounds.

The paper lacks consistency and congruence. For instance, the aim of the paper is to investigate the out migration; but at the same time, it introduces the concepts like internal and external migration without differentiating between these concepts. Besides, the paper reports three objectives; however, neither of them is sufficiently discussed or conformed in the results. The study also claims that the migration might affect the individual's or household's wellbeing; however, again, there is no indication of this claim in the results section. Also, the paper claims that it uses two rounds of PPHS (2002 and 2010); but one does not see any panel regression elsewhere in the paper. It would really make things easy if the authors could explain about the reported method, i.e. it should be clear whether the regressions are fixed effect logistics, random effect logistics or just pooled? To me, it is just simple logistic analysis with pooled data; however the authors should explicitly explain it. Additionally, the PPHS only reports migration data for a small fraction of the households; so it should be explained how they handled the problem of missing data.

As stated earlier, the purpose of the study is to analyse the impact of poverty, land values, and the other social and economic characteristics on out-migration in rural Pakistan. However, the study fails to highlight all of the important controls in this regard. For instance, a detailed discussion of the chosen and the possible omitted controls, in particular in the light of existing literature would be highly appreciated. In particular, the authors must elaborate on the level of the study, i.e. whether it is individual level or households' level? For instance, I see age as one of the variables in the regressions, so it seems to me to be the individual level. However, the authors should explicitly highlight this fact. If the study is individual level, then some of the households' level characteristics such as poverty status would be repeated for members of the each household. In such a case the cluster standard errors are appropriated, i.e. the authors should report it. In the study, the authors used logistic regression while, at the same time, it also introduces the multinomial logistic regression. They should eliminate such redundancy from the study.

Rural-urban Migration is the function of economic incentives. Most of the migration is done in the context from rural to urban areas and not from the perspective of rural to rural areas. Major reasons are economic, marriage and family. However, in the results, the status of poverty is not significant which is a very strong statement and contrary to the incentives theory of migration. At the same time, the ownership of land is significant. The author should look at the fact that it might be the case that the ownership of land is highly correlated with the status of poverty. Similarly, the dependency ratio is insignificant while the households' size is significant. Again, it may be the case that the households' size and the dependency ratio are highly correlated almost in every society.

The ownership of land may be endogenous as higher remittances might affect the purchase or values of land and remittances are normally the function of migration. Besides, there is no control for civil conflicts in the study. However, it is very important given the recent impact of IDPs on migration. Similarly, the decision to migrate and other important decisions such as the schooling decisions or job-market decisions might be simultaneously determined. This type of simultaneity bias should be taken care of. The paper should be revised in the light of these comments.

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## Growth in Pakistan: Inclusive or Not?

ZUNIA SAIF TIRMAZEE and MARYIAM HAROON

### 1. INTRODUCTION

Cross country evidences reveal that Asian countries have experienced rapid growth over the last two decades. The increase in growth is accompanied with reduction in poverty from 1990 to 2001 as the number of individuals living below the poverty line has decreased over the time period [ADB (2006)]. Growth is considered to be a necessary condition for reduction in poverty but growth does not necessarily imply that it will lead to improvement in living standards of every one. Growth does benefit and improve standards of living but it may lead to increase in inequality if it leads to increase in benefits for few section of the society only. This has been witnessed in China as economic growth benefited all segments of the society, it lead to improvement in living standards for all, but the improvement benefited the rich more as compared to the poor. The same situation persists in India as well. In contrast, countries like Brazil, Mexico, and Thailand have different scenario where there is increase in economic growth and this increase is also accompanied with improvement in equity [Anand, *et al.* (2013)].

Pakistan historically has seen episodes of high growth but those unfortunately were not coupled with such macroeconomic conditions as are required to achieve lower poverty levels. Therefore, Pakistan has always been facing the challenge of achieving rather more inclusive growth that could benefit all classes of society. The provision of basic services such as education, health, sanitation, and housing for all the segments of population, and social security schemes to ensure social protection are critical for long run reductions in poverty.

This paper examines inclusive growth (growth accompanied with equitable distribution) for Pakistan using the microeconomic concept of social welfare function (social concentration curve) at the macroeconomic level. The methodology adopted is developed by Anand, *et al.* (2013). Inclusive growth is analysed by decomposing it into two components equity and efficiency. Efficiency requires the overall improvement in the country and equity requires the improvement to be equally distributed across various segments of the population. Our measures of welfare include; income per capita and a household asset index. The social mobility curve is plotted for Pakistan in time periods 2008-09 and 2010-11 at an aggregated and later at a disaggregated level using the

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household level data from Pakistan Social and Living Measurements (PSLM). Our objective is to test to what extent have the benefits of a positive economic growth rate that Pakistan has witnessed for a decade now (despite the global financial crisis of 2008) trickled down to all segments of population, rich and the poor alike.

Brief glances at the macroeconomic indicators of Pakistan reveal important insights about the issue of poverty. Poverty levels are determined by interplay of economic growth, inflation and unemployment levels. All of these three macroeconomic indicators have been worsening for Pakistan exacerbating poverty levels of the country. Pakistan's economic growth rate has been experiencing a decline since 2006-07 falling from a level of 6.8 percent to 4.1 percent in 2009-10. Inflation on the other hand has continued to be in double digits where it peaked to a level of 23.7 percent in 2008-09 though it declined afterwards to 12 percent in 2009-10. Unemployment rate in Pakistan has also witnessed a decline from a high of 6.8 percent in 2006-07 to a low of 5.5 percent in 2009-10. The rise in the prices of staple food crops such as wheat that has undergone a substantial price hike from Rs 625/40 Kg to Rs 950/40 Kg in the fiscal year 2009-10 is adding fuel to the fire. Moreover the sharp rise in international oil and food prices, combined with recurring natural disasters like the 2010 and 2011 floods have had a devastating impact on the economy [Pakistan (2009-10)].

Poverty levels in Pakistan witnessed a sharp decline in the earlier half of the previous decade however the trend reversed after 2005-06 and poverty headcount ratio as depicted in Table 1 peaked at 33.8 percent.

Table 1

*Trend in Poverty: Headcount Ratios*

Year	Headcount Ratio
1993	26.8
1997	29.8
1999	30.6
2001	34.5
2005	23.9
2006	22.3
2008	29.9
2009	33.8 <sup>1</sup>

Source: Arif and Farooq (2011).

Some plausible explanations of this trend reversal could be that Pakistan has faced severe challenges since 2007/08—a falling rate of economic growth, double-digit inflation particularly the food inflation, energy crisis, oil price hikes and deteriorating law and order situation. The security concerns like war on terror have resulted in a diversion of public expenditure from development to defense. Thus the present socio-economic situation has adversely affected the efforts concerning poverty reduction.

The concept of inclusive growth was measured initially using access to opportunity such as education for countries like Philippines [Ifzal and Son (2007)], Pakistan [Newman

<sup>1</sup>Task force on food security (World Bank) cited in *Economic Survey 2008-09*.

(2012) and Asghar and Javed (2011); Ravaillon and Chen (2003)]. The literature also examines inclusiveness of growth using income per capita for Turkey [Taskin (2014)], which reveals that increase in per capita income has been achieved at the expense of equity.

The macroeconomic picture suggests rising poverty and inequality in Pakistan. Given this backdrop our objective in this study is to see whether growth in Pakistan has been beneficial for all or not. If the growth in Pakistan has been achieved at the expense of equity then the benefits of growth are unevenly distributed and the poor benefit less from growth as compared to the rich as the poor are constrained by circumstances or market failures. This situation prevails if market mechanism operates. Thus, the government can play its role by formulating policies that distributes the benefits of growth equally and reduce inequality.

## 2. METHODOLOGY

The methodology developed in this paper has been adopted from Anand, *et al.* (2013). Our measure of inclusive growth is based upon a social welfare function, which is also known as the concentration curve. In the social welfare function, inclusive growth depends upon two factors: average per capita income and distribution of income among the population. The inclusiveness of growth can be depicted using the social welfare curve ( $Z^C$ ). The social welfare curve can be defined as follows:

$$Z^C = x_1, \frac{x_1+x_2}{2}, \frac{x_1+x_2+x_3}{3}, \dots, \dots, \dots, \frac{x_1+x_2+x_3+\dots+x_t}{t} \dots \dots \dots \quad (1)$$

In the above equation,  $x$  is the income of population, which varies from  $x_1$  to  $x_t$  where  $x_1$  is the income of the poorest individual and  $x_t$  income of the richest individual. The generalised concentration curve is a cumulative distribution of a social mobility vector, which can be shown as:

$$Z = (x_1, x_2, x_3, \dots, \dots, \dots, x_t) \dots \dots \dots \quad (2)$$

The above function satisfies two properties as we move from the lower to higher bound of the curve, income should be increasing i.e, from  $x_1$  to  $x_t$ . The other property requires the social concentration curve to be higher for a superior income distribution.

In order to plot the social mobility curve, the population is arranged in ascending order of their income. We divide the population in different income groups and calculate the average income for each group  $\bar{x}_i$ , where  $i$  varies across income group from 0 to 100. Therefore  $\bar{x}_i$  is the average income of the bottom  $i$  percent of the population. Let  $\bar{x}$  be the average income of the entire population.

In order to find the magnitude of change in income distribution, we calculate social mobility index by calculating the area under the social mobility curve, which can be written as follows:

$$\bar{x}^* = \int_0^{100} \bar{x}_i di \dots \dots \dots \quad (3)$$

The greater is the value of social mobility index ( $\bar{x}^*$ ), the greater will be the income. If the distribution of income is equitable then the social mobility index ( $\bar{x}^*$ ) will be equal to the average income ( $\bar{x}$ ) of the entire population. However, the distribution of income is inequitable if average income ( $\bar{x}$ ) is greater than the social mobility curve ( $\bar{x}^*$ ).

Following the methodology of Anand, *et al.* we propose an income equity index ( $\vartheta$ ), which is as follows:

$$\vartheta = \frac{\bar{x}^*}{\bar{x}} \quad \dots \quad (4)$$

The income equity index is a ratio of social mobility index and the average income. If the income equity index ( $\vartheta$ ) is equal to one, then it shows that there is perfect income equality. The closer the value of equity index to 1 the greater is the incidence of equity. By mathematical manipulation of (4), we derived:

$$\bar{x}^* = \vartheta * \bar{x} \quad \dots \quad (5)$$

Growth will be inclusive if it leads to increase in social mobility index ( $\bar{x}^*$ ). Hence, social mobility index can be increased through: increase in average income ( $\bar{x}$ ) through growth, increase in income equity index by increasing equity and a combination of both. Differentiating both sides of the equation leads to:

$$d\bar{x}^* = \vartheta * d\bar{x} + d\vartheta * \bar{x} \quad \dots \quad (6)$$

where  $d\bar{x}^*$  represents the change in the degree of inclusiveness of growth and growth is more inclusive if  $d\bar{x}^* > 0$ . Equation (6) decomposes the measure of inclusive growth into two components: increase in income and the distribution of income. The first component will analyse increase in income while keeping the equity component constant. The second term analyses the change in income distribution while keeping the average income constant. Inclusive growth can be determined by analysing the direction and magnitude of the two terms.

Using Equation (6), we can propose all the possible combinations. Growth is unambiguously inclusive, if both change in income and change in income distribution ( $d\bar{x}, d\vartheta > 0$ ) are positive. While growth is unambiguously non-inclusive, if both change in income and change in income distribution ( $d\bar{x}, d\vartheta < 0$ ) are negative. However, if the change in income is positive and the change in income distribution (equity) is negative then there is higher social mobility, but the increase in social mobility is achieved at the expense of reduction in equity or income distribution (this case can be shown as  $d\bar{x} > 0$  and  $d\vartheta < 0$ ). The last possibility is when the change in income is negative and the change in income distribution is positive, then higher social mobility is achieved with decrease in average income.

By mathematical manipulation of Equation (6), we can get:

$$\frac{d\bar{x}^*}{\bar{x}^*} = \frac{d\bar{x}}{\bar{x}} + \frac{d\vartheta}{\vartheta} \quad \dots \quad (7)$$

Equation (7) shows the decomposition of inclusive growth ( $\frac{d\bar{x}^*}{\bar{x}^*}$ ) into growth in average income (efficiency) ( $\frac{d\bar{x}}{\bar{x}}$ ) and change in income distribution (equity) ( $\frac{d\vartheta}{\vartheta}$ ). Efficiency requires the overall improvement of income in a country and equity requires this improvement to be equally distributed across various segments of the population. The social mobility curve has been estimated for Pakistan using two measures which are income per capita and the wealth index.

### 3. DATA

Using Equation (7) we have plotted the social mobility curve for Pakistan using Pakistan Social and Living Standards Measurements (PSLM). The curve has been plotted for two time periods 2008 and 2010. The overall trends for Pakistan reveal that there has been a positive economic growth rate from 2008 to 2010 with falling inequality and increase in the incidence of poverty. In this paper we want to do a detailed analysis of the source of this inequality by decomposing our chosen sample into different income groups. The Table 2 summarises some of the basic household characteristics of our sample. The sample includes more than 71,000 households for each year. Out of the total sample, 35 percent of the households are residing in urban areas while 65 percent are in rural areas. On average, the size of the household is smaller for wealthier<sup>2</sup> households as compared to the poorer ones as in year 2011, the average size of the household in the top quintile is around 3.73 while the average household size is 5.61 in the bottom quintile. The average household income has increased from year 2008 and 2011 for all the income groups, which is also depicted in the Table 1 as the average household income for both the bottom and top quintile has increased.

Table 2

*Descriptive Statistics of Sample Households: PSLM 2008-09 and 2010-11*

Year	Region	No. of HH <sup>3</sup>	Avg. HH Size	Avg. HH Size	Avg Income	Avg. Income
			of the Bottom Quintile	of the Top Quintile	of the Bottom Quintile	of the Top Quintile
2010-11	Pakistan	71,951	5.61	3.73	8,406	45,199
	Urban	35%	5.89	3.82	12055	61342
	Rural	65%	5.59	3.58	7333	36450
2008-09	Pakistan	71,491	5.77	3.76	7,714	37,508
	Urban	35%	5.95	3.64	9897	51160
	Rural	65%	5.69	3.79	7247	30003

Source: Author's own calculations.

Though the top quintile has experienced a greater percentage rise (a rise of 20 percent) in their incomes as compared to the bottom quintile (8.9 percent rise). The per capita income is greater for urban than rural areas for all income quintiles.

The Table 3 shows the distribution of wealth (ownership of assets) across income groups. The wealth has been categorised into productive (land, animals for transport, poultry, residential and commercial buildings) and non-productive assets (television, computer, refrigerator, air-conditioner, fans, cooler, motorcycle and tractor). The percentage change in ownership of assets has fallen from 2009 to 2011 for most of the assets except for fans, motorcycle, tractors, residential and commercial buildings. The ownership of assets for the top quintile has remained fairly constant for non-productive assets while for the productive assets it has shown a considerable increase where the reverse is so true for the bottom quintile for whom the ownership has fallen for most of the assets.

<sup>2</sup>We have distinguished households based upon their income and have classified them into 10 quintiles.

<sup>3</sup>This sample does not include households for whom income was not reported in PSLM.

Table 3

*Descriptive Statistics of Asset Ownership for Sample Households:  
PSLM 2008-09 and 2010-11*

Asset Ownership	2010-11			2008-09			Change in Percentage of Ownership
	Percentage of HH with Ownership of Assets			Percentage of HH with Ownership of Assets			
	Bottom 10%	Top 10%	100%	Bottom 10%	Top 10%	100%	
<b>Non-productive Assets</b>							
Television	0.27	97.9	54	0.91	99.21	55.93	-3.45
Urban	0.55	98.61	80.24	1.39	99.34	80.68	-0.55
Rural	0.25	96.37	40.48	0.9	98.73	42.39	-4.51
Computer	0.01	58.35	7.4	0	60.38	7.55	-1.99
Urban	0	66.42	16.62	0	65.31	16.85	-1.36
Rural	0.01	37.34	2.43	0	41.78	2.46	-1.22
Refrigerator	0	98.73	35.98	0.03	99.03	36.66	-1.85
Urban	0	99.02	60.34	0	99.16	60.09	0.42
Rural	0	97.98	22.86	0.03	98.54	23.83	-4.07
A/C	0	48.88	5.21	0.01	49.33	5.31	-1.88
Urban	0	58.05	12.68	0	55.17	13.09	-3.13
Rural	0	25	1.18	0.01	27.26	1.05	12.38
Fan	37.18	99.91	86.97	30.37	99.99	86.55	0.49
Urban	73.76	99.87	98.91	38.89	100	98.67	0.24
Rural	34.37	100	80.54	30.12	99.94	79.92	0.78
Air cooler	0	49.23	8.18	0	53.3	9.51	-13.99
Urban	0	47.4	15.19	0	50.78	17.71	-14.23
Rural	0	54	4.4	0	62.8	5.03	-12.52
Motorcycle	3.53	69.87	27.74	2.87	66.72	23.98	15.68
Urban	0.55	66.94	35.51	1.85	65.2	31.67	12.13
Rural	3.76	77.5	23.55	2.9	72.42	19.77	19.12
Tractor	0.25	9.73	2.73	0.71	6.56	2.64	3.41
Urban	0.18	4.45	1.39	0	3.53	1.26	10.32
Rural	0.25	23.49	3.45	0.73	18.03	3.4	1.47
<b>Productive Assets</b>							
Land	21.31	29.32	29.32	35.09	21.4	29.59	-0.91
Urban	3.3	14.81	8.47	18.98	13.17	9.55	-11.31
Rural	22.69	67.09	38.06	35.56	52.48	40.55	-6.14
Animals for Transport	11.55	4.27	7.75	22.72	2.19	9.05	-14.36
Urban	6.42	0.8	1.68	18.98	0.79	1.89	-11.11
Rural	11.94	13.32	11.02	22.83	7.45	12.97	-72.82
Poultry	13.1	6.05	15.65	30.25	3.59	18.05	-13.30
Urban	3.12	1.48	3.01	17.59	0.89	3.44	-12.50
Rural	13.87	17.94	22.46	30.63	13.76	26.04	-13.75
Residential building	85.59	88.12	86.84	83.8	86.34	86.82	0.02
Urban	69.54	84.61	78	77.31	83.62	78.79	-1.00
Rural	86.82	97.27	91.59	83.99	96.62	91.21	0.42
Commercial Building	0.72	11.88	4.21	0.37	12.2	3.56	18.26
Urban	0.92	11.84	5.75	0.46	11.86	5.42	6.09
Rural	0.7	11.96	3.39	0.37	13.5	2.54	33.46

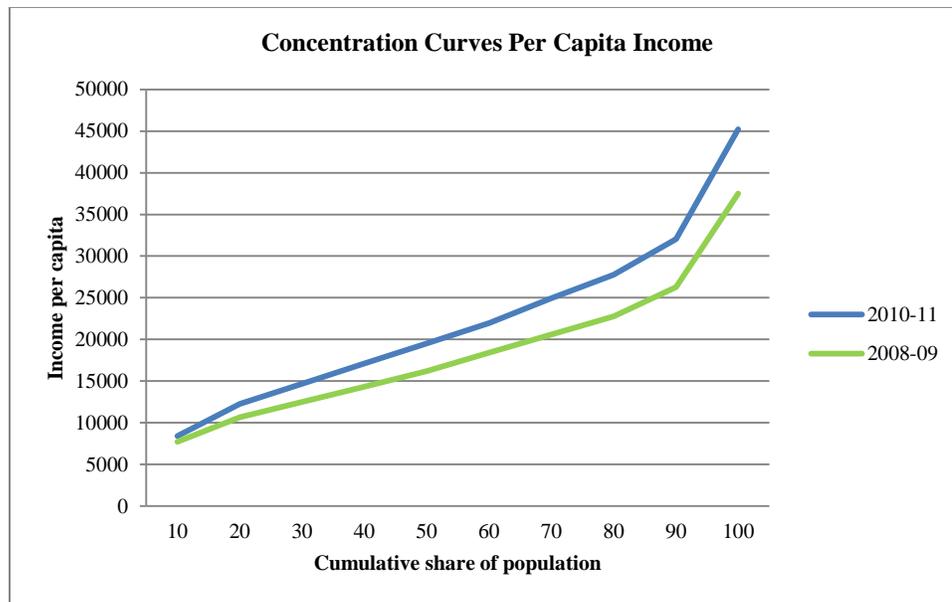
Source: Author's own calculations.

The basic data description shows that there has been a general rise in income for all quintiles. On the other hand, wealth distribution is mostly skewed towards the top quintile and this concentration has increased for the given time period. This occurrence is only pointing towards rising inequality, which we also expect to see in our later analysis.

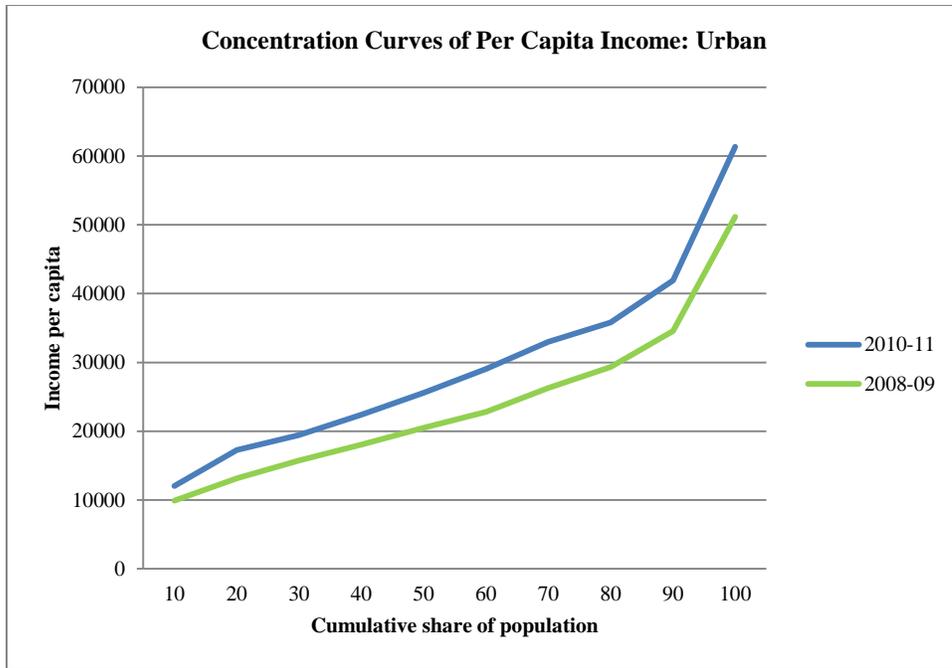
The Table 3 also presents the region wise (rural vs. urban) distribution of assets. It can be seen that in the urban areas for the top quintile the ownership of more valuable assets such as land, residential building, computer, motorcycle etc. has gone up. These are the same assets whose ownership for the bottom quintile has fallen. For the rural areas there is no clear pattern in the distribution of assets, however the data does point out that for the top quintile it is mostly the productive assets that have experienced an increase in ownership whereas for the bottom quintile the ownership cannot be linked to a specific type of asset as one can observe for the top quintile.

#### 4. RESULTS

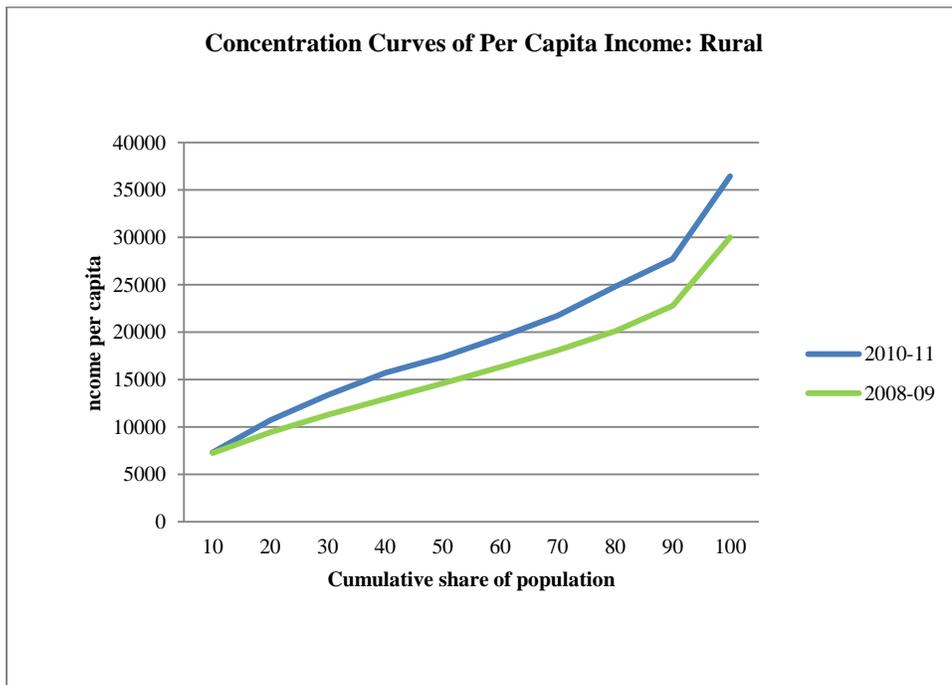
The generalised concentration curves are plotted to examine inclusiveness of growth for entire Pakistan and then also at disaggregated level for urban and rural areas separately for 2008-09 and 2010-11. The inclusiveness of growth has been measured using income per capita and wealth index. The upward sloping concentration curves for both years in Figures 1, 2 and 3 reveal that as one moves to a higher income group the per capita income increases but a rather steeper curve towards the top quintiles shows that the inter quintile income gap is increasing. This trend is evident in both the years for urban as well as rural areas. As shown in Figure 1 the concentration curve for Pakistan for 2010-11 is above the concentration curve for 2008-09, which is indicative of a rise in income for all the segments of population.



**Fig. 1. Concentration Curve of per Capita Income for Pakistan for 2010-11 and 2008-09**



**Fig. 2. Concentration Curve of per Capita Income for Urban Pakistan for 2010-11 and 2008-09**



**Fig. 3. Concentration Curve of per Capita Income for Rural Pakistan for 2010-11 and 2008-09**

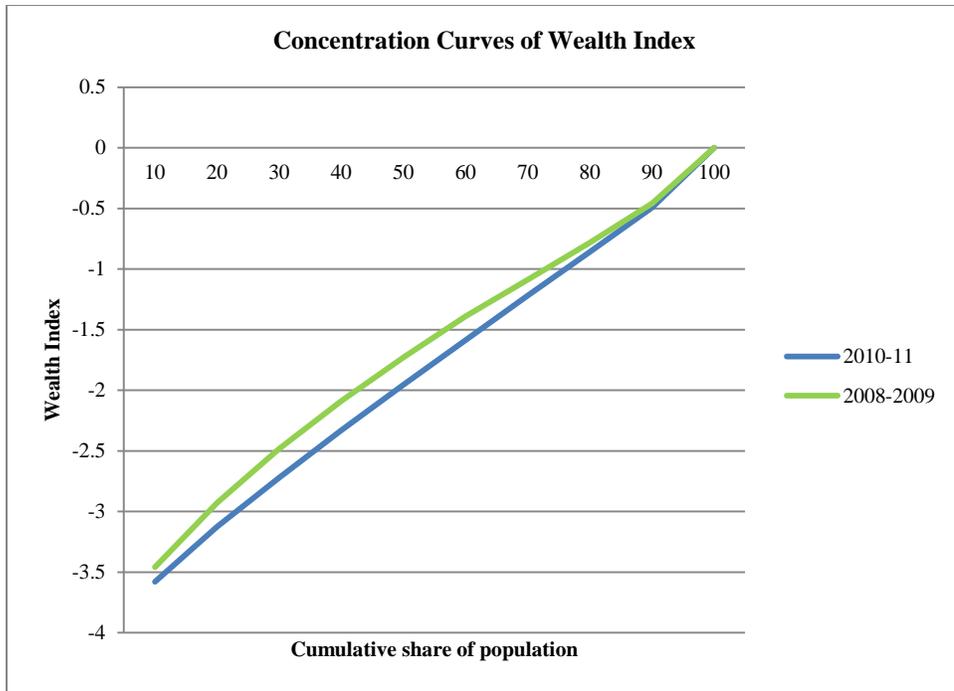
This trend is also evident for concentration curves of rural and urban areas in Figures 2 and 3. A general rise in income for all shows positive contribution to growth in Pakistan. However, a closer look at these curves reveals that this growth has given rise to increased income inequality as there has been a pivotal shift in the curve. This shows that income has increased by a larger percentage for the higher end whereas for the lower segments the increase in income has not been very large. Growth is not accompanied by increase in equity as there has been a non-uniform increase in income with the benefits of this growth mostly favouring the higher income quintiles. However, at the disaggregated level this shift in the concentration curves for rural and urban areas brings to light an interesting finding. The change in the position of the curve for rural areas for the bottom 10 percent of population is very minimal as compared to successive quintiles of the income distribution whereas for the urban areas there has been improvement in income for all segments of the population.

Our findings reveal that there has been overall improvement in the country but the curves are getting steeper over time, which is indicative of the fact that the inequality is not decreasing. We will further test this proposition using the income equity index, which will test whether the improvement is equally distributed across various segments of the population or not.<sup>4</sup>

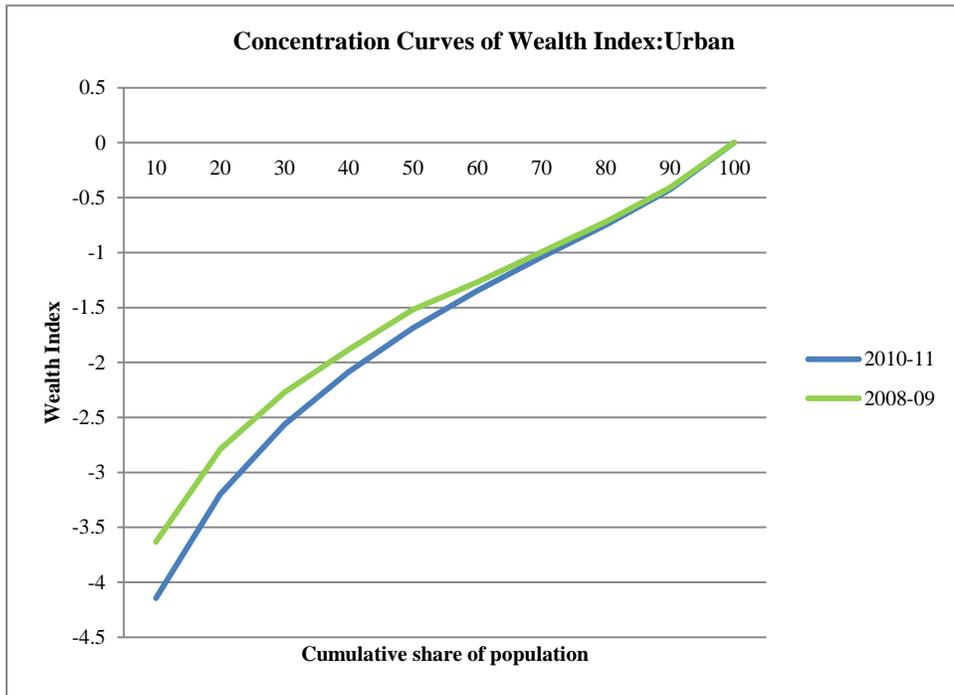
We have also made use of the wealth index to analyse inclusiveness of growth for Pakistan and for both regions. The wealth index has been constructed using the principal component analysis. The PSLM dataset provides detailed information regarding the ownership of productive and unproductive assets for the households. The index is constructed using both productive and non-productive assets and detail of those assets has been reported in Table 3.<sup>5</sup> The Figures 4, 5 and 6 present the concentration curves using wealth index. According to the concentration curve, there has been reduction in ownership of assets over the time period as the curves have fallen from 2008-09 to 2010-11. The decline in the ownership of assets has not been observed in the top quintile of population, the drop is mainly for the lower quintiles. This shows that it is mainly the poorer segments of the population who are experiencing a decline in their economic status. The rich, if not getting richer are able to maintain their existing economic status. This has also been supported by descriptive stats on the ownership of assets where there has been a rise in ownership of productive assets and a reduction in the ownership of non-productive assets. The change in ownership of assets is increasing in assets that are more valuable, such as land and motor vehicles, and decreasing in less valuable assets such as electronic equipments.

<sup>4</sup>The numbers for income per capita used throughout our analysis are nominal in nature. Even if we used the deflated income figures it would still imply an upward shift in the income concentration curve since the inflation rate of Pakistan in 2008 was much higher than the inflation rate in the year 2010.

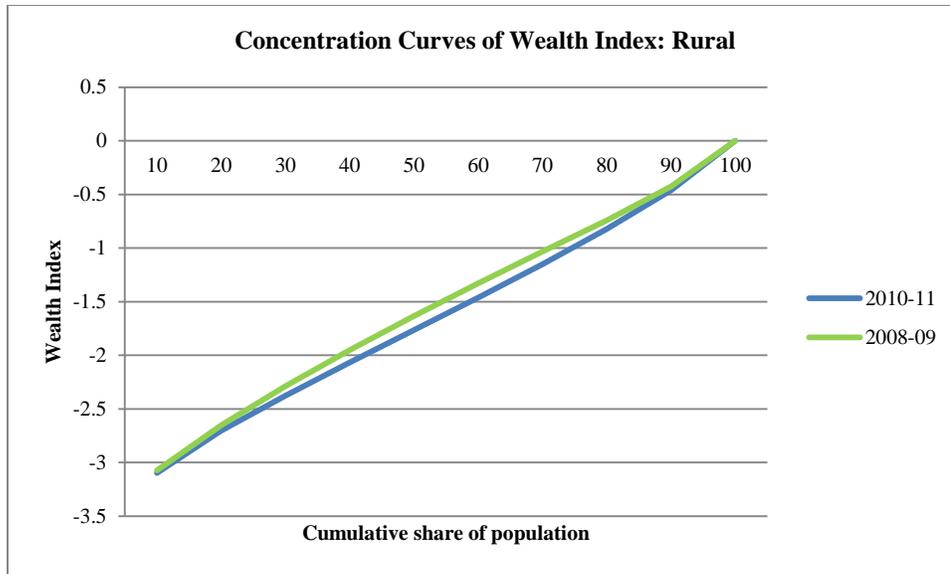
<sup>5</sup>The wealth index has been constructed using various categorisation of assets. We have measured ownership both in binary and continuous (monetary value of asset) terms. Our results are consistent for both the cases.



**Fig. 4. Concentration Curve of Wealth Index for Pakistan for 2010-11 and 2008-09**



**Fig. 5. Concentration Curve of Wealth Index for Urban Pakistan for 2010-11 and 08-09**



**Fig. 6. Concentration Curve of Wealth Index for Rural Pakistan for 2010-11 and 2008-09**

The concentration curve of wealth index for urban and rural areas also exhibit the same pattern as of the entire Pakistan. The lower quintiles have experienced a decline in ownership of assets while there has been no decline in economic status of the upper income groups. For the urban areas the ownership of assets has experienced a magnificent decline for the lower income groups as the curve has shifted by a larger magnitude. While, for the rural areas there has not been any decline at the extreme end income groups, it is only the middle income groups who have endured a falling wealth.<sup>6</sup>

The concentration curves of wealth index exhibit a contradiction in the results that we got from the concentration curves of income per capita. Income per capita, which represents temporary income has shown signs of improvement for all income groups whereas the wealth, which is a measure of permanent income has declined between 2008-09 and 2010-11. One of the explanations of this result could be that the rising income has not been able to keep pace with the rising price level in the economy as inflation continued to be in double digits during this time. With the rising price levels, the increase in income is being mostly used for consumption and is therefore not leading to increase in saving or accumulation of wealth. Especially, the lower quintile is not able to cope up with rising price. The alternative for them is to liquidate their stock of wealth as is also shown by the downward shift of the concentration curves for wealth. For the top income groups also rising income levels are not contributing towards greater accumulation of wealth. This can be due to the possibility that increasing income is being channelled towards higher expenditures and is not facilitating savings. These findings are consistent

<sup>6</sup>The y axis of the concentration curves drawn for the wealth index are the z scores estimated from principal component analysis, which assumes a normal distribution. These could be positive as well as negative. Negative z scores do not imply negative wealth holding. Though more positive z scores represent higher wealth holdings.

with those of the World Bank, which shows consistent fall in the gross domestic savings as percent of GDP for Pakistan (from a high of 12 percent to a low of 9.9 percent).

### Decomposition of Inclusive Growth

The analysis of concentration curves of per capita income revealed that there has been improvement for all income groups and whether that improvement is equitable or not has been tested using the social mobility index<sup>7</sup> and income equity index.<sup>8</sup> The Figures 7, 8 and 9 show the comparison of average per capita income, social mobility index and income equity index specifically for per capita income for 2008-09 and 2010-11. The Figure 7 shows that the average per capita income ( $\bar{x}$ ) has increased from 2008-09 to 2010-11 for entire Pakistan and for both regions as well. The magnitude of change in income distribution is demonstrated by the social mobility index ( $\bar{x}^*$ ) which is the area under the concentration curve.

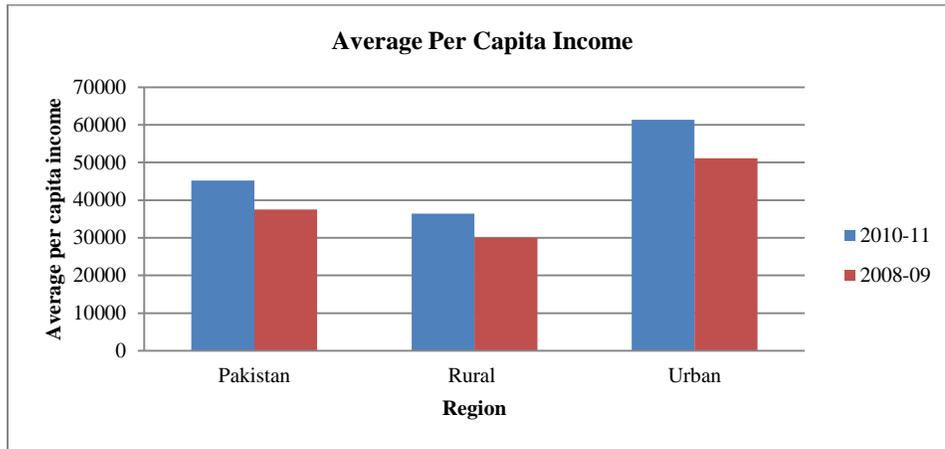


Fig. 7. Average per Capita Income for 2010-11 and 2008-09

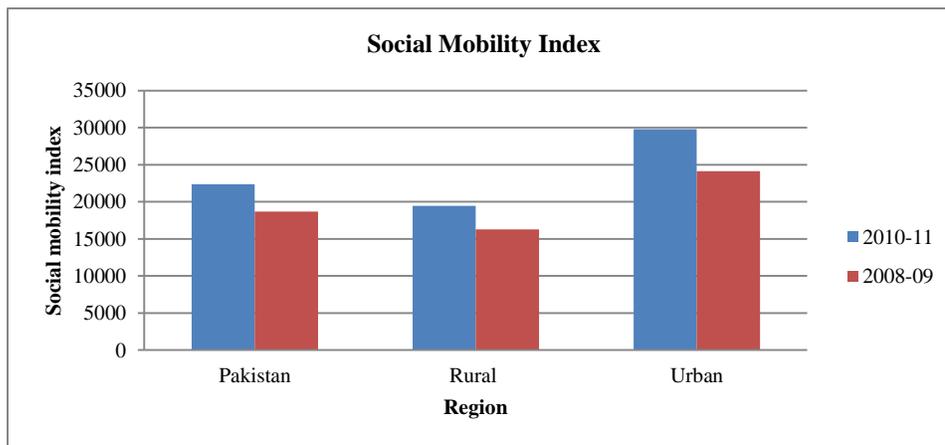
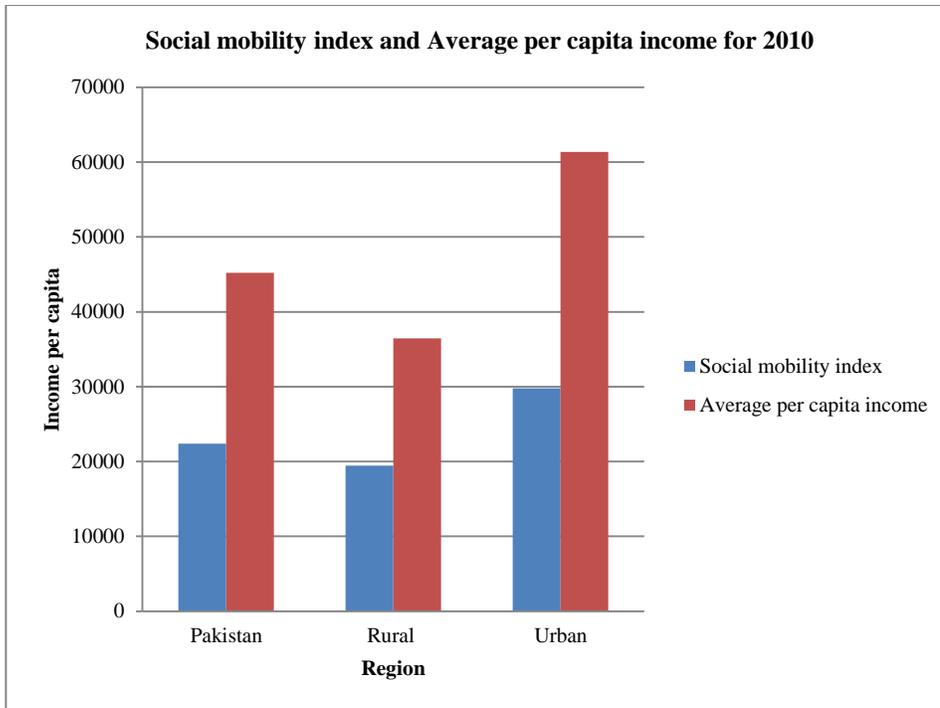


Fig. 8. Social Mobility Index for 2010-11 and 2008-09

<sup>7</sup>It has been constructed using Equation 3.

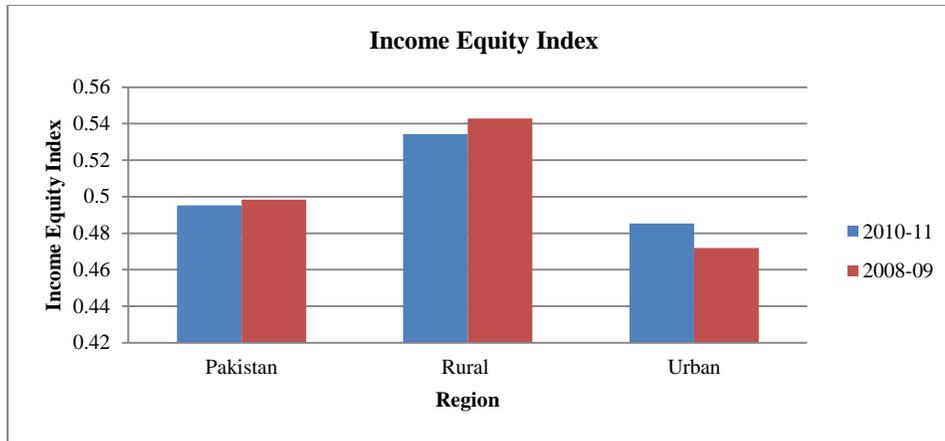
<sup>8</sup>It has been constructed using Equation 4.



**Fig. 9. Social Mobility Index and Average per Capita Income for 2010**

The Figure 8 depicts an increase in social mobility index for the given time period at the aggregated and disaggregated level for Pakistan, which is a sign of improvement in the income. Equitable distribution of income requires the average per capita income to be equal to the social mobility index, which would be possible only if all income groups have the same average per capita income in which case the social concentration curve would be horizontal and not upward sloping like in our case. The Figure 9 presents the comparison of average per capita income and social mobility index depicting that the average per capita income is higher than social mobility index for 2010. This implies that the distribution of income is inequitable as the average per capita income is not equal to average per capita income for all groups.

The Figure 10 shows the income equity index, which is a direct measure of income inequality, ranges from 0 to 1 where the equality increases when the index approaches 1. The income equity index is less than 1 across all regions for both the years. However, the magnitude of inequality varies across regions. The value of the index for entire Pakistan is less than 0.5 which is a depiction of very high level of inequality and the index has fallen in 2010, which implies a worsening of income equality. The region wise analysis reveals the same pattern for rural areas as well but the magnitude of the index is higher (the value of the index is greater than 0.5), which marks lesser income disparity in rural areas. The extent of inequality is highest in the urban areas since the value of the index is very low but the extent of the inequality has fallen in 2011 as shown by a higher bar for 2010-2011.



**Fig. 10. Income Equity Index for 2010-11 and 2008-09**

Table 4

*Decomposition of Inclusive Growth; 2008-09 and 2010-11*

Year	Income Equity Index ( $\theta$ )			Social Mobility Index ( $\bar{x}^*$ )			Average income of the Entire Population ( $\bar{x}$ )		
	Pakistan	Rural	Urban	Pakistan	Rural	Urban	Pakistan	Rural	Urban
2010-11	0.495	0.534	0.485	22386	19474	29777	45200	36450	61342
2008-09	0.498	0.543	0.472	18694	16286	24148	37508	30004	51161
Growth Rate	-0.624	-1.571	2.842	19.75	19.58	23.31	20.51	21.48	19.90

Source: Author's own calculations.

This paper examines whether Pakistan has been able to achieve inclusive growth or not. In order to achieve inclusive growth, we required efficiency (overall improvement) and equity (improvement to be equally distributed). The inclusiveness of growth has been tested using the criterion suggested by the inclusiveness conditions.<sup>9</sup> The results for Pakistan are presented in Table 4 which suggest that Pakistan and rural areas of Pakistan satisfy the third condition, which implies that the growth in per capita is occurring at the expense of equity as growth rate of per capita income is positive whereas the growth rate of equity index is less than zero. Only for the urban areas the growth rate of income equity index and that of average per capita income is greater than zero which according to the inclusiveness matrix is a case of unambiguously inclusive growth.

## 5. CONCLUSION

Pakistan has experienced tremendous economic growth rate over the last decade. However, to see whether this growth is inclusive or not, it is imperative to also examine the distribution of growth as growth by itself is not a sufficient condition for reduction in poverty and inequality. The growth can be categorised as inclusive in nature if it simultaneously leads to reduction in poverty.

<sup>9</sup>The conditions are stated using Equation 6.

The paper examines inclusive growth for Pakistan using the microeconomic concept of social welfare function (social concentration curve) at the macroeconomic level. The social concentration curve is plotted for two time period in order to see the improvement in social welfare over time. The methodology adopted is developed by Anand, *et al.* (2013), which analysed inclusive growth by decomposing it into two components equity and efficiency. Efficiency requires the overall improvement in the country and equity requires the improvement to be equally distributed across various segments of the population. The population is segmented using personal distribution of welfare by deciles across all households in the sample. Our measures of welfare include; income per capita and a household asset index. The social mobility curve is plotted for Pakistan in time periods 2008-09 and 2010-11 using the household level data from Pakistan Social and Living Measurements (PSLM).

Our findings reveal that there has been an overall improvement in the country's income due to the upward shift of the concentration curve but the concentration curves got steeper over time which is indicative of efficiency without equity. We further tested this proposition using the social mobility index and the income equity index. The comparison of average per capita income and social mobility index depicted that the average per capita income is higher than social mobility index implying that the distribution of income is inequitable whereas the income equity index is less than 1 across all regions for both the years, which depicts high level of inequality. However, the magnitude of inequality varies across regions. The condition of inclusiveness of growth suggests that Pakistan and rural areas of Pakistan satisfied the third condition that the growth in per capita is achieved at the expense of equity. Only for the urban areas the growth rate of income equity index and that of average per capita income is greater than zero, which according to the inclusiveness matrix is a case of unambiguously inclusive growth.

One of the important finding of our analysis is a fall in concentration curves of wealth index from 2008-09 to 2010-11. It exhibits a contradiction in concentration curves of income per capita. Income per capita, which represents temporary income has shown signs of improvement whereas the wealth, which is a measure of permanent income has declined between 2008-09 and 2010-11. This can be due to the possibility that increasing income is being channelled towards higher expenditures and is not facilitating savings.

Given these findings, we can see that the growth in Pakistan is not inclusive since growth has been achieved at the expense of equity. The benefits of growth are unevenly distributed where the poor benefit less as compared to the rich. Thus, there is a need for the government to play its role by formulating policies that distribute the benefits of growth equally and reduce inequality.

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# **Measuring the Performance and Achievement of Microfinance Institutions Incorporating Subsidy Dependence Index and Outreach Index in Pakistan's Case**

HINA ALMAS and MUBASHIR MUKHTAR

## **1. INTRODUCTION**

The curse of poverty had remained a significant problem throughout the history of civilisations. Even in this era of development at least one third of the world population is suffering from the problem of poverty. With such a huge number of human beings living in such a deprived situation, it becomes very crucial to target this issue and search out feasible ways to overcome it.

Microfinance has come one of the important tools for reducing poverty. It offers a solution by stimulating economic growth and development. Established microfinance institutions use many instruments to fulfill their promise of poverty reduction. One of those instruments is microcredit. Through this instrument microfinance institutions provide small-scale loans to individuals or groups so that the borrowers could initiate their business and break out of poverty cycle.

Historically microfinance institutions have been playing their role in many formal and informal ways. There were many savings and credit groups in Ghana, India, Mexico, Indonesia, Sri Lanka, West Africa etc. locally known as; *susus*, *chit funds*, *tandas*, *arisan*, *cheetu*, *tontines* etc. respectively. In the recent era of economic development the formal microfinance institutions became prominent in the latter half of twentieth century. With the establishment of ACCION International in Latin America and Grameen Bank of Muhammad Yunus in Bangladesh in 1960's and 70's, microfinance approach made its place in economic policies for poverty reduction. Grameen bank has provided loans of \$9.1 billion to poor and spread its business to 37 countries. Muhammad Yunus was given noble prize for his services in 2006.

However, microfinance sector has been currently facing many challenges especially of mission drift. Institution started to serve social cause has now slipped into the direction of profit maximisation. When microfinance institutions focus their attention

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on social objectives they have to face the risk of financial unsustainability. MFIs need to be economically viable and sustainable in the long run but at the same time they must consider economic implications of long-term sustainability, which are not being considered, [Srinivasan, *et al.* (2006)].

The microfinance revolution and the remarkable development of the Microfinance industry in scale and scope raise demands for increased justification of the utilisation of scarce public funds. In order to allocate these resources in the most efficient way, performance evaluation should reveal an accurate and meaningful picture of the performance of MFI in terms of reaching the objectives desired by society and the efficiency in developing products and services to the target recipients [Yaron and Manos (2008)].

While a vast amount of literature exists on the trade-off between outreach depth and financial sustainability, not much less research has been done in the field of how successful MFIs designed their institutions to bridge this trade-off [Woller (2004)]. MFIs must fulfill their promise of poverty reduction but at the same time they should be financially sustainable, as well. Same situation exists in the case of Pakistan, where there is tradeoff between poverty outreach and financial sustainability. Studies show that if preference of MFIs is to serve the poor than financial sustainability will be difficult due to high transaction cost. This research is to investigate these issues in Pakistan's context.

The objective of this study is to explore and provide a methodology which recognises those MFIs which achieve the goal of poverty reduction while remaining financially sustainable. Also this study provides a benchmark and methodology to investors and donor agencies to direct their funds towards self-sufficient and socially targeted MFIs. Thus this study will help in accelerating the economic growth and development of the country.

For this purpose we have taken up the approach of Yaron (1992) in which he has advocated to study the performance of MFI through the dual concept of outreach and sustainability, studying the breadth and depth of the institution. For measuring the outreach, Yaron has proposed Outreach Index (OI) and for measuring the sustainability or self-sufficiency he has proposed Subsidy Dependence Index (SDI). Thus the combination of OI and SDI gives more reliable measure of performance of MFI. In contrast to this we have also used one of the leading methodologies for measuring the performance of MFIs i.e. Financial Self-Sufficiency (FSS) and compared its results with SDI and OI.

This study is divided in five sections. Starting from literature review which discusses the theoretical foundation and provides the framework for empirical study, it continues on the methodology and data collection. Section four elaborates on the results and highlights the important facts for consideration. Section five concludes the study with policy implications and further research direction. Tables of data collected of each microfinance institution are attached as annexure.

## 2. LITERATURE REVIEW

Microfinance is an important way of building the potentials of the poor who are mostly ignored by other financial institutions. Social objectives of microfinance are defined as "the effective translation of an institution's social goals into practice in line

with accepted social values; these include sustainably serving increasing number of poor people, improving the quality and appropriateness of financial services and improving the economic and social conditions of clients”.<sup>1</sup> Social performance is being measured by using some variables as proxies like number of borrowers, average loan size, percentage of female borrowers, etc. Economic performance can be measured by subsidy dependence index and financial self-sufficiency index. SDI can be measured by subsidy received by microfinance institutions; loan portfolio and weighted average index on loan portfolio whereas FSS can be measured by Adjusted Financial Expense, Adjusted Net Loan Loss Provision Expense, Adjusted Operating Expense and Adjusted Financial Revenue.

The microfinance industry is characterised by a “schism” [Murdoch (2000)], which spurs debate between two streams of thought. On the one hand are institutionalisms that focus on achieving financial self-sufficiency by outreaching in scale (targeting more the marginally poor), while, on the other hand, welfarists emphasise outreach in depth and social impact and attribute an important role to subsidies. While institutionalists regard “subsidised” institutions as inherently inefficient [Murdoch (1999); Hollis (1998)], welfarists argue that all crucial microfinance innovations came from flagship institutions such as Grameen Bank, ACCION and FINCA, which were heavily dependent on donor funding at the time of innovation [Murdoch (1999); Hollis (1998)].

Despite the fact that there is a common understanding on the importance of financial performance and gradual strive towards sustainability, the debate goes on with regard to fulfilling the promise of microfinance in targeting the “poorest” of the poor [Tucker (2011)]. Various surveys such as the one conducted in Bolivia show that the majority of households reached by MFIs were near the poverty line. That means that they rather reached the marginally poor than the very or poor [Navajas (2000)].

This opened the debate on the depth of outreach and Schreiner (1999) aided discussions by proposing a framework that defines the six dimensions of outreach such as length, breath, scope, cost, depth and worth. Length of outreach can be described as “microfinance supply in a particular time frame”. In this time frame present and future both are included. Breath of outreach can be defined as “number of clients”. Breath depends upon the funds supplied to the clients, if all other factors are kept constant. Scope of outreach is “number of types of financial contracts supplied”. Cost of outreach can be stated as “sum of price cost and transaction cost”. Price cost is cost, which is directly paid in the form of cash for interests and fee whereas transaction cost is non-price cost for indirect cash expenses. Depth of outreach he argues is the preference of society towards recipients of funds. As direct measurement through income or wealth is difficult, Schreiner (1999) proposes indirect proxies for depth such as gender and location. In gender women are given preference and in location, rural are preferred [Schreiner (1999)].

Deepening outreach accordingly means to extend services to women and to remote rural areas. Rural finance, however, usually triggers high transaction costs and increased risk due to dispersion. High transaction cost and risk thus often serve as an argument by those focusing on sustainability against reaching out to remote rural areas. During the

<sup>1</sup><http://www.microfinancegateway.org/p/site/m/template.rc/1.11.48260>.

past ten years considerable concern arose over the increasing emphasis on financial performance as this often served as legitimisation for drifting from the original social mission in servicing the very poor [Buchenau and Mayer (2007)].

The significant development of the Microfinance industry resulted in a broad spectrum of microfinance institutions ranging from organisations that regard social objectives only as byproducts to those who focus on translating their missions into practice. Measurement of success of microfinance institutions accordingly depends on the intent (mission) and design of the MFI, the selection of specific target segments [Dunford (2000)]. The design of appropriate methodologies to translate mission into practice while gradually achieving cost recovery and subsidy independence accordingly is of utmost importance [Ledgerwood (1999); Nitin (2001)].

Cull, *et al.* (2006) studied that to what extent the MFIs can earn profit when they are also targeting the poor. His main objective was to find a relationship between financial performance and poverty outreach of MFIs. He used data between 1999 and 2002 for 124 MFIs (village banks, individual-based lenders, and group-based lenders) from 49 developing countries by using FSS, unadjusted measure of OSS and ROA. From this study he found out that when interest rates rise to high levels, it does not cause greater profitability or cost minimisation. Individual based lenders, which charge higher interest rate and high labour cost earn more profit. No important relationship is found between labour cost and profitability. Designs of institutions establish significant relationship between tradeoff between outreach and profitability of institutions [Cull, *et al.* (2006)]. Stieglitz and Weiss gave similar statement that raising interest rates will undermine portfolio quality due to adverse selection and moral hazard. Further studies proved that individual-based lenders that charge higher interest rates are more profitable than group lenders but only up to some extent. When interest rate reaches threshold level, profitability starts decreasing. In case of group based lenders profit does not increase with the rise in yield. Those individual lenders, who charge high labour cost gain more profit. There was no important relationship found between labour cost and profitability for group lenders. They also found that it is not necessary that institutions with smaller loans will earn less profit [Stieglitz and Weiss (1981)].

Subsidy is very substantial to measure the sustainability of Microfinance institutions. A large number of microfinance programs in the world are subsidised in different ways, sustainability of the programs poses a question in the mind of academics and researchers. Grameen Bank of Bangladesh has to face high repayment rate but also has to depend upon subsidies [Morduch (1999)].

Seibel and Torres (1999) stated that sustainability of Grameen type MFI with the substantial increase in outreach is possible but this can be done only at the cost of subsidy. Yaron (1992) proposed Subsidy Dependence Index (SDI) for the first time. According to Hulme and Mosley (1996), SDI measures subsidy dependence and limit to which lending interest rate should be raised to cover all the operating costs of MFIs. Consequently the notion of a subsidy free break-even rate for MFIs provides the argument for the upward revision in interest rates to poor borrowers.

Yaron (1992) calculated SDI by a ratio of subsidy and loan portfolio and the result is multiplied by lending rate of interest. The most interesting calculation part of the index is subsidy where it comprises of cost revenue and cost components. Hulme and Mosley

(1996) introduced advanced version of SDI formula by using simpler calculations and new notations. Kahndakar and Khalily (1995) suggested that SDI ratio more clearly explains the financial sustainability of MFIs. According to them SDI index compares subsidy only with revenue from lending however revenue from investments in non-loan assets (treasury bills) should also be considered.

Financial self-sufficiency index is also used for measuring the self-sufficiency of microfinance institutions. FSS has many deficiencies as compared to SDI. FSS does not include opportunity cost of capital, it doesn't differentiate between MFIs that target poverty and the MFIs which invest their fund in other businesses and it tends to underestimate the subsidy dependence of microfinance institutions [Yaron and Manos (2007)].

In Table 1 we have presented a detailed view on some current methodologies for evaluating MFIs performance. Along with it we have discussed the limitations of each technique, to present a comparative analysis of each.

Table 1

*Methodologies for Evaluating MFI*

Techniques	Objective	Limitations
Difference-in-Difference (DID)	To assess the impact of the microfinance program on various outcomes.	Failure to take into account externalities and spillover effects, and the differencing nets out the effect of the comparison group.
Stochastic Frontier Analysis (SFA)	To estimate the cost function for MFIs.	This method inherently renders biased coefficients.
Operational Self-Sufficiency(OSS)	It shows that to cover MFI direct cost, is revenue enough or not? It includes only financial cost but excludes cost of capital	OSS only covers operating income and operating expenses along with the provision of loan loss.
Financial Self - Sufficiency (FSS)	To portray financial health of MFIs.	FSS measure tends to underestimate the subsidy dependence of the MFI
The Break Even Condition	In depth economic analysis of the institution.	It is a simple technique and it can work in only stable economic conditions whereas revenues and costs change with passage of time. Hence it is not effective for volatile conditions.
Data Envelopment Analysis (DEA)	It measures that how much MFIS are cost efficient.	It cannot control measurement errors and other random effects
The Return on Assets (ROA) and the return on equity (ROE)	To measure the performance of MFIs	They ignore the subsidies received by MFIs and opportunity cost of capital
Discounted Cash Flow (DCF) method	To measure the performance of microfinance institutions.	It requires the implementation of a different data collection system to that which the organisation uses to generate its financial statements
Economic Value Added (EVA)	It measures the excess of the profit over return required by the suppliers of capital	It requires accounting figures are adjusted to measure the profit more accurately.
SDI	To measure the subsidy dependence of microfinance institutions.	It does not measure the subsidy that MFIs get by revenue from investments in non-loan assets like treasury bills, etc.
OI	To measure the poverty outreach of microfinance institutions.	NIL

### 3. METHODOLOGY

#### 3.1. Problem Statement

Microfinance institutions strive to reduce sufferings of poor. This target is difficult to achieve because microfinance institutions have to pay a high cost to reach their poor clients. Only those microfinance institutions may achieve their objectives, which are financially sustainable themselves. It is very necessary to find those MFIs, which are able to reduce poverty while remaining financially sustainable. We will measure the performance of microfinance institutions by SDI and OI. SDI index is used for measuring the self-sufficiency of microfinance institutions and OI is used to measure the outreach of microfinance institutions.

#### 3.2. SDI

In measuring the magnitude of subsidy dependence of respective microfinance institutions, this paper uses subsidy dependence model developed by Yaron (1992). For calculation of SDI, it is necessary to aggregate all subsidies received by all MFI and compare it to total loan revenues, being the product of the banks on lending interest rate or profit rate and the average annual loan portfolio (LP). This can be mathematically expressed as

$$SDI = S/LP * i$$

Where *SDI* is the index of subsidy dependence; *LP* is the average outstanding loan portfolio and *I* is the weighted average on lending rate paid on loan portfolio. [Yaron and Manos (2007)]

The amount of the annual subsidy received by the MFI is defined as:

$$S = A (m - c) + [(E * m) - P] + K$$

Where:

*S*=Annual subsidy received by the MFI

*A*=MFI concessionary borrowed funds outstanding (annual average)

*m*=The assumed interest rate that the MFI would have to pay for borrowed funds if access to concessionary borrowing was eliminated.

*c*=Weighted average annual concessionary rate of interest actually paid by the MFI on its annual average concessionary borrowed funds outstanding

*E*=Average annual equity.

Data was collected from microfinance institutions financial statements available online at Mix Market website and from annual reports. SDI for different years from 2006 to 2012 was calculated. The sample is based on seven conventional and one Islamic Microfinance institution.

#### 3.3. OI

Yaron (1992) proposed use of outreach index along with SDI for measuring the outreach of microfinance institutions. OI index measures the output of financial support provided to Microfinance institutions. Use of SDI along with OI is beneficial for measuring both the subsidy dependence and outreach of microfinance institutions. There are different variables, which are required to calculate outreach index for example number of loans, amount of loans, income group, total amount per income group etc. The

weighted output index (*OI<sub>w</sub>*) is then expressed as:

$$OI^w = \frac{\sum_{i=1}^n Li_i}{\sum_{i=1}^n Li}$$

Where (*Li*), is income size groups

The non-weighted output index (*OI<sub>nw</sub>*) is expressed as:

$$OI^{nw} = \frac{1}{n}$$

The ratio  $Z = OI_{nw} / OI_w$  should be interpreted as a “discount factor” thus

$$Z = \frac{\sum_{i=1}^n Li}{n \sum_{i=1}^n Li_i}$$

We have first calculated OI index with actual weight ratio (ratio calculated from male and female borrowers and similarly urban and rural borrowers) than we have changed the weight ratio to 0.6 and 0.4 and in the end we have calculated the OI index with fixed 0.5 ratios. Results are shown in 4.3 section. We have obtained data from financial statements of microfinance institutions.

### 3.4. FSS

Financial Self-Sufficiency is an important measure of sustainability of the lending operation. FSS index is also used to measure the self-sufficiency of microfinance institutions. It has helped in giving us a comparison statement between using SDI, OI and FSS. We have followed the following formula of FSS

$$FSS = \frac{\text{Adjusted Financial Revenue}}{\text{Adjusted (Financial Expense + Net Loan Loss Provision Expense + Operating Expense)}}$$

Data of all variables is obtained from financial statements of microfinance institutions given on mix market website. Results and graphs are given in section 4.4.

Financial Self-Sufficiency indicates whether or not enough revenue has been earned to cover both, direct costs- including financing costs, provision for loan losses and operating expenses and indirect costs include the adjusted cost of capital.

### 3.5. Comparison of SDI and FSS

Table 2

*Comparison between FSS and SDI*

FSS	SDI
This index ignores the opportunity cost of equity. Hence it cannot evaluate those MFIs, whose opportunity cost of equity changes over time.	It includes all financial resources including opportunity cost of equity. Hence this index gives the exact measurement of opportunity cost of capital without overestimating the self-sufficiency of Microfinance institutions.
It does not include exemptions from RR	It includes exemptions from RR
FSS cannot distinguish between MFIs that invest their assets in loan portfolio and those MFIs, which incorporate their assets in other investments.	SDI can easily differentiate between MFIs that invest their assets in loan portfolio and those MFIs, which incorporate their assets in other investments.
FSS index fails to evaluate the growth of MFIs toward their subsidy independence, when MFIs starts relying on the concessionary borrowing.	SDI index can show the progress of MFIs toward the subsidy independence because this index entirely calculates the subsidies received by MFIs. <sup>2</sup>

<sup>2</sup>Yaron and Manos (2007) “Determining the Self Sufficiency of Microfinance Institution.” *Saving and Development* No 2, pp. 131–60.

### 3.6. Data

Data was collected from financial statements of microfinance institutions, given on mix market website. Data of eight microfinance institutions was used from 2006 to 2012. There are seven conventional and one Islamic microfinance institutions working in Rawalpindi/Islamabad, whose data was used. All of these MFIs have range of ownership pattern, size, management, methodology, source of funding etc.

## 4. CALCULATIONS AND DISCUSSION

### 4.1. SDI Measurement Models: Results and Findings

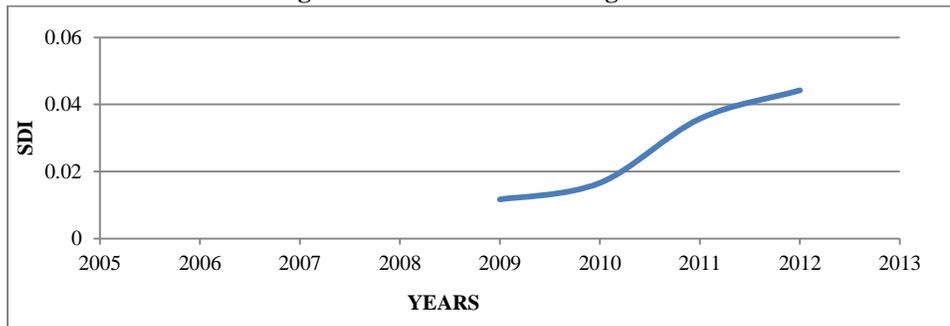
Table 3

*SDI for Different MFIS from Year 2006 to 2012*

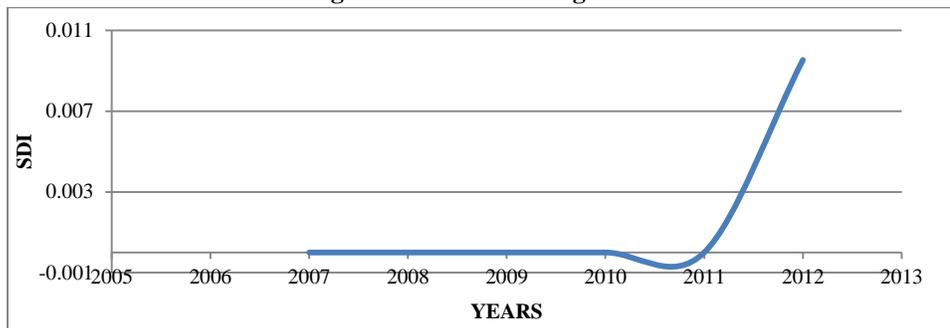
Years	KASHF Bank	NRSP Bank	Khushali Bank	FMFB	Pak Oman MFB	KASHF Foundation	BRAC-AK	Akhuwat Bank
2006	–		0.0181	–0.0047	0.0102	–0.01740	–	0
2007	–	–	0.0137	0.0073	0.0127	–0.05838	–	0
2008	0.01165	–	–0.050	0.0123	0.0962	0.059511	0.00056	0.0368
2009	0.06086	–	1.1070	0.0051	1.6412	0.342643	–2.6395	0.0244
2010	0.20818	0	0.78179	0.0424	–0.023	0.000629	–0.0200	0.0400
2011	0.12055	0.095	0.1837	0.0276	1.6458	–0.17589	0.04568	0.00012
2012	0.04487	–0.09	0.0714	0.0006	2.6923	–0.14432	0.04681	0.00012

#### 4.1.1. Graphs

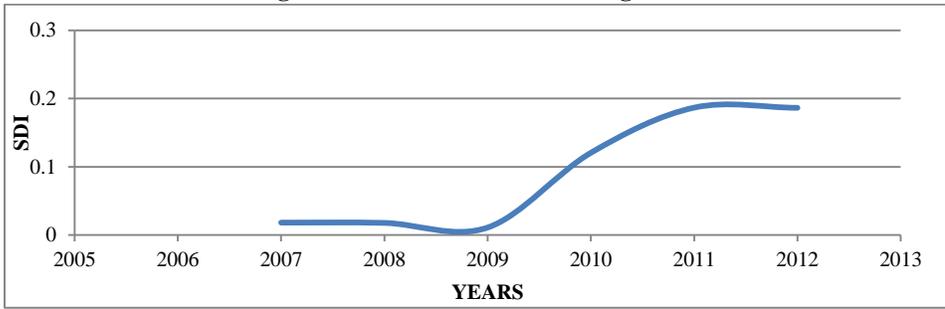
**Fig. 1. Kashf Bank Increasing Trend**



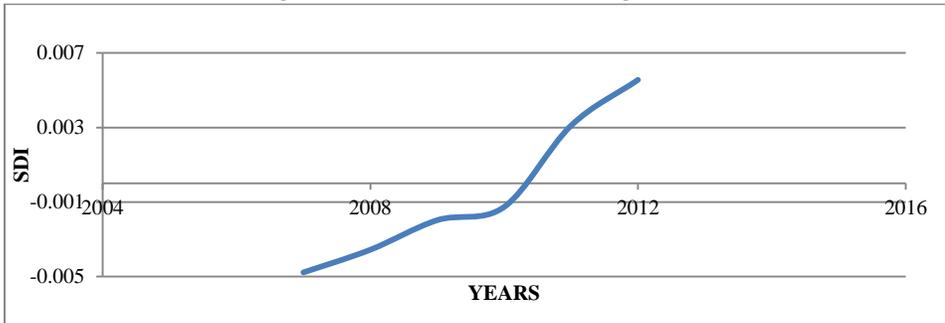
**Fig. 2. NRSP Increasing Trend**



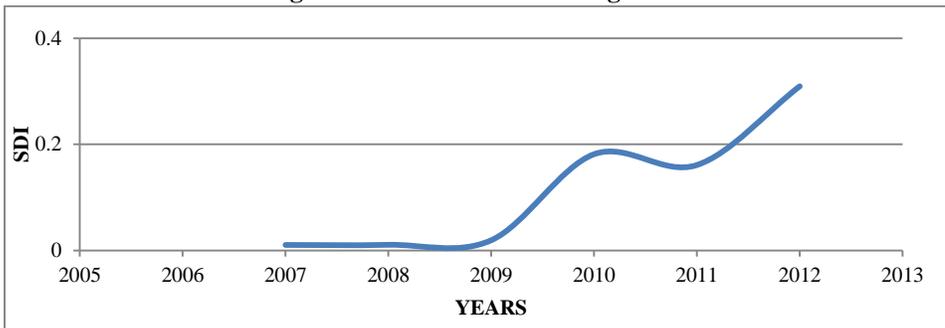
**Fig. 3. Khushali Bank Increasing Trend**



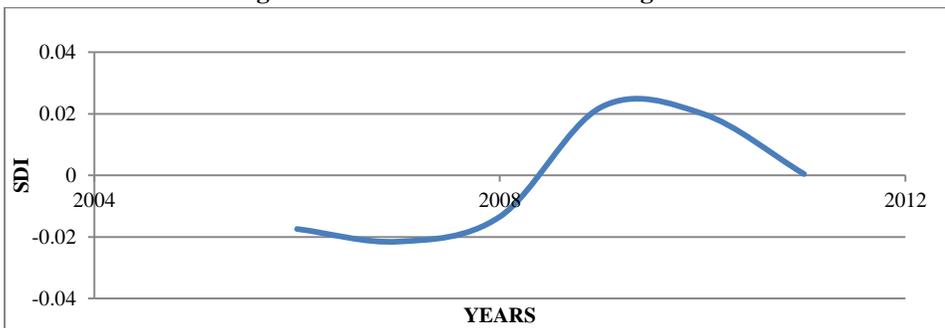
**Fig. 4. Khushali Bank Increasing Trend**

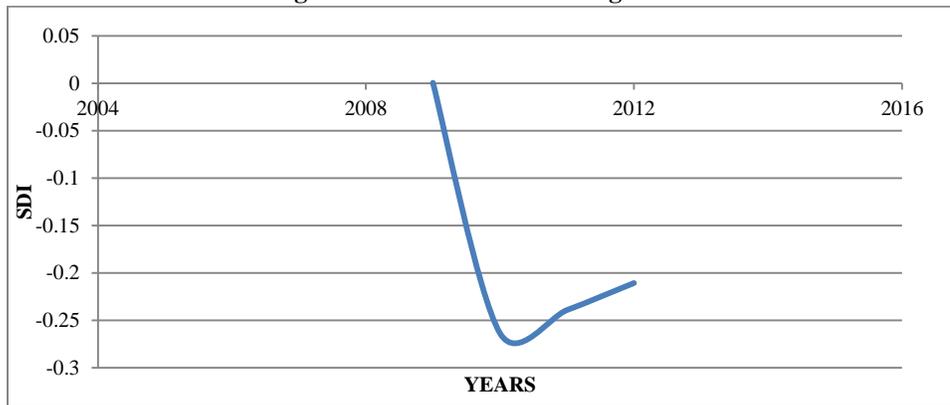
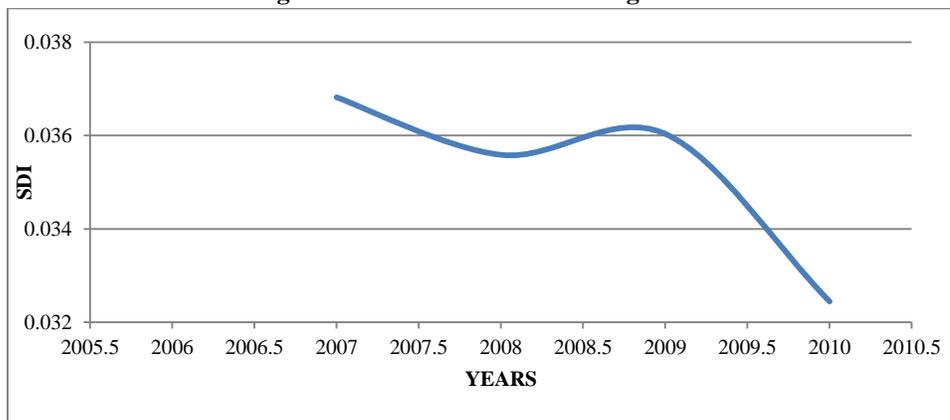


**Fig. 5. POMF Bank Increasing Trend**



**Fig. 6. Kashf Foundation Decreasing Trend**



**Fig. 7. BRAC Bank Increasing Trend****Fig. 8. Akhuwat Bank Decreasing Trend**

SDI was calculated by using the formula of SDI (mentioned above). Variables used for each MFI are average outstanding loan portfolio, lending rate paid on loan portfolio, annual subsidy received by the MFI, MFI concessionary borrowed funds outstanding, assumed interest rate that MFI would have to pay for borrowed funds, weighted average annual concessionary rate of interest actually paid by MFI on its average annual concessionary borrowed funds outstanding, average annual equity. Data of all variables is given in income statements of microfinance institutions given on mix market website except subsidy. Subsidy was calculated by using the formula of subsidy (mentioned above). SDI of all MFIs range from 0 to 1. SDI of KASHF bank ranges from 0.01165 to 0.0487. It shows increasing trend. SDI of NRSP bank ranges from 0.095 to -0.091. It shows increasing trend. SDI of Khushali bank ranges from 0.0181 to 0.0714. It shows increasing trend. SDI of First microfinance bank ranges from -0.0047 to 0.0006. It shows increasing trend. SDI of Pak Oman microfinance bank ranges from 0.0102 to 2.6923. It shows increasing trend. SDI of KASHF foundation ranges from -0.01740 to -0.14432. It shows decreasing trend. SDI of BRAC bank ranges from 0.00056 to 0.04681. It shows increasing trend. SDI of Akhuwat bank ranges from 0 to 0.00012. It shows decreasing trend. 0 to 1 range of SDI shows that results are satisfactory.

## 4.2. OI Measurement Models: Results and Findings

### 4.2.1. With Weight Ratio Calculated

Table 4

*OI for Different MFIS from Year 2006 to 2012 with Actual Weight Ratio*

	2006	2007	2008	2009	2010	2011	2012
Khushali Bank				0.66 Society benefit	0.64 Society benefit	0.62 Society benefit	0.66 Society benefit
NRSP Bank						0.92 Society benefit	0.83 Society benefit
KASHF Bank			0.96 Society benefit	0.96 Society benefit	0 Society benefit	0.97 Society benefit	
FMFB Bank			0.55 Society benefit	0.57 Society benefit	0.59 Society benefit	0.59 Society benefit	0.54 Society benefit
POMFB Bank				0.66 Society benefit	0.64 Society benefit	0.60 Society benefit	0.59 Society benefit
KASHF Foundation						0.75 Society benefit	0.75 Society benefit
BRAC Bank				0.76 Society benefit	0.81 Society benefit	0.78 Society benefit	0.78 Society benefit
AKUWAT Bank			0.78 Society benefit	0.78 Society benefit	0.78 Society benefit	0.77 Society benefit	

### 4.2.2. With 0.6 and 0.4 Weight Ratios

Table 5

*OI for Different MFIS from Year 2006 to 2012 with 0.6 and 0.4 Weight Ratio*

	2006	2007	2008	2009	2010	2011	2012
Khushali Bank				0.60 Society benefit	0.59 Society benefit	0.59 Society benefit	0.59 Society benefit
NRSP Bank						0.644137 Society benefit	0.63292199 Society benefit
KASHF Bank			0.44 Society not benefit	0.44 Society not benefit	0 Society not benefit	0.44 Society not benefit	
FMFB Bank			0.50 Society benefit	0.58 Society benefit	0.59 Society benefit	0.59 Society benefit	0.56 Society benefit
POMFB Bank				0.47 Society not benefit	0.47 Society not benefit	0.49 Society not benefit	0.49 Society not benefit
KASHF Foundation						0.45 Society not benefit	0.44 Society not benefit
BRAC Bank				0.42 Society not benefit	0.39 Society not benefit	0.40 Society not benefit	0.40 Society not benefit
AKUWAT Bank			0.41 Society not benefit	0.41 Society not benefit	0.42 Society not benefit	0.416 Society not benefit	

### 4.2.3. With Fixed 0.5 Weight Ratio

Table 6

*OI for Different MFIS from Year 2006 to 2012 with 0.5 Weight Ratios*

	2006	2007	2008	2009	2010	2011	2012
Khushali Bank				0.5	0.5	0.5	0.5
				Society not benefit	Society not benefit	Society not benefit	Society not benefit
NRSP Bank						0.5	0.5
						Society not benefit	Society not benefit
KASHF Bank			0.5	0.5	0	0.5	
			Society not benefit	Society not benefit	Society not benefit	Society not benefit	
FMFB Bank			0.5	0.5	0.5	0.5	0.5
			Society not benefit				
POMFB Bank				0.5	0.5	0.5	0.5
				Society not benefit	Society not benefit	Society not benefit	Society not benefit
KASHF Foundation						0.5	0.5
						Society not benefit	Society not benefit
BRAC Bank				0.5	0.5	0.5	0.5
				Society not benefit	Society not benefit	Society not benefit	Society not benefit
AKUWAT Bank			0.5	0.5	0.5	0.5	
			Society not benefit	Society not benefit	Society not benefit	Society not benefit	

The society will benefit when subsidy is equally distributed among male and female and rural and urban community as four cases are considered for this study.

The results calculated from actual weight ratio are not up to the mark because for actual weight ratio subsidy distributed among other communities are also taken in account but due to non-availability of data we have taken only four categories that's why results are not appropriate.

The results calculated from 0.5-weight ratio are also not up to the mark because of equal distribution among all categories is not possible.

The results calculated from 0.6 and 0.4 weight ratio are satisfactory because the MFIs which have better distribution between male and female and similarly rural and urban, will ultimately lead toward benefit for society, which has also seen from calculation that Khushali, NRSP and FMFB lead toward benefit for society.

### 4.3. FSS MFSS Measurement Models: Results and Findings

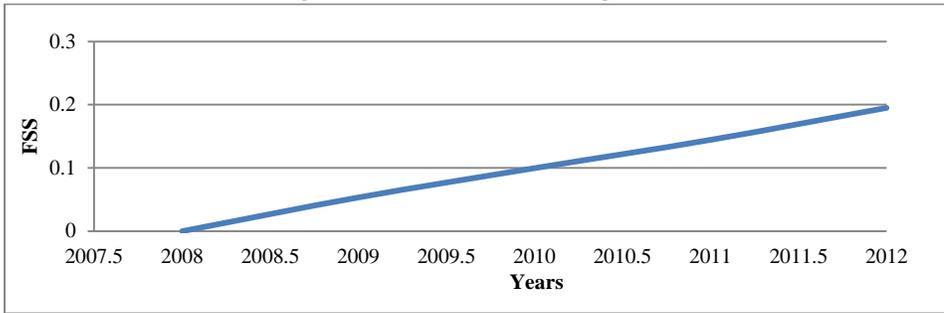
Table 7

*FSS for Different MFIS from Year 2006 to 2011*

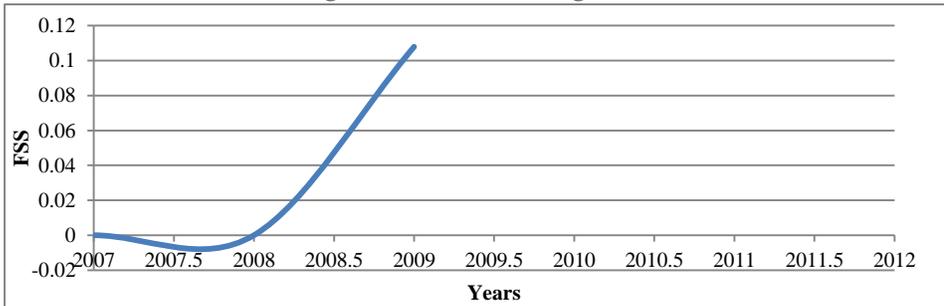
Years	KASHF Bank	NRSP Bank	Khushali Bank	FMFB	POMFB	KASHF Foundation	BRAC Bank	Akhuwat Bank
2006	–	–	0.874	1.130	0.690	1.506	–	0.690
2007	–	–	0.813	0.892	0.642	1.551	–	–
2008	0.532	–	0.834	0.825	0.734	0.586	0.034	0.582
2009	0.516	–	1.033	1.019	0.861	0.097	0.614	0.326
2010	0.547	0.000109	1.139	0.885	1.047	0.775	0.655	0.186
2011	0.650	1.079	1.090	0.931	1.070	0.840	0.637	0.912
2012	0.752	1.140	1.031	0.954	0.989	0.997	0.718	–

4.3.1. Graphs

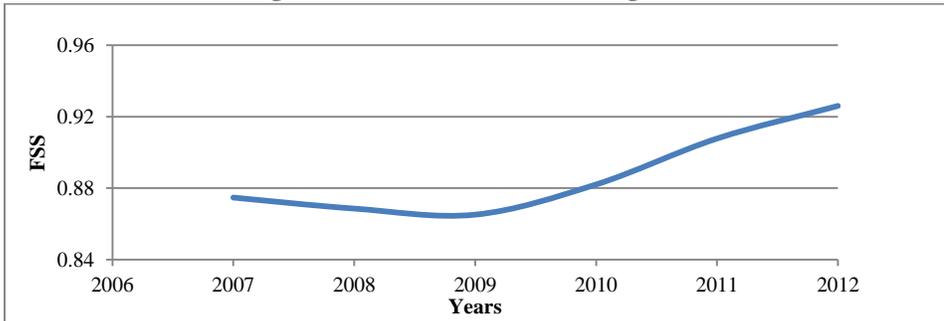
**Fig. 9. Kashf Bank Increasing Trend**



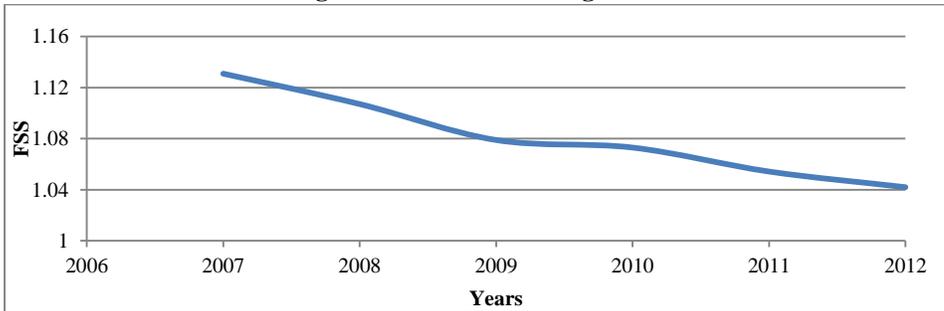
**Fig. 10. NRSP Increasing Trend**



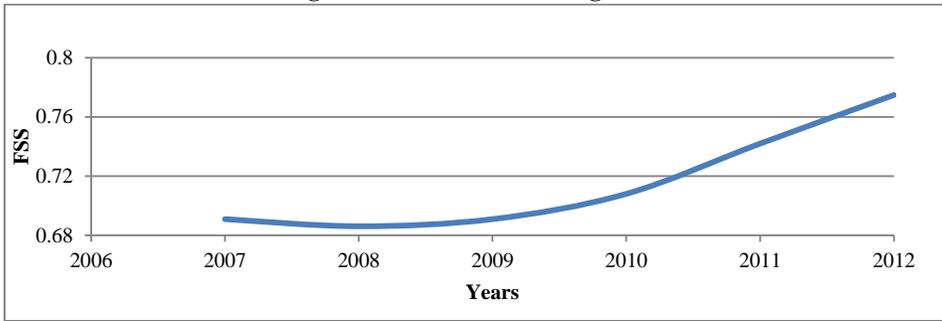
**Fig. 11. Khushali Bank Increasing Trend**



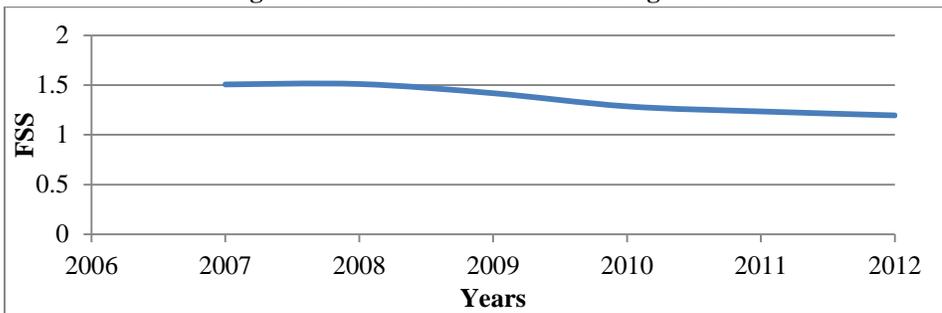
**Fig. 12. FMFB Decreasing Trend**



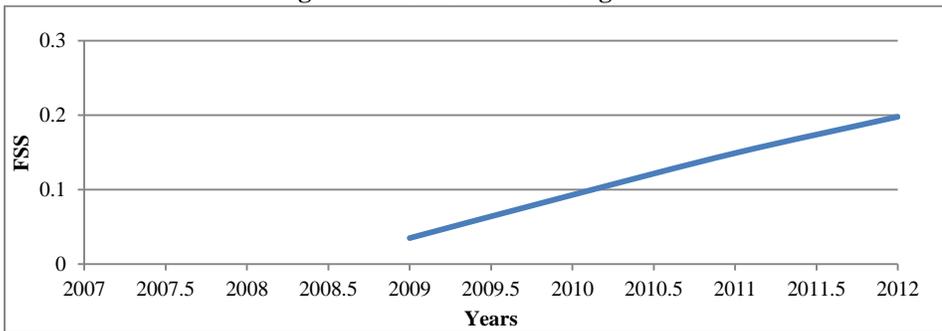
**Fig. 13. POMFB Increasing Trend**



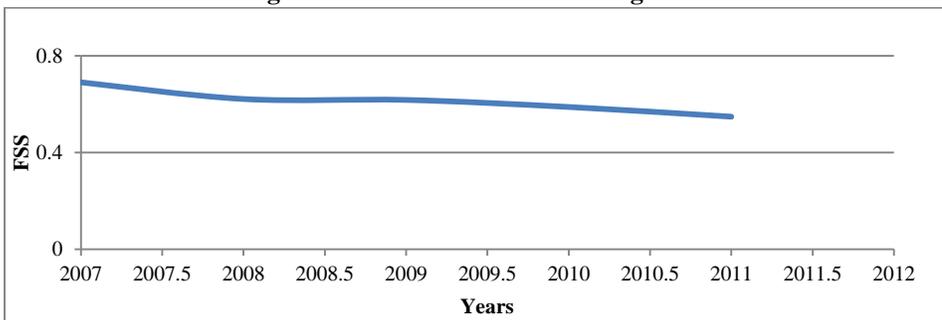
**Fig. 14. Kashf Foundation Decreasing Trend**



**Fig. 15. Brac Bank Increasing Trend**



**Fig. 16. Akhuwat Bank Decreasing Trend**



Results show that KASHF bank, NRSP, Khushali bank, POMFB, BRAC bank have become more financially self-sufficient with passing years but First Microfinance bank limited, KASHF foundation, Akhuwat bank are showing decreasing trend. It shows that their financially self-sufficiency is decreasing with time.

## 5. CONCLUSIONS

- (1) SDI index shows dependence of Microfinance institutions on subsidies. SDI of 0 shows that a microfinance institution is sustainable or we can say that the MFI is capable of covering all the subsidies (on borrowed funds) from its profit. A negative value of SDI shows that a MFI is completely self-sufficient and this particular MFI is also getting profit after covering its costs. Similarly the positive SDI value shows that MFI is not sustainable and in order to become sustainable, MFI has to increase its lending rate. In our case all the MFIs are showing different trends of their dependence on subsidies. Kashf bank, NRSP, Khushali bank, First Microfinance bank, Pak Oman microfinance bank, BRAC bank, all of these MFIs are showing increasing trend. This indicates that with passing years, they are relying more on subsidies. On the other hand KASHF foundation and Akhuwat foundations are showing decreasing trend. It shows that with time, they have become more self-sufficient and sustainable.
- (2) When  $CW < C$ , it shows that more subsidies are allocated to lower income group of society, hence society benefits from subsidies. And when  $CW > C$ , it shows that targeting the lower income group requires more cost. Therefore, society does not benefit from subsidies. We have calculated first OI with actual calculated weight ratios, then with 0.6 and 0.4 ratios and then with 0.5 weight ratio. In first case results show that society benefits from the subsidies. In second case, results show that in case of Khushali bank, NRSP bank, First microfinance bank, more subsidies are allocated to lower income groups of society and society benefits from the subsidies but on the other hand in case of BRAC bank, KASHF foundation, Akhuwat foundation, KASHF bank, Pak Oman microfinance bank, less subsidies are allocated to lower income groups of society and society does not gain from subsidies. In third case, results of all MFIs show that society does not get benefit from the subsidies and fewer subsidies are allocated to lower income group of society.
- (3) FSS. Results show that KASHF bank, NRSP, Khushali bank, POMFB, BRAC bank have become more financially self-sufficient with passing years but First Microfinance bank limited, KASHF foundation, Akhuwat bank are showing decreasing trend. It shows that their financially self-sufficiency is decreasing with time.
- (4) Both the FSS and SDI show different results relating to the subsidy dependence of the same microfinance institutions. SDI results show that more MFIs are increasing dependence on subsidy while FSS results show that more MFIs are become financially self-sufficient with time, which is not the case in reality because administrative costs are increasing with every year but yield on loan portfolio is not necessarily increasing. Hence we can say that FSS underestimates the subsidy dependence of microfinance institutions and does not

depict the exact picture of subsidy dependence of microfinance institutions.

- (5) Microfinance institutions should struggle to reduce operational cost. In this way, they will be more financially sustainable and will be able to target poor population more efficiently. If operational cost is large, and it is not covered with in their income, then MFIs cannot reach their clients in far off places because by doing so, they will be financially unsustainable.

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## Microfinance Institutions and Poverty Reduction: A Cross Regional Analysis

ATTIYA YASMIN JAVID and AFSHEEN ABRAR

### 1. INTRODUCTION

The alleviation of poverty is one of the most debated issues among the academicians and policy makers. From 1950s to 1980s the poverty reduction program has been based on increase the participation of poor into the economy by better macroeconomic performance. Though the poor part of population mostly engaged in informal sector<sup>1</sup> is identified by researchers but has not become the part of economic models and government policy [Robinson (2001)]. Poverty reduction has been institutionalised in 1944 when World Bank was set up. The World Bank worked through governments and institutions by giving loans to developing countries called structural-adjustment programmes. These programmes were highly unsuccessful, created dependence on aid with little help to poor part of societies [Murduch (1999) and Diop, *et al.* (2007)].

This failure due to distrust in formal institutions give the beginning of a shift in development thinking that leads to the emergence of microfinance. The focus is support of the informal sector by providing credit to help people to pull them above the poverty line. Microfinance helps these informal micro-enterprises through micro-credit. The micro-credit approach to poverty reduction is “the provision of small loans to individuals, usually within groups, as capital investment to enable income generation through self-employment” [Weber (2006)]. The informal businesses of poor are referred as a type of un-met demand for credit. Poverty is considered as the outcome of market failure,<sup>2</sup> microfinance would correct the market failure, providing access to credit to the poor. Credit would create economic power that would generate into social power, lifting the poor out of poverty [Yunus (1999)].

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*Authors' Note:* The errors and omissions are authors' sole responsibility.

<sup>1</sup>Until 1980s the presence of in-formal microenterprises- street vendors, home workshops, market stalls, providers of informal transportation services-are generally considered by policy-makers and economists to be a result of economic dysfunction [Robinson (2001)].

<sup>2</sup>Market imperfections, asymmetric information and the high fixed costs of small-scale lending, decrease to reach of the poor to formal finance, thus the poor will chose the informal financial sector or to the worst case of financially excluded [Green, Kirkpatrick, and Murinde (2006)].

Thereafter, microfinance is considered as an important tool for reducing poverty.<sup>3</sup> These developments have generated high expectations from the microfinance programs to alleviate poverty effects among donors and policy makers and aid organisations. However, latter it is recognised that microfinance programmes can play long term and significant role to reduce poverty, MFIs need to be successful in extending loans to poor borrowers, while at the same time being able to at least cover the costs of their lending activities, i.e., they may need to focus on being financial sustainable in the long run” [Armendariz and Labie (2011)].

MFIs are facing a double challenge in reducing poverty: they have to provide both financial services to the poor (outreach) and also cover their costs in order to avoid bankruptcy (sustainability). This is the main motivation to assess MFIs’ both dimensions to deal poverty that are taken into account in the present paper.

The present study tries to answer this question by analysing whether microfinance institutions have played some role in reducing poverty in six regions and around the world. The main focus of this study is to find out the determinants of outreach in microfinance industry. The study explores the dimension of outreach depth or breath of outreach, cost of outreach and expected future outreach that are more meaningful in alleviating poverty. The impact of institutions specific factors like cost, profitability, and MFI age, MFI size, lending methodology, regulation and risk on the outreach of MFIs are investigated. The country specific factors such as economic conditions of the country and regional dummies are also included to examine their impact on outreach in six regions of the world.

The study contributes to the existing literature by investigating depth, breath and cost of outreach of MFIs in reducing poverty, increasing empowerment opportunities and maintains sustainability in microfinance institutions. It also highlights that the tradeoff is required by MFIs in outreach and sustainability in order to perform microfinance activities for a longer period of time. Since the cost of outreach is higher that demands an optimal level of profitability that can be generated through efficient management of MFIs through cost reducing on regular basis. This study also signifies that age, size, regulation, lending methodology, legal status and geographic location of MFIs, human development index and population density to capture country specific factors also affect their outreach.

After brief introduction the remainder of the study is organised as follows. Section two reviews the relevant literature on the role of microfinance on poverty alleviation. Methodology and data used in the analysis is discussed in section three. The empirical results and their interpretation are provided in section four and last section offers conclusion.

## 2. LITERATURE REVIEW

A large number of studies on the impact of microfinance in poverty reduction has been conducted especially in developing countries in past few years with the growth of microfinance institutions in these countries. There is wide range of evidence that suggests that microfinance increase income, increase business profits and lift the people out of poverty. In contrast there are studies which supports the contrast view that microfinance

<sup>3</sup>UN has declared 2005 to be the international Year of Microcredit and Mohammad Yunus has received the Nobel Peace prize in 2006.

programs are successful in reducing poverty in few regions like Asia and Latin America but not in every region. This section provides the brief review of the most relevant studies done in this area.

Olivares and Polance (2005) have analysed average outstanding loans used as proxy for depth of outreach, as dependent variable with other explanatory variables like age of institution, lending methodology, sustainability, competition, and gender. Their results reported negative relationship between age and loan size which means that older MFIs give loan of small sizes. Another study conducted by Mersland and Strom (2009) document that average loan size is a main proxy of serving the poorest of the society. They find a positive relationship between average profit and average loan size indicating that the increase size of loan represent increase urge for profit by MFIs. Christen and Drake (2002) show a positive relationship between depth outreach measured by average loan size with profitability. Their study empirically support that MFIs in Latin America are most profitable, as their profitability is the mixture of three properties; large loan size, competition and regulations.

Wagenaar (2012) has worked on institutional transformation and mission drift in microfinance institutions. According to him, there is huge pressure from donors on microfinance institutions to be profitable. Due to this reason some MFIs have transformed from non-profit to profit oriented institutions. He argues that financial sustainability may lead toward less reaching to the poorest of the poor. Results show that transformed MFIs have significantly higher loan size and have lower percentage of female borrowers. This shows that transformation effects outreach that cause deviation from social mission towards profitability. Cull, *et al.* (2011) investigate regulated and non-regulated microfinance institutions. The results show that regulated MFI has high loan size than non-regulated NGO type microfinance institutions. The operating cost increases as loan size decreases by lending to poorer segment. To minimise or absorb this operating cost MFI are more tempted towards better off clients and restrict outreach to poorer segment and increases loan size is reported. Therefore, regulated microfinance institutions are more likely to experience deviation from social mission than non-regulated NGO type institutions.

Rashid, *et al.* (2011) find positive impact of microfinance on poverty alleviation. They show that increased fund, lower interest rate and accessible financial services made microfinance important and effective for poverty reduction. Another study of Zacharias (2008) shows that average cost and efficiency goes in opposite direction. He has addressed the issue of economics of scale in microfinance institutions and finds evidence of scale efficiencies. His study focuses on the operational cost and size relationship finds that bigger firm is associated with smaller cost. The study finds that average loan size and average cost are negatively co-related thus suggesting that increase in average loan and firm size reduces the operational cost.

Robert, *et al.* (2011) examine the tradeoff between outreach and efficiency of MFIs. They find that MFIs operating in countries with good financial development are more efficient. They find that outreach is negatively related with efficiency suggesting that MFIs with small loan size are less efficient. Their findings showed that efficiency can only be obtained when MFI will focus less on poor segment.

Cull, *et al.* (2007) find not a significant relationship between loan size and profitability. For individual lender results reveal that higher profit leads towards lower outreach resulting in crowding out the poorer clients. Village micro banks put more focus on advancing small loans to the very poor and bear high average cost and receive more subsidies. Few individual lending institutions strive best for both profitability and higher outreach to the poor; fulfilling their ultimate promises, but these are exceptional cases. Finally their results showed that MFIs with higher profits lead toward weak level of outreach and kicks out the very poor from financial schemes.

Armendariz and Szafarz (2009) empirical work on Latin America and south Asia show that poverty oriented MFIs may not serving poor neither because of progressive lending nor because of cross subsidisation. It is not only the result of transaction cost but also due to their own mission fulfilling strategy and other region specific characteristics. According to their findings if all loans are identical then transaction cost only affects the number of loans not the size of loan. Secondly if there are two types of clients, poor and unbanked wealthier clients, having different transaction cost then mission drift on the loyalty of MFIs with outreach maximisation objective. Finally MFIs may use unbanked wealthier clients for purpose of cross subsidisation for poor showing strong commitment with outreach.

Ghosh and Tassel (2008) observe that MFIs may drift from their mission and start focusing on profitable less costly borrowers in order to attract more profit oriented investors. Their results show that funded by profit oriented donors charge higher interest rates. According to their findings poverty gap ratio is the reason for not reaching the poor. Higher interest rates are mainly due to very heavy transaction cost that arises when lending small amounts to poor people is observed by Gonzalez (2010). He further states that Microfinance interest rates normally range between 20 to 70 percent per year, depending on the nature of the activity, however they can touch very high level, as high as 90 percent per year. Strom and Mersland (2007) find no significance difference between nonprofit organisation and shareholder owned MFIs in terms of financial performance and outreach. They do not find any evidence that shareholder owned firm produces more better results in terms of outreach or profitability than nonprofit organisations. So their study clearly indicates that it is MFIs own vision and mission that make MFI good or bad at becoming profit orienting or setting maximum outreach as basic objective. They find that group lending is expensive but results in maximum outreach; on the other hand individual lending is better for financial sustainability. In defining the sustainability of MFIs the role of interest rates cannot be under-valued.

Fernando (2006) shows that the Human Development Index (HDI) is a measure that ranks countries on the basis of human development. It has four levels ranging from "very high, "high, "medium", and "low, human development countries. This Index relatively measures of education, literacy, standards of living and life expectancy for countries worldwide. According to Kai (2009) for measuring the impact of economies of scale, another explanatory variable population density has been introduced, the higher value of the index shows, more population concentration. The value can range from 0 (the population would be equally scattered all over county or region) to 100 (all population would be concentrated in one area of the country or region) considering the effect of economies of scale, a higher value of index may lead to reduce the operational costs, thus increasing productivity. Add a line about the findings of HDI and PDP in two studies.

### 3. METHODOLOGY AND DATA

The poverty is reduced by reaching the poor and long term serving the poor that is possible when MFIs' are financially sustainable, therefore both outreach and financial suitability is investigated in this study.

#### 3.1. Methodological Framework

The main focus of this study is to examine that microfinance institutions are playing their role to reduce poverty. The microfinance institutions objectives include; outreach to the poor and institutional financial sustainability that is long run expected outreach to cut poverty [Zeller, *et al.* (2002) Schreiner (2002)]. The different dimensions of outreach are discussed in the literature Schreiner (2002) and followed by several studies investigating outreach and financial sustainability Mersland and Strom (2008); Woller (2006); Woller and Schreiner (2002) and many recent studies and used by performance evaluation and impact assessment studies by donors like USAID [Mersland and Strom (2008)].

The breadth of outreach indicates the number of poor participate in microfinance program.<sup>4</sup> It is expected that the larger the number of borrowers the better the outreach and more the poorest population is served. The number of active borrowers is used to capture breadth of outreach in the present study. The depth of outreach captures the value of net gain of a borrower as a client of MFI programme and it is based on the argument that outreach must be measured not just by total number of borrowers but on the number of poor borrowers,<sup>5</sup> as their relative level of poverty is also considered. The average loan size has been used as a proxy measure of breadth of outreach and smaller loans indicate poorer borrowers are served, all other things being equal.<sup>6</sup> The average loan size captures the depth of outreach in the present study following Schreiner (2001) and others.

The cost of outreach to an MFI client refers to interest rate paid and other related costs as a result of receiving financial services from MFIs. The cost of outreach is the highest amount the borrower would agree to bear to get the loan [Navajas, *et al.* (2000)]. Therefore, all things being equal, the less the cost of outreach the more clients are willing to borrow. Interest charges are used as a measure of cost to clients [Mersland and Strom (2008) and others].

The Financial sustainability is the ability of MFI to cover all its operating and financing costs from revenue mostly from the return of loans portfolio [Tellis and Seymour (2002) and Thapa, *et al.* (1992)]. The amount of return will depend on the interest rates charged and the volume of loan outstanding which in turn depend on average loan and the number of loans remaining outstanding. This would mean that, all things being equal, the more clients MFIs have that take loans, at the same or higher interest rates the higher the revenue. On the other side the higher the cost incurred to serving its clients would mean a reduced profitability to an MFI. This implies that in order to achieve sustainability, the MFIs that target poorer borrowers must charge higher

<sup>4</sup>Studies have used the number of borrowers as measures of microfinance breadth of outreach [Mersland and Strom (2008, 2009); Hermes, *et al.* (2008) and others].

<sup>5</sup>Navajas, *et al.* (2000); Hulme and Mosley (1996) and many recent work.

<sup>6</sup>Mersland and Strom (2009); Cull, *et al.* (2007), Adongo and Stork (2006); Hartarska (2005); Woller and Schreiner (2002) and Schreiner (2001).

interest rates [Conning (1999)]. Charging higher interest rates, which could lead to profitability, may however, price the poorest out of the microfinance services and thereby adversely affecting the attainment of the social objective of the MFIs [Morduch (2000)].

Most participants in the informal sector are believed to be women [Liedholm and Mead, (1995)]. Although female are about 50 percent of the world's work force, and contribute about 67 percent of the world's work, but only 10 percent of the world's wages are earned by them and belong 1 percent of its wealth. Most female are doing same work as male do, but females face more poverty within the household than male, but their work is mostly not visible nor paid [Fernando (2006b)]. It is believed that providing credit to the women by MFIs will reduce the poverty of the household.

The following models are estimated to examine the effect of MFI specific factors and country specific factors on the number of active borrows and average loan size. The number of active borrowers indicator of breadth of outreach is adopted by Armendariz, *et al.* (2011) and other studies. Average loan size is also widely.

In Equation (1) AB is the number of active borrowers which measures the breadth of outreach<sup>7</sup> and it is related with the capital structure, average profit, average cost, size of MFI, age of MFI, portfolio at risk. A set of dummy variables include: group lending will take 1 and zero for individual lending, NGO is 1 and zero if MFI has other legal status, operates in rural market take 1 and zero for urban market, regulated take 1 and unregulated zero. To measure country specific difference Human Development Index (HDI) and Population Density per square meter (PDP) are used. HDI is a measure that ranks countries on the basis of human development. It has four levels ranging from "very high, "high, "medium", and "low, human development countries. This Index relatively measures of education, literacy, standards of living and life expectancy for countries worldwide. For measuring the impact of economies of scale, another explanatory variable population density has been introduced, the higher value of the index shows, more population concentration. The value can range from 0 (the population would be equally scattered all over county or region) to 100 (all population would be concentrated in one area of the country or region) considering the effect of economies of scale, a higher value of index may lead to reduce the operational cost.

Due to interdependence of number of active borrowers, average loan size, interest rate and financial sustainability, these four models are estimated simultaneously given below:

$$AB_{it} = \alpha_0 + \alpha_1 Profit_{it} + \alpha_2 Cost_{it} + \alpha_3 Size_{it} + \alpha_4 Risk_{it} + \alpha_5 Cap_{it} + \alpha_6 FSS_{it} + \alpha_7 Age_{it} + \alpha_8 Rural_{it} + \alpha_9 Group_{it} + \alpha_{10} Ngo_{it} + \alpha_{11} Reg_{it} + \alpha_{12} HDI_{it} + \alpha_{13} PD_{it} + \varepsilon_{it} \quad (4.1)$$

$$ALS_{it} = \beta_0 + \beta_1 Profit_{it} + \beta_2 Int_{it} + \beta_3 Size_{it} + \beta_4 Risk_{it} + \beta_5 Cap_{it} + \beta_6 FSS_{it} + \beta_7 Age_{it} + \beta_8 Rural_{it} + \beta_9 Group_{it} + \beta_{10} Ngo_{it} + \beta_{11} Reg_{it} + \beta_{12} HDI_{it} + \beta_{13} PD_{it} + \varepsilon_{it} \quad (4.2)$$

$$Int_{it} = \gamma_0 + \gamma_1 Profit_{it} + \gamma_2 ALS_{it} + \gamma_3 Size_{it} + \gamma_4 Risk_{it} + \gamma_5 Cap_{it} + \gamma_6 FSS_{it} + \gamma_7 Age_{it} + \gamma_8 Rural_{it} + \gamma_9 Group_{it} + \gamma_{10} Ngo_{it} + \gamma_{11} Reg_{it} + \gamma_{12} HDI_{it} + \gamma_{13} PD_{it} + \varepsilon_{it} \quad (4.3)$$

$$FSS_{it} = \delta_0 + \delta_1 Profit_{it} + \delta_2 Cost_{it} + \delta_3 Size_{it} + \delta_4 Risk_{it} + \delta_5 Cap_{it} + \delta_6 ALS_{it} + \delta_7 Age_{it} + \delta_8 Rural_{it} + \delta_9 Group_{it} + \delta_{10} Ngo_{it} + \delta_{11} Reg_{it} + \delta_{12} HDI_{it} + \delta_{13} PD_{it} + \varepsilon_{it} \quad (4.4)$$

<sup>7</sup>As indicator of breadth of outreach is adopted by Armendariz, *et al.* (2011) and other studies.

The six regions are expected to be different in depth of outreach, its breadth, women outreach, cost of outreach and financial sustainability as indicator of future outreach. Therefore all four models reported above are estimated by including regional dummies. Among the six regions: Eastern Europe and central Asia. South Africa, South Asia, East Asia and Pacific, Latin America and the Caribbean, and Middle East and north Africa, the Eastern Europe and central Asia is taken as base category.

As this study uses the information for 382 microfinance institutions belonging to six regions over the period for the period 2006 to 2012, the panel data estimation technique is suitable for this purpose. Empirical researches on possibly encounter two sources of discrepancies, missing variables and endogeneity biases and these models have simultaneity as well. The generalised method of moment GMM estimator is more suitable as it deals with the problems. The generalised method of the moment model suggested by Arellano and Bond (1991) and modified by Blunder and Bond (1998) is used as the estimation technique. The lag explanatory variables are used as instruments and the Sargen test is used to test the validity of the instrumental variables.

### **3.2. Data**

The data has been collected for 382 Micro finance institutions, located in 70 countries throughout the six regions of the world including: The six regions Eastern Europe and Central Asia, South Africa, South Asia, East Asia and Pacific, Latin America and the Caribbean, and Middle East and North Africa. The data is on annual basis covering the period 2006 to 2013. The data is from Microfinance Information Exchange (Mix) which is an authentic source providing uniform data all over the world.

## **4. EMPIRICAL RESULTS**

The effect of microfinance institution specific and country specific factors that influence outreach to the poor and being financial sustainability that is expected outreach of these instructions in the long run to cut poverty. The panel data is used and generalised method of Moments of Blunder and Bond (1998) is applied as estimation technique. The analysis begins with the distribution of MFIs among different regions, type, regulated or unregulated and on the country level are presented in Table A1, A2, A3 and A4 in Appendix respectively.

The results of factors determining the breadth of outreach are reported in Table 4.

1. The cost per borrower has negative and significant effect on total number of active borrowers in almost all regions and worldwide. Therefore, as cost increases MFIs serve less borrowers by giving larger loans to fewer clients. This is also consist with the Yunus (1999) observation that increasing cost may reduce micro loans to the core poor clients. The results also confirm by other studies including Mersland and Strom (2009). The age of an MFI has positive impact on number of active borrowers which is significant for almost all regions and also collectively indicating mature firm have more active clients. The large sized of MFI serve more active borrowers in all regions and collectively. The risk of repayment is inversely related to breadth of outreach but significant in Eastern Europe, Latin America and in world. Regulated firm have less clients but negative relationship is significant in South Asia, Latin America and in all regions together. Group

lending relative to individual has positive effect in Africa, Latin America and worldwide showing that group lending increase the breadth of outreach When MFIs operate in rural markets the number of client increases and this increase is significant in Eastern Europe, Africa, Latin America and overall in six regions. Capital structure has no impact on the breadth of outreach. Increase in human development, population density also increases client served but this relationship is significant in South Asia and worldwide. The results show that financial sustainability is positively and significantly related with the total number of active borrowers in South Asia, Latin America and Eastern Europe and overall regions. This means as increase in the number of borrows increase sustainability. The result is also in line with the results of Logotri (2006) but in contrast with Marsland and Storm (2008).

The results reported in Table 4.2 are the factors that affect depth of outreach measured by average loan size. The result shows that an MFI is able to earn higher profit when loan size is larger. This is in conformity with Yunus (1999) argument that big loan size creates more profit and this thing crowd out the poorer clients from credit scheme [Christen and Drake (2002)]. The loan size increases with increase in cost significantly in Latin America and worldwide, MFIs are needed to increase efficiency to minimize cost and to avoid mission drift. When an MFI is efficient, its cost is low and loan size is also small. This result is also in line with the cost findings of Mersland and Strom (2011), Freixas and Rochet (2008). The results indicate that average loan size increases as size of the MFI increases in all regions. This result is supported by Mersland and Strom (2011). MFI maturity has positive impact on loan size and significant for South Asia, Middle East, Latin America and worldwide. The results show that financial sustainability has positive and significant effect on average loan size. As average profit increases loan size also increases and as average profit decreases average loan size also decreases. The result is consistent with the findings of Mersland and Strom (2011) and Freixas and Rochet (2008) model.

Table 4.1

*Results of Determinants of Breadth of Outreach Measured by  
Number of Active Borrowers*

	East Asia & Pacific		Eastern Europe & central Asia		Middle East & North Africa		South Africa		South Asia		Latin America & Caribbean		All world	
	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat
C	3.40	1.37	-3.62*	-9.14	7.49	8.73	7.30*	8.46	-2.14*	-1.81	-3.75*	-9.59	1.38*	6.27
AGE	0.06*	2.45	0.01	0.40	0.05*	2.02	0.06*	2.35	0.02**	1.74	0.01	0.47	0.02*	4.95
CAP	0.14	0.24	0.19	1.33	0.51	1.03	0.73	1.50	0.34*	3.31	0.19	1.35	0.55*	7.49
GROUP	-1.42*	-3.16	0.12*	2.26	-0.19*	-2.96	-0.23*	-3.02	-0.30	-1.48	0.12*	2.29	0.40*	7.41
REG	-0.01*	-1.87	-0.18*	-2.94	-0.09	-0.27	0.17	0.56	0.30***	1.77	-0.19*	-3.03	-0.03***	-1.76
NGO	0.03	1.35	0.14***	1.76	0.03**	1.77	0.17**	1.71	0.21*	2.11	0.09*	3.11	0.18*	3.14
RISK	-0.51	-1.37	-0.67*	-5.28	-0.69	-1.21	-0.40	-1.03	-0.16	-0.61	-0.64*	-5.24	-0.18*	-4.21
FSS	-0.21	-0.90	0.81*	4.58	-0.97	-0.82	-0.50	-0.62	0.50*	1.84	0.18*	4.59	0.61*	2.55
SIZE	0.22*	5.45	0.77*	4.86	0.22*	5.41	0.21*	5.16	0.60*	17.34	0.77*	5.02	0.55*	8.26
Cost	0.96*	3.14	0.51*	3.85	0.32*	3.41	0.19*	2.77	0.08*	2.94	0.51*	3.92	0.73*	5.00
Rural	0.29	0.93	0.37*	6.65	0.06	0.17	0.05	0.13	0.39	0.70	0.37*	6.67	0.42*	6.81
Profit	-0.69*	-2.21	0.35*	8.14	-0.42*	-1.97	-0.79*	-1.98	-0.23	-1.25	0.32*	7.88	-0.05	-0.44
HDI	6.65***	1.71	0.04	0.12	0.67	0.69	0.47	0.48	0.64*	2.87	0.22	0.62	2.02*	11.41
PDP	0.01	1.29	0.02	-0.19	0.01	1.28	0.01	1.40	0.01*	3.27	0.01	0.26	0.02*	7.21
R <sup>2</sup>	0.48		0.46		0.50		0.49		0.45		0.40		0.49	

Note: The \* indicates significance at 1 percent, \*\* significance at 5 percent and \*\*\* significance at 10 percent.

Table 4.2

*Results of Determinants of Depth of Outreach Measured by Average loan size*

	East Asia & Pacific		Eastern Europe & central Asia		Middle East & North Africa		South Africa		South Asia		Latin America & Caribbean		All world	
	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat
C	-1.77	-1.60	1.18	2.29	0.52	3.87*	0.11	0.30	-0.18	-0.32	2.56*	10.95	0.41*	4.65
AGE	0.02	1.15	0.01	-0.03	-0.01	-2.91*	0.04	3.17*	0.01	0.86	0.01*	2.26	0.01*	3.26
CAP	-0.76*	-2.54	0.23	0.98	-0.15	-1.56	0.11	0.46	-0.07	-0.33	-0.39*	-3.25	0.09*	1.90
GROUP	0.06	0.21	0.15*	1.90	0.23	2.96*	-0.14	-0.67	-0.25*	-2.56	-0.11*	-2.46	-0.11*	-3.33
REG	-0.38**	-1.73	0.03	0.37	0.08	1.39	0.24	1.59	0.09	1.15	0.15*	3.04	0.22*	6.60
NGO	-0.03***	-1.75	-0.02**	-1.84	-0.33	-0.831	-0.19*	2.46	-0.02**	-1.79	-0.05*	2.75	0.16*	2.44
RISK	-0.28	-0.13	-0.39	-0.50	0.05	0.07	-1.40	-0.68	0.53	0.50	0.77*	3.74	0.42*	2.37
FSS	-0.02	-0.01	1.34**	1.83	0.17	0.36	-1.45	-1.14	-0.07	-0.16	-0.99*	-2.68	-0.07	-0.45
SIZE	0.09*	5.02	0.01	1.07	0.02	2.82*	0.01	0.94	0.01	1.58	0.05*	12.15	0.05*	16.70
INT	-0.82*	-5.25	0.07	0.39	-0.03	-0.18	-0.06	-0.13	-0.41	-1.20	-0.12	-1.10	-0.17*	-1.98
Rural	-0.34*	-1.93	-0.06	-0.66	-0.26	-3.61*	-0.20	-1.06	-0.16	-0.90	-0.10*	-2.05	-0.14*	-3.65
Profit	0.88	1.30	-0.44	-1.52	-0.17	-0.73	-0.39	-0.63	-0.01	-0.09	-0.59*	-3.86	-0.29*	-3.71
HDI	1.92	1.01	-0.81	-1.12	-0.17	-0.96	0.38	0.80	0.88	0.79	-3.82*	-11.84	-0.72*	-6.80
PDP	0.01*	3.71	0.02*	-2.59	0.00	-5.15*	0.00	-1.22	0.01	-1.11	0.02*	-6.40	0.01*	-5.12
R <sup>2</sup>	0.43		0.44		0.38		0.35		0.35		0.32		0.39	

Note: The \* indicates significance at 1 percent, \*\* significance at 5 percent and \*\*\* significance at 10 percent.

The cost of outreach to an MFI borrowers is captured by real interest rate paid and other related costs as a result of receiving financial services from an MFI. The real interest has two sided affects; interest rate provides financial support and income to the MFI and on the other hand it increases cost of a loan facility to the poor. It inhibits the poor from accessing financial services. There is a relation between cost and interest rate. It is expected that increasing cost will increase the interest rate in order to cover the cost and be financially sustainable on the one hand [Dlamini (2012)]. On the other hand, the less the cost of outreach the more borrowers are willing to get loan from the microfinance and smaller are loan size other things being equal. [Mersland and Strom (2008)]. The results of determinants of interest rate that is measure of cost of outreach are displayed in Table 4.3. The results show that in all six regions and worldwide average loan size is inversely related with interest rate. Higher cost leads to less reaching the poor. Sustainability is positively related to interest rate. Size of MFI does not affect the interest rate in all regions but in all regions together it has small but positive and significant effect on interest rate. Risk of repayments negatively impact interest rate except Eastern Europe. Capital structure, group lending compared to individual, rural market compared to urban and regulation are not significant contributors of cost of outreach. PDP and HDI have no role on the interest rate charged from borrowers.

In Table 4.4 presents the results of factors contributing to financial sustainability. The results indicate that the cost per borrower reduces the financial sustainability of the MFIs as suggested by the accounting theory that costs reduce profitability. This result is also supported by Conning (1999) that MFIs with higher costs per dollar loaned are less profitable and therefore, less financially sustainable. As the case of type of lending group lending has positive effect on sustainability and this is supported by the theory that MFI prefers group lending that ensures repayment and increase financial sustainability. This finding is in line with Hartarska (2005); Mersland and Strom (2009); Armendariz and Morduch (2007); Cull, *et al.* (2007). It is expected that mature MFIs to be more sustainable than younger ones, but results indicate that the age of an MFI is not related to its financial sustainability. The results show positive relationship between MFI size and

Table 4.3

*Results of Determination of Interest Rate as Measure of Cost of Outreach*

	East Asia & Pacific		Eastern Europe & central Asia		Middle East & North Africa		South Africa		South Asia		Latin America & Caribbean		All world	
	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat
C	-0.39*	-2.38	0.33*	2.73	-0.02	-0.31	0.01	0.03	0.03	0.32	0.32*	4.77	0.13*	6.46
AGE	0.01*	3.67	0.01	-1.23	0.01*	2.63	0.01*	2.56	0.01	-0.79	0.01*	-2.28	0.01	-1.12
CAP	-0.07	-1.59	0.07	1.29	-0.08**	-1.87	-0.08**	-1.86	-0.12*	-3.37	0.03	0.76	-0.01	-0.45
GROUP	-0.05	-1.26	-0.02	-1.25	0.01	0.24	-0.01	-0.37	-0.02	-1.15	-0.01	-0.68	-0.01	-1.13
REG	-0.01	-0.24	0.01	0.31	0.08*	2.88	0.08*	2.72	0.02	1.34	-0.01	-0.69	-0.01**	-1.77
NGO	0.02**	1.77	0.13*	2.73	0.04**	1.85	0.01***	1.75	0.04*	1.92	0.20*	1.97	0.13*	2.56
RISK	0.74*	2.30	-0.28	-1.49	0.99*	2.70	0.93*	2.55	-0.10	-0.56	-0.24**	-1.82	-0.05	-1.28
FSS	0.18	0.88	0.33**	1.89	0.34	1.46	0.03*	2.00	0.10	1.40	0.21*	2.03	0.14*	3.98
SIZE	0.01*	1.35	0.02	-0.81	0.01	0.02	0.01	0.51	0.02	1.43	0.01	0.95	0.01*	3.93
ALS	-0.06*	-5.25	-0.01*	-2.39	-0.01	-1.78***	-0.01	-0.28	-0.01	-2.20	-0.01	-1.80**	-0.01*	-1.98
Rural	-0.01	-0.48	0.02	0.73	0.01	0.28	0.01	0.29	-0.01	-0.38	0.01	0.68	0.03*	3.38
Cost	0.71*	8.87	0.26*	3.85	0.83*	9.71	0.84	9.77	0.02	1.17	0.07	1.66	0.01*	5.24
HDI	0.49**	1.82	-0.20	-1.18	-0.10	-1.14	-0.10	-1.11	0.11	0.63	-0.19	-1.97	0.03	1.13
PDPSM	0.02*	4.37	0.01	-1.60	0.01	-0.98	0.01	-1.08	0.02**	1.88	0.02	-1.31	0.02*	-3.47
R <sup>2</sup>	0.68		0.54		0.59		0.59		0.55		0.54		0.55	

Note: The \* indicates significance at 1 percent, \*\* significance at 5 percent and \*\*\* significance at 10 percent.

Table 4.4

*Results of Determination of Financial Sustainability as Measure of Future Expectation of Outreach*

	East Asia & Pacific		Eastern Europe & central Asia		Middle East & North Africa		South Africa		South Asia		Latin America & Caribbean		All world	
	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat
C	-4.25	-1.50	-0.12	-0.62	-0.31	-0.49	-0.41	-0.66	0.87*	3.00	0.28*	2.49	0.30	3.48
AGE	0.02	0.72	0.01	0.79	0.02	-0.18	0.01	0.30	0.02	-0.96	0.01	-0.96	0.01*	-2.83
CAP	0.20*	3.58	0.10	1.13	1.23	2.89	0.32*	3.09	0.31*	2.71	0.12*	2.20	0.25*	8.76
GROUP	-0.20*	2.47	0.04*	2.15	0.06***	1.77	0.01	1.83**	0.04*	2.78	0.05*	2.48	0.02*	2.16
ALS	0.30*	1.90	0.05*	2.28	0.10***	1.73	-0.09	-0.59	-0.02	-0.53	-0.04*	-3.16	-0.08*	-2.32
REG	0.29	0.64	-0.10*	-0.32	0.08	2.11	0.21	0.81	-0.06	-1.54	-0.07*	-3.02	-0.04*	-2.04
NGO	0.06	0.28	0.09	0.55	0.03	0.32	0.19*	2.49	0.01**	1.85	0.04	0.38	0.10**	1.87
RISK	-3.29	-0.94	-0.18	-0.66	-1.55	-0.44	-1.49	-0.42	-1.05	-1.54	0.13	0.59	-0.36*	-3.36
SIZE	0.09*	1.99	0.06*	2.11	0.04	1.44	0.03	1.27	0.06*	11.92	0.01*	7.09	0.05*	7.91
AB	-0.29*	-3.16	0.27*	4.09	0.80*	2.15	0.77*	2.16	0.20*	2.93	0.31*	7.05	0.01	0.83
INT	-0.19	-1.21	-0.07	-0.95	-1.16**	-1.84	-0.90	-1.05	-0.14	-0.85	-0.08	-1.53	0.01	0.22
Rural	-0.54*	-1.91	0.03	0.86	-0.24	-0.75	-0.34	-1.03	0.06	0.68	-0.03	-1.22	-0.04	-1.53
Cost	-0.17	-1.50	0.28*	2.39	-0.15*	-2.10	-0.57	-0.54	-0.22*	-5.23	0.10	1.34	0.16	1.98
HDI	11.81*	2.58	0.18	0.69	0.22	0.27	0.36	0.44	-1.58*	-2.84	-0.29**	-1.88	0.05	0.04
PD	0.01*	2.51	0.01	-0.11	0.03	0.71	0.01	0.51	0.02	-0.39	0.01*	-1.99	0.02***	1.72
R <sup>2</sup>	0.42		0.45		0.49		0.40		0.42		0.47		0.47	

Note: The \* indicates significance at 1 percent, \*\* significance at 5 percent and \*\*\* significance at 10 percent.

their financial sustainability that is contradiction with findings by Hartarska (2005), but in confirmation with Mersland and Strom (2009); Kyereboah-Coleman and Osei (2008); Cull, *et al.* (2007). The number of active borrowers which measures the breadth of outreach improves the financial sustainability of microfinance institutions that is consistent with the results of Logotri (2006). The repayment risk decreases the financially sustainable as expected. The rural market participation has no role of financial sustainability. The financial sustainability is positively related to interest rate and negatively to average loan size. The MFI size and experience makes MFI more financially sustainable. The capital structure, rural market, group lending are positive contributors indicating that in most of the regions and around the world financial sustainability and outreach has trade off.

This goal of microfinance to reach and empower women as majority of the world's poor is women and work in informal sector. It is believed that providing credit to women would reduce the poverty level of the household. The results show that group lending, rural market, capital structure, risk and financial sustainability, MFI size, population density have positive impact on women outreach. Age has no effect on reaching the women and has effect on all regions together. Regulated MFI target not to the poorest section as collateral is required, therefore these MFIs have less women client and HDI has positive effect. The results lead to conclusion that in case of women financial sustainability and outreach are met simultaneously to some extent.

The results of different measures of outreach are estimated by using regional dummies along with other determinants. The results show the fact that the smaller is the size of loan, the higher is the interest charged on these loans. According to Cull, *et al.* (2007) a simple indicator is average loan size showing that the small size of loans symbolise that MFI is targeting poor customers and help in declining poverty [Cutler (2010) and Rosenberg, *et al.* (2009)]. The variable for breadth outreach by number of active borrowers and women borrowers has also shown significant positive impact on poverty reduction [Hermes, *et al.* (2009)]. As regard result of lending type shows that those MFIs who mostly lend to group compared to individual generally charge significantly low rates of interest so the cost of outreach is higher [Cull, *et al.* (2008)] showing that group lending increase outreach and reduce poverty. The results of control variables are almost same as obtained in above tables. The MFIs who are operating in South Africa, South Asia, East Asia and Pacific, Latin America and the Caribbean, and Middle East and North Africa have less financial suitability but more active borrowers, women borrowers, average loan size, charging relatively high interest rates as compared to Eastern Europe and Central Asia MFIs with exception of South Asia that is charging lower rate.

Table 4.5

*Results of Determination of Women Outreach*

	East Asia & Pacific		Eastern Europe & central Asia		Middle East & North Africa		South Africa		South Asia		Latin America & Caribbean		All world	
	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat
C	0.32	1.14	0.17*	2.40	0.53*	3.42	0.53*	3.45	0.39	1.62	0.14*	1.92	0.10*	3.13
AGE	0.01	0.67	0.01*	3.66	0.02	0.12	0.02	0.18	-0.01*	-5.52	0.03*	3.68	0.01	0.06
CAP	0.04	0.34	0.18*	4.77	0.02	0.22	0.01	0.11	0.52*	5.91	0.17*	4.73	0.04*	2.02
GROUP	0.03*	2.32	0.04*	3.29	0.13**	1.81	0.13	2.41	0.01*	2.22	0.05*	3.33	0.13*	10.63
REG	0.06	0.76	0.10	0.65	0.04	0.76	0.05	0.86	0.07	0.25	0.10	0.66	0.16*8	1.80
NGO	0.07*	2.35	0.01*	1.99	0.04**	1.86	0.48*	2.35	0.02**	1.78	0.12***	1.73	0.21*	2.37
RISK	-0.35**	-0.81	-0.20**	-1.85	-0.56	-1.62	-0.79***	-1.66	-0.39***	-1.69	-0.20**	-1.84	-0.35*	-5.17
FSS	0.88***	1.61	0.69*	6.05	0.82***	1.69	0.81***	1.67	0.14**	1.77	0.69*	6.02	0.74*	12.51
SIZE	0.02*	2.50	0.02*	13.43	0.02*	3.01	0.02*	3.26	0.06	4.74	0.02*	13.55	0.02*	20.70
Profit	0.56*	2.66	0.02	0.69	0.45*	2.13	0.52*	3.27	0.07	1.28	0.02	0.71	0.02	0.04
Rural	-0.21	3.01	0.11*	7.68	0.16**	1.88	0.16*	1.90	0.01	0.13	0.11*	7.67	0.09*	6.55
Cost	-0.04	-0.15	0.72*	5.24	0.13	0.49	0.32*	1.98	0.07**	1.83	0.72*	15.08	0.36*	12.14
HDI	0.80	3.91	0.27*	2.78	0.13	0.64	0.13**	1.72	0.54**	1.79	0.23*	2.30	0.22*	5.33
PDP	0.01	-1.11	0.02	-0.40	0.01	-0.62	0.01	-0.57	0.01*	3.28	0.01	0.08	0.01*	6.05
R <sup>2</sup>	0.34		0.35		0.36		0.35		0.32		0.37		0.38	

Note: The \* indicates significance at 1 percent, \*\* significance at 5 percent and \*\*\* significance at 10 percent.

Table 4.6

*Results of Regional Differences in outreach*

	Interest Rate		Average Loan Size		Active Borrowers		Women Borrower		Financial Sustainability	
	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat
C	0.15	10.20	0.09	1.34	-0.39**	-1.82	-0.06	-1.66	0.41*	4.41
AGE	0.01***	-1.73	0.01*	2.96	0.01*	3.46	0.01*	-1.94	0.02**	1.80
CAP	-0.02	-1.40	0.02	0.40	0.30*	4.44	0.12*	6.41	0.22*	7.47
GROUP	0.01***	1.63	-0.12*	-3.76	0.15*	3.00	0.11*	8.90	0.01	0.69
REG	-0.01	-1.04	0.21*	6.08	-0.18*	-2.70	-0.03*	-2.50	0.01**	1.78
NGO	0.07*	2.32	-0.02**	-1.75	0.03**	1.79	0.02*	11.72	0.05**	1.76
RISK	-0.07**	-1.88	-0.28***	-1.63	-1.16*	-4.70	-0.37*	-5.50	-0.09	-3.79
SIZE	0.01*	4.28	0.04*	14.36	0.54*	5.46	0.03*	5.50	0.29*	2.69
Avgls	-0.01*	-2.78							0.05*	7.47
INT			-0.24*	-2.78	0.36*	6.38	0.12*	8.26	0.01*	1.34
Rural	0.03*	2.86	-0.18*	-4.70	0.03*	2.86	0.12*	8.26	-0.04	-0.69
Profit	0.07*	4.00	0.40*	5.58	0.83*	4.09	0.58*	10.23	0.01*	2.26
HDI	0.03***	1.73	0.72*	6.80	0.01	2.05	0.06**	1.81	0.08**	1.85
PD	0.02*	3.47	0.01*	5.12	0.01*	2.93	0.01*	2.50	0.01	0.33
DAF	0.02	0.23	0.17*	3.13	1.33*	13.90	0.09*	3.59	-0.17	-3.99
DEAP	0.04*	2.46	-0.05	-0.72	1.71*	15.67	0.24*	8.18	0.10	1.98
DLAC	0.02***	1.78	-0.11*	-2.37	0.55*	7.84	0.05*	2.67	-0.18	-5.50
DMENA	0.04*	2.67	-0.33*	-4.48	1.29*	12.51	0.13*	4.72	-0.13	-2.71
DSA	-0.08*	-6.14	-0.46*	-8.20	2.15*	23.26	0.34*	14.31	-0.17	-3.82
		0.52		0.50		0.51		0.53		0.54

Note: The \* indicates significance at 1 percent, \*\* significance at 5 percent and \*\*\* significance at 10 percent.

## 5. CONCLUSIONS

The main objective of this study is to examine that microfinance institutions are playing their role to reduce poverty. The poverty is reduced by reaching the poor and long term serving the poor that is possible when MFIs' are financially sustainable, therefore both outreach and financial suitability is investigated in this study by conducting a cross region analysis of 382 MFIs covering six regions of the world. In this study two approaches are used for estimations, conducting estimations for four measures of outreach (breadth, depth, cost, and expected future outreach) for each of the region separately and for the world as a whole, first. Second for robustness check the results of different measures of outreach are estimated by using regional dummies along with other determinants.

The results show the fact that the smaller is the size of loan, the higher is the interest charged on these loans. According to Cull, *et al.* (2007) a simple indicator is average loan size showing that the small size of loans symbolize that MFI is targeting poor customers and help in declining poverty. The reason is that well off customers are not attracted in small loans and in line with the results of Cutler (2010) and Rosenberg, *et al.* (2009). The variable for breadth outreach by number of active borrowers and women borrowers has also shown significant positive impact on poverty reduction [Hermes, *et al.* (2009)]. As regard result of lending type shows that those MFIs who mostly lend to group compared to individual generally charge significantly low rates of interest so the cost of outreach is higher Cull, *et al.* (2008) showing that group lending increase outreach and reduce poverty. MFIs lending type group lending have low rate and no collateral compare to individual, who on average charge lower cost of outreach (interest rates). Nonprofit institutes are more actively meeting the objective of reaching poor and taking participants

out of poverty. The results of other factors like MFI size, capital structure, MFI size, profit are positive and risk, regulation, are negative and significant contributor of outreach generally in all regions. The results support that providing credit to large number of active borrowers and women would reduce the poverty level of the household. The overall results of the study indicate that as depth of outreach is inversely related with the cost of outreach and positively with sustainability. However, breadth of outreach has significant positive relation with cost of outreach and sustainability. These results indicate that in most of the regions and around the world financial sustainability and outreach has trade off. The implications of these results is that it is required both outreach and sustainability, as in order to survive in future, microfinance industry should be sustainable by reducing its transaction, operational and administrative cost against its lending interest rate and average profit.

## APPENDIX

Table A1

*MFIs on Regional Basis*

S.No.	Region	Frequency	%
1	East Asia and the Pacific	20	5.235
2	Eastern Europe and central Asia	74	19.372
3	Middle east and north Africa	22	5.759
4	South Africa	56	14.660
5	South Asia	49	12.827
6	Latin America and the Caribbean	161	42.147
	Total	382	100

Table A2

*MFIs on the Basis of Legal Status*

S.No.	Legal Status	Frequency	%
1	Bank	36	9.424084
2	Credit union/cooperatives	41	10.73298
3	NBFI	140	36.64921
4	NGO	165	43.19372
	Total	382	100

Table A3

*MFIs on the Basis of Lending Type*

S.No.	Lending Types
1	Group lending
2	Individual lending
3	Village banking

Table A4

*MFI on the Basis of Countries*

S.No.	Country	No.of MFIs	S.No.	Country	No. of MFIs
1	Albania	3	36	Kyrgyzstan	5
2	Angola	1	37	Lebanon	1
3	Argentina	2	38	Mali	3
4	Armenia	4	39	Magnolia	1
5	Azerbaijan	10	40	Morocco	7
6	Bangladesh	4	41	Mexico	13
7	Benin	4	42	Moldova	1
8	Bolivia	24	43	Mongolia	2
9	Bosnia and Herzegovina	9	44	Montenegro	1
10	Brazil	6	45	Mozambique	1
11	Bulgaria	2	46	Nepal	6
12	Burkina Faso	1	47	Nicaragua	14
13	Cameroon	2	48	Nigeria	3
14	Chile	2	49	West Bank and Gaza	1
15	Colombia	11	50	Pakistan	4
16	Cambodia	11	51	Palestine	2
17	Costa Rica	1	52	Paraguay	4
18	East Timor	2	53	Peru	38
19	Ecuador	28	54	Philippines	4
20	Egypt	6	55	Rwanda	2
21	El Salvador	3	56	Republican Dominica	2
22	Ethiopia	6	57	Russia	7
23	Gambia	1	58	S Africa	3
24	Georgia	6	59	Senegal	5
25	Ghana	3	60	Serbia	2
26	Guatemala	6	61	Sudan	1
27	Guinea	1	62	Tajikistan	6
28	Haiti	2	63	Tanzania	5
29	Honduras	2	64	Togo	2
30	India	35	65	Trinidad & Tobago	1
31	Indonesia	1	66	Tunisia	1
32	Jordan	3	67	Uganda	4
33	Kazakhstan	6	68	Uzbekistan	3
34	Kenya	9	69	Vietnam	2
35	Kosovo	6	70	Venezuela	1

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## **Social and Financial Efficiency of Microfinance Institutions in Pakistan**

ZAHOOR KHAN and JAMALLUDIN SULAIMAN

### **1. INTRODUCTION**

Financial efficiency and profitability of ‘for profit’ institutions have been traditionally measured with the help of financial ratios [Hassan and Sanchez (2009)]. However, financial ratios are inappropriate to investigate the sources of inefficiency, estimate financial or social efficiency with multiple inputs and outputs, and to decompose the sources of efficiency or inefficiency into technical, technological and scale efficiencies or inefficiencies respectively [Hassan and Sanchez (2009)]. Microfinance Institutions (MFIs) are special institutions, which simultaneously consider their social role to uplift the marginalised community members along with their commercial objective to secure self-sustainability. In standard literature this phenomenon is coined MFIs as being ‘double bottom line’ institutions. [Gutiérrez-Nieto, Serrano-Cinca, and Mar Molinero (2007); Gutiérrez-Nieto, Serrano-Cinca, and Molinero (2007)]. This simultaneity differentiates MFIs from conventional financial institutions. The achievement of socioeconomic efficiency is indispensable for MFIs to operate independently and on a wider scale. Thus investigation of socioeconomic efficiency of MFIs is important for monitoring and optimal policy implications.

Efficiency assessment techniques are broadly divided into parametric; such as Stochastic Frontier Analysis (SFA), Thick Frontier Analysis (THA) etc., and non-parametric techniques such as Data Envelopment Analysis (DEA) [Berger and Humphrey (1997); Gutiérrez-Nieto, *et al.* (2007)]. According to Berger and Humphrey (1997) the popular efficiency assessment technique is DEA. This technique does not assume any prior specific shape of distribution and is also free from specific functional form. In spite of the mentioned strengths of DEA, it also has some demerits as well. Before investigating efficiency of Pakistani MFIs, it is important to consider the limitation of DEA. Otherwise it may yield misleading results. For example, an inefficient DMU may become efficient and vice versa because of inappropriate specification of the model or irrelevant input or output variables [Gutiérrez-Nieto, *et al.* (2007)]. How to avoid or minimise the biasedness of this technique is a question of central importance for researchers and policy institutions? The DEA technique identifies an efficient MFI based on extreme

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information therefore, it is unsafe to conclude that an MFI is efficient or otherwise based on a single input-output specification. To deal with this issue, this paper attempts to identify an efficient MFI based on all possible and theoretically important combinations of input and output variables. This idea was developed by Cinca and Molinero (2004). There are different statistical techniques such as “Factor Analysis” to identify factor inputs or outputs, which are more important than other combinations of input and output variables for model specifications.

Pakistan initiated microfinance programmes in 1980s. The Agha Khan Rural Support Programme (AKRSP) and the Orangi Pilot Project were the first microcredit programmes initiated in Pakistan. Today microfinance sector in Pakistan consists of; Microfinance banks, Rural Support Programmes, NGOs, Islamic microfinance NGOs and specialised MFIs. Major changes have been observed in the microfinance sector in Pakistan. First, there were no practices of the provision of other financial services like micro-insurance, deposit; micro-pensions etc., except microcredit but in recent days MFIs provide a set of financial products and policies. Second, microcredit programmes were initiated to help the poor and marginalised people without any commercial objectives but today's most of the MFIs have changed their intentions and now they are looking for both: commercial gains and social success. Third, microfinance programmes in Pakistan were multidimensional in nature but today's microfinance programmes are more specific and specialised.

Pakistan is one of the developing countries, which recognised the importance of microfinance as a strong tool for socioeconomic uplifting of the poor and financially marginalised segments since the early 80's. Although, the country has initiated the efforts for the last 30 years against poverty and gender disparity; however, the desired outcome has not been achieved. Under the “Microfinance Strategy 2007”, the state bank of Pakistan set a target to reach 3 million borrowers until the end of 2010. Further, the target is expected to grow from 3 million to 10 million by the end of 2015 [SBP (2011)].<sup>1</sup> However, until the end of fiscal year 2012-13, around 2.43 million poor have only been reached by microfinance institutions [Mixmarket (2012)].

This paper aims to gauge financial and social efficiency of Pakistani MFIs across the country to know the underlying factors which make a particular DMU efficient or otherwise. These factors have been investigated in different dimensions such as organisational characteristics, cost and financial structure of MFIs, the ability of MFIs to generate maximum profit, disburse maximum loans, and targeting ‘poorer and financially marginalised’ community members.

## 2. THEORETICAL FRAMEWORK OF THE STUDY

The roots of micro-financing, to facilitate the poor by providing small loans for productive utilisation and self-employment, can be traced back to philosophical concern of conceptualising poverty as lacking of access to financial capital [Engberg-Pedersen and Munk Ravnborg (2010); Hulme and Shepherd (2003)]. According to this concept poor are assumed to be productive, capable of running their own small businesses and creditworthy to payback their loans. This idea initiated the extension of microcredit to the poor at different formal and informal levels [Ledgerwood (1999)]. Informal credit has remained a more dominant source for the poor who

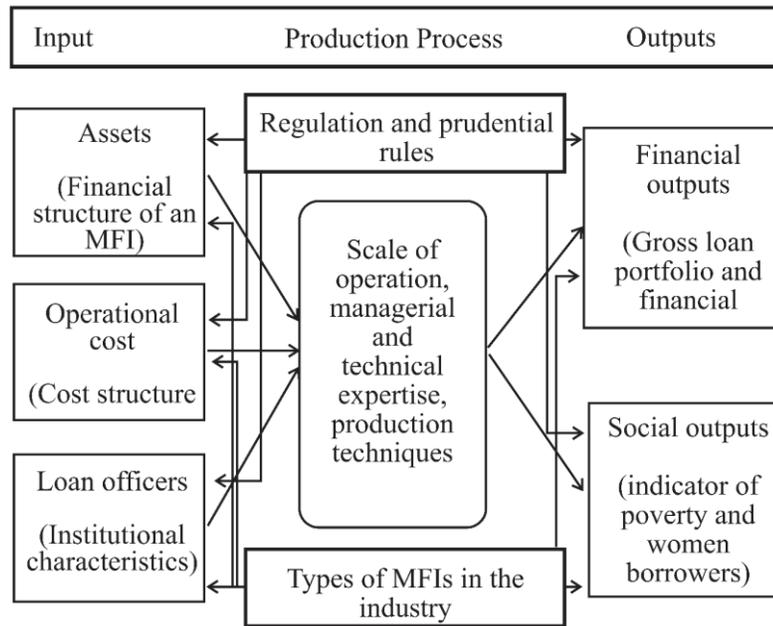
<sup>1</sup>Please see Table 1.3 and 1.4.

were not able to produce physical collateral for conventional financial institutions [Rhyne and Christen (1999)]. In nutshell, conceptualisation of poverty as lack of access of the poor to financial capital, the extension of financial capital for self-employment and productive utilisation of credit, marginalisation of poor by the traditional banks due to lack of physical collateral, exploitation of the poor by informal credit sources and focus of business models on alleviation of poverty are some of the factors which initiated microfinance activities across the globe.

The operations of microfinance institutions can be broadly observed into two contexts. First, Microfinance institutions can be observed as financial intermediaries such as they collect deposits from the clients and non-clients, they provide saving facilities to the clients and then mobilise the funds among the clients who need them [Christen and Drake (2002); Qayyum and Ahmad (2006)]. In this context, microfinance institutions are more or less similar to conventional banks in terms of their operations. Second, microfinance institutions can be treated as production units [Gonzalez (2007); Haq (2008)]. MFI institutions use certain inputs such as credit officers, capital and produce outputs such disbursement of loans, generating revenue and targeting the poor clients [Armendáriz and Morduch (2010); Qayyum and Ahmad (2006)]. Production approach seems more appropriate than intermediary approach because all MFIs do not provide the facility of saving and deposits, except microfinance banks (which is only one kind of MFIs) thus, this approach does not fit to maximum MFIs [Gutiérrez, Serrano-Cinca, and Molinero (2007)]. Efficiency theories, to test financial or social efficiency and overall performance of microfinance thus do not seem good in production approach. The neo classical theory of production and production efficiency seems more suitable when the MFIs are assumed as productive units (such as firms), while they are producing almost same products, working in the same regulatory and environment, using more or less same inputs. Based on the assumptions of neoclassical economists, producers always operate efficiently in terms of both technical aspects and economic aspects as well [Kokkinou (2010)]. For example, technical efficiency means optimisation by not wasting productive resources while economic efficiency means producers optimise by solving allocation problem involving prices. The difference in production may result from the differences in;

- (i) Technology of production.
- (ii) Differences in the efficiency of the production process.
- (iii) Differences in the environment where production is taking place.

There is a fair chance of difference in production even when technology and production environment are almost the same, firms or industries may exhibit different productivity levels due to differences in their production efficiency [Kokkinou (2010)]. Thus, this study attempt to investigate social and financial efficiency of the MFIs under the assumption of constant return to scale (input oriented CCR-model) and variable return to scale (input oriented BCC-model). The following Figure 1 shows theoretical framework of the study.



**Fig. 1. Theoretical Framework of the Study**

**Inputs:** Factors which are used to produce something or deliver a service. These can affect the production process, Industry characteristics can be affected from external factors.

**Production Process:** This is a link between factors input and output. This may compromise the quality and quantity of inputs, exogenous factors, and industry characteristics while it can affect output and industry characteristics in turn. This may encompass production technology, internal environment, scale of production.

**Output:** This may be in the form of physical production or the provision of service. Output is affected by inputs through the production process and affects organisational performance.

**External Factors:** Factors which are exogenous such as intervention of the government through regulation polices, donors, rating agencies. These factors may affect the whole process-starting from input selection to operational performance.

**Industry Characteristics:** Industry characteristics such as the number of FMIs in the industry, capital or labour intensity of the industry, what product is being produced or what service is being offered. Industry characteristics are affected by and also affect inputs, production process, output and organisational performance.

### 3. MATERIAL AND METHODS

The sample size of the study consists of all Pakistani MFIs, available with latest complete information on Microfinance Information Exchange (MIX). The study therefore; uses cross sectional data for the year 2012. The selection of input and output variables is based on the literature [Gutierrez-Nieto, *et al.* (2007); Hassan and Sanchez (2009); Mamiza Haq, Michael, and Shams (2010)]. After going through the literature

three inputs (Assets, Operating Costs (OC) and Loan Officers (LO)) and four outputs (two financial variables such as Gross Loan Portfolio (GLP), Financial Revenue (FR) and two social variables such as Women Borrowers (WB) and indicator of poorer clients' index (P)) selected to investigate how efficiently MFIs in Pakistan transform the selected inputs to achieve their twin objectives; optimal social and financial efficiency. Based on Gutiérrez, *et al.* (2007) calculating poverty index requires to weight each MFI as;  $w = \{[1 - (K_i - \text{Min}(k)) / \text{Range of } K]\}$  where  $i$  represents the number of a particular MFI.  $\text{Min}(k)$  is the minimum of Average Loan per Borrower (ALPB) while  $\text{max}(k)$  is the maximum of ALPB. The range represents the difference between maximum and minimum ( $\text{Max}(K) - \text{Min}(k)$ ). Based on the weight ( $w$ ) assigned to each MFI, the indicator of poverty has been thus obtained.  $P_i$  is an index of support of the poor, based on ALPB. This index favours those MFIs which have smaller ALPB.  $P_i$  for a specific MFI can be obtained when its weight ( $w$ ) is multiplied by number of borrowers ( $B$ );  $wB = \{[(1 - (K_i - \text{Min}(k)) / \text{Range of } K) * B]\}$ . It is a combination of two outreach indicators; width of outreach (number of borrowers) and depth of outreach (ALPB). Women borrowers and poverty index, both, are used as social indicators of MFIs.

MFIs in Pakistan consist of seven specialised microfinance banks, three Non-Banking Financial Institutions (NBFI) and nineteen NGOs. Keeping into consideration the limitation of same input and output variables for DEA models, this study adopted a *production approach* and avoided deposits with MFIs as input because the majority MFIs (particularly, NGO are mostly not regulated and thus are not able to mobilise savings and collect deposits from their clients) do not provide the facilities of saving or deposit collections. The following Table 1 represents input and output variables, their definitions and measurement units.

Table 1

<i>Inputs and Outputs and Their Definitions and Measurement</i>			
Symbol	Variable Name	Variable Definition	Unit
Input (A)	Total Assets	Total of all net asset accounts	\$
Input (B)	Operating Cost	Expenses related to operations, such as all personnel Expenses, rent and utilities, transportation, office supplies, and depreciation	\$
Input (C)	Number of loan officers	The number of individuals who are actively employed by the MFI to disburse loan and collect repayments.	Number
Output (1)	Gross loan portfolio	Gross loan portfolio outstanding principal balance of all of the MFI's outstanding loans including current, delinquent and restructured loans, but not loans that have been written off.	\$
Output (2)	Financial revenue	Financial revenue generated from the gross loan portfolio and from investments plus other operating revenue	\$
Output (3)	Indicator of Benefit to the poorest	Poverty Index, it is a combination of two outreach indicators; width of outreach (number of borrowers) and depth of outreach (ALPB).	\$
Output (4)	Number of women borrowers	Number of active borrowers who are female	Number

Source: Adopted from [Gutiérrez, *et al.* (2007); Gutierrez and Goitiso Lezama (2011)].

Data envelopment analysis efficiency score, with the help of the selected input and output variables, is estimated under BCC [Banker, Charnes, and Cooper (1984)] and

CCR [Charnes, Cooper, and Rhodes (1978)] input based models through 19 different specifications. Each specification of input/s and output/s represents a unique combination to reveal the sources of efficiency or inefficiency for each MFI. For example, the input variables represent three dimensions; asset (capital structure), operating cost (cost structure) and loan officers (the quality of human resources) and the output variables represent financial indicators (gross loan portfolio and financial revenue) and social indicators (indicator of poverty and targeting the women clients). First 12 models (A1, A2, A3, A4, B1, B2, B3, B4, C1, C2, C3, and C4) represent a corresponding one to one relationship among the input and output variables. This will help to identify the channels of efficiency for each MFI. The next four models (ABC1, ABC2, ABC3 and ABC4) represent the combinations of all inputs with respect to financial and social indicators. Subsequent two models (ABC12 and ABC34) represent financial and social efficiency models. These are more comprehensive models of financial and social efficiency than the previous models because they take into consideration all input and output variables, which make an MFI efficient or otherwise. The final model (ABC1234) represents overall efficiency based on all the selected input and output variables.

These models were estimated through DEA, a non-parametric technique, used for calculation of social and financial efficiency without prior information about the shape of the distribution of a data set. This technique allows the researchers to calculate social or financial efficiency with multiple inputs and outputs [Gutiérrez, *et al.* (2007); Gutierrez and Lezama (2011); Haq, Skully, and Pathan (2010); Kabir and Benito (2009)]. This technique is equally beneficial for commercial and non-commercial DMUs. Both input-oriented (IO) and output-oriented (OO) versions of the DEA methodology have been applied to the data for the sake of efficiency score comparison. In order to specify the mathematical formulation of the IOM, if there are K MFIs (in the language of DEA it is called DMUs) using N inputs to produce M outputs then inputs are denoted by  $x_{jk}$  ( $j=1 \dots n$ ) and the outputs are represented by  $y_{ik}$  ( $i=1 \dots m$ ) for each MFI  $k$  ( $k=1 \dots K$ ). The efficiency of the DMU can be measured as shown by [Coelli, Rao, and Battese (1998); Qayyum and Ahmad (2006); Shiu (2002); Worthington (1999)].

$$\text{Technical Efficiency} = (\text{Sum of weighted output} / \text{Sum of weighted input}) \\ = \text{TE}_k = \frac{\sum_{i=1}^m u_i y_{ik}}{\sum_{j=1}^n v_j x_{jk}} \quad \dots \quad \dots \quad \dots \quad \dots \quad (1)$$

Where  $y_{ik}$  is the quantity of the  $i^{\text{th}}$  output produced by the  $k^{\text{th}}$  MFI,  $x_{js}$  is the quantity of  $j^{\text{th}}$  input used by the  $k^{\text{th}}$  MFI, and  $u_i$  and  $v_j$  are the output and input weights respectively. The DMU maximises the efficiency ratio,  $\text{TE}_k$ , subject to;

$$\left( \frac{\sum_{i=1}^m u_i y_{ik}}{\sum_{j=1}^n v_j x_{jk}} \right) \leq 1, \text{ where } u_j \text{ and } v_j \geq 0 \quad \dots \quad \dots \quad \dots \quad (2)$$

The above Equation (2) indicates that efficiency measures of an MFI cannot exceed 1, and the input and output weights are positive. The weights are selected in such a way that the MFI maximises its own efficiency. To select optimal weights the following mathematical programming (output-oriented) is specified [Coelli, *et al.* (1998); Qayyum and Ahmad (2006); Shiu (2002); Worthington (1999)].

#### 4. CCR AND BCC INPUT ORIENTED MODELS

Input-orientated DEA model looks at the amount by which inputs can be proportionally reduced, where the amount of output is supposed to be fixed. On the contrary, the output-orientated model looks at the amount by which outputs can be proportionally expanded, where the amount of input is supposed to be fixed. The DEA can be conducted under the assumption of constant returns to scale (CRS) or variable returns to scale (VRS)

$$\text{Min } \theta = \theta_o - \varepsilon(\sum_{i=1}^m s_i^+ + \sum_{j=1}^n s_j^-) \quad \dots \quad \dots \quad \dots \quad \dots \quad (3)$$

Subject to

$$\begin{aligned} \sum_{j=1}^n x_{ik} \lambda_k + s_j^- &= \theta_{x_{io}}, \quad j = 1, \dots, n \\ \sum_{j=1}^m y_{jk} \lambda_k - s_i^+ &= y_{x_{io}}, \quad i = 1, \dots, m \\ \lambda_j, s_j^-, s_i^+ &\geq 0, \varepsilon > 0, k = 1, \dots, s \end{aligned}$$

Where  $\theta_o$  is the proportion of DMU $o$ 's inputs needed to produce a quantity of output equivalent to its benchmarked DMU output identified and weighted by the  $\lambda_i$ .  $s_i^+$  is the slack variables of input and output respectively.  $\lambda_j$  is a (n x 1) column vector of constants and indicate benchmarked DMUs.

The CCR model developed by Charnes, *et al.* (1978) estimate the efficiency of DMU with the assumption of Constant Return to Scale (CRS). This assumption may fail in imperfect markets. The CRS assumption is only appropriate when all firms are operating at an optimal scale. The use of the CRS specification when all firms are not operating at the optimal scale results in measures of Technical Efficiency (TE) which are confounded by scale efficiencies (SE). The use of the VRS specification permits the calculation of TE devoid of these SE effects. SE can be calculated by estimating both the CRS and VRS models and looking at the difference in scores. VRS model is essentially the CRS with an additional constraint added to the LP problem.

The BCC model developed by Banker, *et al.* (1984) is a modified version of CCR. This model helps to investigate scale efficiency. If restriction  $\sum_{k=1}^s \lambda_k = 1$ , is connected, then CCR model becomes BCC [Banker, Charnes, Cooper (1984)] model.

The modified form of CCR can be written as:

$$\text{Min TE } (\theta) = \theta_o - \varepsilon(\sum_{i=1}^m s_i^+ + \sum_{j=1}^n s_j^-) \quad \dots \quad \dots \quad \dots \quad \dots \quad (4)$$

Subject to

$$\begin{aligned} \sum_{j=1}^n x_{ik} \lambda_k + s_j^- &= \theta_{x_{io}}, \quad j = 1, \dots, n \\ \sum_{j=1}^m y_{jk} \lambda_k - s_i^+ &= y_{x_{io}}, \quad i = 1, \dots, m \\ \sum_{k=1}^s \lambda_k &= 1 \\ \lambda_j, s_j^-, s_i^+ &\geq 0, \varepsilon > 0, k = 1, \dots, n \end{aligned}$$

### 5. ESTIMATION TECHNIQUES AND METHODOLOGICAL CONCERNS

Following the model specification suggested by Cinca and Molinero (2004) the study estimated DEA efficiency for each feasible specification. Thus 19 different specifications of input and output variables have been estimated. Finally, super efficiently for all specified models have been estimated to rank the efficient MFIs [Lovell and Rouse

(2003)]. In terms of input oriented models, super efficiency of a DMU represents the maximum possible proportional increase in an input vector retaining the DMU efficiency [Khodabakhshi (2007)]. The DEA efficiency and super efficiency of all selected models have been estimated in the Efficiency Measurement System (EMS 1.3 version). The following Tables 2 and 3 show the results of various DEA efficiency models under the BCC and CCR models. The BCC models are used to estimate pure technical efficiency while CCR models are used to estimate overall technical efficiency. The ratio of CCR and BCC are then used to estimate scale efficiency and returns to scale [Banker and Thrall (1992); Ruggiero (2011)]. The maximum value of a technical or pure technical efficient MFI is 100. It means that the MFI is 100 percent efficient to transform inputs into outputs. Any MFI for which the efficiency score is less than 100 is considered inefficient in managerial and technical aspects [Charnes, *et al.* (1978)].

## 6. RESULTS AND DISCUSSION

Tables 2 and 3 show efficiency scores, which resulted from input oriented CCR and BCC models for 29 MFIs with 19 specifications, to comprehend that what makes an MFI efficient or otherwise. The last three columns (ABC12, ABC34, ABC1234) of the Tables 2 and 3 present financial, social and overall efficiency respectively. None of the MFIs is 100 percent efficient under all specifications. A total of 10 out of 29 MFIs while only 2 MFIs were found 100 percent efficient on social, financial and overall efficiency dimensions under BCC and CCR models respectively. An MFI, which is efficient on social or financial dimensions is also 'overall efficient'. Under both model structures (BCC & CCR) the number of efficient MFIs increases when it has used more input and output variables. This is evident from the last three columns of the Tables 2 and 3. As these models involve more input and output variables, therefore the numbers of efficient MFIs are also higher than the rest of models' results.

The efficiency result of MFIs also varies across the return to scales. Under the CCR models, assuming a constant return to scale, only two out of twenty nine MFIs are overall efficient (means efficient on social, financial and overall dimensions-including all input and output variables) while under BCC models, assuming variable returns to scale, ten MFIs are efficient on social, financial and overall dimensions. This finding of the study cautions about misleading results, resulting from a single specification of DEA efficiency estimated for a DMU. Notwithstanding, such a single specification may not reveal the sources of efficiency or inefficiencies. The difference between the results of the CCR and BCC models of efficiency reveals the difference between managerial, technical and scale efficiencies. The MFIs, which are socially, financially and overall efficient under CCR models such as ASA- Pakistan and Orangi are at least efficient by either managerial or scale dimensions. Relaxing the assumption of constant return to scale enhanced the number of efficient MFIs. This reflects that majority of MFIs are efficient based on the managerial and technical skills but not on the scale dimensions. Thus the difference between BCC and CCR efficiency models reveal the sources of inefficiency, which resulted from the scale of the DMUs. The findings reveal that 2 out of 10 efficient MFIs, based on three comprehensive specifications (ABC12, ABC 34, ABC 1234) under CCR are efficient based on managerial and scale dimensions (Please see Table 3 last three columns). Estimating efficiency of DMUs with a single specification and from full dataset will not reveal that how a particular DMU has

achieved efficiency? Similarly, if a DMU is inefficient we shall not be able to detect the reasons of inefficiency.

Super efficiency for all 19 specifications of models has been estimated to know the rank of the efficient MFIs. As super efficiency of inefficient MFIs remains the same therefore, this technique only helps to rank the efficient MFIs [Scheel (2000)]. Based on the CCR input efficiency model, the super efficiency of Oranagi (an NGO based MFI) is 216.60 percent followed by ASA- Pakistan (an NFBI) with a 120.90 percent score. It can be interpreted as keeping the same output level; an increase in the inputs usage by Orangi and ASA- Pakistan by 116 percentage points and 20 percentage points respectively will not affect the efficiency level of these MFIs.

## 7. CONCLUSION AND POLICY IMPLICATIONS

The assessment of MFIs' efficiency is imperative for all stakeholders for optimal policy measures. Data envelopment analysis is a popular non-parametric, non-stochastic, linear programming based efficiency technique. This paper concentrates on the technical aspects of DEA efficiency score that how it varies across the selection of inputs and outputs, the number of inputs or outputs and the selection of DEA estimation technique. The sample size of this study consists of all MFIs in Pakistan. We have modelled all feasible and meaningful specifications. After 19 different specifications with the help of three input and four output variables, representing various dimensions of MFIs such as cost structure, financial structure and organisational characteristics, we have used input oriented BCC and CCR data envelopment analysis oriented models. We have also estimated super efficiency for all MFIs to rank them according to their potential. This study attempted to investigate financial and social level of efficiency of MFIs and to gauge tracks to efficiency.

The study attempted to achieve the required objectives using appropriate methodology. The study used Data Envelopment Analysis technique to investigate social and financial efficiency. The findings of the study revealed that NGOs and NBFIs were more efficient, based on the achievements of social and financial objectives than microfinance banks. Financial and social efficiency of MFIs were estimated by two ways to reveal information about 'managerial and technical' aspects of MFIs. The study revealed that none of the microfinance institutions was found 100 percent efficient under all financial and social efficiency models. There were 13 MFIs, which were pure technically efficient in financial aspects out of the 29 MFIs. Bukhsh foundation scored highest (77.7 percent) and remained financially efficient under 15 of 19 different pure technical efficiency models. Subsequently, non-banking financial institutions and microfinance banks stood second in financial efficiency ranking (55.5 percent) based on pure technical score.

Like financial performance of MFIs, there was also a difference in social performance of MFIs, which resulted from variation in institutional characteristics. Twelve MFIs were found socially efficient based on input oriented pure technical efficiency models. Out of total socially efficient MFIs, nine were NGOs, one microfinance bank (Khushali bank) and two non-banking financial institutions (ASA-Pakistan, Orix leasing). The study reveals and recommends the following;

Table 2

*DEA Efficiency of MFIs Based on BCC Input Oriented Models*

DMUs	A1	A2	A3	A4	B1	B2	B3	B4	C1	B2	C3	C4	ABC1	ABC2	ABC3	ABC4	ABC 12	ABC 34	ABC 1234
Akhuwat	54	33	41	15	45	37	43	18	21	10	30	16	61	38	52	22	61	52	61
Apna MF Bank	83	74	9	10	42	59	15	15	34	26	13	14	90	79	20	20	91	20	91
ASA Pakistan	100	100	100	100	79	90	100	100	22	17	59	82	100	100	100	100	100	100	100
Asasah	8	53	79	79	16	16	18	23	43	30	52	78	88	56	100	100	88	100	100
BRAC - PAK	73	95	58	60	20	34	20	24	14	14	23	38	73	95	58	60	95	60	95
Buksh Foundation	100	100	100	100	29	29	29	29	100	100	100	100	100	100	100	100	100	100	100
CSC	62	85	31	38	22	47	15	22	39	40	31	52	72	93	48	62	93	62	93
CWCD	82	80	28	14	28	41	15	15	25	21	18	13	82	80	30	21	82	30	82
DAMEN	77	89	30	4	59	99	27	50	69	60	41	100	100	100	54	100	100	100	100
FFO	79%	75	63	66	32	42	30	35	32	28	35	47	81	79	69	72	81	72	81
FMFB - Pakistan	48	68	10	5	45	64	12	7	45	45	26	19	79	83	26	19	83	31	85
GBTI	33	40	10	12	37	61	25	25	58	56	39	46	61	81	41	46	81	46	81
JWS	69	74	36	41	29	51	20	30	37	31	29	52	79	80	52	64	82	64	82
Kashf Bank	57	81	1	1	22	36	1	1	52	53	5	5	82	98	5	5	98	5	98
Kashf Foundation	100	98	100	100	63	65	85	100	27	19	75	100	100	98	100	100	100	100	100
Khushali Bank	100	76	67	11	83	55	39	10	61	42	100	39	100	71	100	28	100	100	100
NRSP	99	84	100	50	100	100	100	95	17	12	100	39	100	100	100	95	100	100	100
NRSP Bank	63	85	13	3	59	80	16	4	43	41	27	7	96	100	30	7	100	30	100
Orangi	6	32	50	5	100	86	100	18	99	46	100	28	100	88	100	30	100	100	100
Orix Leasing	62	53	45	45	46	63	42	54	65	50	65	100	82	76	80	100	82	100	100
POMFB	18	42	6	4	12	40	7	7	28	41	20	16	29	54	20	16	54	20	54
PRSP	28	52	20	11	29	72	26	16	15	20	21	16	35	78	30	21	78	30	78
RCDS	59	76	34	36	27	58	21	29	36	35	30	54	69	83	53	62	83	62	83
SAFWCO	64	61	56	28	35	57	40	28	29	22	33	31	71	66	74	42	73	74	82
SRSO	86	61	48	51	75	68	47	62	47	26	49	89	100	69	72	95	100	95	100
SRSP	85	48	97	94	69	69	69	69	90	80	100	100	100	100	100	100	100	100	100
Sungi	98	79	100	100	100	100	100	100	43	38	52	62	100	100	100	100	100	100	100
TMFB	100	100	1	4	100	100	1	5	100	100	5	27	100	100	4	18	100	18	100
TRDP	83	61	82%	51	69	81	96	72	31%	19	54	50	99	81	100	77	99	100	100

Source: Authors' own calculations.

Table 3

*DEA Efficiency of MFIs Based on CCR, Input Oriented Models*

DMUs	A1	A2	A3	A4	B1	B2	B3	B4	C1	B2	C3	C4	ABC1	ABC2	ABC3	ABC4	ABC12	ABC34	ABC1234
Akhuwat	54	30	34	13	36	36	35	16	19	8	22	15	61	37	52	22	61	52	61
Apna MF Bank	81	66	5	7	37	55	3	6	24	16	2	7	87	77	6	10	88	10	88
ASA Pakistan	100	89	82	88	54	90	69	87	21	16	32	62	100	100	99	100	100	100	100
Asasah	77	48	70	73	12	14	17	21	24	13	41	77	84	56	97	100	84	100	100
BRAC – PAK	73	85	48	53	16	34	16	21	13	13	16	32	73	93	52	57	93	57	93
Buksh Foundation	60	100	24	19	3	10	2	2	10	13	7	10	60	100	25	20	100	25	100
CSC	61	77	28	35	19	45	14	20	27	28	23	52	70	92	47	62	92	62	92
CWCD	78	72	27	7	22	37	12	4	14	11	9	4	78	80	30	8	80	30	80
DAMEN	77	80	26	36	51	98	26	44	61	52	38	96	100	100	54	96	100	96	100
FFO	74	68	59	63	22	37	27	34	15	12	22	43	74	76	67	71	76	71	76
FMFB – Pakistan	39	47	8	5	29	64	9	6	44	44	17	17	58	73	18	17	73	24	73
GBTI	31	36	7	11	25	55	9	16	28	27	12	33	42	56	1	33	56	33	56
JWS	68	66	31	37	27	49	19	27	29	23	24	52	77	80	50	64	80	64	80
Kashf Bank	57	71	0	0	16	36	0	0	49	49	0	1	76	90	0	1	90	1	90
Kashf Foundation	81	71	63	68	40	65	48	62	26	19	38	74	88	83	91	100	90	100	100
Khushhali Bank	61	51	27	9	32	49	22	9	61	41	50	31	83	65	57	26	86	63	87
NRSP	65	57	38	35	62	100	55	60	16	12	17	29	85	100	6	60	100	65	100
NRSP Bank	51	59	11	3	37	80	12	4	42	40	17	7	68	82	23	7	82	23	82
Orangi	65	29	42	5	100	82	100	14	84	31	100	21	100	84	100	24	100	100	100
Orix Leasing	60	48	39	41	39	59	40	49	44	29	53	100	77	60	79	100	77	100	100
POMFB	17	38	5	2	9	38	5	2	16	29	9	6	23	50	12	6	50	12	50
PRSP	27	47	17	10	23	72	22	15	13	18	15	15	34	73	30	21	73	30	73
RCDS	58	68	30	32	26	57	20	26	29	28	27	53	67	83	51	62	83	62	83
SAFWCO	63	55	47	26	34	55	39	25	23	16	32	31	70	65	73	41	71	73	81
SRSO	86	55	40	45	57	67	40	55	43	23	37	76	100	69	70	93	100	93	100
SRSP	66	40	80	75	18	20	33	37	17	9	39	66	69	46	100	96	69	100	100
Sungi	85	75	100	100	46	75	84	100	13	9	28	50	85	84	100	100	85	100	100
TMFB	53	64	1	4	32	72	1	4	100	100	4	23	100	100	3	16	100	16	100
TRDP	82	55	68	45	64	78	81	64	27	15	40	49	98	80	100	77	98	100	100

Source: Authors' own calculation.

Table 4

*DEA Super Efficiency of MFIs Based on CCR Input Oriented Models*

DMUs	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	ABC1	ABC2	ABC3	ABC4	ABC12	ABC34	ABC1234
Akhuwat	54	30	34	13	36	36	35	16	19	8	22	15	61	37	52	22	61	52	61
Apna MF BK	81	66	5	7	37	55	3	6	24	16	2	7	87	77	6	10	88	10	88
ASA Pakistan	117	89	82	88	54	90	69	87	21	16	32	62	117	111	99	108	121	108	121
Asasah	77	48	70	73	12	14	17	21	24	13	41	77	84	56	97	106	84	106	106
BRAC - PAK	73	85	48	53	16	34	16	21	13	13	16	32	73	93	52	57	93	57	93
Buksh Found	60	112	24	19	3	10	2	2	10	13	7	10	60	112	25	20	112	25	112
CSC	61	77	28	35	19	45	14	20	27	28	23	52	70	92	47	62	92	62	92
CWCD	78	72	27	7	22	37	12	4	14	11	9	4	78	80	30	8	80	30	80
DAMEN	77	80	26	36	51	98	26	44	61	52	38	96	105	126	54	96	128	96	140
FFO	74	68	59	63	22	37	27	34	15	12	22	43	74	76	67	71	76	71	76
FMFB - Pak	39	47	8	5	29	64	9	6	44	44	17	17	58	73	18	17	73	24	73
GBTI	31	36	7	11	25	55	9	16	28	27	12	33	42	56	16	33	56	33	56
JWS	68	66	31	37	27	49	19	27	29	23	24	52	77	80	50	64	80	64	80
Kashf Bank	57	71	0	0	16	36	0	0	49	49	0	1	76	90	0	1	90	1	90
Kashf Found	81	71	63	68	40	65	48	62	26	19	38	74	88	83	91	104	90	104	104
Khushali Bk	61	51	27	9	32	49	22	9	61	41	50	31	83	65	57	26	86	63	87
NRSP	65	57	38	35	62	102	55	60	16	12	17	29	85	102	61	60	105	65	108
NRSP Bank	51	59	11	3	37	80	12	4	42	40	17	7	68	82	23	7	82	23	82
Orangi	65	29	42	5	157	82	119	14	84	31	189	21	181	84	209	24	181	209	217
Orix Leasing	60	48	39	41	39	59	40	49	44	29	53	104	77	60	79	108	77	120	120
POMFB	17	38	5	2	9	38	5	2	16	29	9	6	23	50	12	6	50	12	50
PRSP	27	47	17	10	23	72	22	15	13	18	15	15	34	73	30	21	73	30	73
RCDS	58	68	30	32	26	57	20	26	29	28	27	53	67	83	51	62	83	62	83
SAFWCO	63	55	47	26	34	55	39	25	23	16	32	31	70	65	73	41	71	73	81
SRSO	86	55	40	45	57	67	40	55	43	23	37	76	106	69	70	93	106	93	106
SRSP	66	40	80	75	18	20	33	37	17	9	39	66	69	46	107	96	69	107	107
Sungi	85	75	121	114	46	75	84	115	13	9	28	50	85	84	122	115	85	122	122
TMFB	53	64	1	4	32	72	1	4	120	192	4	23	100	136	3	16	136	16	136
TRDP	82	55	68	45	64	78	81	64	27	15	40	49	98	80	103	77	98	103	103

Source: Authors' own calculation.

The study reveals that efficiency score resulted from DEA, is sensitive towards the choice of inputs, outputs, functional form and number of inputs and outputs. Based on the sensitivity of this technique, the study warns against single specification of DEA and recommends multiple specifications of DEA efficiency models to conclude whether a particular DMU is efficient or otherwise. It was noticed that two MFIs could yield the same efficiency score, however; their way to achieve efficiency was quite different from each other. The MFIs had used different channels, which were considered their strengths, such as controlling operational cost or optimal utilisation of loan officers and Assets. It was also noticed that MFIs were more efficient in their managerial and technical skills rather than the scale of operation of MFIs. It is recommended to estimate pure technical and scale efficiencies separately, to comprehend the sources of efficiency or inefficiency about various DMUs to identify peers for corresponding MFIs accordingly. The overall super efficiency result of an MFI, based on collective social and financial output variables (variable 1, 2, 3, and 4), is at least as efficient as financial or social super efficiency models for that MFI. Increasing the number of input and output variables changes the efficiency score of DMUs. This is evident from Tables 2 and 3. The higher the number of input and output variables, the higher the efficiency chance for an MFI and vice versa. In this case the estimation of super efficiency is important along with technical and scale efficiencies. This allows the researchers to rank the MFIs, based on super efficiency score. Technical and scale efficiency in isolation cannot rank MFIs according to their corresponding efficiency levels.

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# Causality Linkages among Energy Poverty, Income Inequality, Income Poverty and Growth: A System Dynamic Modelling Approach

GHULAM MURTAZA and MUHAMMAD ZAHIR FARIDI

## 1. INTRODUCTION

The energy services stipulation of a country discloses its importance as a decency of course of action necessary for economic prosperity, lessening the poverty and depolarising the social asymmetry [Barnes, *et al.* (2011)]. The accomplishment of basic needs of energy services that include excess to electricity, commercial use of energy for production process as well as usage of electricity in the residential areas and modern use of energy sources for cooking purposes portrays an image of high-quality living standard of individuals and offers a way forward to economic development.<sup>1</sup> The notion of pro-poor growth is well documented in the recent literature for assurance of thinning the poverty that is congregated through translation of growth into the lives of poor by reshaping the income distribution<sup>2</sup> for marginalised group of people. Ekouevi and Tuntivate (2012) and studies of international agencies [AGECC (2010); WHO (2006); UNDP and WHO (2009)] have preliminarily acknowledged the need of improving the access to reliable and affordable modern energy services in the developing economies for economic prosperity and social welfare of individuals.

As for as social inequality is concern, energy poverty is of enormous worth to address it as deficiency in supplying commercial energy especially electricity, tends to emphasise the social asymmetry in the society [Pereira (2010)]. While the energy

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<sup>1</sup>International Energy Agency report (2010) declares that 1.3 billion people living without excess to electricity and about 2.6 million people who are not provided clean cooking facilities globally. This indicates a serious impediment to social and economic development and must be addressed uncompromisingly for the achievement of UN Millennium Development Goals [Dagoumas and Kitsios (2014)].

<sup>2</sup>According to Scheikman (2002), the prudent government policies formulated with the aim of reducing poverty and income inequality account education and health substances a lot and these issues cannot be accomplished without required energy services.

development mitigates the poverty as it provides the sustainability and enhances the opportunities for growth that leads to better quality of life [Pereira (2010)]. The significance of energy services in the mechanism of structural transformation for development and trading off the old modes of living for new ones has made the concept of energy poverty a leading concern now a days. In the developing countries like Pakistan, energy services supplies are not met perfectly that create social injustice by depriving people from clear cooking facility that badly effect their health conditions; as well as from education as new modes of training and guidance demand electricity essentially. Comfort and ease of life purely rely on the use of modern home appliance and on vehicles which run from electricity and fuel accordingly. Thus unswervingly availability of energy components (i.e., oil, gas, electricity and coal) at affordable prices diminishes social asymmetry; eliminates poverty; boosts up economic performance and ultimately up lifts the living standard of people.

The above deliberation urges to find out the causality linkages among energy poverty, income inequality, income poverty and growth for Pakistan. Moreover, secondly, study intends to examine the energy services conditions through construction of an Energy development index (EDI) that measures the energy poverty in Pakistan at macro level. Thirdly, study creates distinction on methodological grounds from rest of the studies. Study follows multivariate TY- procedure for the estimation of VAR system through seemingly unrelated regression (SUR) using modified Wald test for the causality analysis.

After a brief introduction in the first section, trends and size of energy services in Pakistan and its comparison with the rest of the economies and regions is drafted under Section 2. Section 3 is about the energy development index (EDI) and its construction. Review of Literature is presented in Section 4. Data and methodology is provided in Section 5 while the empirical results and discussion are presented in Section 6. At the end, Section 7 is consisting on conclusions and policy recommendations.

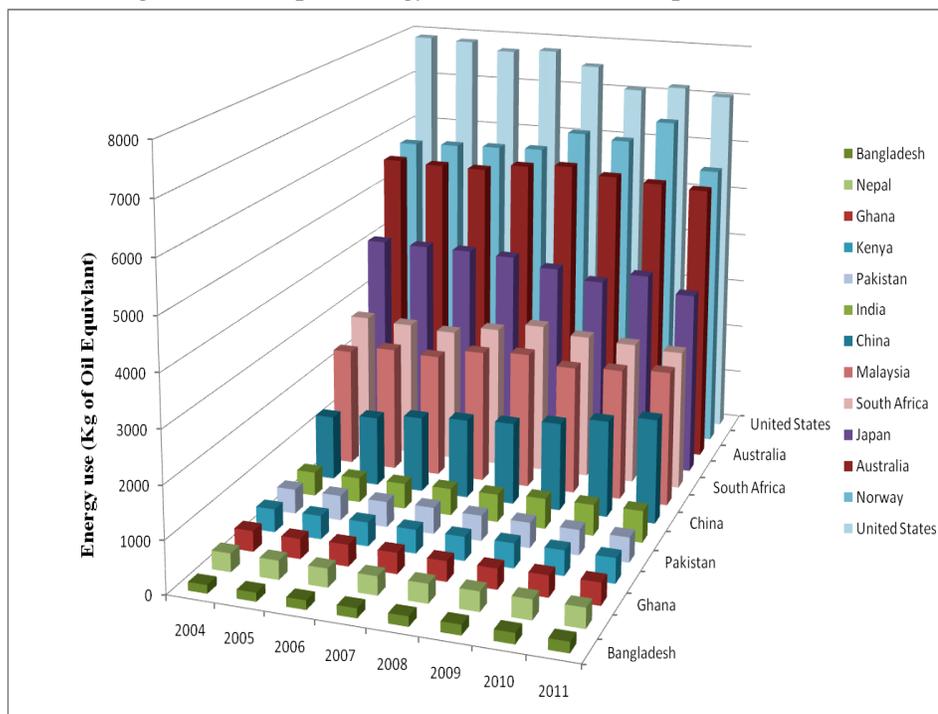
## **2. ENERGY POVERTY SCENARIO IN PAKISTAN**

Per capita commercial energy consumption is thought-out well gauge for energy development which gears up economic growth and eliminates poverty. The present per capita energy use for Pakistan is near to the ground. The per capita energy use is 481.61 Kg tons of oil equivalent (Kg of Toe) for Pakistan while the average per capita energy use of South Asia is 555 kg Toe; OECD members countries has a average of 4176 kg Toe; Sub-Saharan Africa region has 681 Kg Toe; and, World average per capita energy consumption is 1890 kg Toe, the estimates of [WDI (2011)] reveal. This picture depicts the situation of energy poverty in Pakistan regarding use of energy as within the region, Pakistan energy consumption is about 15 percent below than average energy consumption of South Asia; 21 percent less than that of India; and, even less than Sri Lanka equals to 5 percent nearly. With respect to world energy consumption, Pakistan uses 75 percent less energy and in comparison to OECD countries its value is 88 percent. The Figure 2.1 demonstrates the situation of energy use for Pakistan as compared to different countries of the world.

People access to electricity is considered first-rated indicator for excess to modern energy services. The world development indicators show 1.2 percent increase, from 67.4

percent to 68.6 percent, in population accessed with the electricity in Pakistan for the year 2010 to 2011. Figure 2.2 displays an inclusive comparison of Pakistan with different regions and countries to make energy poverty incidence clear for Pakistan. Within the region of South Asia, Pakistan is providing electricity less than India, Sri Lanka and Nepal. In contrast to Malaysia and Unites Arab Emiratis who are providing electricity to whole population almost, Pakistan has succeeded just 68.6 percent in providing electricity to its population. Similarly, Pakistan is also 18 percent below than middle income countries and almost 10 percent below than the world average in percentage of providing excess to electricity.

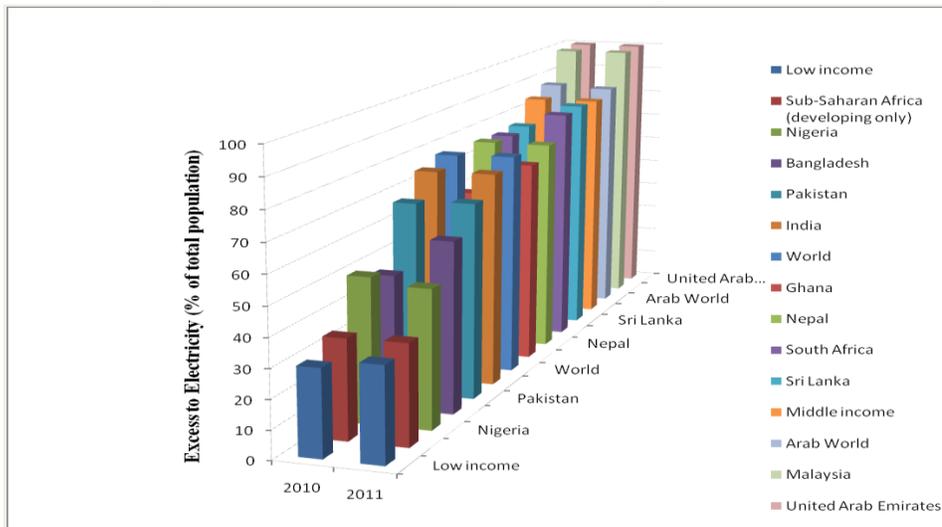
**Fig. 2.1. Per Capita Energy Use in Pakistan Compared to World**



*Authors' assemblage. Source: WDI (World Bank Data CD-Rom).*

Figure 2.3 presents substantial dependence of developing countries on biomass for cooking purposes. The statistics of World Energy Outlook, 2012 (IEA) and WHO database (2010) indicate that 2588 million people (38 percent of world population); over 1.8 billion people (equals to half of developing Asia population); and, about 700 million people (80 percent of the sub-Saharan Africa), who are using traditional biomass sources for cooking purposes and deprived from clean cooking facilities. 64 percent of population (111 million people) of Pakistan is using traditional biomass for cooking purposes. While in China, India, Indonesia, Philippines, Vietnam and rest of developing Asia, 29 percent, 66 percent, 55 percent, 50 percent, 56 percent and 54 percent of population is not availing clean cooking facilities respectively.

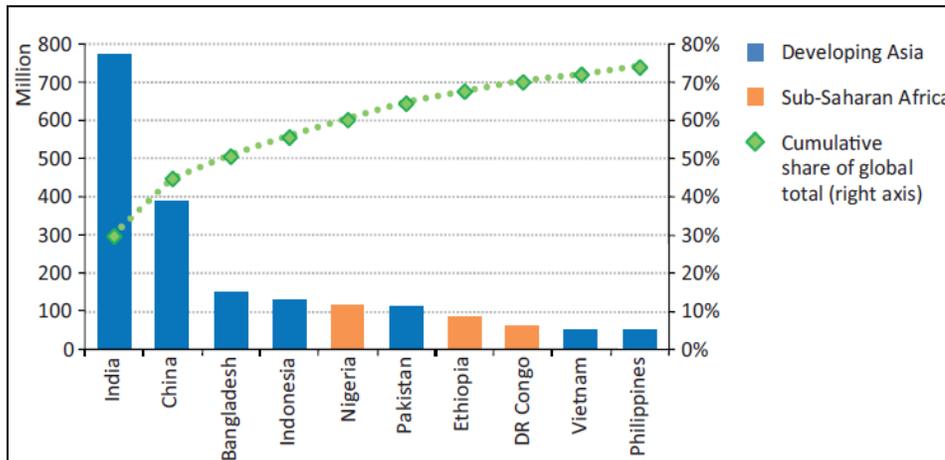
**Fig. 2.2. Excess to Electricity in Pakistan Compared to World**



Authors' assemblage. Source: WDI (World Bank Data CD-Rom).

Comparative exploration of modern fuel sources available for cooking purposes show the incidence of energy poverty in Pakistan. Biomass dependence, in Pakistan, is almost double than that of china and world average, almost equal to India and Africa region, 10 percent more than Vietnam and developing Asia average, 60 percent more than Middle East, 15 percent more than Philippines and developing countries. So, large dependence on biomass consumption for cooking purposes designates Pakistan a poor country who is failing in providing health and safe cooking facilities. Yet, Pakistan has shown an improvement in that indicator of energy poverty as in the list of developing Asian countries Pakistan is keeping pace with China, Thailand and Vietnam where a notable improvement in lessening biomass dependence is observed.

**Fig. 2.3. Use of Biomass for Cooking in Pakistan and Developing Countries- 2010**



Source: World Energy Outlook 2012, IEA and WHO database (2010).

### 3. LITERATURE REVIEW

The leading intention of the paper is to present a comprehensive review of prior work to confer a deep insight about the issue of energy poverty and its integrating factors. The empirical studies on the issue of energy poverty for the developing countries are not in surfeit. However, study makes a healthy endeavour to present literature on prior work done until now in the following.

The significance of the role of energy especially electricity as a mean of economic development is dated back at least to 1950s. Supply of electricity causes to stimulate human productivity and welfare that ultimately improve economic status of population. It is considered that poverty elimination, efficiency of productivity, pollution reduction, and health improvement is the fruit comes from provision of modern energy [United Nations (1954)].

After gaining the importance from a number of overseas development agencies [World Bank (1985); WIN (2005); UNDP (2007, 2012); ADB (2010a, b)], the energy related issues have, now, become the central focus for economic development and social wellbeing of individuals. The UN General Assembly has announced the years 2014-2024, to be “the decade of sustainable energy for all” [United Nations (2014)].

Recent literature and UNDP reports have re-conceptualised the poverty across-the-board that withdraw it from traditional perception in which poor were jammed with the notion of earning less than 2 dollar a day [Sovacool (2012)]. A number of factors have, now, encompassed in the definition of poverty that include life expectancy, literacy, caloric intake, housing quality and excess to energy [UNDP (2010)]. This inaugurated the intuition of non-income dimensions of poverty such as lack of excess to electricity and reliance on the traditional biomass fuel for cooking [Joneset, *et al.* (2010); International Energy Agency (2010)].

The health impacts of biomass combustion form cooking are observed in a number of studies. The pragmatic studies of [Pokhreltal (2005, 2013); Shrestha and Shrestha (2005); WIN (2005); Joshi, *et al.* (2009); Dhimal, *et al.* (2010); Mallaetal (2011)] come to a conclusion that emissions from burning of biomass are harmful for individuals health significantly, especially, for women and children health which reduce life expectancy, productivity and efficiency. Besides this, searching for biomass fuel is a time taking activity that restricts women and children from any other productive activity [Saghir (2005); Barnes and Toman (2006)].

Causality linkages of income inequality and energy poverty are well examined in the studies of [Hussain (2011); Sovacool (2012); Larson and Kartha (2000); Masud, *et al.* (2007)]. Studies narrated that income poor pay eight times more than the other group of income for the same unit of energy they use. It is estimated that on average 20-30 percent income is spent on the energy services by the poor households directly while additional 20-40 percent income is paid out indirectly in term of time and health injury related with collection and use of raw energy material respectively. On the other hand, in contrast, making use of modern energy services in running heavy machinery, illumination of shops and factories, refrigeration of products for preservation and development of the mechanisation process has lifted up employment opportunity and provided incentive to poor by decreasing inequality and increasing their income level.

Savacool (2012) pointed out a significant relationship between energy poverty and economic wellbeing of people in the developing countries. Income poverty and energy deprivation move together, where a significant proportion of income is allocated for availing energy services. For an instance, in case of Nepal, the introduction of renewable energy technologies is the centre focus of government policies that has activated the balanced growth and helping out to eradicate poverty [Malla (2013)]. The studies of [Roddis (2000); Cabraal and Barnes (2006); World Bank (2002)] also drawn the same conclusion of bi-directional causality between energy development and poverty.

Above narratives make us available a termination that energy services must be the essential meeting point of any economic agenda and planning for social development. This leads us to put up an augmented system that will connect poverty, growth and inequality with the new no-income dimensions of poverty that is— energy poverty. A plausible causality linkage among these variables may leave new foresights for economic planners.

#### 4. THE ENERGY DEVELOPMENT INDEX (EDI)

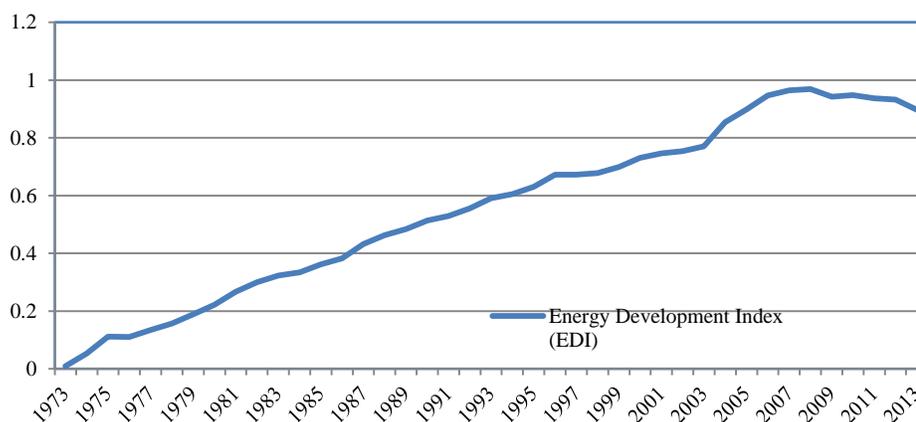
Ecological scientists and social welfare organiser always put forth the need of understanding energy poverty to mitigate it [Pachauri and Spreng (2011)]. It requires apparatus and structure in which it could be measured, monitored, recorded and reported. A number of scientists, over last 20 years, are involved in the energy and development issues to understand the concept of energy poverty [Bravo, *et al.* (1979); Bazilian, *et al.* (2010); Saghir (2004); Krugmann and Goldemberg (1983); Pachauri and Spreng (2004); Goldemberg (1990); Pachauri and Spreng (2011); Foster, *et al.* (2000)]. The present study construct Energy Development Index (EDI) to measure<sup>3</sup> the energy poverty at national level for Pakistan following the definition and computation methods of [IEA (2004); Malla (2013)]. The EDI is a composite index consists of four indicators or components that are equally weighted but this study assigned the weight to each indicator on the basis of principal component analysis (PCA). The Table 4.1 briefly describes the definitions, proxies and measuring units of indicators of energy poverty for Pakistan. Each indicator is normalised first by using the following formula;

$$\text{Indicator} = \frac{\text{Actual value} - \text{Minimum value}}{\text{Maximum value} - \text{Minimum value}}$$

The principal component analysis (PCA) is utilised on all normalised indicators of energy services to find weights for computing the energy development index (EDI). The outcomes of PCA show that (PC 1) explain 97 percent of the standardised variance, the Eigen values of (PC 1) reveal. While (PC 2), (PC 3) and (PC 4) explain standardised variance equals to 0.018 percent, 0.006 percent, 0.0006 percent respectively. So the first component (PC1) is best for assigning the weights to normalised indicators. The individual share of each indicator to EDI is given as under;

<sup>3</sup>Still there is no consensus on the issue of measuring energy poverty [Nussbaumer, *et al.* (2012)]. Different studies on measuring the Energy poverty based on; different approaches; definitions; data availability are being cited as under for reference and not discussed in detail as this is beyond the scope of this paper. [Bazilian, *et al.* (2010); Foster, *et al.* (2000); Mirza and Szirmai (2010); Barnes, *et al.* (2010); Practical Action (2010); Awan, *et al.* (2013); Pachauri, *et al.* (2004); IEA (2004); World Energy Outlook (2010); United Nations Development Program (2010); Jones (2010); Holdren and Smith (2000); Khandker, *et al.* (2012); Sovacool, *et al.* (2012)].

**Fig. 4.1. Trends in Energy Development Index (EDI) for 1973-2013**



$$\text{Energy Development Index (EDI)} = 0.25(\text{Per capita energy consumption}) + 0.244(\text{Excess to electricity}) + 0.25(\text{Per capita electricity in residential sector}) + 0.255(\text{Share of modern energy fuel in total residential energy use}).$$

The results of ordinary correlates (provided in Appendix-I) call for a composite index. The outcomes of the Energy Development Index (EDI) are graphed for each year as shown in Figure 4.1. The trend of EDI indicates the development of energy services over the time. Yet this growth is not in line with the growth rates of other developing countries. It is observed that from 2007 to onward a decrease in the trend points out the incidence of energy crisis. The shortage of energy supply, especially of electricity has increased the magnitude of energy poverty in Pakistan.

Table 4.1

*Indicators for Energy Development Index (EDI)*

Indicator	Definition	Proxy	Units of Measurement
Per Capita Commercial Energy Consumption	It is the amount of energy per capita used in the production process indicates the overall economic development of the country.	Commercial Energy Consumption Per Capita	Tonnes of oil equivalent (Toe)
Excess to Electricity	People from total population availing the facility of electricity which is an indicator for social asymmetry, reliance and ease of life.	Rate of Electrification	Percentage
Per Capita Electricity in Residential Sector	It is per capita consumption of electricity in the residential sector that express the ability of the consumer for the payment of electricity services and basic reliability.	Per Capita Electricity Consumption in Residential Sector	Tonnes of oil equivalent (Toe)
Share of Modern Energy Fuel in Total Residential Energy Use	The excess of modern energy services for cooking purposes out of total energy services provided to household instead of traditional biomass burning for cooking. It includes the use of oil, gas and electricity.	Share of Fossil Fuel Energy Consumption in Total Consumption	Percentage

## 5. DATA AND METHODOLOGY

The study intends to find out the causality linkages among energy poverty, economic growth, income inequality and income poverty in case of Pakistan. A number of studies have presented a system that provides the scheme in which the poverty, growth and inequality are well studied. The present study augments this system by incorporating the new dimension of poverty that is— energy poverty. Thus, the study estimates the dynamic Granger non-causality relationship between poverty, growth, income inequality and energy poverty by employing multivariate Toda and Yomamoto (1995), TY-modeling.

### 5.1. Data

The study uses annually time series data for Pakistan ranges from 1973 to 2012. The data are sourced from Economic Survey of Pakistan (various issues), the World Development Indicators database CR-ROM, Jamal (2006) and Pakistan labour force survey (various issues), depending upon the availability of data while some absent values of data are interpolated by using software, Eviews 7.0 package.

The study uses four variables for the analysis. GDP Per Capita (GDPPC) is the income per individual measured in Pak rupees, Income Inequality (INEQ) indicates the distribution of income among different income groups of people of country proxies by Gini-coefficient (in percentage), Income Poverty (POV) is measured with head count ratio (percentage) while the energy poverty (EDI) is expressed with the help of energy development index (EDI)<sup>4</sup> measured in percentage. All the variables are expressed in percentage after taking the natural log of GDPPC.

### 5.2. Time Series Properties of Data

Before proceeding to multivariate TY-procedure, it requires the time series properties of data to be scrutinised for obtaining the maximum order of integration of series. The study uses augmented Dickey- Fuller (1979), ADF test as well as Phillips Perron (1988), PP test for robustness of unit root results.

The ADF test works in the following specification where optimal lag length is selected on the basis of Schwarz information criteria (SIC);

$$\Delta S_{i,t} = c + \rho v_{i,t-1} + \sum_{j=1}^{k-1} \Gamma_j S_{i,t-j} + \beta T + \varepsilon_{i,t} \quad \dots \quad \dots \quad \dots \quad \dots \quad (1)$$

Where  $S_{i,t}$  indicates the respective time series variables i.e., GDPPC, POV, INEQ, EDI.  $T$  specifies time trend,  $\Delta$  shows first difference operator and  $\varepsilon_{i,t}$  is the white noise error. The Equation (1) tests the Null hypothesis ( $\rho = 0$ ) for the existence of a unit root process in the series against the alternative hypothesis of ( $\rho \neq 0$ ) mean-stationary.

For an exogenous shock to a time series that already has a deterministic trend (T), the under-rejection of the hypothesis is inevitable that may not supply robust results [Philip and Perron (1988)]. So, permitting for dependence and heterogeneity in the error term, following specification presents the non-parametric adjustment to ADF test statistic;

<sup>4</sup>EDI is measured with the help of a composite index consists of four variables. Definitions, measuring units and proxies of all four variables (indicators) are provided in Table 4.1 under Section 4 in detail.

$$S_{i,t} = c + \beta \left\{ t - \frac{c}{2} \right\} + \rho S_{i,t-1} + \varepsilon_{i,t} \quad \dots \quad \dots \quad \dots \quad \dots \quad (2)$$

Where,  $S_{i,t}$  is the corresponding time series (i.e., GDPPC, POV, INEQ, EDI),  $\{t - \frac{c}{2}\}$  is the time trend,  $c$  stands for sample size and  $\varepsilon_{i,t}$  is white noise error.

**5.3. Econometrics Methodology**

Existing Literature presents a variety of methodologies available for causality inferences depending on the characteristics of time series data. Granger non-causality, Johnson and Juselius (1990) ECM causality, ARDL modeling causality suggested by Pesaran and Shin (1998), TY- multivariate model causality and DP nonparametric causality proposed by Diks and Panchenko (2006) are considered the standard causality tests available.

This paper follows Toda and Yomamota (1995) to employ TY-multivariate modeling because of a number of advantages over other methodologies. Unlike Johnson ECM causality which necessitates same order of integration of all time series, TY-Procedure is feasible even when the order of integration of time series is mixed. Thus TY-Procedure is free from pre-testing of co-integration of the series. Likewise, in ECM Granger causality, use of standard Wald F-Stat for coefficient restrictions on parameter after estimating VAR system from OLS, confers non- standard asymptotic distribution of Wald F-stat that may involve nuisance parameters if one or more series contain a unit root [Toda and Phillips (1993); Sims(1990)]. So, TY- modeling is preeminent procedure for causality inferences as it does not demand any co-integration test and presents an *augmented* VAR system narrated as VAR ( $k + d^{max}$ ) through which restrictions are implemented with the help of modified Wald Test (MWALD) on VAR( $k$ ) after estimating *augmented* VAR system from Seemingly unrelated Regression (SUR) at level. Here,  $k$  is the number of lags and  $d^{max}$  represents the maximum order of integration among all the time series. Kuzozumi and Yamamoto (2000) asserted that the model will be valid until the condition;  $k > d^{max}$  holds.

We examine the dynamic causality among energy poverty, growth, inequality and income poverty by applying the TY- procedure, speified as follows;

$$S_t = \varphi_s + \varphi_1 S_{t-1} + \varphi_2 S_{t-2} + \varphi_3 S_{t-3} + \dots + \varphi_n S_{t-n} + \omega_{\tau,t} \dots \quad (3)$$

Specifying this generalised version of TY-procedure for our concerned variables (i.e., EDI, INEQ, GDPPC and POV), we obtain the following *augmented* VAR system of equations;

$$EDI_t = \alpha_1 + \sum_{i=1}^k \zeta_{1i} EDI_t + \sum_{j=k+1}^{d \max} \zeta_{2i} EDI_{t-j} + \sum_{i=1}^k \varphi_{1i} INEQ_t + \sum_{j=k+1}^{d \max} \varphi_{2i} INEQ_{t-j} + \sum_{i=1}^k \gamma_{1i} POV_t + \sum_{j=k+1}^{d \max} \gamma_{2i} POV_{t-j} + \sum_{i=1}^k \psi_{1i} GDPPC_t + \sum_{j=k+1}^{d \max} \psi_{2i} GDPPC_{t-j} + \omega_{1,t} \dots \dots \dots (4)$$

$$INEQ_t = \alpha_1 + \sum_{i=1}^k \gamma_{1i} INEQ_t + \sum_{j=k+1}^{d \max} \gamma_{2i} INEQ_{t-j} + \sum_{i=1}^k \varphi_{1i} EDI_t + \sum_{j=k+1}^{d \max} \varphi_{2i} EDI_{t-j} + \sum_{i=1}^k \psi_{1i} POV_t + \sum_{j=k+1}^{d \max} \psi_{2i} POV_{t-j} + \sum_{i=1}^k \zeta_{1i} GDPPC_t + \sum_{j=k+1}^{d \max} \zeta_{2i} GDPPC_{t-j} + \omega_{2,t} \dots \dots \dots (5)$$

$$\begin{aligned}
 GDPPC_t = & \alpha_1 + \sum_{i=1}^k \psi_{1i}GDPPC_t + \sum_{j=k+1}^{d \max} \psi_{2i}GDPPC_{t-j} + \sum_{i=1}^k \varphi_{1i}EDI_t + \sum_{j=k+1}^{d \max} \varphi_{2i}EDI_{t-j} + \sum_{i=1}^k \gamma_{1i}INEQ_t \\
 & + \sum_{j=k+1}^{d \max} \gamma_{2i}INEQ_{t-j} + \sum_{i=1}^k \zeta_{1i}POV_t + \sum_{j=k+1}^{d \max} \zeta_{2i}POV_{t-j} + \omega_{3,t} \dots \dots \dots (6)
 \end{aligned}$$

$$\begin{aligned}
 POV_t = & \alpha_1 + \sum_{i=1}^k \psi_{1i}POV_t + \sum_{j=k+1}^{d \max} \psi_{2i}POV_{t-j} + \sum_{i=1}^k \varphi_{1i}EDI_t + \sum_{j=k+1}^{d \max} \varphi_{2i}EDI_{t-j} + \sum_{i=1}^k \gamma_{1i}INEQ_t \\
 & + \sum_{j=k+1}^{d \max} \gamma_{2i}INEQ_{t-j} + \sum_{i=1}^k \zeta_{1i}GDPPC_t + \sum_{j=k+1}^{d \max} \zeta_{2i}GDPPC_{t-j} + \omega_{4,t} \dots \dots \dots (7)
 \end{aligned}$$

After the *augmented* VAR system is constructed, it is estimated from seemingly unrelated regression(SUR).Standard MWALD is used for the parameter restrictions on VAR(k) from VAR(k+d<sup>max</sup>)to get the value of chi-square statistic that is asymptotically normally distributed [Zapata and Rambaldi (1997)].

To demonstrate how MWALD works, we consider equation (4) where we can test the hypothesis that income inequality (INEQ) does not Granger cause energy poverty (EDI) if  $\varphi_{1i} = 0 \forall i$ ; likewise, income poverty (POV) does not Granger cause energy poverty (EPI) if  $\gamma_i = 0 \forall i$ ; similarly, growth (GDPPC) does not granger cause energy poverty (EDI) if  $\psi_i = 0 \forall i$ . The same mechanism is extended for the Equations (5), (6) and (7).

**5.5. The Innovation Accounting System**

This system demonstrates how a variable retorts from a shock that comes across in other variables within the system and whether this shock dies or continues over the time. Following Pesaran and Shin (1948) and Koop, *et al.* (1996), we have employed generalised impulse response function (GIRF) to gauge the comparative potency of causality in an out-of-sample period as the TY-procedure tests only the long run causality within the sample period. The generalised impulse response function (GIRF) has advantages of other standard impulse response functions [Ewing and Payne (2005)].

**6. RESULTS AND DISCUSSIONS**

The empirical evidences of Granger non-causality among poverty, growth, inequality and energy poverty call for a dynamic system as designed in TY-modeling. This representation persists an *augmented* VAR (k+d<sup>max</sup>) system. For this sake, to find the values of k and d<sup>max</sup> for estimating *augmented* VAR (k+d<sup>max</sup>), unit root properties and lag length selection of variables are thin slices of this segment.

**6.1. Stationarity of Data and Lag Length Selection**

For any time series analysis, the identification of the unit root in the time series is important. Study used ADF and PP tests for scrutinising the order of integration of series. Results are reported in Table 6.1. Maximum order of integration of concerned variables is (d<sup>max</sup>=1) which fulfill the requirement of TY-Procedure for Granger non-causality inference.

Table 6.1

*Stationarity of Data*

Variable	At Level				With First Difference				Max.* Lag Length	Order of Integration
	Intercept		Trend and Intercept		Intercept		Trend and Intercept			
	ADF	PP	ADF	PP	ADF	PP	ADF	PP		
RGDPC	0.33	1.65	-4.21	-4.42*	-10.5*	-10.92*	-	-	9	I(0)
EDI	-2.69	-2.69	0.31	0.02	-4.23*	-4.24*	-	-	9	I(1)
POV	-0.70	-1.28	-2.35	-1.57	-1.73	-4.12*	-0.40	-4.1*	9	I(1)
INEQ	-2.63***	-2.92**	-2.85	-3.3**	-	-	-	-	9	I(0)

Source: Authors' calculations, \* max lag length for ADF test is 9 where optimal lag length is chosen on the basis Schwarz info criterion. For PP test, Bandwidth is opted on the basis of Newey-West using Bartlett kernel. Critical values for different level of significance are cited from MacKinnon (1996). \*, \*\*, \*\*\* represents 1 percent, 5 percent and 10 percent level of significance respectively.

Next is to find out the maximum lag length ( $k$ ) of the time series variables for the estimation of *augmented VAR* ( $k+d^{max}$ ). Different criteria are available for lag length selection consisting on Akaike information criteria, Likelihood Ratio, Hannan-Quinn, Final prediction error and Schwarz information criterion (SIC). Taking small sample size into account, we supply [1 3] interval for unrestricted VAR output and same for finding maximum lag length ( $k$ ). Results are reported in Table 6.2 which shows that consistent maximum lag length is ( $k=2$ ).

Table 6.2

*VAR Lag Order Selection Criteria*

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-362.7281	NA	4777.565	19.82314	19.99730	19.88454
1	-136.2288	391.7825	0.055020	8.444803	9.315569*	8.751788
2	-112.3280	36.17433*	0.037106*	8.017727	9.585107	8.570302*
3	-95.76586	21.48596	0.039199	7.987344*	10.25134	8.785507

Source: Authors calculations.

For dynamic Granger non-causality inferences, we have estimated the *augmented VAR* ( $k+d^{max}$ ) that is—VAR(3) in level. The stability condition of VAR(3) as well Diagnostic tests for each separate equation of VAR system are performed.

Table 6.3

*Diagnostic Test Results of VAR(3)*

Diagnostic Tests	Test Statistics	p-values
Autocorrelation LM	261.90	.158
Residual Normality (J-B test)	13.35	.101
White Heteroskedasticity Test	22.98	.114
VAR Stability	-No root lies outside the unit circle-	

Source: Authors calculations.

Now, the diagnostic tests are carried out reported in Table 6.3 for the estimated VAR of order 3. Results indicate that the VAR system is free from any biasness of regression results. The test of stability of VAR(3) shows that roots does not lie outside the unit root circle as confirmed in Figure 6.1. In the same way, we have also applied the diagnostic tests on each endogenous equation of VAR system before proceeding to Granger non-Causality tests. Results are presented in Table 6.4 which indicates that each equation passes the diagnostic tests.

Table 6.4

*Diagnostic Tests of Estimated Endogenous Equations*

Equations	Autocorrelation- LM	Residual Normality (J-B)	White Heteroskedasticity(ARCH)	CUSUM Test
EDI	.301 (.824)	13.97 (.497)	0.244 (0.62)	Within limits
INEQ	1.089 (.375)	13.54 (.0331)	2.733 (.107)	Within limits
GDPPC	1.051 (.390)	.382 (.825)	.853 (.361)	Within limits
POV	3.026 (0.042)	9.431 (.097)	7.131 (.0329)	Within limits

Source: Authors calculations.

## 6.2. Granger Causality Results

The results of Granger non-causality are reported in Table 6.5. Results provide interesting causality relationship between energy poverty, growth and income poverty and income inequality for Pakistan and exemplify worthy integration of variables within the dynamic system to locate the net collision. We are noteworthy interested in the direction of causality among economic growth, energy poverty and income poverty besides a number of other results. The results show bi-directional long run causality between economic growth and energy poverty; running from energy poverty to economic growth and vis verse. It explores the fact that excess to modern energy services are highly significant for the economic prosperity of Pakistan as energy is considered the main driver of any economic activity that wheel up the production process many fold. Similar results are observed for industrialised, less developed as well as for developing countries like Nigeria, India, Pakistan and Bangladesh [(Paul and Bhattacharya (2004); [Worrell, *et al.* (2001); Mozumder and Marathe (2007); Ojinnaka (1998); Shahbaz and Feridun (2011); Javid, *et al.* (2013); Faridi and Murtaza (2013)].

Table 6.5

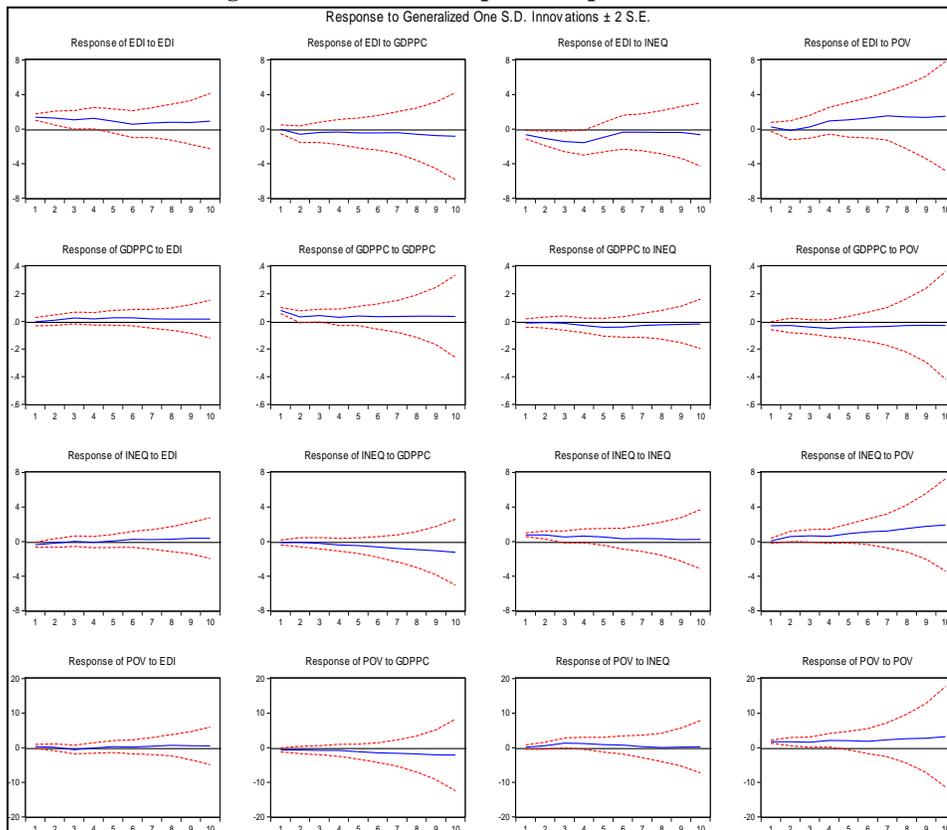
*Results of Dynamic Granger non-Causality*

Dependant Variables	MWALD Test				Causality Inferences
	Economic Growth	Income Poverty	Energy Poverty	Income Polarisation	
Economic Growth	1	5.841** (0.053)	16.482* (0.0003)	1.948 (0.377)	Economic Growth← Income Poverty Economic Growth ← Energy Poverty
Income Poverty	0.521 (0.770)	1	3.972 (0.121)	2.853 (.248)	–
Energy Poverty	17.140* (0.0002)	10.160* (0.006)	1	7.719* ( 0.021)	Energy Poverty← Economic Growth Energy Poverty← Income Poverty Energy Poverty← Income Polarisation
Income Polarisation	3.741 (0.154)	13.850* (0.001)	1.666 (0.4346)	1	Income Polarisation← Income Poverty

Source: Authors calculations. \*, \*\* represent significance level of 1 percent and 5 percent respectively.

On the other hand, results reveal that economic well being may ultimately leads to greater resources to be had to meet the energy demand challenges and to endow the easiness of life regarding clean cooking facilities and making more use of modern home appliances. Likewise, uni-directional causality among energy poverty, income poverty and income inequality; running from income poverty and income inequality to energy poverty is observed. This indicates that low income households, in Pakistan, are not able to afford fully the modern energy services as essentially they have to devote a large share of their income for energy services payments as their there exist high income inequality. The causality linkages also explain that growth is not pro poor in Pakistan as an increase in national income is not translated into lives of the poor because growth is not reducing the size of income distribution imbalances. Consequently, retaining people income poor makes people energy poor depriving them from clean cooking fuel and other modern energy services.

After the investigation of causality between energy poverty, growth, income poverty and inequality, we also estimated the generalised impulse response function to find the response of a shock of a variable to other variable within the dynamic VAR system. In order to find the standard errors, Monte Carlo Simulation is used with 5000 replications. The results shown in Figure 6.1 verified that the long run causality that the shock impacts are persistent for a longer period of time. The impact of income poverty on energy poverty involves a two year lags after that it gets persistent. Yet response of energy poverty to inequality is for shorter period of time and dies out after 5 to 6 years.

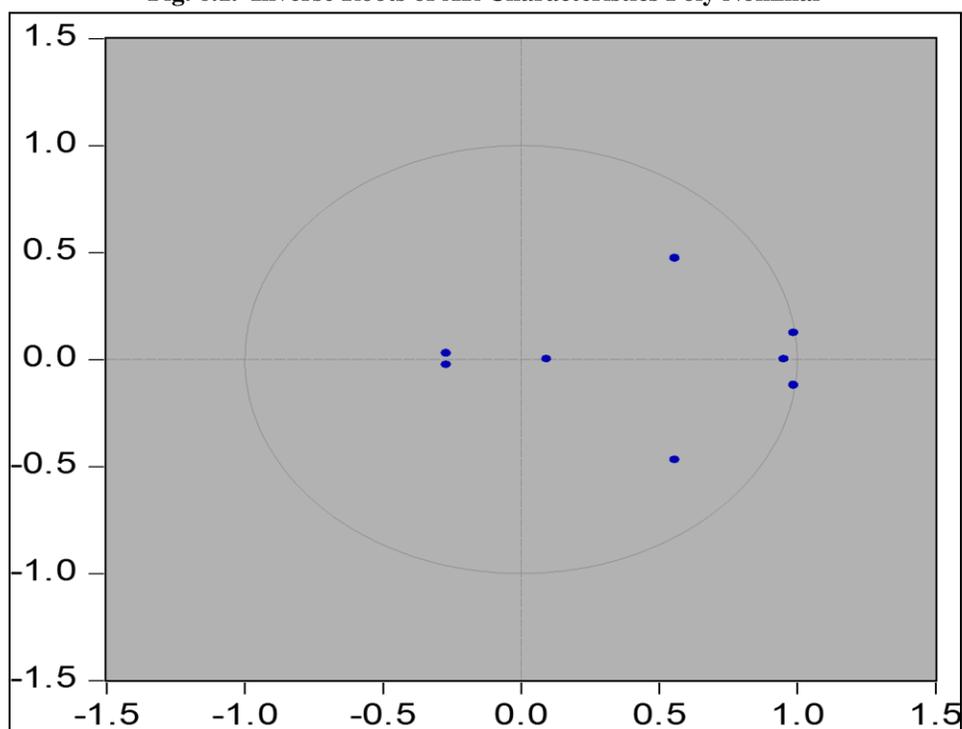
**Fig. 6.1. Generalised Impulse Response Function**

## 7. CONCLUSIONS AND POLICY SUGGESTIONS

The present study probes the dynamic causality among energy poverty, growth, income poverty and income inequality for Pakistan using the data ranges from 1973 to 2012. The analysis adopts the advanced TY-modelling in a multivariate framework that overcomes the problem of variables omission biasness. The extract of the study goes over the main points that a significant bi-variant causality linkages between growth and energy poverty; uni-variant causality that runs from income poverty to energy poverty and from income polarisation to energy poverty is observed. This furnishes a clear message for the economic planner that for any social and economic policy, state of energy services must be considered indispensably. There is urgent need of pro poor growth policies to depolarise the unfair income distribution and to mitigate the income poverty so that the fruits of growth may be transferred to poor and the excess to modern energy services may become possible to them. That's why, high commercial energy consumption; modern cooking fuel availability—that saves time and protects health of households; excess to electricity especially in rural areas are the limbs of new social and economic development policies that Pakistan should follow for all these concerned intents and purposes.

APPENDIX -I

Fig. 6.1. Inverse Roots of AR Characteristics Poly Nominal



*Principal Components Analysis*

Sample Size : 1973-2012

Number	Value	Difference	Proportion	Cumulative	Cumulative
				Value	Proportion
1	3.897334	3.822513	0.9743	3.897334	0.9743
2	0.074821	0.049537	0.0187	3.972155	0.9930
3	0.025284	0.022722	0.0063	3.997439	0.9994
4	0.002561	-	0.0006	4.000000	1.0000

Variables	PC 1	PC 2	PC 3	PC 4
Electrification Rate	0.258698	0.823500	0.255691	-0.115485
Fusel Fuel Consumption	0.243443	-0.014865	-0.684998	0.526499
Per Capita Electricity Consumption in Residential Areas	0.259862	-0.451212	0.649089	0.353877
Per Capita Energy Use	0.253636	-0.343562	-0.209958	-0.764352

*Ordinary Correlations*

Variables	Electrification Rate	Fusel Fuel Consumption	Per Capita Electricity	
			Consumption in Residential Areas	Per Capita Energy Use
Electrification Rate	1.000000			
Fusel Fuel Consumption	0.961786	1.000000		
Per Capita Electricity Consumption in Residential Areas	0.936884	0.970316	1.000000	
Per Capita Energy Use	0.945549	0.990971	0.988608	1.000000

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## **Determinants of Human Development Disparities: A Cross District Analysis of Punjab, Pakistan**

MUHAMMAD QASIM and AMATUL RAZZAQ CHAUDHARY

### **1. INTRODUCTION**

Human development is the primary objective of all developing economies of the world. It has great importance in social planning. Every individual, society and nation wants a prosperous life.

Different instruments are used, investments are undertaken and different policy frameworks are designed to achieve this target. Human development is a process to enlarge the choices of people. So, the definition of human development is very broad, but people have three basic and essential choices which are acceptable at every level of development. First, people always have desire to live a long and healthy life. Second, they have desire to expand their knowledge. Third, people have desire to access the resources needed for a decent standard of living [UNDP (1990)].

United Nations Development Programmes (UNDP) introduced Human Development Index (HDI) in 1990 covers three dimensions. It evaluates the average improvement in a nation or region in basic three aspects of human development, a long and healthy life, access to knowledge and decent standard of living. The HDI is the geometric mean of normalised indices measuring the improvements in each aspect [UNDP (2011)].

It is observed that human development disparities exist across the countries and regions of the world. Different countries have different HDI values like Australia 0.929, Germany 0.905, Singapore 0.866, United States 0.910, China 0.687, Saudi Arabia 0.770, India 0.547, Sudan 0.408 and Afghanistan 0.398. These disparities exist even among those countries, which fall in the same range of GDP per capita. For example Sri-Lanka and Egypt fall in the same range of GDP per capita but both have different human development status, HDI value of Sri Lanka is 0.691 whereas HDI value of Egypt is 0.644. Similarly Pakistan and Viet Nam fall in the same range of GDP per capita but both have different human development status, HDI value of Viet Nam is 0.593 whereas HDI value of Pakistan is 0.5042 [UNDP (2011)].

There may be various factors, which may be held responsible for human development disparities. Differences of institutional quality have been identified as one of the most important of these factors. North (1990) describes that development

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disparities across the countries are due to difference in quality of institutions. According to him countries differ in human development due to different institutional arrangements. However differences in human development can also be observed across the regions of the same country even with same institutional arrangements. Pakistan may be an interesting case study in this regard, where regional disparities exist among the provinces as well as within provinces.

UNDP (2003) calculated human development indices at districts level in Pakistan. Their results show that there are big human development gaps among the districts of Pakistan; for example HDI value of Jhelum is 0.703 and HDI value of Dera Bhugti is 0.285. Jamal and Khan (2007) and Siddique (2008) have also pointed out big human development imbalances among the districts of Pakistan. Inequality in public provision of social services like clean drinking water, education, and health relate facilities in Pakistan has been also investigated by Chaudhary and Chaudhary (1998). Easterly (2001) called this type of economic growth as “growth without development”.

Punjab is the most populated and developed province of Pakistan. More than half of the population of Pakistan resides in Punjab. The developmental gaps across the districts of Punjab are also clearly observable. The existing literature shows that there are massive human development disparities across the districts of Punjab. The HDI value of Sheikhpura is 0.62, Lahore 0.558, Muzaffar Garh 0.459, Dera Ghazi Khan 0.471 and Multan is 0.494 (UNDP, 2003). According to Jamal and Khan (2007) HDI value of Jhelum is 0.7698, Kasur 0.7132, Bhakkar 0.7058 Rajanpur 0.631, D.G Khan 0.6307, Muzaffar Garh 0.6201, Bahawalpur 0.6182 and Lodhran is 0.614. Human development disparities among the districts of Punjab have also been pointed out by Qasim and Chaudhary (2014). According to them HDI value of Rawalpindi is 0.6731, Lahore 0.6667, Sheikhpura 0.6487, Faisalabad 0.6267, Sialkot 0.6191, Kasur 0.6178, Nankana Sahib 0.5505, Narowal 0.5452, Rahim Yar Khan 0.5302, Dera Gazi Khan 0.4992, Pakpatten 0.4787, Bahawalnager 0.4769, Lodhran 0.4753, Bahawalpur 0.4521 and Rajanpur is 0.4515.

It is important to study development disparities among regions because it may create a severe type of rivalry and distrust among the different regions, which can be dangerous for social cohesion [Pervaiz and Chaudhary (2010)]. This distrust and rivalry can hamper the development and wellbeing of the people in different ways. Azfar (1973) points out that inter-regional disparity has created rivalry among the different regions of Pakistan. It implies that inter-regional disparities should be taken care of. The present study tries to investigate some socio-economic factors responsible for these human development disparities among the districts of Punjab. Impact of Social infrastructure, remittances, industrialisation, population density on Human Development Index (HDI) and Non Income Human Development Index (NIHDI) has been investigated.

This study is organised in the following sections. We have discussed, introduction in section one. Section two consists of brief review of literature. Section three consists of theoretical framework and methodology. Section four is about empirical results and discussion and section five consists of conclusion and policy implications.

## 2. LITERATURE REVIEW

There may be various factors, which may be held responsible for human development disparities. Many economists such as Marshall (1890), Henderson and Clark (1990), Krugman (1991), Kim (1995), Becker, *et al.* (1999), Chelliah and Shanmugam

(2000), Edwards and Ureta (2003), Hanson and Woodruff (2003), Córdova (2005), UNDP (2005), Lopez, *et al.* (2007), Hawash (2007), Fayissa and Nsiah (2010) and Tripathi and Pandey (2012) have identified that social infrastructure, remittances, industrialisation and population density may determine human development from different aspects across the countries and across the regions of a country.

Different studies indicated that population density, social infrastructure, remittances and industrialisation had significant relationship with development from different perspectives. Malthus (1798) studied the universal tendency of population growth and economic development. According to him, if there were no checks on population growth, then population would increase at geometric rate but at the same time due to diminishing returns, food supplies can increase only at arithmetic rate. Because, each member of population would have less land to work and its marginal production would start to decline. But this prediction missed empirical support. The theory ignored the impact of technological progress on growth rate. The modern economic growth is associated with rapid technological progress in the form of scientific, technological and social innovations. All countries, therefore, have the potential to increase their economic growth as compared to their population growth. Marshall (1890) described that agglomeration of population increased specialisation. Miyashita (1986) pointed out that population density increased agriculture productivity and specialisation. Hirschman and Lindblom (1962) described that inter-sectoral backward and forward linkages to economic development in manufacturing were perceived to be much stronger as compared to mining or agriculture, which were typically characterised by weak linkages. Papanek (1967) described that industrialisation had significant positive impact on economic growth of Pakistan.

Many studies indicated that the social infrastructure had significant relationship with economic development. Mera (1973), Hardy (1980), Antle (1983), Eberts (1986), revealed that social infrastructure had positive relationship with economic development. Romer (1986) indicated investment on human capital is a main source for fast economic growth. Henderson and Clark (1990) described that there was positive impact of population density on productivity. Krugman (1991) pointed out that agglomeration of population expanded economic activity, increased specialisation and division of workers. Ravallion (1991) investigated the impact of public expenditures towards provision of social services like infrastructure, education and health facilities on human development. The study examined the relationship of public provision of social services with human development of developing countries by using different indicators of education and health as proxies for human development. The results showed that public expenditures related to public provision of social services especially towards education and health facilities had positive relationship with human development. Anand and Ravallion (1993) worked on the role of private income and public provision of social services in human development of developing economies. The study concluded that private income and public expenditures on health and education facilities had positive impact on human development. It suggested developing economies could improve their human development through increasing public expenditures on education and health.

Lucas (1993) described that due to industrialisation, Korea achieved high level of economic development. Kim (1995) examined the impact of industrialisation on human

capital accumulation. The study concluded that industrialisation had positive relationship with human capital accumulation in Korea. He mentioned that the government policies regarding industrialisation and human capital accumulation played vital role to improve human development. Tiffen (1995) investigated the relationship between population growth, population density and economic growth in Kenya. The study covered the time period from 1932 to 1990. The results showed that population growth and population density both had strong positive relationship with economic growth in Kenya. Becker, *et al.* (1999) highlighted three important conclusions about the relationship between population density and economic development. First population density had positive impact on productivity. Second high population density enhanced technical innovation and third, population density increased investment in human capital because the productivity of human capital was higher in those regions where population density was high.

Prabhu (1999) investigated the relationship between economic growth, human development and public provision of social services in Maharashtra state of India. The study examined the role of social infrastructure in human development at state level and also at regional level in Maharashtra over the period of 1960 to 1995. The results showed that social infrastructure had positive relationship with human development and government expenditures on social infrastructure promoted human development across the regions. Chelliah and Shanmugam (2000) discussed some factors, which were responsible for human development disparities across the districts of Tamil Nadu. They argued that industrialisation and agricultural productivity had important role in the human development. The districts with high degree of industrialisation and high agricultural productivity had high levels of human development. Jamal and Khan (2002) investigated the relationship of social development and human development with economic growth in Pakistan. The study constructed Social Development Index (SDI) for social development, growth rate of GDP per capita used for economic growth and HDI for human development. They also examined the causality of economic growth, human development and social development. The results showed that social development and human development had positive relationship with economic growth and all three variables had causal relationships in Pakistan. Chin and Chou (2004) studied the relationship between social infrastructure and economic development among the developing countries of the world. The study concluded that social infrastructure had strong positive relationship with economic development. Those countries, which were more efficient in social infrastructure had better economic development as compared to other countries. Public expenditures on social infrastructure had positive impact on human development [Adeyemi, *et al.* (2006): Akram (2007)].

Iqbal and Sattar (2005) investigated the impact of remittances on the economic development of Pakistan. The results showed that remittances had positive effect on economic development of Pakistan. The study argued, after empirical analyses from 1972 to 2003, that remittances were an important source to increase economic development of Pakistan. Adams (2006) concluded from an empirical study that remittances generally reduced poverty and could redistribute income. UNDP (2005) examined the impact of industrialisation on human development in Kenya. The report studied the relationship of industrialisation with different human development indicators like income, education,

employment, agricultural productivity, skill formation and entrepreneurship. The overall results showed that there was strong, significant and positive impact of industrialisation on human development in Kenya. This report also mentioned some challenges of industrialisation to human development in Kenya like rapid urbanisation, uneven development and limited skills and over specialisation, poor worker health, environmental degradation and over-crowded services. The report suggested that industry could be supportive for human development by tackling poverty through industrialisation, improving opportunities to work, clean and healthy environment, job security and quality of infrastructure, protection of children, training and education, addressing gender disparity, information and awareness. Hawash (2007) described that industrialisation played a vital role to promote economic development in Egypt. Castaldo and Reilly (2007) examined the pattern of household's expenditures after receiving the remittances in Albania. The results showed that Albanian migrants used higher shares of remittances on human capital (education and health) as compared to other consumption goods. The remittances had positive impact on human development in Albania. Knudsen, *et al.* (2008) concluded that the population density had positive correlation with creativity, innovation and human capital.

Siddique (2008) found households income per capita, poverty and public provision of social services as determinants of capability development across the districts of Pakistan. She constructed public provision of social services index with education, health, water and sanitation facilities. The results of regression indicated that income, public provision of social services had positive impact on capability development and poverty had negative relationship with capability development. Pillai (2008) examined the relationship between human development, economic growth and social infrastructure in Kerala State of India. The study argued that due to strong social infrastructure, Kerala had top ranked position in human development among the Indian states. The empirical results showed that social infrastructure had positive and significant relationship with human development in Kerala State. The human development and economic growth both had causal relationship in Kerala. Keskinen (2008) studied the relationship of population density and economic development in two areas Tonle Sap and Mekong Delta. These two areas were unique in characteristics, Tonle Sap was the area of Cambodia and Mekong Delta was the area of Vietnam. The Mekong had high population density and more developed area as compared to Tonle Sap. The results of empirical analysis showed that population density had positive impact on economic development in both areas. Barseghyan (2008) concluded that population density was positively correlated with productivity through economies of scale.

Szirmai (2009) described that virtually all cases of high, rapid, and sustained economic growth in modern economic development are associated with industrialisation, particularly growth in manufacturing production. The manufacturing sector offered special opportunities for economies of scale. Szirmai found significant positive correlation of 0.79 between the income per capita and the industrialisation. Fayissa and Nsiah (2010) investigated the relationship between aggregate remittances and economic growth with unbalanced panel data from 1980 to 2004 in thirty-seven African countries. The results indicated positive relationship between remittances and economic growth in African countries. Adenutsi (2010) analysed the long run impact of remittances on human

development in low income countries. He selected eighteen Sub-Saharan countries and used panel data from 1987 to 2007 for the study. He concluded that remittances had strong positive and significant impact on the human development in Sub Saharan countries. Yang (2011) studied the relationship between remittances and human development. The results showed that there was positive relationship between remittances and human development aspects (education, health and earning), which could help to reduce poverty. Kibikyo and Omar (2012), Hassan, Mehmood and Hassan (2013) described that remittances had strong positive relationship with different human development indicators. The interactions between HDI and socio-economic variables have not been determined, and the causes of human development variations across the districts of Pakistan have not been discovered.

### 3. THEORETICAL FRAMEWORK AND METHODOLOGY

An overview of existing literature shows that there are various factors, which may be held responsible for human development disparities across the countries and among the regions of a country. The present study investigates some important socio-economic determinants of human development disparities among the districts of Punjab, Pakistan. Normally, income per capita is used to examine the well-being of a region or country. However income per capita hides so many aspects of the socio-economic conditions of a society. Dasgupta and Weale (1992) describes that per capita income is not an appropriate measure to examine the well-being of a society because it does not necessarily tell about social condition of the society. Therefore this study uses HDI and NIHDI to measure human development disparities. Social infrastructure, remittances, industrialisation and population density are considered as the determinants of HDI and NIHDI. Public expenditures on social infrastructure may increase human development [Adeyemi, *et al.* (2006); Akram (2007); Siddique (2008)]. Remittances may contribute to human development by affecting education and health outcomes [Kibikyo and Omar (2012); Hassan, Mehmood, and Hassan (2013)]. Industrialisation can enhance income of the people through the creation of job opportunities. It also promotes innovations, labour skills and technical education by improving returns to human capital formation [Hawash (2007)]. Productivity of human capital is higher in those regions where population density is high. So, population density increases investment in human capital and promotes human development [Becker, *et al.* (1999)]. This shows that social infrastructure, remittances, degree of industrialisation and population density may lead to differences in human development.

This study uses HDI and NIHDI for thirty-five districts of Punjab for the year 2011. It also investigates the impact of social infrastructure, remittances, degree of industrialisation and population density on HDI and NIHDI. The study uses two regression models, the first model finds out the determinants of HDI and the second model determines the factors that influence the NIHDI across the districts. Both regression models are estimated using Ordinary Least Square (OLS) method. The models used for the present study are given below:

$$HDI_i = f(SI_i, REM_i, IND_i, PD_i) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (3.1)$$

$$NIHDI_i = f(SI_i, REM_i, IND_i, PD_i) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (3.2)$$

The stochastic form of the above models is given below:

$$HDI_i = \alpha_1 + \beta_1 SI_i + \beta_2 REM_i + \beta_3 IND_i + \beta_4 PD_i + e_i \quad \dots \quad \dots \quad \dots \quad (3.3)$$

$$NIHDI_i = \alpha_2 + \gamma_1 SI_i + \gamma_2 REM_i + \gamma_3 IND_i + \gamma_4 PD_i + \mu_i \quad \dots \quad \dots \quad \dots \quad (3.4)$$

$HDI_i$  = Human Development Index of  $i^{\text{th}}$  district

$NIHDI_i$  = Non- Income Human Development Index of  $i^{\text{th}}$  district

$SI_i$  = Social Infrastructure of  $i^{\text{th}}$  district

$REM_i$  = Remittances of  $i^{\text{th}}$  district

$IND_i$  = Industrialisation of  $i^{\text{th}}$  district

$PD_i$  = Population Density of  $i^{\text{th}}$  district

$i = 1, 2, 3, \dots, 35.$

### 3.1. Specification of the Variables Chosen for Present Study

HDI and NIHDI are used as dependent variables whereas social infrastructure, remittances, industrialisation and population density are used as independent variables. The data of HDI and NIHDI for thirty-five districts of Punjab is collected from Qasim and Chaudhary (2014) and data for independent variables is taken from various statistical surveys. The details of construction, brief description and data sources of the variables are given in the following:

#### 3.1.1. Human Development Index

Human development index (HDI) used in this study covers three dimensions. These dimensions include average achievements by the districts in health, education and income. The average achievements are measured through three indices i.e. health index, education index and income index. HDI is a composite index, which combines these three indices with equal weightage. UNDP has been reporting HDI for a large numbers of countries since 1990 at annual basis. Qasim and Chaudhary (2014) used literacy rate and combined enrolment rate for construction of district education index. Composite education index assigned two-third weightage to literacy rate of ten years and above population and one-third weightage to combine enrolment. Child survival rate and immunisation rates were used for the construction of health index. Composite health index assigned seventy percent weight to child survival rate and thirty percent weight to immunisation rate. Income index was constructed by calculating district GDP per capita. Districts share of agricultural crop value and manufacturing value added were used for estimating district GDP per capita. These three indices are combined with equal weightage in order to calculate a composite HDI for thirty-five districts of Pakistani Punjab using 2011 data. Three dimensions are following;

$$HDI = (1/3 \text{ Health} + 1/3 \text{ Education} + 1/3 \text{ Income}) \quad \dots \quad \dots \quad (3.5)$$

#### 3.1.2. Non Income Human Development Index

In its human development report published in 2010 UNDP has introduced some new indices to measure human development. Non Income Human Development Index

(NIHDI) is one of such measures. It is constructed by using the indicators related with health and education. Unlike HDI, it does not use Gross National Product (GNP) in its construction. HDI measures the improvements in three aspects, which are a long and healthy life, access to knowledge and decent standard of living. But NIHDI takes into account only two aspects which, include a long and healthy life and access to knowledge. Thus NIHDI focuses only on non-income dimensions of human development. Both education and health indices were calculated with same indicators that were used in HDI. The construction of NIHDI is given below:

$$NIHDI = (1/2 \text{ Health} + 1/2 \text{ Education}) \dots \dots \dots \dots (3.6)$$

### 3.1.3. *Social Infrastructure*

It is very hard to find a generally agreed definition of social infrastructure but commonly it is related to schools, libraries, universities, clinics, hospitals, courts, museums, theatres, playgrounds, parks, fountains and statues etc. It is defined as the infrastructure that promotes the health, education and cultural standards of the population [Snieska and Simkunaite (2009)]. We have used educational institutions (primary, secondary and tertiary) per person of the age cohort 5 to 25 year and health institutions (hospitals, dispensaries, rural health centres, basic health units, sub-health centres) per person as proxies for social infrastructure at districts level. We have constructed social infrastructure index with the help of Principal Component Analysis (PCA). In education institutions we have included government mosque schools, government primary schools, government middle schools, government high schools, higher secondary schools by government and others, intermediate and degree colleges by government and others.

### 3.1.4. *Remittances*

Remittances relates to those transfers, which are received by the household in the home place. In the present study we have taken domestic remittances and foreign remittances in millions. Domestic remittances include those remittances, which are received by the district from other districts of the same country. Foreign remittances include the remittances, which are received by the district from foreign countries. So we have used total remittances (domestic plus foreign).

### 3.1.5. *Industrialisation*

Generally Industry refers to that sector of economy, which is related with manufacturing and production of different products. In literature different proxies have been used for industrialisation to examine its relationship with economic development. We used degree of industrialisation, which we estimated by dividing the total number of factories of a district by its population as a proxy for industrialisation and examined the effect of industrialisation on the human development of thirty five districts.

### 3.1.6. *Population Density*

Population density is mid-year population divided by land area in square kilometres. Population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship, except for refugees not

permanently settled in the country of asylum, which are generally considered as part of the population of their country of origin. Land area is a country's total area, excluding area under inland water bodies, national claims to continental shelf, and exclusive economic zones. We have used population density (thousand people per square km) for the districts of Punjab.

### 3.2. Data Sources

We have used cross sectional data for thirty-five districts of Punjab for the year 2010-11 in the present study. The data for HDI and NIHDI is collected from Qasim and Chaudhary (2014) and data for determinants of human development disparities have been collected from different kind of sources. The data of social infrastructure, degree of industrialisation and population density is collected from Punjab Development Statistics (2012), whereas data of total remittances (within country plus foreign) is collected from MICS (2011), which is conducted by Punjab Bureau of Statistics with the collaboration of UNDP and United Nations International Children's Emergency Fund (UNCIEF).

## 4. EMPIRICAL RESULTS AND DISCUSSION

The results of estimated models are following:

### 4.1. The Determinants of HDI

Table 1

*Determinants of HDI across the Districts of Punjab*

Dependent Variable = HDI			
Variable	Coefficient	T-Statistic	Prob-Value
Constant	0.416229	14.22767	0.0000
IND	0.244561	2.895155	0.0070
PD	0.073369	1.872807	0.0709
REM	0.210867	1.951867	0.0603
SI	0.153773	2.574078	0.0152
F-Statistic = 6.837336			
Prob(F-Statistic) = 0.000490			
R-Squared = 0.476890			
Adj-R- Squared = 0.407142			
Durbin-Watson Stat = 2.296086			

Source: Author's Calculation.

The results of Table 1 reveal that all four variables Social Infrastructure (SI), Remittances (REM), Industrialisation (IND) and Population Density (PD) have positive and statistically significant impact on HDI across the districts of Punjab. The results show that the coefficient of industrialisation is significant at 1 percent level of significance and the coefficient of social infrastructure is significant at 5 percent. But the coefficients of population density and remittances are significant at 10 percent level. The estimates indicate that 1 unit increase in industrialisation increase human development by 0.2445 units. The results show that one unit positive change in population density improves human development by 0.0733 units. Similarly, human development changes by 0.2108 units due to one unit change in remittances while one unit increase in infrastructure leads to 0.1537 units improvement in human development. The explanatory power of the model is 0.4768, which suggests that these four variables determine the 48 percent of human development across the districts. The districts having better social infrastructure, more inflows of remittances, higher degree of industrialisation and dense population may have higher HDI ranking.

#### (A) Diagnostic Tests

Diagnostic tests for normality, serial correlation, heteroskedasticity and model specification are applied. The results of these tests are shown in Table 2.

Table 2

#### Diagnostic Tests

<i>Normality Test</i> (Jarque-Bera Statistic)	Jarque-Bera Statistic = 0.3018	Probability = 0.8599
<i>Serial Correlation</i> (Breush-Godfrey Serial Correlation LM Test)	F-statistics = 0.7579	Probability = 0.3911
<i>Heteroskedasticity Test</i> (White Heteroskedasticity Test)	F-statistics = 0.2879	Probability = 0.9639

Source: Author's Calculation.

The results of these tests indicate that the residual is normally distributed and there is also no problem of serial correlation and autoregressive conditional heteroskedasticity.

To analyse the stability of the coefficients, the cumulative sum (CUSUM) and the cumulative sum of squares (CUSUMsq) are applied. The graphical representation of (CUSUM) and (CUSUMsq) are shown in Figures 1 and 2. If the plot of these statistics remains within critical boundaries of the five percent significance level, the null hypothesis stating that the regression equation is correctly specified cannot be rejected. The results of the Figures 1 and 2 indicate that the plots of both statistics (CUSUM) and (CUSUMsq) are within the boundaries, see in the Appendix A-3, so it is clear that our model is correctly specified.

#### 4.2. The Determinants of NIHDI

Table 3

*Determinants of NIHDI across the Districts of Punjab*

Dependent Variable = NIHDI			
Variable	Coefficient	T-Statistic	Prob-Value
Constant	0.487937	15.00677	0.0000
IND	0.157677	1.670333	0.0953
PD	0.046731	0.936437	0.3565
REM	0.440375	3.898905	0.0005
SI	0.284635	3.446218	0.0017
R-Squared = 0.574924			
Adj-R-Squared = 0.518247			
F-Statistic = 10.14390			
Prob(F-Statistic) = 0.000026			
Durbin-Watson Stat = 2.228256			

Source: Author's Calculation.

The results of Table 3 show that Social Infrastructure (SI), Remittances (REM) and Industrialisation (IND) have positive and statistically significant impact on NIHDI. But the relationship between population density and NIHDI is insignificant. The results show that the coefficients of Industrialisation, social infrastructure and remittances are respectively significant at 10, 1 and 5 percent level of significance. The estimates indicate that 1 unit increase in industrialisation increases human development by 0.1576 units. The results show that one unit positive change in remittances improves human development by 0.4403 units. Similarly, human development changes by 0.2846 units due to one unit change in social infrastructure.

#### (B) Diagnostic Tests

Diagnostic tests for normality, serial correlation, heteroskedasticity and model specification are applied. The results of these tests are shown in Table 4.

Table 4

*Diagnostic Tests*

<i>Normality Test</i>		
(Jarque-Bera Statistic)	Jarque-Bera Statistic = 0.0437	Probability = 0.9783
<i>Serial Correlation</i>		
(Breush-Godfrey Serial Correlation LM Test)	F-statistics = 0.4810	Probability = 0.4934
<i>Heteroskedasticity Test</i>		
(White heteroskedasticity Test)	F-statistics = 0.8431	Probability = 0.5741

Source: Author's Calculation.

The results of these tests indicate that the residual is normally distributed and there is also no problem of serial correlation and autoregressive conditional heteroskedasticity.

To analyse the stability of the coefficients, the cumulative sum (CUSUM) and the cumulative sum of squares (CUSUMsq) are applied. The graphical representations of (CUSUM) and (CUSUMsq) are shown in Figures 3 and 4. If the plot of these statistics remains within critical boundaries of the five percent significance level, the null hypothesis stating that the regression equation is correctly specified cannot be rejected. The results of the Figure 4.3 and 4.4 indicate that the plots of both statistics (CUSUM) and (CUSUMsq) are within the boundaries, see Appendix A-3, so it is clear that our model is correctly specified.

## **5. CONCLUSION AND POLICY IMPLICATION**

The study investigated some socio-economic determinants of HDI and NIHDI across the districts of Punjab. Among the vast range of determinants of HDI and NIHDI, the study focused on some socio-economic determinants of differences in HDI and NIHDI. Thirty-five districts were considered for this purpose and cross section data was used.

The results of both models indicated that social infrastructure, industrialisation, remittances positively affected the HDI and NIHDI while population density positively affected the HDI but had insignificant association with NIHDI. The government of Punjab can empower the people through providing the opportunities for education, health, water and sanitation facilities that widen the people's horizon and capabilities to participate, negotiate and influence accountable institutions, which are responsible for the provision of social services and economic incentives for the development. To improve human development and to reduce human development disparities Government of Punjab and non-government organisations can expand social infrastructure among the districts because it has positive and significant impact on the HDI and NIHDI. More focus should be on those districts, which have low social infrastructure (education institutions and health institutions) like Layyah, Vehari, Muzaffar Garh, D.G Khan, Pakpatten, Bahawalnager, Lodhran, Bahawalpur and Rajanpur as compared to other districts. The development at sectoral level (agriculture, industrial and services) plays an important role to increase human development. To improve sectoral development government can make policies, which are not only pro-people development, but create the income and welfare enhancing opportunities needed to promote human development at district level. The results show that industrialisation has positive impact on HDI and NIHDI across the districts of Punjab, so government should give incentives and provide basic facilities like infrastructure to investors to increase industrialisation especially in those districts which have low degree of industrialisation like Layyah, Vehari, Muzaffar Garh, D.G Khan, Pakpatten, Bahawalnager, Lodhran, Bahawalpur, Rajanpur, Sahiwal, Narowal, Okara, Chakwal, Bhakhar, Hafizabad, Jhang, Mianwali, Mandi Bahuddin and Khanewal.

The results indicate that remittances (foreign plus domestic) also have positive impact on HDI and NIHDI across the districts of Punjab. The government can build labour skills development and technical training institutes according to the international demand for labour. The government and private organisations can also create job opportunities in education, health, agriculture, industrial and other sectors at regional

level especially in southern region of Punjab because the people of one district can easily move to nearer district for earning. The literature on remittances provides some examples of governments that have implemented business counselling, information and training programmes to assist return migrants and remitters to get the required information and knowledge for investment. Although in Pakistan the Overseas Pakistanis Foundation (OPF) is offering investment advisory services to return migrants but there is a need to expand its benefits among those districts which have low remittances. The foundation can help to increase investment projects in low HDI districts, especially among southern region districts. The government of Korea launched an experimental training programme in 1986 for retraining return migrants in new skills so that they can move to other industries or establish their own business. By mid-1986, some 4,000 workers were participating in the scheme [Athukorala (1992)]. To promote remittances, government can also follow the policies of Bangladesh and the Philippines where the share of informal remittances has gone down because their banking systems have focused on speed, transfer cost reduction, and income tax relief for remitters [Amjad, *et al.* (2013)]. Due to positive relationship of population density with HDI we can say that dense population can promote human development among the districts of Punjab because it has different indirect impacts on human development. First, population density increases productivity. Second, high population density promotes technical innovation. Third, when population density increases, there is a higher incentive for investment in human capital, because the productivity of human capital is higher in those regions where population density is high [Becker, *et al.* (1999)]. The Government of Punjab can enhance the empowerment of the people among the districts with the improvement in income, education, health and other social services. There are different criteria for the allocation of development budget among the regions. Underdevelopment may also be considered as criteria for the allocation of development budget among the different regions. The Government of Punjab may increase the development budget of those districts, which have low level of human development like Layyah, Vehari, Muzaffar Garh, Sargodha, D.G Khan, Pakpattan, Bahawalnager, Lodhran, Bahawalpur and Rajanpur.

## APPENDIX

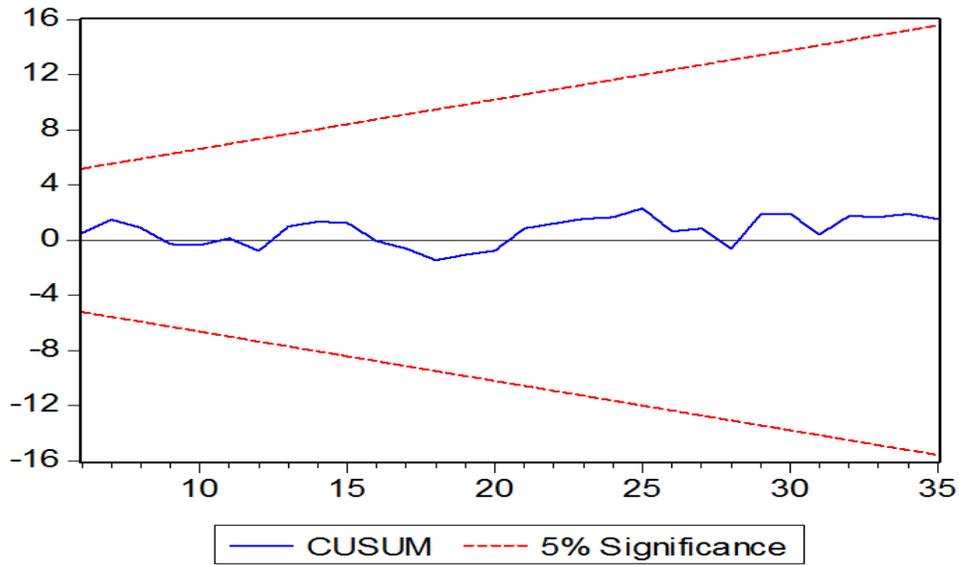
Table A-1: Data

Ranking of the Districts based on HDI					
Districts	HDI		Districts	HDI	
	Value	Rank		Value	Rank
Rawalpindi	0.6731	1	Nankana Sahib	0.5505	19
Lahore	0.6667	2	Mandi Bahuddin	0.5470	20
Sheikhupura	0.6487	3	Narowal	0.5452	21
Faisalabad	0.6267	4	Toba Take Singh	0.5411	22
Sialkot	0.6198	5	Okara	0.5408	23
Kasur	0.6171	6	Hafizabad	0.5359	24
Multan	0.6071	7	Rahim Yar Khan	0.5302	25
Jhelum	0.5985	8	Layyah	0.5299	26
Chakwal	0.5983	9	Vehari	0.5064	27
Khushab	0.5776	10	Muzaffar Garh	0.5047	28
Jhang	0.5770	11	Sargodha	0.5006	29
Attock	0.5690	12	Dera Gazi Khan	0.4992	30
Mianwali	0.5665	13	Pakpatten	0.4787	31
Bhakhar	0.5643	14	Bahawalnager	0.4769	32
Gujrat	0.5642	15	Lodhran	0.4753	33
Gujranwala	0.5630	16	Bahawalpur	0.4521	34
Khanewal	0.5567	17	Rajanpur	0.4515	35
Sahiwal	0.5559	18	PUNJAB	0.5567	

**Table A-2: Data**

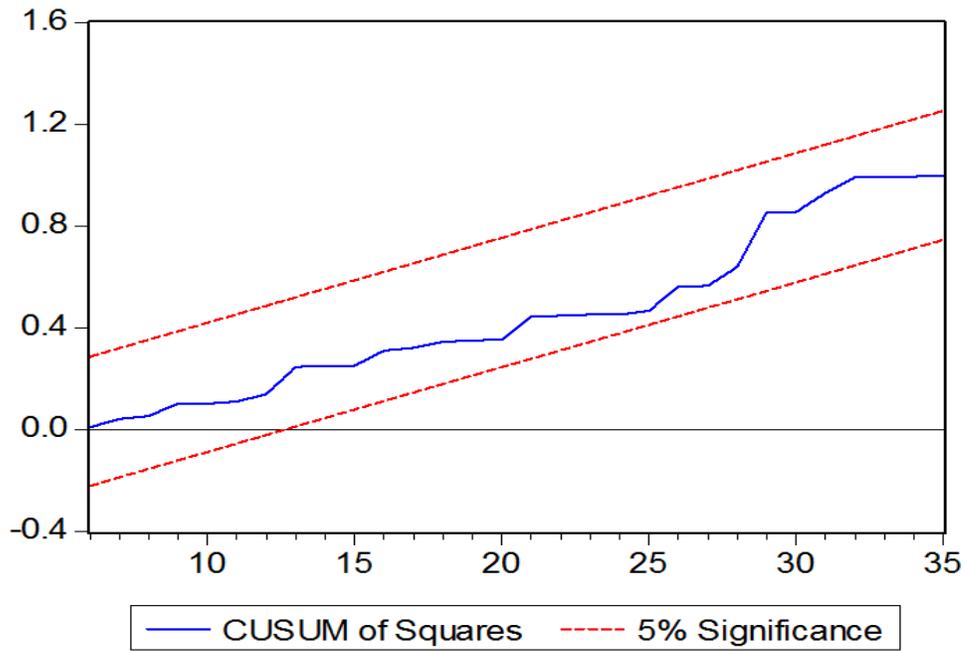
Districts	Social Infrastructure (Index)	Remittances in millions	Degree of Industrialisation	Population Density
Attock	0.00341	0.2180	0.03095	0.238
Bahawalnager	0.00341	0.1480	0.07913	0.305
Bahawalpur	0.00230	0.1400	0.10497	0.138
Bhakhar	0.00348	0.1769	0.01827	0.181
Chakwal	0.00416	0.1920	0.10502	0.206
Dera Gazi Khan	0.00274	0.1400	0.04330	0.197
Faisalabad	0.00201	0.2000	0.23570	1.235
Gujranwala	0.00201	0.2176	0.23576	1.331
Gujrat	0.00292	0.2900	0.21439	0.840
Hafizabad	0.00264	0.2082	0.06165	0.467
Jhelum	0.00182	0.3240	0.07444	0.420
Jhang	0.00567	0.1693	0.08101	0.331
Kasur	0.00210	0.1680	0.18864	0.798
Khanewal	0.00274	0.1680	0.06252	0.605
Khushab	0.00334	0.2840	0.09954	0.182
Lahore	0.00134	0.3600	0.22491	4.889
Layyah	0.00342	0.2600	0.08586	0.251
Lodhran	0.00219	0.1580	0.08240	0.589
Mandi Bahuddin	0.00270	0.2629	0.06178	0.548
Mianwali	0.00337	0.3120	0.05120	0.237
Multan	0.00199	0.1680	0.10566	1.121
Muzaffar Garh	0.00187	0.1480	0.03559	0.457
Nankana Sahib	0.00298	0.1800	0.12928	0.596
Narowal	0.00382	0.2400	0.01567	0.702
Okara	0.00224	0.1384	0.02833	0.680
Pakpatten	0.00217	0.2437	0.10786	0.633
Rahim Yar Khan	0.00255	0.1400	0.04697	0.371
Rajanpur	0.00237	0.1680	0.04755	0.128
Rawalpindi	0.00261	0.2760	0.07032	0.822
Sahiwal	0.00275	0.2100	0.09643	0.708
Sargodha	0.00308	0.2520	0.10845	0.597
Sheikhupura	0.00202	0.1879	0.31691	0.897
Sialkot	0.00271	0.2760	0.22347	1.207
Toba Tek Singh	0.00330	0.1883	0.06773	0.651
Vehari	0.00227	0.2013	0.06556	0.647

**Table A-3: Figures (CUSUM) and (CUSUMsq)**



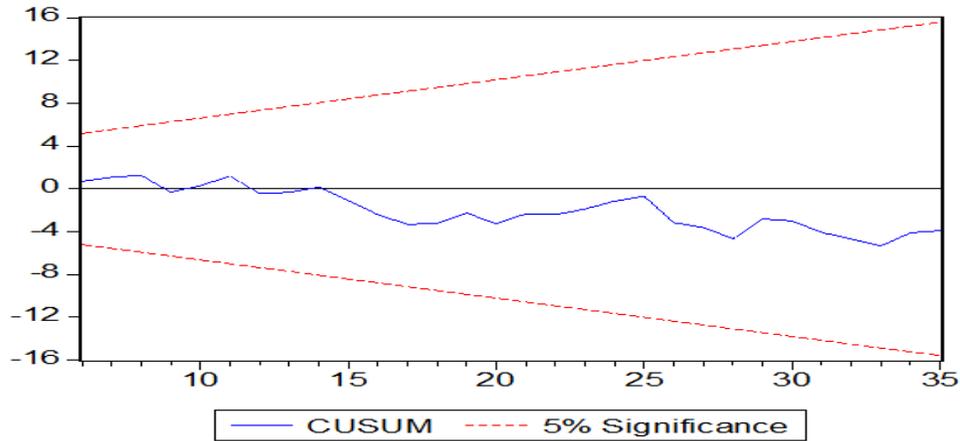
The straight lines represent critical bounds at 5 percent Significance level.

**Fig. 1. Plot of Cumulative Sum of Recursive Residuals**



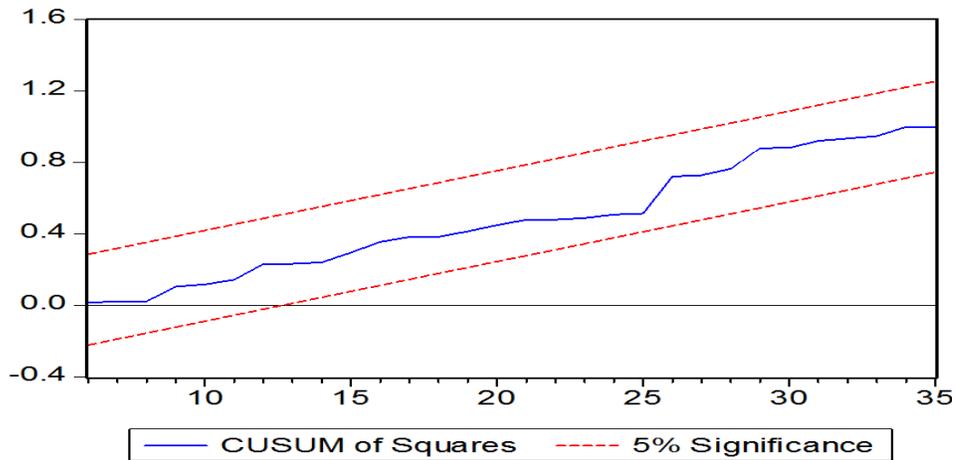
The straight lines represent critical bounds at 5% Significance level.

**Fig. 2. Plot of Cumulative Sum of Squares of Recursive Residuals**



The straight lines represent critical bounds at 5% Significance level.

**Fig. 3. Plot of Cumulative Sum of Recursive Residuals**



The straight lines represent critical bounds at 5% Significance level.

**Fig. 4. Plot of Cumulative Sum of Squares of Recursive Residuals**

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## **Trends of Income Inequality and Polarisation in Pakistan for the Period 1990-2008**

MUHAMMAD TOUSEEF-UR-REHMAN, USMAN MUSTAFA, and HUMAYUN RASHID

### **1. INTRODUCTION**

Trends of income inequality and polarisation previously were calculated by Arshad, *et al.* (2008) in Pakistan for the period of 04 years from 1992-93 to 2001-02, using Gini-coefficient and Bossert and Schworm (2006) measures respectively. Empirical analysis of polarisation has huge importance in the economic policy making. However, polarisation has been less probed, rather un-explored phenomenon. So far only a handful studies have been conducted on this topic and most of the covered western countries with an exception of India. This research area appears to be unexplored in Pakistan, except for a few studies which led to the foundation for the present study.

Problem statement is that in spite of handsome economic growth rates and the rate of industrialisation, income distribution continues to deteriorate in Pakistan and why masses have not been able to enjoy the benefits of economic development. For social welfare analysis, issues like inequality, poverty, per capita income and trickle-down effect need to be addressed. Much empirical studies have been conducted on these issues however it appears that per capita income is not appropriate measure of the welfare in any economy because it hides a wide range of fluctuation behind the score/value. However, still it is treated as one of the foremost indicator of the wellbeing of the economy.

Despite of the recent and more sophisticated tools to assess effectiveness of economic growth, development and economic advancement the historical importance and simplicity of per capita income as a measure of the average level of prosperity in an economy still stands valid.

In Pakistan, per capita income in Dollar terms has increased from \$586 in 2002-03 to \$10,466 in 2008-09. Real per capita income in rupee terms has also increased by 2.5 percent as compared to 0.3 percent growth last year (Government of Pakistan, , 2009). However, In Pakistan 30 to 35 percent of the population is living on one dollar a day as reported by World Bank (2002). For these people, it is very hard to provide three square meals a day for family members.

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At the same time, phenomena such as “the disappearing middle class” or “clustering around extremes” do not appear to be easily captured by standard measures of inequality such as the Gini coefficient. It is to characterise such phenomena that Esteban and Ray (1994), Foster and Wolfson (1992), Wolfson (1994), Tsui and Wang (1998), Esteban et al., (1999) have proposed alternative indices of polarisation. These indices seek evidence for clustering in the distribution of personal income at the lower and upper ends. It is claimed that, at least in theory, they represent a major departure from standard measures of inequality.

It has also been discovered that high inflation rate deteriorates income distribution. However, inflation may be a positive indicator for macroeconomic and fiscal stabilisation in an economy which are also pre-requisite for economic growth. Therefore, changes in food prices are used as a determinant of income inequality. Inflation rates were at 7.9 percent in 2005-06 [Pakistan (2009)] and as of 2010-11 it was 14.1 percent. The study at hand attempts to answer a critical question whether economic growth trickles-down to the poor and impact on income distribution.

In Pakistan a number of attempts have been made to estimate the income or expenditure inequality using the Household Income and Expenditure Survey (HIES) data. The debate on trends in income inequality during the 1990s, an era of stabilisation and structural adjustment has been wide-ranging in Pakistan. However, lesser attempts have been made to explore the extent of polarisation in Pakistan. Polarisation is a phenomenon that has attracted much attention in recent past. Polarisation refers to the situation where middle class gets clustered towards the poles or in other words the population based on income distribution gets clustered to one or the other income extremes. It has been observed that, polarised societies are prone to competitive rent-seeking activities and will have difficulty agreeing on public goods such as infrastructure, education and good policies [Bossort, *et al.* (2007)]. In recent years it has been agreed upon that income inequality and polarisation capture different features of distribution and can even move in opposite directions.

Existing measures of polarisation have been applied empirically in many countries. Polarisation of income distribution and its causes have been studied in Spain by Gradin (2000, 2002), in Italy by D’Ambrosio (2001), and in China by Zhang and Kanbur (2001). Duclos, Esteban and Ray (2004) estimated polarization for income distributions of 21 countries. Seshanna and Decornez (2003) study polarisation across various countries in the world. Ravallion (1997) estimate Foster and Wolfson calculated polarisation indices for 67 developing and transitional economies. Aighokan (2000) briefly alerts about the possible problem of Polarisation in Nigeria. Leonid (2002) estimated the regional inequality and polarisation in Russia. Arshad and Idrees (2008) briefly introduced trends in Polarisation in Pakistan.

The present study focuses on the patterns and trends of regional inequality and polarisation in Pakistan from 1990 to 2008. Study calculates these trends in overall Pakistan, its urban and rural segment and in the four (04) Provinces of Pakistan. For each component, the study derives per capita real consumption expenditures from the HIES/PIHS/PSLM data. Objectives of this study are as follows:

- (i) To explore the trends of income inequality and polarisation in Pakistan overall and its urban and rural segments during 1990 to 2008.
- (ii) To measure the relationship of income inequality and polarisation in all the provinces during the study period.

The study proceeds as the data set, unit of measurement and the methodologies are discussed in Section 2. Empirical analysis of Pakistan and its rural and urban segments are presented in Section 3, whereas Section 4 highlights the study results of Provinces. Section 5 concludes the study.

## 2. FRAMEWORK OF STUDY

The choice of data set, units of measurement and the methodologies used for the measurement of income inequality and polarisation are discussed in this section.

### 2.1. Data

The data set of present study has been collected from various issues of Household Integrated Economic Survey (HIES)<sup>1</sup> conducted and published by Federal Bureau of Statistics (FBS), Government of Pakistan. Statistics show that during all the years more than 60 percent of the sampled households belong to rural areas of Pakistan (Table B1). The province wise distribution shows that the maximum number of households belongs to Punjab, followed by Sindh, Khyber Pakhtunkhwa (KPK)<sup>2</sup> and Balochistan (Table B2). In 1998-99 Household Integrated Economic Survey (HIES) was merged with Pakistan Integrated Household Survey (PIHS), and the interrogation methodology was revised and split in two modules separately for male and female respondents. The rationale behind this sectioning was that none of either males or females is aware of all income and expenditure details. In 2005-06, PIHS was replaced with the Pakistan Social and Living Standards Measurement Survey (PSLM). PSLM incorporated the HIES as well as the Core Welfare Indicators (CWIQ). The survey consists of all urban and rural areas of the four provinces of Pakistan defined as such by the various population censuses concerned. The household and individual-level data used in the instant study has been collected from eight rounds of HIES (Table B3). For the purpose of this study, household and individual level data has been drawn from HIES 1990-91, HIES 1992-93, HIES 1993-94, HIES 1996-97, PIHS 1998-99, PIHS 2001-02, PSLM 2005-06 and PSLM 2007-08. Therefore, the data used in this study combine eight rounds of micro data from household surveys to make inference the trends in income inequality and polarisation in Pakistan.

### 2.2. Choice of Income Units

How the study use the data to manipulate the requisite outcome. There can be many options in the HIES/PIHS/PSLM data for the choice of income unit, i.e. aggregate household, per capita household income, or per-adult equivalent. The aggregate household covers the household as a single unit and thus ignores household size. Per capita household incorporates household size but gives same weight to all household members. Whereas 'adult equivalence' is a method based on the calories required by the males or females in different age groups. There is much literature on adult equivalence. Jamal (2006) has given a summary of different adult equivalence scales used in different studies for Pakistan. Among them the most acceptable is the calorie intake approach.

<sup>1</sup>Most of the studies on inequality in Pakistan have used HIES data.

<sup>2</sup>KPK (Khyber Pakhtunkhwa) is a new name of NWFP, Which was changed in the 18<sup>th</sup> amendment of the Constitution of Pakistan, was passed by the National Assembly of Pakistan on April 8, 2010.

Income does not always necessarily reflect the true living standards. The households with high per capita income do not always necessarily enjoy high living standards. Under such cases, consumption expenditure can be a better indicator of living standards. Moreover there are less chances of under reporting in consumption expenditures as compared to income levels. In the present study it was, therefore, felt worthwhile to measure consumption inequalities.

### 2.3. Methodology

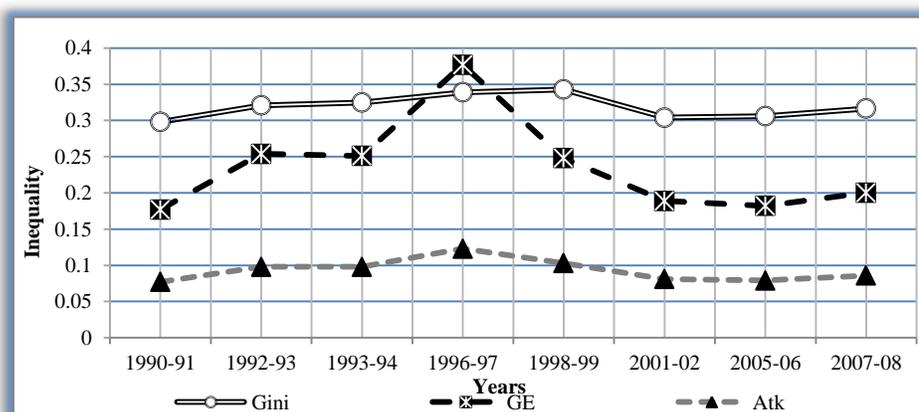
The study calculates trends in income inequality by two Lorenz-consistent inequality measures, namely the Gini coefficient [Cowell (1995)] and the Generalised Entropy [Shorrocks (1984)]. The Gini coefficient is used because it is the most commonly referred to measure of inequality and, therefore, can provide good benchmarking values. The Generalised Entropy (GE) measure is used as it will introduce some measures discussed later in this study. The Atkinson index of income inequality is also used in the subject study. The study also measures and discusses polarisation, which is a concept distinct from income inequality as elaborated by the Generalised Esteban, *et al.* (1999) and Foster and Wolfson (1992).

## 3. EMPIRICAL ANALYSIS AT NATIONAL LEVEL

### 3.1. Trends in Overall, Urban and Rural Income Inequality in Pakistan at National Level

Gini coefficients, Generalised entropy and Atkinson measure of inequality for Pakistan as a whole as well as for urban and rural areas of Pakistan have been estimated and explained in this section (Table A1). Gini coefficient of overall Pakistan increases with the sluggish pace from 1990-91 to 1998-99 almost 05 percentage points i.e from 0.298 to 0.343. Later, from 1998-99 to 2005-06 it declines 04 percentage points i.e. 0.343 to 0.306 followed by an increasing trends in 2007-08 vide Figure 3.1. The results of Gini coefficients as calculated by Jamal (2006) also show that Gini increases from 1990-91 to 1998-99 and later on it decreases till the study year 2001-02. Pakistan, Government of (2001), FBS also explain that Gini coefficient decreases from 1998-99 to 2001-02.

Fig. 3.1. Inequality Measures of Overall Pakistan

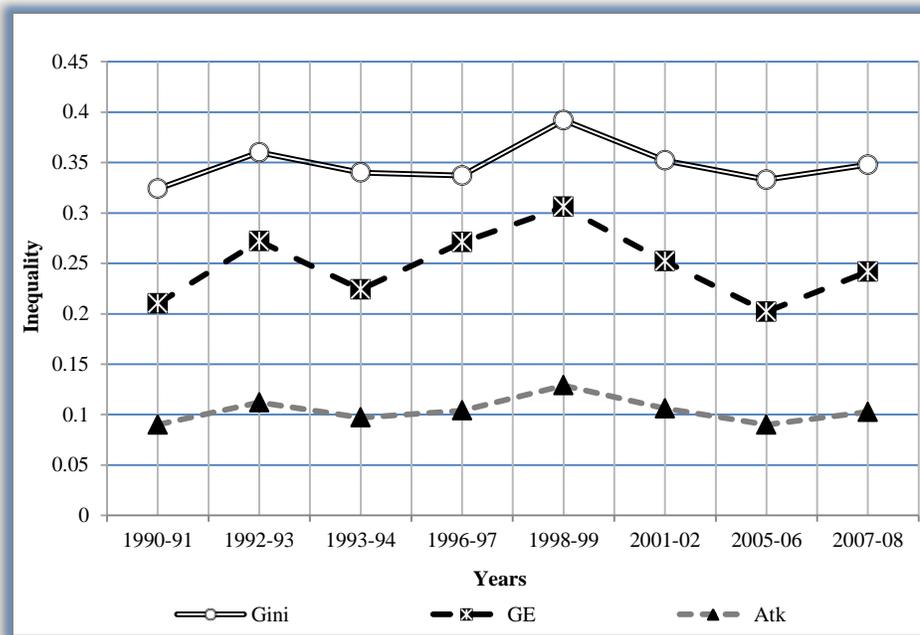


The overall Generalised entropy increases with an energetic pace from 1990-91 to 1996-97 almost 20 percentage points i.e. from 0.177 to 0.377. Subsequently from 1996-97 to 2005-06 it decreases 19 percentage points i.e. 0.377 to 0.182 followed by an increasing trends in 2007-08.

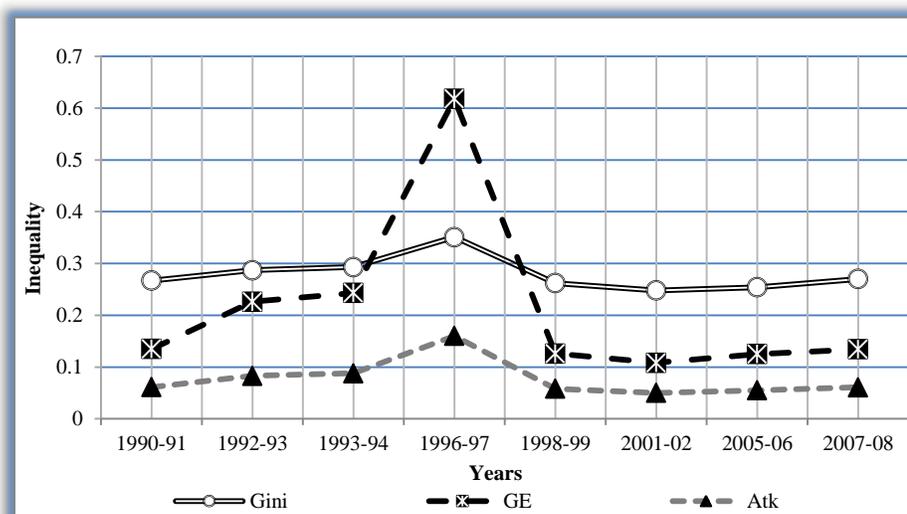
The Atkinson measure of inequality shows the same trend as the generalised entropy but with lesser variation. It increases from 1990-91 to 1992-93. According to World Bank (2002) for the same time period household income inequality rose from 0.26 to 0.47 Gini points; and the dynamics are similar to this study. After that from 1996-97 to 2005-06 it decreases.

The measures of inequality in Urban Pakistan illustrate that all the inequality measures increases from 1990-91 to 1992-93 followed by a decreasing trend in 1993-94. After that inequality increases till 1998-99 as shown by all measures. Afterward the urban inequality decreases till 2005-06 but it increases swiftly in 2007-08 see Figure 3.2.

**Fig. 3.2 Inequality Measures of Urban Pakistan**



The measures of inequality in Rural Pakistan illustrate that all the inequality measures increases from 1990-91 to 1993-94 with the sluggish pace followed by a dynamic pace in 1996-97. After that income inequality decreases in 1998-99 with an active pace followed by a lethargic pace in 2001-02. After that the rural inequality increases till 2005-06. After that the rural inequality increases till 2007-08 vide Figure 3.3. The rural Pakistan shows the different pattern with more deviations. It is also observed that there is very high level of income disparities in the year of 1996-97, in which there is a very high level of income heterogeneity and income disparities which is exceptional.

**Fig. 3.3. Inequality Measures of Rural Pakistan**

Pakistan (2001) FBS show that overall, urban and rural Gini coefficient increases from 1992-93 to 1998-99. World Bank (2003) also indicates the same results in overall and urban Pakistan whereas, rural poverty decreases very minor from 1992-93 to 1998-99. Arshad, *et al.* 2008 also concluded that from 1992-93 to 1998-99 the overall, urban and rural income inequality increases whereas, from 1998-99 to 2001-02 it decreases. The present study also shows the similar trends as above cited studies indicate.

One possible explanation for the results could be that rural incomes are more human labour based than urban incomes. That is why movement from household based data to persons based data has reduced the value of Gini coefficients more in rural areas than in urban areas. In other words high income households in rural areas are those which have more people living in those households and low income households are those which have less people living in them. That is why when incomes were re-divided on persons or per capita basis the inequality fell as high incomes of larger families were divided among more people and small incomes of smaller households were divided among people living in smaller households [Ahmed (2000)].

Another aspect is that the floods of 1992-93 had severe effect in the rural areas. The effects of destructive floods of 1992-93 were eliminated in year 1996-97 (Table A1). Consumption of rural population especially agricultural dependent persons went up again in rural areas. Secondly, the government after floods of 1992-93 gave special attention to the agriculturists [Arshad, *et al.* (2008)].

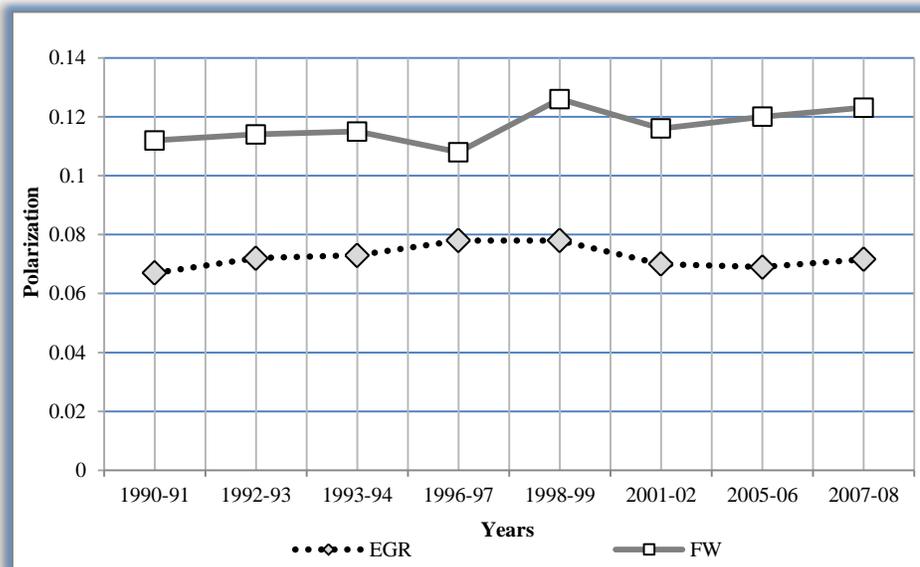
In urban areas on the other band, huge profits of stockiest, importers and constructors were eliminated. These reversed the situation of inequalities in urban and rural segments of the country. Increasing trends in inequalities are recorded till 1998-99. This period is critical with reference to the Structural Adjustment Programme. Kemal (2003) also concluded that "overall poverty and inequality increased during the adjustment phase" [UNDP Pakistan Report (2009), Brief-3].

The year of 1996-97 is the period of maximum inequality in overall as well as in rural Pakistan, whereas, 1998-99 was the period of maximum inequality in urban Pakistan. This was the period during which Pakistan opted for nuclear explosions. As an after effect, many developed nations imposed sanctions on Pakistan by stopping foreign aid and other assistance. As a result poor segment of the society got affected adversely and thus inequalities rose in Pakistan and its urban segment. These statistics indicates that the sanctions of 1998-99 had more adverse effects on low-income groups of urban Pakistan, and thus reduced their consumption considerably deteriorating consumption inequalities in overall Pakistan. Urban areas saw more adverse effects due to the fact that most people of urban areas are employed in service departments and multinational companies, which dropped their investments. Prices of daily food items rose drastically and thus adversely affected the consumption levels of urban citizens. On the other hand, as people of rural areas mainly depend upon agriculture and most of them are not purchaser of major food items such as rice, wheat, etc., from markets, so the inequality level of low income groups did not significantly affect the rural areas of Pakistan.

### 3.2. Trends of Overall, Urban and Rural Polarisation Measures in Pakistan at National Level

The estimation of polarisation calculated and described by two different methods i.e., Generalised Esteban, *et al.* (1999) and Foster and Wolfson (1992) in Pakistan and its rural-urban segments in this section (Table A1). The trends of polarisation in Pakistan estimated by Arshad, *et al.* (2008) using the Bossert-Schworm measure (2006) and finds the same result as calculated by Foster and Wolfson (FW) measure of polarisation in the present study. While, Generalised Esteban, *et al.* (EGR) measures show a different results.

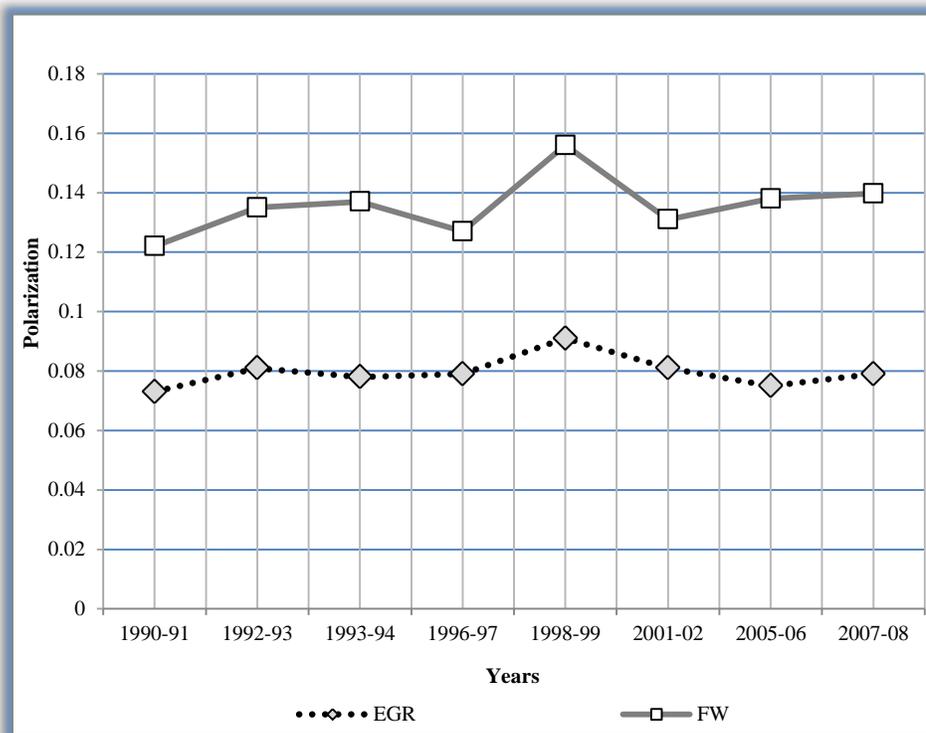
Fig. 3.4. Polarisation Measures of Overall Pakistan



Arshad, *et al.* (2008) estimates that polarisation decreases from 1992-93 to 1996-97 and then it increases from 1996-97 to 1998-99 followed by a decreasing trend in 2001-02 in overall, urban and rural Pakistan. The identical results in the current study are also shown by the Foster and Wolfson measure in the same time period (Table A1). The estimation of overall polarisation by Generalised Esteban, *et al.* (1999) indicates that there is a consistent increase till 1996-97 and then it decreases with the same pace. Whereas, the Foster and Wolfson measure of polarisation shows more fluctuations as presented above in Figure 3.4.

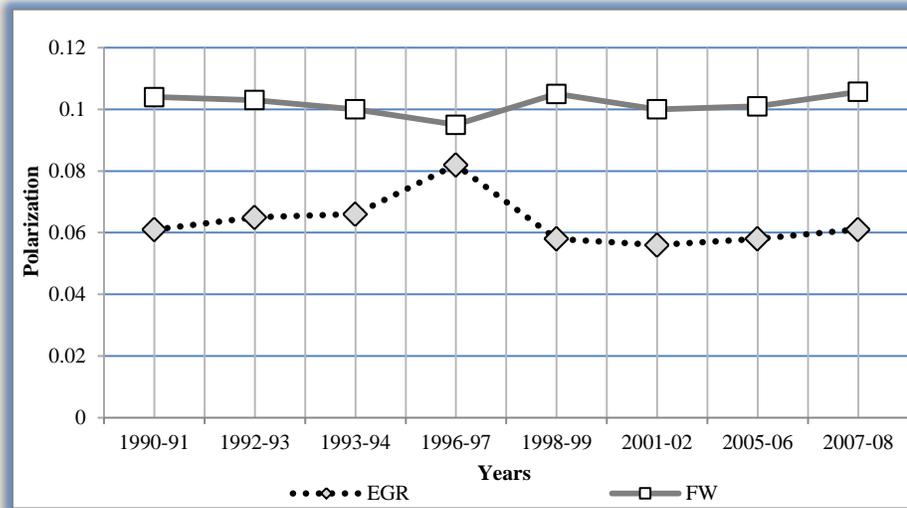
The trends of urban polarisation from 1990-91 to 1992-93 increased in urban Pakistan by a dynamic pace as estimated by either of the two measures of polarisation. This increasing trend continues in urban Pakistan as shown by the measure of Foster and Wolfson while, Generalised Esteban *et al.*, show a declining trend. Then from 1996-97 to 1998-99 the urban polarisation increased as shown by both measures. Later on it decreases till the end of the study period (Figure 3.5).

**Fig. 3.5. Polarisation Measures of Urban Pakistan**



The rural polarisation explains a very steady trend over the study years. First it increases from 1990-91 to 1996-97 as shown by Generalised Esteban, *et al.* (1999) measure whereas, Foster and Wolfson measure shows an opposite trend in the same study period. Afterward, from 1996-97 polarisation measure of Generalised Esteban, *et al.* (1999) decreases till 2005-06 while, Foster and Wolfson measure shows a contrary trend (Figure 3.6).

Fig. 3.6.



The increasing trend of polarisation with the dynamic pace from 1990-91 to 1992-93 indicates that the middle class weakened due to the adverse effects of flood in 1992-93. After that from 1992-93 to 1998-99 polarisation increases with the sluggish pace. The rising trend in the later years shows that the middle class strengthens over the years with little fluctuations till 1998-99. Afterward, polarisation decreases with a dynamic pace from 1998-99 to 2005-06. This declining trend is observed mostly by all the polarisation measures. This decline in polarisation has lot of factors involved i.e. helping of world's economics giants in favour of Pakistan because of fight against terrorism, the re-scheduling of loans etc. Furthermore, the government of this period has also worked a lot on poverty alleviation programmes like the commencement of Poverty Reduction Strategy Paper (PRSP) collaborated with the international agencies aiming to help poverty alleviation in Pakistan and improving the factors involved in social indicators. Due to increase in tax base by the present government, the burden of tax was somewhat shifted to companies and industrial sector as compared to the salaried class, which helped in strengthening of middle class [Arshad, *et al.* (2008)].

### 3.3. Trends of Income Inequality vs. Polarisation of Overall, Urban and Rural Pakistan

The trends of income inequality and polarisation in overall, urban and rural Pakistan have been explained in detail in Sections 3.1 and 3.2 respectively. In this sections, an attempt has been made to correlate the two concepts. To begin with, it must be understood that there is a wide difference between the concept of polarisation and income inequality. Income inequality looks at the distribution of income among all income units while, polarisation focuses on the strengthening or weakening of middle class. So the magnitudes of these measures are not comparable at all. The only significance is of their mutual trend. The estimates show that the Gini coefficients, Generalised Estaban, *et al.* (1999) and the Atkinson measures have approximately same

trend whereas, Generalised entropy and Foster and Wolfson measures shows the different pattern. Three features are immediately apparent from the measure of income inequality and polarisation (Table A1 and Figures 3.1 and 3.4). First, the overall trend for both inequality and polarisation measures increases but at substantially different rates. Second, although there is an overall upward trend, this is not uniform, from 1998-99 to onward, inequality and polarisation has actually declined. Third, the distinction between the three inequality measures is greater than the two polarisation measures.

Figures of urban Pakistan illustrate that all the measures have a consistent trend in the study period. The magnitude of the fluctuations is approximately similar as shown by all the measures of income inequality and polarisation. In case of urban Pakistan, the result of income inequality and polarisation shows that from 1990-91 to 1992-93 it increases followed by a decreasing trend from 1992-93 to 1996-97 except the Foster and Wolfson measure. The result shows that the estimates from 1996-97 to 1998-99 increased followed by a decreasing trend till the end of the study period. Whereas the Foster and Wolfson polarization measure shows a different trend as compare to other measures.

This proves that decreasing inequalities do not ensure decreasing polarisation. As from 2001-02 to 2005-06 all the inequality measures decreases, while the Foster and Wolfson measure of Polarisation increases. After that from 2005-06 to 2007-08 all the measures increases (Figure 3.2 and 3.5). Though inequalities have increased from 2001-02 to 2007-08 still the proportion of middle class has increased. The dispersion in incomes even in the middle-income groups can increase or there may be a wider gulf in the incomes of the lesser than before proportion of people at the poles.

Three features are revealed by the results of inequality and Polarisation measures. First, the overall trend for both inequality and polarisation measures increases but at substantially different rates. Second, although there is an overall upward trend, this is not uniform, from 1998-99 to onward inequality and polarisation has actually declined and from 2001-02 to 2007-08 it increases. Third, the distinction between the three inequality measures is greater than the two polarisation measures (Figure 3.3 and 3.6).

Since the rural population accounts for more than 65 per cent of total population [Pakistan (2007)] it is worthwhile, to compare the measures of inequality and polarisation for rural Pakistan. Again, the Generalised Esteban, *et al.* (1999) exhibits a similar pattern to the Gini coefficients. This time, Foster and Wolfson index and Atkinson index have the slightest increase during the whole period and they show different patterns in 1996-97, 2005-06 and 2007-08 from other measures. The Generalised entropy measure rises much faster than the Gini coefficients, suggesting the different sensitivities of these two measures to changes in different parts of the distribution. Because of its sensitivity to the median value, the Foster and Wolfson index may fluctuate more rapidly when the median value and its associated group change. But an important aspect is that on the whole, polarisation and the inequality measures agree on the trend over the sample period.

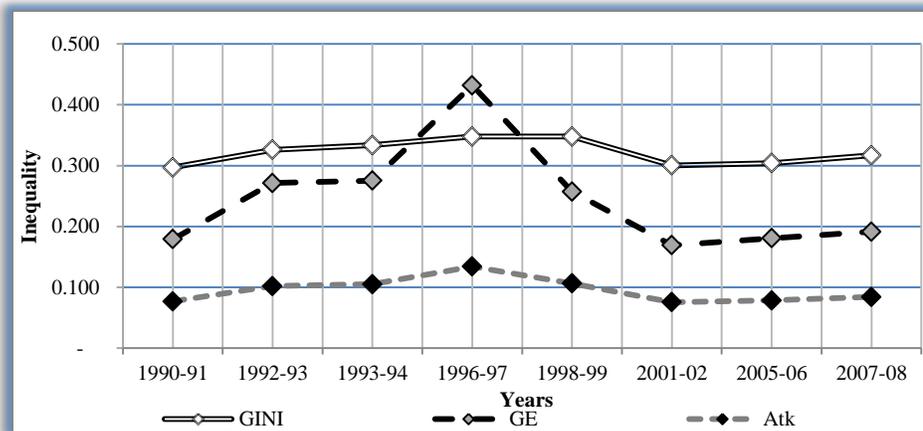
#### **4. COMPARISON OF THE TRENDS OF INCOME INEQUALITY AND POLARISATION IN ALL PROVINCES OF PAKISTAN**

In this section the study compared the trends of income inequality and polarisation of all the provinces over the study period. The trends of income inequality and polarisation in all the Provinces have been depicted in detail in previous section. The

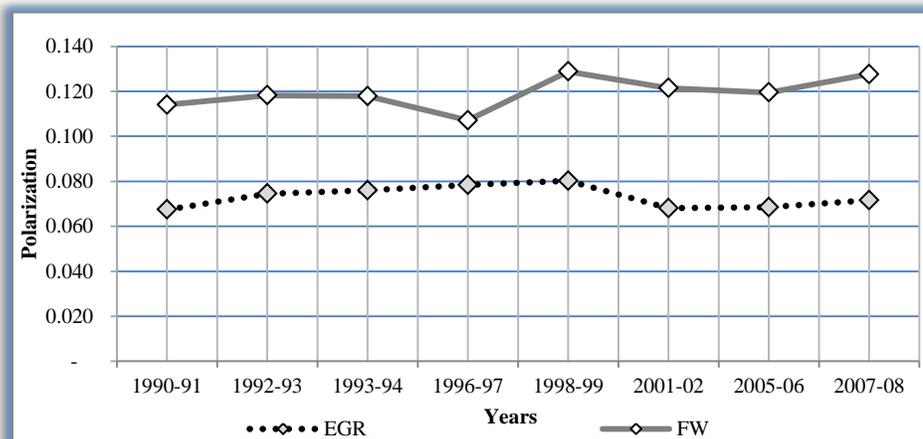
main focus of this section is a comparison of income inequality and polarisation in all provinces.

The estimates of income inequalities and polarisations of Punjab have been presented and explained in Figures 3.7 and 3.8 respectively. The Gini coefficients, Generalised entropy, Atkinson and Generalised Esteban, *et al.* (1999) measures show approximately the same trend whereas, Foster and Wolfson measure differs from other measures in the period from 1993-94 to 1998-99. Three features are immediately apparent from Figures 3.7 and 3.11. First, the overall trend for both inequality and polarisation measures increases but at substantially different rates till 1996-97 except the Foster and Wolfson measure. Second, although there is an overall upward trend, it is not uniform, from 1998-99 to onward inequality and polarisation actually decline. Lastly, the distinction between the three inequality measures is greater than the two polarisation measures.

**Fig. 3.7. Inequality Measures in Punjab**

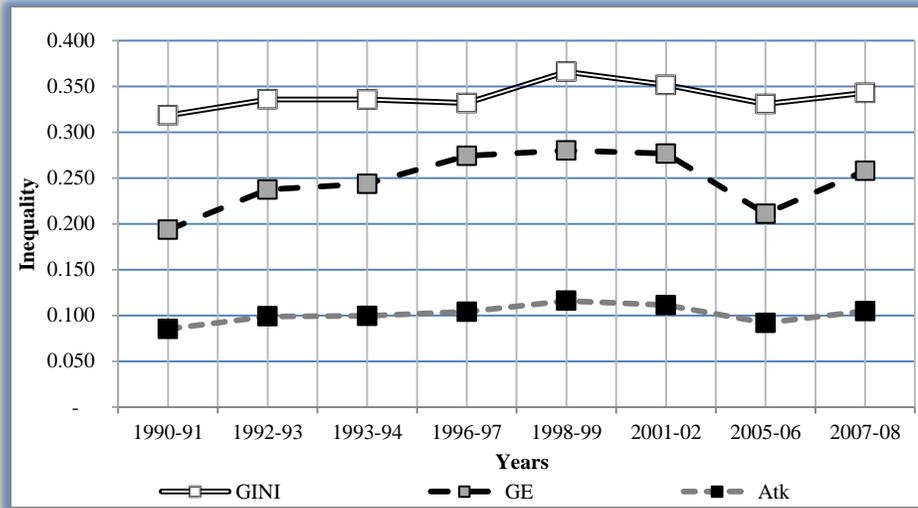


**Fig. 3.8. Polarisation Measures in Punjab**



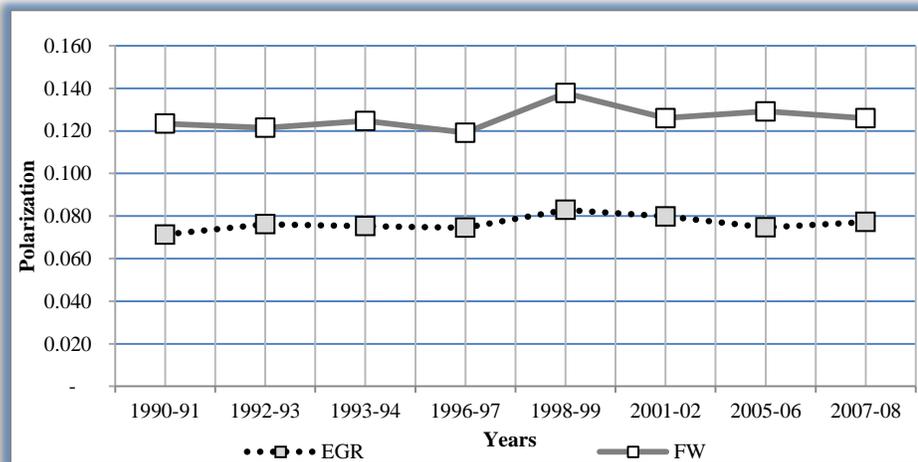
The trends of income inequality and polarisation in the province of Sindh are illustrated in Figures 3.9 and 3.10. The Gini coefficients, Generalised entropy, Atkinson and Generalised Esteban, *et al.* (1999) measures show approximately the same trend whereas, Foster and Wolfson measure differs from other measures in the period from 1993-94 to 1998-99 and from 2005-06 to 2007-08.

**Fig. 3.9. Inequality Measures in Sindh**



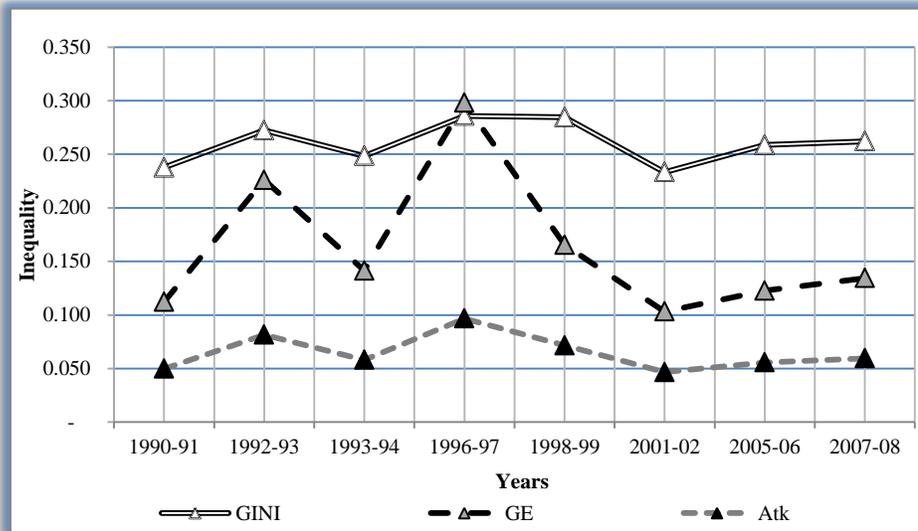
There are two phases first, the trend for both inequality and polarisation measures increases but at substantially different rates till 1998-99 except the Foster and Wolfson measure. Secondly, from 1998-99 to onward inequality and polarisation has decreasing trends. Lastly, these measures increase in 2007-08 except Wolfson measure.

**Fig. 3.10. Polarisation Measures in Sindh**

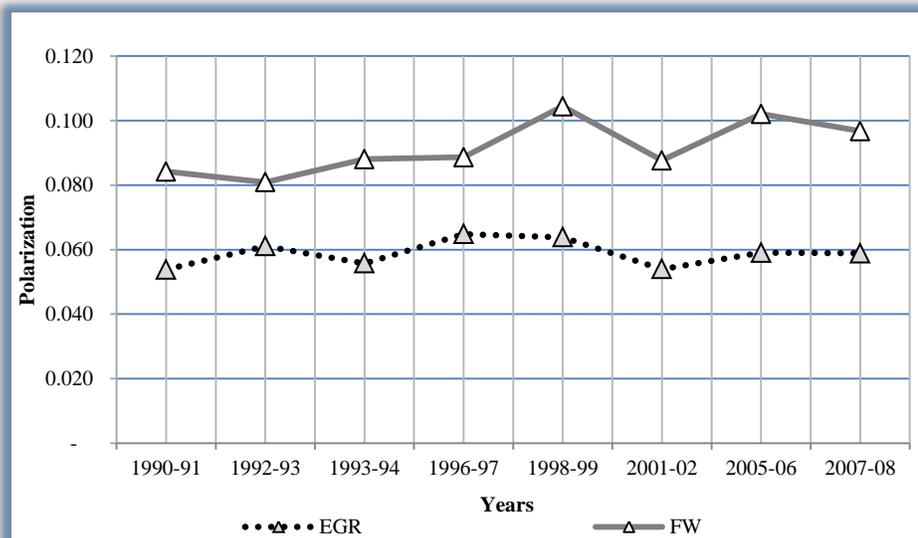


The trends of income inequality and polarisation in the province of Khyber Pakhtunkhwa are presented and explained by the help of Table A2 and Figures 3.11 and 3.12. Gini coefficients, Foster and Wolfson and Generalised Esteban, *et al.* (1999) measures have the approximately same trend whereas, Generalised entropy and Atkinson shows the similar trends. All the measure shows the cyclical trends, however there magnitude and pace is different. Due to cyclical trends there are many phases however, looking at the trends it is obvious that as the inequality increases polarisation also increases.

**Fig. 3.11. Inequality Measures in Khyber Pakhtunkhwa**

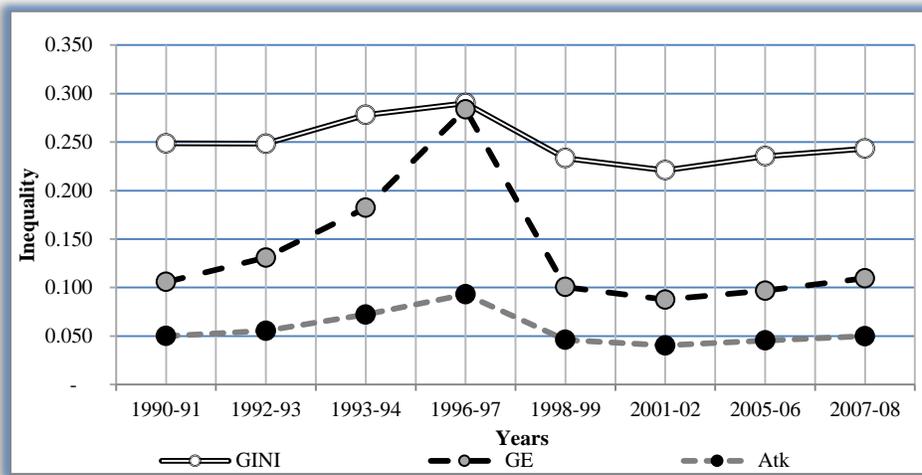


**Fig. 3.12. Polarisation Measures in Khyber Pakhtunkhwa**

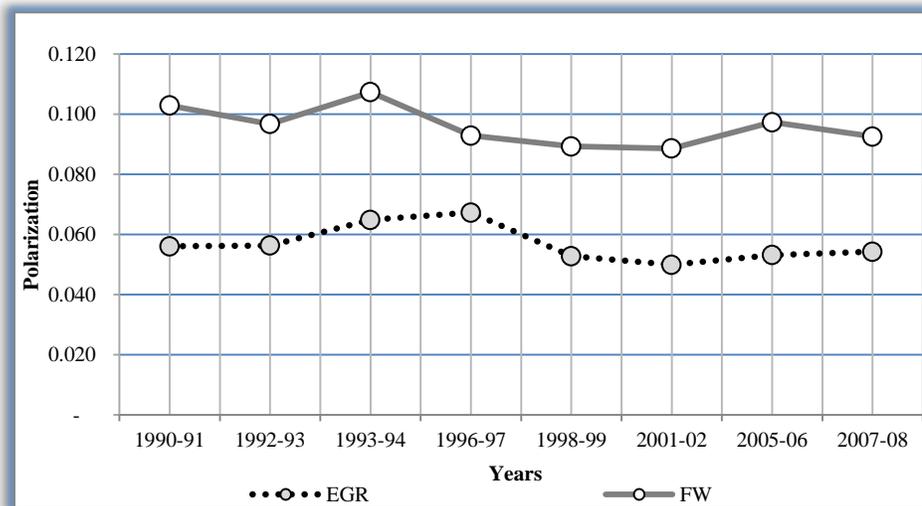


Figures 3.13 and 3.14 illustrate the trends of inequality and polarisation in the province of Baluchistan. Gini coefficients, Atkinson and Generalised Esteban, *et al.* measures have the approximately same trend whereas, Generalised entropy and Foster and Wolfson measure illustrate the different trends. Generalised entropy is a measure which shows the greater magnitude of the fluctuations. It shows that there are three phases. In first phase Inequality and polarisation measure as Gini coefficients, Atkinson and Generalised Esteban, *et al.* (1999) increases till 1996-97 indicating that as the inequality increases the middle class become weak. From 1996-97 to 1998-99 the inequality decreases by strengthens the middle class. In the last study years inequality and polarisation increases again.

**Fig. 3.13. Inequality Measures in Balochistan**



**Fig. 3.14. Polarization Measures in Khyber Balochistan**



## 5. CONCLUSION

The main purpose of this study is to calculate the trends of income inequalities and polarisation in Pakistan as a whole and its urban-rural segments as well as in its four provinces. The calculations of the study show that Pakistan is fairly optimistic in terms of its distribution of income.

The highest level of inequity is seen in Sindh and lowest level of inequality is seen in Baluchistan. The fluctuation ratios in rural Pakistan are more than in urban Pakistan indicating a very important phenomenon in rural versus urban Pakistan i.e. the rural incomes are more human labour based than urban income. In other words high-income households in rural areas are those which have greater number of family members and low income households are those which have less family members. Therefore, when re-divided, income among persons or on per capita basis the inequality fell as high incomes of larger families are divided among larger number of people and small incomes of smaller households are divided among smaller number of people.

The same phenomenon is observed in all provinces of Pakistan but a bit higher in Sindh and Khyber Pakhtunkhwa. The overall trends in inequalities and polarisation in Pakistan and its provinces are varying i.e. from 1996-97 polarisation has increased sharply. The trends have reversed during 2001-02 and again polarisation declines during this period. In general 1998-99 is the period of maximum polarisation in all segments of Pakistan. In Brief, although the two polarisation measures are theoretically different from standard inequality measures, empirically the new measures of polarisation do not give us very different results from the standard measures of inequality. Simply looking at the trends of these measures will not help us capture the distinctive concerns about polarisation versus increasing inequality in Pakistan.

Moreover, the study also concludes that there is no trickle-down effect of the growth rate and the inequality moved upward or downward during the high growth rate years as it stirred in 1996-97 up and 2001-02 down. High inflation rate play an important role to enlarge the gap between rich and poor. Inequality increase briskly as the inflation rate goes in two digits indicating that the inequality is growing in the era of the present Government.

## APPENDIX "A"

Table A1

*Trends of Income Inequality and Polarisation of Overall, Urban and Rural Pakistan*

Years	Description	Inequality			Polarisation	
		Gini	GE	Atk	EGR	FW
<b>1990-91</b>	<b>Overall</b>	0.298	0.177	0.077	0.067	0.112
	<b>Urban</b>	0.324	0.210	0.090	0.073	0.122
	<b>Rural</b>	0.267	0.135	0.061	0.061	0.104
<b>1992-93</b>	<b>Overall</b>	0.321	0.254	0.098	0.072	0.114
	<b>Urban</b>	0.360	0.272	0.112	0.081	0.135
	<b>Rural</b>	0.287	0.226	0.083	0.065	0.103
<b>1993-94</b>	<b>Overall</b>	0.325	0.251	0.098	0.073	0.115
	<b>Urban</b>	0.340	0.224	0.097	0.078	0.137
	<b>Rural</b>	0.293	0.243	0.088	0.066	0.100
<b>1996-97</b>	<b>Overall</b>	0.339	0.377	0.123	0.078	0.108
	<b>Urban</b>	0.337	0.271	0.104	0.079	0.127
	<b>Rural</b>	0.351	0.618	0.160	0.082	0.095
<b>1998-99</b>	<b>Overall</b>	0.343	0.248	0.103	0.078	0.126
	<b>Urban</b>	0.392	0.306	0.129	0.091	0.156
	<b>Rural</b>	0.262	0.126	0.058	0.058	0.105
<b>2001-02</b>	<b>Overall</b>	0.304	0.189	0.081	0.070	0.116
	<b>Urban</b>	0.352	0.252	0.106	0.081	0.131
	<b>Rural</b>	0.248	0.108	0.050	0.056	0.100
<b>2005-06</b>	<b>Overall</b>	0.306	0.182	0.079	0.069	0.120
	<b>Urban</b>	0.333	0.202	0.090	0.075	0.138
	<b>Rural</b>	0.254	0.125	0.055	0.058	0.101
<b>2007-08</b>	<b>Overall</b>	0.316	0.200	0.086	0.072	0.123
	<b>Urban</b>	0.348	0.242	0.103	0.079	0.140
	<b>Rural</b>	0.270	0.134	0.061	0.061	0.106

Source: Calculated by author from various issues of HIES/ PIHS/ PSLM.

Table A2

*Inequality and Polarisation Measures of all the Provinces of Pakistan*

Provinces	Ineq. and Pol Measures	Years							
		1990-91	1992-93	1993-94	1996-97	1998-99	2001-02	2005-06	2007-08
<b>Punjab</b>	<b>Gini</b>	0.297	0.326	0.334	0.348	0.348	0.300	0.304	0.317
	<b>GE</b>	0.179	0.271	0.275	0.432	0.257	0.169	0.181	0.191
	<b>Atk</b>	0.077	0.102	0.105	0.134	0.106	0.075	0.078	0.084
	<b>EGR</b>	0.067	0.075	0.076	0.078	0.080	0.068	0.068	0.072
	<b>FW</b>	0.114	0.118	0.118	0.107	0.129	0.121	0.119	0.128
<b>Sindh</b>	<b>Gini</b>	0.319	0.336	0.336	0.332	0.366	0.352	0.331	0.343
	<b>GE</b>	0.194	0.237	0.244	0.274	0.280	0.277	0.211	0.258
	<b>Atk</b>	0.085	0.099	0.100	0.104	0.116	0.111	0.092	0.105
	<b>EGR</b>	0.071	0.076	0.075	0.075	0.083	0.080	0.075	0.077
	<b>FW</b>	0.123	0.121	0.125	0.119	0.138	0.126	0.129	0.126
<b>KPK</b>	<b>Gini</b>	0.238	0.272	0.248	0.286	0.284	0.233	0.259	0.262
	<b>GE</b>	0.112	0.226	0.141	0.298	0.165	0.103	0.123	0.134
	<b>Atk</b>	0.050	0.082	0.058	0.097	0.072	0.047	0.056	0.059
	<b>EGR</b>	0.054	0.061	0.056	0.065	0.064	0.054	0.059	0.059
	<b>FW</b>	0.084	0.081	0.088	0.089	0.104	0.088	0.102	0.097
<b>Balochistan</b>	<b>Gini</b>	0.249	0.248	0.278	0.290	0.233	0.221	0.235	0.243
	<b>GE</b>	0.106	0.131	0.182	0.284	0.101	0.088	0.097	0.110
	<b>Atk</b>	0.050	0.056	0.072	0.093	0.046	0.040	0.045	0.050
	<b>EGR</b>	0.056	0.056	0.065	0.067	0.053	0.050	0.053	0.054
	<b>FW</b>	0.103	0.097	0.107	0.093	0.089	0.089	0.097	0.093

Source: Calculated by author from various issues of HIES/ PIHS/ PSLM.

Table A3

*Inequality, Growth and Inflation Rate*

Survey Years	Overall Inequality <sup>1</sup>			Growth Rate <sup>2</sup>	Inflation Rate <sup>3</sup>
	Gini	GE	Atk		
1990-91	0.298	0.177	0.077	4.459	9.051
1992-93	0.321	0.254	0.098	7.835	4.851
1993-94	0.325	0.251	0.098	1.258	9.825
1996-97	0.339	0.377	0.123	4.847	10.789
1998-99	0.343	0.248	0.103	1.014	11.803
2001-02	0.304	0.189	0.081	1.865	4.41
2005-06	0.306	0.182	0.079	7.672	9.276
2007-08	0.316	0.200	0.086	5.638	7.771

Source: <sup>1</sup>Calculated by author from various issues of HIES/ PIHS/ PSLM.

<sup>2,3</sup> IMF.

**APPENDIX "B"**

Table B1

*Percentage of Distribution of Household in Urban and Rural Areas by Survey Years*

Survey Years	Percentage of HH Sample Size		
	Urban	Rural	Total
1990-91	31.9	68.1	100
1992-93	28.4	71.6	100
1993-94	30.4	69.6	100
1996-97	31.2	68.8	100
1998-99	29.5	70.5	100
2001-02	29.2	70.8	100
2005-06	33.6	66.4	100
2007-08	32.8	67.2	100

Source: Calculated from HIES, PIHS, PSLM (various issues).

Table B2

*Percentage of Distribution of Household by Survey Years Province Wise*

Survey Years	Percentage of HH Sample Size				Total
	Punjab	Sindh	KPK	Baluchistan	
1990-91	61	23.5	12.6	2.9	100
1992-93	59.1	22.6	14.2	4.1	100
1993-94	58.4	23.8	13.3	4.5	100
1996-97	59.4	20.7	16.6	3.3	100
1998-99	56.7	23.5	14.1	5.7	100
2001-02	56.3	25.3	14	4.4	100
2005-06	55.8	24.8	14.5	4.9	100
2007-08	57.9	23.5	13.8	4.8	100

Source: Calculated from HIES, PIHS, PSLM (various issues).

Table B3

*Distribution of Household by Survey Years*

Survey Years	HH Sample Size
HIES 1990-91	6516
HIES 1992-93	14593
HIES 1993-94	14668
HIES 1996-97	14261
PIHS 1998-99	14820
PIHS 2001-02	14831
SLM 2005-06	15453
PSLPM 2007-08	15512
<b>Total Households</b>	<b>110654</b>

Source: HIES, PIHS, PSLM (various issues).

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### **Comments**

It is an important paper which takes into account not only inequality but also polarisation as it takes both ends of income groups. Polarisation is associated with disappearance of middle class. If income concentrated around two opposite distributive poles, the size of the middle class decreases. Sizeable middle class is a source of new entrepreneurs, high saving, promote human capital and creates demand for quality consumer goods which boost overall investment and productivity. Therefore high level of polarisation affect growth negatively.

Following are few comments on the paper:

- (1) The authors had taken consumption expenditure as a proxy of income. So the title should be restricted to “Trends in Inequality.....
- (2) The study had taken into account per capita expenditure as a unit of measurement which gives equal weights to all members of households and the economies of scale disappeared. Instead of it Adult Equivalent Scale (AES) can be used giving different weights to households members i.e. earner= 1, adult =0.8 and children <18 years=0.8.
- (3) For measuring inequality the authors had used different inequality indices i.e. Gini coefficient, generalised entropy and Atkinson index. They had not discuss significance of these measures as different inequality measures give different weights to changes in the income (extreme end or mean or lower end of distribution).
- (4) Also give significance of two measures of polarisations.
- (5) Need correction of Fig. 14. It is written as Khyber Balochistan.
- (6) In graphical presentation a spike is found for the year 1996-67 for Pakistan and its different regions for GE index as this index takes into account the transfer of income on both ends but this trend is not seen in polarisation indices. Needs some discussion and look for the authenticity of data for this particular year.
- (7) The economic interpretation in analysis would help in improving the readability of the paper.
- (8) A proper citation style should follow using software, Endnotes X7.
- (9) Finally, needs a through look at text for minor corrections.

Overall, this paper is good contribution in the literature of distributional issues.

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# The Political Economy of Decentralisation and Access to Pro-poor Social Services Delivery in Pakistan

MANZOOR AHMED

## 1. INTRODUCTION

A key argument made by several economists with respect to decentralisation reform is that it can reduce poverty. This assertion is based on the view that it leads to improvements in public sector services delivery. The efficient provision of public goods by the local governments may occur because of their ability to take into account local determinants while providing services, such as health and education [Oates (1972)]. It may also be due to competition, as local governments encourage the provision of efficient public services to, and lower tax burdens on the lower strata of society [Brennan and Buchanan (1980)].

Decentralisation has gained acceptance as a reform policy in many countries (e.g., Vietnam, Argentina, Colombia, Tanzania, India, Tunisia, Brazil, Bolivia, Indonesia, Ghana, and Mexico, *inter alia*),<sup>1</sup> following the realisation that complex political-economic and social issues might not be effectively handled by central government only [Rondinelli and Cheema (1983)]. It is widely believed that locally elected governments, imbued with fiscal and administrative authority, may perform far better and with more efficiency in terms of development, planning, and the provision of public services than a remote and centralised government. In supporting this argument, Manor (1999) considers decentralisation as an effective policy tool that may help in addressing issues such as regional inequity and disparity, poverty, and political instability.

However, opponents of decentralisation believe that it creates economic inefficiencies, increases social inequality, and adversely affects social service provisions [Slater (1989); Samoff (1990); Tanzi (1995); Blair (2000)]. Samoff (1990), for example, shows that decentralisation, when used as a policy tool, has largely been a worldwide failure. Supporting that conclusion, Slater's (1989) study of Tanzania illustrates that decentralisation failed to enhance local capacities in implanting local programmes.

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<sup>1</sup>For more in-depth discussion, see Rondinelli and Cheema (1983), Slater (1989), Manor (1999), Rao (2000), Faguet (2004), Crawford (2008), and Fausto and Barillo-Rabling (2008).

On the question of any direct effect of decentralisation on social services delivery and redistributive policies, the empirical literature is divided. Throughout the body of empirical work, the relationship of these indicators is not well elucidated. Nonetheless, whatever scant research has been done needs to be carefully reviewed. For example, Von Braun and Grote's (2000) work with respect to the cases of India, China, Egypt, and Ghana finds a negative relationship between decentralisation and expenditures on social services geared toward the poor. However, West and Wong (1995) note that decentralisation, given its flawed design (i.e., more focus on federal-provincial fiscal relations, and local governments are left entirely at the mercy of the provinces), is the prime cause of regional inequality and poverty in China.

Faguet (2004) examines the consequences of decentralisation on poverty at the national level. His results indicate how decentralisation affects the pattern of investments on social sectors and the formation of human capital. His argument supports the common assertion that decentralisation changes the pattern of public expenditures to focus more on the provision of services that are related to poverty alleviation.

Martinez-Vazquez (2001) shows that decentralisation may also alter poverty levels by changing the composition of public sector expenditures. As part of the various redistributive schemes, public resources that are given directly to poor individuals may augment their incomes. In any case, pro-poor public expenditures affect poverty, even in the absence of direct resource transfers to the poor. For example, with decentralisation, public expenditures relating to basic services such as health and education will increase. Since these services are fundamental to human development, fiscal decentralisation is likely to increase the welfare of the poor.

In Pakistan, in order to decentralise the administrative and financial matters to the local level, a devolution plan was launched in 2001 that brought large-scale changes to governance and public finance of Pakistan, where several important social and economic services were devolved to local governments. Such drastic changes could bring a widespread transformation in nature, extent and magnitude of the essential social and economic service provision to common people. Apparently, the local governments because of their proximity and accountability to local people were more efficient and effective in increasing services that should benefit the local community particularly the poor and disadvantaged. Nonetheless, in spite of the importance of the matter the related literature has not provided a systematic and robust research on this issue using Pakistan as a case. This paper aims to fill this gap in the literature through a systematic theoretical and empirical research. The empirical results show that after the devolution plan in 2001 the social and economic services delivery has increased and improved.

The rest of the paper is as follows. Section 2 provides a brief description of the local government system and its evolution in Pakistan. Section 3 presents a legislative bargaining model on federalism. Section 4 discusses the hypothesis, data and methodology for empirical investigation while Section 5 presents and describes the results. Section 6 concludes the paper.

## **2. HISTORICAL BACKGROUND OF LOCAL GOVERNMENT**

### SYSTEM IN PAKISTAN

The local government system introduced in the Sub-Continent in 19th century by the British India government aimed, primarily to privilege local elites. The local government under the British *Raj* was not empowered, as it was not democratically elected. Instead, the central bureaucracy nominated the representatives of the local governments [Venkatarangaiya and Pattabhiram (1969)]. The system ran through an extreme ‘top-down’ style with circumscribed functions of local representatives. The key administrative role at the local level was performed by the agents of the central bureaucracy, the Deputy Commissioner, and other bureaucratic operatives, such as the Assistant Commissioner, *Tehsildars*, *Naibdehsildars* and *Patwaris* [Tinker (1968): AERC (1990)].

However, after the independence, during late 1940s and in the 1950s an ever-increasing centralisation gave birth to a powerful military bureaucracy that diluted the already limited sub-national governments [Waseem (1994); Talbot (1998)]. Similar to pre-partition style, local bodies system in the 1960s was overwhelmingly controlled by the central bureaucracy through its appointed officials at the local level who had the discretionary power to restrict any kind of action the elected representatives might desire to pass or implement. During the 1971-1977, the local governments, however, were pushed to the background and hence remained dysfunctional.

The local government system revived with the arrival of the military dictatorial regime again in 1979, where the political and administrative structure similar to the 1960s of over centralisation of administrative and economic power at the provincial and federal levels was implemented. It is interesting to note that with the death of Zia-ul-Haq and subsequently with the advent of democracy in 1988 after party-based general elections at both federal and provincial levels, the local governments were dispensed with. Thus, until the 1999 the local governments were in dormancy.

However, after the 1999 military coups d'état, the local government system was once again reinstated but this time with entirely different structure, functions and responsibilities under the auspices of the devolution plan of 2000-01.

The devolution plan clearly spells-out the expenditure and revenue raising powers and responsibilities of all three tiers of local governments. They were entitled to allocate and disburse resources according to their own priorities apparently without strong interference or direction from the upper tiers of governments (federal and provincial). However, Bahl and Cyan (2009) believe that in practice the provincial governments very often exercised control over certain expenditure areas, particularly on expenditures undertaken through “conditional transfers” from the provinces.

Another significant change accompanying the devolution plan was the introduction of a formula-based system of resource sharing between the provincial and local governments. All four provinces constituted their respective Provincial Finance Commissions (PFC) in 2001 to formulate the resource transfer mechanism and distribution of finances between the provincial and the local governments. The resource distribution criteria between provincial and local governments under the PFC is elaborated in Table 1.

Table 1

*Intergovernmental Resource Transfer Criteria*

Total Pool and Distribution Criteria	Punjab	Sindh	KPK	Balochistan
Local share of the Provincial Divisible Pool	39.8%	40%	40%	31%
Formula Factors with Weights	100%	100%	100%	100%
Population	75%	50%	50%	50%
Backwardness of District	10%	17.5%	25%	
Tax Collection Effort	5%	7.5%		
Fiscal Austerity	5%			
Area				50%
Development Incentive/ Infrastructure Deficiency	5%		25%	
District Governments' Deficit Transfers		25%		

Source: Shah (2004) and Sindh (2004).

As illustrated in Table 1 population was the most important criterion used by all provinces in resource distribution. Under the Local Government Budget Rules (2002), the local governments had the power to formulate their budgets and prioritise public expenditures without the legal consent of the provincial governments. The same rules categorically elaborated the procedure for budget making and its approval from the concerned local council. The local governments made the budgets once the provincial government informed the former about their share under the PFC. It was mandatory for the local councils to budget both development and non-development expenditures. The funds allocation for development expenditures were undertaken after meeting the non-development expenses.

**3. A LEGISLATIVE BARGAINING MODEL OF FISCAL FEDERALISM**

Consider an economy where there are two provinces, A and B; additionally, there are two districts,  $i = \{1,2\}$ , within each province. Individuals differ in their inherent labour productivity, denoted by  $s_i$ , which is distributed according to the density function  $\gamma_i(s)$ . An individual's wage rate,  $w_i s_i$ , is linear in the productivity parameter. An individual of type  $s_i$ , residing in district  $i$  of province A, receives utility from private consumption  $c_i(s_i)$  and a district-specific public good,  $G_i$ ; conversely, that individual receives disutility from the labour supply  $\ell_i(s_i)$ . For simplicity, we assume Cobb–Douglas preferences.

$$\ln u_i(s_i) = \ln(c_i(s_i)) + \ln(1 - \ell_i(s_i)) + \ln(G_i) \quad \dots \quad \dots \quad \dots \quad \dots \quad (1)$$

We denote the  $B$  district with  $\sim$ . In other words, the utility of a type- $s$  individual in district  $i$  of province  $B$  is

$$\ln \tilde{u}_i(\tilde{s}_i) = \ln(\tilde{c}_i(\tilde{s}_i)) + \ln(1 - \tilde{\ell}_i(\tilde{s}_i)) + \ln(\tilde{G}_i) \quad \dots \quad \dots \quad \dots \quad \dots \quad (1')$$

An individual of type  $s_i$  in district  $i$  of province A receives an after-tax wage income, as well as a federal transfer  $b$ ; both are used for private consumption:

$$c_i(s_i) = (1 - \tau)w_i s_i \ell_i(s_i) + b \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (2)$$

where  $\tau$  is the federal income tax rate. Consequently, in province B:

$$\tilde{c}_i(\tilde{s}_i) = (1 - \tau)\tilde{w}_i\tilde{s}_i\ell_i(\tilde{s}_i) + b \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (2')$$

We will suppress the  $\sim$  when there is no ambiguity (i.e., when we calculate the derivations for province A, and can always obtain the corresponding quantities for province B by adding  $\sim$ ). We assume the district-specific wage rate to be linear in that district's development expenditure,  $D_i$ , and that the "base wage"  $w$  are the same across districts—namely:

$$w_i = wD_i \quad \dots \quad (3)$$

$$\tilde{w}_i = w\tilde{D}_i \quad \dots \quad (3')$$

### 3.1. Economic Equilibrium

Maximising (1) s.t. (2) we derive the labour supply function and the corresponding indirect utility function:

$$\ell_i(s) = \frac{1}{2} - \frac{\theta}{2wsD_i} \quad \dots \quad (4)$$

$$U(\tau, ws, \theta, D_i, G_i) \equiv \max_{c_i(s), \ell_i(s)} U_i(s) = ((1 - \tau)ws) \left( D_i + \frac{\theta}{ws} \right)^2 \frac{G_i}{D_i} 2^{-2}, \quad \dots \quad (5)$$

where

$$\theta \equiv \frac{b}{1 - \tau} \quad \dots \quad (6)$$

### 3.2. Government Budgets

Each province is given a budget,  $R$  and  $\tilde{R}$ , by the federal government, to use on development expenditure and the public goods in each of the two districts:

$$R = D_1 + D_2 + G_1 + G_2 \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (7)$$

$$\tilde{R} = \tilde{D}_1 + \tilde{D}_2 + \tilde{G}_1 + \tilde{G}_2 \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (7')$$

The federal government collects tax revenue from wage income and distributes it to the provinces, in addition to providing the federal subsidy.

$$R + \tilde{R} + Nb + \tilde{N}b = \tau(Y_1 + Y_2 + \tilde{Y}_1 + \tilde{Y}_2) \quad \dots \quad \dots \quad \dots \quad \dots \quad (8)$$

where

$$Y_i = \int_s wD_i s \ell_i(s) \gamma_i(s) ds \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (9)$$

### 3.3. The Provincial Legislative Bargaining Game

We assume a simple alternating-offer bargaining game, as in Marsiliani and Renström (2007). Take province A, with two elected representatives (types  $s_1^*$  and  $s_2^*$ ). If district 1 is the larger of the two districts, we assume that district 1 makes the first offer. District 2 can accept or reject it. If district 2 rejects it, then one representative is chosen at random to make the final offer. (The game could be extended to several rounds, without altering the qualitative properties.) In the final round, if district  $i$  is chosen to make the final offer, it will maximise its own utility subject to (7), thus implying the setting  $D_j = G_j = 0$ . Maximising (5) subject to (7) provides the optimal level of development expenditure and of the public goods when the entire budget is used in district  $i$ , and the resulting indirect utility function is:

$$D_i = R \frac{1 + m_i(R)}{4} \quad \dots \quad (10)$$

$$G_i = R \frac{3 - m_i(R)}{4} \quad \dots \quad (11)$$

$$V(\tau, ws_i^*, \theta, R) \equiv \max_{D_i, G_i} U_i(s_i^*) = R^2 (3 - m_i(R))^3 (1 + m_i(R)) ((1 - \tau)ws_i^*) 16^{-2}, \quad \dots \quad (12)$$

where

$$m_i(R) \equiv \sqrt{1 - 8 \frac{\theta}{ws_i^* R}} \quad \dots \quad (13)$$

If district 2 is not chosen in the final round, then since  $G_2 = 0$ , it follows that  $V_2 = 0$ . If district 2 is chosen in the final round, the utility is given by (13). If we denote the probability that district 1 is chosen as  $p$ , then the expected utility of district 2 entering the final round is:

$$E[V_2(R)] = (1 - p)R^2 (3 - m_2(R))^3 (1 + m_2(R)) ((1 - \tau)ws_2^*) 16^{-2} \quad \dots \quad \dots \quad (14)$$

Thus, district 2 accepts any proposal that satisfies

$$((1 - \tau)ws_2^*) \left( D_2 + \frac{\theta}{ws_2^*} \right)^2 \frac{G_2}{D_2} 2^{-2} \geq (1 - p)R^2 (3 - m_2(R))^3 (1 + m_2(R)) ((1 - \tau)ws_2^*) 16^{-2} \quad (15)$$

When district 1 makes the first offer, it maximises its own utility, subject to both (15) and (7).

Note that this problem can be written as:

$$\max_{D_1, D_2, R_2} ((1 - \tau)ws_1^*) \left( D_1 + \frac{\theta}{ws_1^*} \right)^2 \frac{R - R_2 - D_1}{D_1} 2^{-2}, \quad \dots \quad \dots \quad \dots \quad \dots \quad (16)$$

subject to

$$((1 - \tau)ws_2^*) \left( D_2 + \frac{\theta}{ws_2^*} \right)^2 \frac{R_2 - D_2}{D_2} 2^{-2} \geq (1 - p)R^2 (3 - m_2(R))^3 (1 + m_2(R)) ((1 - \tau)ws_2^*) 16^{-2} \quad (17)$$

The first-order conditions imply that (9), (10), and (11) hold for the respective districts evaluated at  $R_1$  and  $R_2$ , respectively.  $R_2$  is chosen at the level where (17) holds with equality—that is:

$$D_i = R_i \frac{1 + m_i(R_i)}{4} \quad \dots \quad (18)$$

$$G_i = R_i \frac{3 - m_i(R_i)}{4} \quad \dots \quad (19)$$

$$V(\tau, ws_i^*, \theta, R_i) = R_i^2 (3 - m_i(R_i))^3 (1 + m_2(R_i)) ((1 - \tau)ws_i^*) 16^{-2} \quad \dots \quad \dots \quad (20)$$

for  $i = 1, 2$  and

$$R_2^2 (3 - m_2(R_2))^3 (1 + m_2(R_2)) = (1 - p)R^2 (3 - m_2(R))^3 (1 + m_2(R)) \quad \dots \quad (21)$$

Equations (18)–(21) completely characterise the bargaining equilibrium as a function of the provincial budget  $R$ , the federal tax rate  $\tau$ , and the benefit rate  $\theta$ . The same equations are obtained for province B, using the  $\sim$  notation.

### 3.4. Federal Decision-Making

We characterise the situation where one district within one province dominates at the federal level. That situation can occur when the finance minister comes from one of the provinces. The finance minister decides the allocation to the provinces,  $R$  and  $\tilde{R}$ , taking into account the bargaining game at the provincial level, so as to maximise its own utility. At first, it could look as if the finance minister would set  $R$  for the other province to zero. This is not the case, as production there would then stop, and no taxes could be collected from that province. Instead, it is optimal to maximise the net tax revenue from the other province. Suppose the finance minister comes from province A; then,  $\tilde{R}$  is chosen so that

$$\max_{\tilde{R}} \tau(\tilde{Y}_1 + \tilde{Y}_2) - \tilde{N}b - \tilde{R}, \quad \dots \quad (22)$$

subject to (4), (9), (18), and (21).

The first-order condition to (22) gives  $\tilde{R}$  as a function of  $\tau$ ,  $\theta$ ,  $w$ , etc.

$$\tilde{R} = \tilde{R}(\tau, \theta, w) \quad \dots \quad (23)$$

Differentiating (23), and evaluating within a symmetric equilibrium (where the two districts within a province are equal), we obtain

$$\frac{\partial \tilde{R}}{\partial \theta} = \frac{\tilde{R}}{\theta} \frac{1}{(1 - \phi_{\tilde{R}})^2 + \phi_{\tilde{R}}^2} \quad \dots \quad (24)$$

Notice that by (6),  $b = (1 - \tau)\theta$ ; then,

$$\frac{\partial}{\partial b} \left( \frac{\tilde{R}}{\tilde{R} + b} \right) = \frac{b}{(\tilde{R} + b)^2} \frac{\partial \tilde{R}}{\partial b} - \frac{\tilde{R}}{(\tilde{R} + b)^2} = \frac{\theta}{(\tilde{R} + b)^2} \left( \frac{\partial \tilde{R}}{\partial \theta} - \frac{\tilde{R}}{\theta} \right) = \frac{\tilde{R}}{(\tilde{R} + b)^2} \frac{2\phi_{\tilde{R}}(1 - \phi_{\tilde{R}})}{(1 - \phi_{\tilde{R}})^2 + \phi_{\tilde{R}}^2} > 0, \quad \dots \quad (25)$$

Where the second equality follows from (6)—i.e., from  $b = (1 - \tau) \theta$ —and the last equality from Equation (24). Then, we have:

**Proposition:** *In the bargaining equilibrium, the ratio of the local expenditure to the total expenditure is increasing in the federal government transfer rate that inherently enables the provincial governments to allocate more resources to the local governments.*

The proposition implies that if the transfer rate,  $b$ , is larger, then decentralisation is greater. Larger allocations to subnational governments increase the expenditures on sectors and subsectors that are pro-poor. Thus, it is worthwhile to note that unlike a conventional approach that would consider counter-productive the role of subnational government in redistribution, we instead postulate that subnational governments is both effective and productive in making redistributive policies.

#### 4. HYPOTHESIS, DATA AND METHODOLOGY

##### 4.1. Hypothesis

We postulate that since the local governments are more responsive to local people's needs because of being accountable to them, the pattern of investment may be in the favour of those sectors that can deliver benefits to the poor. Given this, the paper tests the following hypothesis:

**Hypothesis:** *Ceteris paribus*, after the decentralisation, pattern of public investment changes and sectors related to social services provision receive more expenditure.

##### 4.2. Data

Data (as reported in Table 2) are drawn from various sources including the FBS (various issue), provincial governments budget documents (various years), SPDC (2010, 2007, 2012), State Bank of Pakistan (2010) and *Pakistan Economic Survey* (Various Issues). For provincial population estimates, we divide total population on in four provinces based on their shares in 1998 census. Provinces in Pakistan are largely demarcated on ethnic/linguistic bases and inter-provincial migration is negligible. Therefore, it is plausible to expect that the population share of the provinces is virtually time-invariant. In addition, we use population as an independent variable. The same variable is used to obtain per capita expenditures of the provinces.

In order to get public expenditures, per capita income and other variables in real terms, their nominal values are deflated with the GDP deflator. An annual time series dataset from 1975 to 2008 is constructed, because the local governments completed their four years tenure in 2008 and next elections were suspended until the time of writing. The reported data are annual because budgetary allocations to both provincial and local governments were undertaken annually and the data are available on annual basis. The cross section comprises all four provinces of Pakistan.

Table 2

*Descriptive Statistics*

Variables	Obs.	Mean	Std. Dev.	Min	Max
Devolution Reform (Dummy)	136	0.235294	0.425751	0	1
Decentralisation	136	0.087414	0.069814	0.01	0.37
Population (in Millions)	136	28.08185	23.86578	3.59	90.07
Per Capita GDP	136	4008.559	1264.578	2239	7686
Agri. Value Add.*	136	1136.948	288.9449	696.9466	1948.867
Civil Work *	136	20.8603	85.585	0.3527	842.806
Pop. Per Bed	136	1508.684	171.6524	1269	1963
Welfare Expenditure*	136	0.731106	1.011983	0.00322	6.941837
Public Health Expenditure*	136	2.116858	3.431105	1.01345	19.11971
Social Sector Expenditure*	136	43.49989	50.24139	1.191492	249.2615
Education Expenditure*	136	44.64446	47.66713	1.126267	223.6559
Health Expenditure*	136	9.672765	10.01052	0.231037	40.75399
Irrigation Expenditure*	136	5.469899	4.801413	0.177114	24.1072
Rural Development Expenditure*	136	1.794452	5.016514	1.22011	39.68176

\* Value Expressed in Per Capita term.

The data limitation at district level and beyond restricted our analysis to provincial level. Since the provincial governments' expenditure *largely* reflect the local governments' expenditure—as shown in the Table 2—virtually the local governments use 40 percent of the total provincial expenditures, hence local governments' expenditures are reflected at overall provincial expenditures. Therefore, it may be plausible to use the provincial level data for local level analysis. Further, the financial expenditure at provincial level provided similar information for both pre and post devolution plan that enables us in detecting the impact of the devolution plan reforms.

### 4.3. Methodology

Following Faguet (2004), Faguet and Sanchez (2008) and Aslam and Yilmaz (2011) we identified nine sub-sectors of public sector which could impact the living standard of local communities in general and the poor and marginalised social groups in particular. (These sectoral variables are described in Appendix A). Normally the social service/public good provision is 'measured in quality adjusted units of output, separated by the type' [Faguet (2004), p. 876]. Given the data constraint, we measured the real investment quantity in terms of public expenditures on these sectors. This approach although restricted us from analysing the effectiveness of the Devolution on the quality of delivery of the public goods. It enabled us in comparing the pre and the post Devolution in terms of the inter-sectoral resource allocations and the pattern of public sector investments.

The dependent variables are the inflation-adjusted annual per capita amount of investments undertaken in each sector. 'Population per bed' variable is not expressed in per capita term. The primary independent variable is the Devolution Reform, which is captured by a dummy variable that takes 1 on 2002 and afterward (2002 to 2008) and zero otherwise (i.e. from 1975 to 2001). Following Neyapti (2010), per capita GNP is used to proxy for the overall level development. Arguably population – which is an important time-variant factor— can affect the extent and magnitude of the social services

[Aslam and Yilmaz (2010)], and regions/provinces, where the more populated areas receive better treatment than less populated ones.

The following model is constructed and statistically estimated using a panel dataset (34\*4):

$$Sec_{it} = \alpha + \beta_1(FD_{it}) + \beta_2(PDum_{it}) + \beta_3(YDum_{it}) + \beta_4(Dev_{it}) + \beta_5(Pop_{it}) + \beta_6(GDP_{it}) + e_i + \mu_{it} \quad (26)$$

The subscripts (*it*) stand for province *i* at time *t*. (*Sec<sub>it</sub>*) alternatively represents all sectors included in the analysis. (*FD<sub>it</sub>*) is the expenditure decentralisation. (*PDum<sub>it</sub>*) is the provincial dummy and (*YDum<sub>it</sub>*) is the year dummy. The provincial and time dummies expectedly capture all of the characteristics associated with the provinces at a given time. (*Dev<sub>it</sub>*) is the dummy variable for the devolution plan. The Devolution dummy (*Dev<sub>it</sub>*) represents the role of local governments and other institutions that came into effect after the devolution plan. (*Pop<sub>it</sub>*) is the population of the provinces expressed in million and (*GDP<sub>it</sub>*) is real per capita GDP described in 1980 constant price terms. The per capita GDP of provinces is expected to control for the overall economic condition of the provincial economy among other things. The impact of province level per capita GDP and expenditure on social and economic services is expected to be positive: higher average per capita income of one province may lead to increase in the expenditures on above services because of the additional resource availability to that province from own revenue sources.

## 5. EMPIRICAL RESULTS AND DISCUSSION

For each service, a Fixed Effect model is estimated separately and results are reported in Table 3. We find that the devolution plan variable is significant and positive (negative sign for population per bed as expected) across all social and economic indicators. In above equation the positive coefficients of *FD<sub>it</sub>* ( $\beta_1$ ) and *Dev<sub>it</sub>* ( $\beta_2$ ) suggest that the expenditures on that service have increased at a faster rate as compared to the pre devolution period, *ceteris paribus*. This leads us to conclude that the decentralisation has been effective in terms of increasing the expenditures on social and economic services. It therefore suggests that the devolution reforms on average have been effective in provision of social and economic services provided to local communities. Thus, it is plausible to conclude that following the devolution, the magnitude of all nine vital socio-economic services has increased.

As the major objective of the decentralisation to local levels was to make the public services accessible to the local people and the improvement of social infrastructure, it is reasonable to group the included services into two broad categories: 1. economic services and 2. social services. The economic services include development expenditures on sectors such as agriculture, civil work, water management and rural development, whereas the social services include health, education, water supply and sanitation facility, and social welfare and recreational services

Table 3

*Determinants of Public Expenditures on Rural Development, Agriculture and Civil Work, Education, Basic Healthcare Indicators, Water and Sanitation, Social Welfare and Water Management*

Variables	Pub. Exp. Rural Dev. $\phi \psi$	Agri. V. Add $\psi$	Pub. Exp. Civil Work $\phi \psi$	Public Exp. Education. $\phi \psi$	Pub. Exp. on Basic Health $\phi \psi$	Pop. Per Bed	Pub. Exp. On Water and Sani. $\phi \psi$	Public Exp. On Social Welfare $\phi \psi$	Public Exp Irrigation. $\phi \psi$
Models	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect
Devolution Reform (Dummy)	10.69** (5.068)	0.303*** (0.093)	5.434*** (1.036)	3.733*** (0.192)	3.094*** (0.159)	-297.3** (12.401)	55.79*** (10.083)	5.272*** (0.527)	3.079*** (0.225)
Fiscal Decentralisation	0.817** (0.457)	0.820** (0.344)	0.753* (0.391)	0.275*** (0.713)	0.249*** (0.754)	0.399** (0.488)	0.868*** (0.090)	0.268*** (0.074)	0.861*** (0.091)
Population	0.0474 (0.379)	0.00694*** (0.002)	0.00701 (0.021)	0.0176*** (0.006)	0.0086*** (0.003)	2.569*** (0.326)	0.846*** (0.209)	0.0236** (0.011)	0.0164*** (0.005)
Per Capita GDP	0.00148 (0.004)	0.000134***	-0.000803** (0.000)	0.000183** (0.0334)		0.026*** (0.005)	-0.007** (0.004)	-0.0005*** (0.000)	0.000015* (0.000)
Constant	2.213 (12.901)	6.588*** (0.087)	5.346*** (0.963)	2.538*** (0.217)	1.452*** (0.113)	175.1*** (12.910)	36.54*** (9.369)	-0.707 (0.489)	1.861*** (0.209)
Year Dummy	Included	Included	Included	Included	Included	Included	Included	Included	Included
N	136	136	136	136	136	136	136	136	136
R <sup>2</sup> (Within)	0.1678	0.8807	0.5832	0.9563	0.9753	0.9875	0.7105	0.9003	0.9490
R <sup>2</sup> (Between)	0.1693	0.0121	0.2980	0.492	0.8590	0.9007	0.8347	0.120	0.6256
R <sup>2</sup> (Overall)	0.1693	0.4461	0.4475	0.9027	0.8628	0.2553	0.6430	0.6458	0.6668
F/WaldChai2	1.57 (0.09)	20.45 (0.0000)	3.88 (0.000)	81.34 (0.000)	114.02 (0.000)	293.. (0.000)	6.80 (0.000)	25.03 (0.000)	51.62 (0.000)

$\phi$  Value expressed in log form;  $\psi$  values are in million Rs.; Panel regressions have robust standard error in parentheses.  
\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.0$

The relationship between public expenditure with education and decentralisation variables is positive and significant. Healthcare variables (annual expenditures on healthcare and population per bed) maintain positive (negative) and strongly significant coefficient *vis-à-vis* the decentralisation indicators, suggesting that health services have increased in both quantity proxied by expenditures and quality proxied by population per bed after the devolution reforms.

The impact of decentralisation on local level is not limited to social services. Likewise, the economic services such as agriculture, infrastructure development (proxied by civil work) and water management have registered a marked improvement in post devolution period.

Interestingly, these outcomes are in accordance with our theoretical prediction; that is, socio-economic services may be better provided by the sub-national government as compared to their central counterpart. In the same vein, it is also in the line of the empirical literature [for instance, Faguet (2004)] that shows that the local governments because of the better local knowledge are more effective in providing these social services.

As far as other explanatory variables in the regressions analysis are concerned, the per capita GDP is positively correlated with education expenditures. The population variable has showed either unexpected (negative) sign or appeared insignificant *vis-à-vis* all socio-economic services except health indicators. The negative coefficients of the population in relation to services like education, water and sanitation and civil work suggest that the per capita investment on such services were higher in Balochistan. This may explain that in Balochistan with very vast land and disperse population the per capita cost of providing a certain social or economic service remains much higher as compared to other provinces.

In general, the overall fit of the regression models is consistent with the decentralisation literature because it explains up to 70 percent or more of the variation in social service delivery (reflected by the R-squares of each model).

Hausman Tests with Chi2 (10) and P. Values 116.46 (0.00), 106.88 (0.00), 2.35(0.00), 70.41 (0.00), 38.42 (0.00), 33.74 (0.00), 56 (0.00), 40(0.00), 92(0.00) for first to nine models respectively allow us to select the Fixed Effect models for the final estimation. A major threat to validity of our outcomes could come from the time-variant factors that simultaneously correlate with services and the Devolution indicators, which may create the problem of endogeneity. This would occur if the federal and provincial governments' choices of devolution were purposely based on quality and quantity of social and economic indicators of localities. As the devolution plan was a nation-wide policy, applied to all local governments in Pakistan, endogeneity should not be a major issue.

## 6. CONCLUSION

To garner a better theoretical understanding, we developed a legislative bargaining model of fiscal federalism. The model explicitly contains welfare dimension that relates to the pro-poor services delivery. The model shows that fiscal transfers have empowered sub-national governments to spend more on basic social and economic sectors. We empirically tested this proposition, which suggests an overall positive and statistically

significant relationship between decentralisation and pro-poor social services delivery. The empirical evidence shows that the devolution significantly changed the size and magnitude of social and economic investments.

The efficacy of the decentralisation at local level is evident much more in services like rural development and water management facilities than the education. This indicates the presence of the local elite capture on which an extensive fiscal federalism literature [permanent among them is Bardhan and Mookherjee (2005)] exists. That is because political representatives may award work on irrigation projects and other related physical infrastructure to locals as political patronage.

Constraint experienced with data made it difficult to draw a definite conclusion on the skewness of the social service provision. The data issue also limited this research from measuring and analysing the quality of these services in terms of units of output rather than sticking only to the supply of such services measured through public expenditures. More research is required to investigate the effectiveness of the decentralisation to local level in enhancing the quality of ‘untargeted services’ that potentially affect the local communities without any differentiation. Theoretically, not skewed and untargeted pattern of service distribution is likely to impact positively the poor and disadvantaged communities more as compared to their rich counterparts. Moreover, the paper suggests more research to assess the impact of 18<sup>th</sup> Amendment to the Constitution of Pakistan in 2010 on services provision that abolished concurrent list and subsequently devolved constitutional, administrative and economic powers to sub-national governments.

## APPENDIX A

### Variables Used to Determine Sectoral Allocation of Public Resources

1	Water and Sanitation	5	Agriculture (Agriculture Value Addition)
2	Education (primary and Tertiary)	6	Irrigation
3	Health (Basic Health Care)	7	Rural Development
4	Social Security and Welfare	8	Civil Work

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### Comments

It is a decent effort discussing the effects of decentralisation on the service delivery. This paper focusses on Pakistan and explores the effects for its troubled history of decentralisation. Author touches upon a very important topic and has tried to identify the effects of decentralisation on certain sectors that can bring a positive change in people's life. The paper contains both the theoretical models as well as the empirical estimation however there are still issues that need reconsideration. Main comments as are follows:

- (1) Introduction offers a good collation of literature, while the historical background makes it obvious that the local government system in Pakistan was not fully functional. This clarifies why the topic presented in this paper has largely remained neglected in Pakistan.
- (2) Section 4 mentions nothing about the devolution plan so the title needs to be changed.
- (3) In the data section 5, CPI is used as a deflator; however, it would be better to use GDP deflator to deflate different series because the author is mainly dealing with aggregated data for public sector expenditures.
- (4) Furthermore, initially the paper conveys that the focus is on the third tier of the government but suddenly the econometric analysis is conducted at the provincial level instead; this is inconsistent with the initial build up of the paper. The author gives only four lines to justify this and assumes that Provincial expenditures reflect local spending. However, it can be seen at Table 1 (page 4), that only 40 percent of provincial proceeds are allocated to the districts in each province.
- (5) Devolution reform is presented with the help of a dummy variable; despite the initial theoretical debate that *higher transfer rate* will depict greater decentralisation. The problem with dummy variable is that it can take only two values i.e. "zero" and "1"; where zero would mean no decentralisation that goes against the spirit of what the author wants to emphasis. Therefore, it would be helpful if the author can also use the conventional revenue/expenditure proxies to represent decentralisation to make the argument convincing and to get the analysis consistent with the theoretical section.
- (6) Furthermore, the decentralisation dummy takes the value of 1 only for the period 2001-2008 and zero otherwise (1975-2000). This reflects that author is not convinced about the earlier attempts for decentralisation. Yet again the conventional proxy might be more helpful than the dummy as it can overcome this issue. Similarly, the dummy should take value 1 after year 2002, i.e. a completed year of the implementation of devolution plan.
- (7) This paper uses 4 different methods for estimation, however, Fixed Effects (FE) seems plausible as the provinces are inherently quite different from each

other. Moreover, the OLS with year and province dummies will represent the Least squares dummy variable (LSDV) estimator i.e. equivalent to the Random effects (RE-GLS) model so there is no need for the two simultaneously: this is also clear from empirical results as the two regressions give similar results. In fact, Hausman test is basically used to help us identify the appropriate techniques out of RE and FE. Therefore, the authors should include only those results in the main text that are most appropriate.

- (8) It is surprising to see that public expenditures on health (at Table 3) has, at certain year taken the minimum value of zero; this needs to be checked again and corrected.
- (9) The dependent variables include certain sectors which are beyond the effective administrative control of the district governments like police, agriculture, irrigation etc. In fact focus should be on the most obvious social sector where the impact of decentralisation is most obvious, especially when the period under focus is so short i.e. 2002-2008. Another important matter to consider is that of the concurrent list which could only be liquefied in 2010; this puts a question mark on the analysis, questioning provincial capacity to make a change during the study period.
- (10) It is uncommon to use a single model to judge nine different socio-economic services/sectors, hence the author should rethink about it. Moreover, the author can use other important variables like development spending, federal transfers, international aid/assistance etc. to explain the provincial social sectors.
- (11) Lastly, the paper unnecessarily puts more weight on the federal transfers to proxy empowered subnational governments. Instead, whether the provincial revenues comes from the own source revenues or the federal transfers, in both the cases it will represent a financially capable/empowered sub national government.

To conclude, this paper reflects the hard work done by the author; still better synergy should be built between the theoretical and the empirical part. Moreover, the empirical part needs serious reconsideration. Hence, provided that the issues in estimation are resolved, this paper offers a good contribution to literature.

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# **Micro Hydro Power: A Source of Sustainable Energy in Rural Communities: Economic and Environmental Perspectives**

MOHAMMAD UMAR and ANWAR HUSSAIN

## **1. INTRODUCTION**

Energy is an important need of human life. It is the life blood of all economic activities. Due to increase in population and economic activities, the need for energy is increasing at a faster rate. Without having sufficient energy, the goal of economic and social development and the Millennium Development Goals in particular cannot be achieved.

Most of the rural areas in different parts of the world are without electricity. About 1.6 billion people in the world who are living in rural areas are without electricity [Greenstone (2014)]. The reason is that it is too costly to provide electricity services to rural communities through conventional means due to remote location and low density of population. Moreover, due to poverty and low income the rural inhabitants are not in a position to afford the main grid electricity. The use of diesel and gasoline has been used for decades for provision of electricity to rural areas. But it was not so successful due to economic, technical and environmental problems [Woodruff (2007a)].

Given this backdrop, Pakistan is being faced with the electricity shortages for the last several years. There are many factors that have intensified this issue. High cost with low level of energy generation as compared to demand being manifold the supply. While the country's growing population and economic activities necessitate the generation of more energy. On the other hand, there are also issues of conservation, misuse and overuse of energy at household and industrial level. Line losses, electricity theft, corruption, mismanagement and lack of political consensus on the big power projects are other factors that have significantly contributed to the energy crisis in Pakistan [Pakistan (2013)].

In the wake of the issue of climate change and environmental degradation, the importance of clean energy technologies has been increasing. In 2004 about US\$55 billion was invested in renewable energy in the world, which is just one third of the amounts that was invested in conventional power plants. In 2005, renewable energy supplied 17 percent of the world primary energy. This growth in renewable energy

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occurred in developing countries, which accounts for 44 percent of the world renewable generating capacity [Woodruff (2007b)].

The renewable energy technologies are highly expected to grow in the future due to declining prices, and the need for environmental protection [Paish (2002)]. The renewable energy sources include hydropower, solar energy, wind, biomass and geothermal energy etc. The energy or electricity generated from these sources is clean. It means that it causes no GHG emissions.

Hydro power is the largest source of renewable energy. Sixteen percent of electric energy in the world is generated from hydro power. Its share in the renewable energy is about four-fifths in the world [Dolf (2012)]. More than 1200MW micro/mini hydro power potential is estimated to be available in the country. Out of this potential, less than 5 percent is being developed. For microhydel power plants with capacities 100 and 500KW each, an estimated potential of 300MW and more than 400MW, respectively exists in Northern Area only [Sheikh (2010)].

Hydro power is classified on the basis of its size and energy generation capacity. This classification has been made for European countries. Large hydro project has a generation capacity of 100MW. While medium-hydro project has a generation capacity of 20MW-100MW. Small-hydro project has a capacity of 1MW to 20MW. Mini-hydro project ranges from 100KW to 1MW. This may be a stand alone or grid connected. Micro-hydro project has a capacity of 5KW to 100KW that supplies electricity to a small community in rural areas [Dolf (2012)].

Micro Hydro Power (MHP)<sup>1</sup> can be an option for providing a reliable and cheap energy to the rural communities. This technology has the advantage that it can be made on small streams, canals and river tributaries in the hilly areas. This technology does not require the storage of water or building a reservoir or dam. Water is only diverted from a river through a power channel towards a power house. The water that is used to run a turbine can again meet the same river without any loss. It requires no combustion of fuel or gas. This system is cost effective as compared to solar and wind energy [Dolf (2012)]. Because sun light varies with respect to time and place. It is only available during the day. Similarly, wind power also depends on location and speed of wind which varies from time to time.

The area that is taken as a case study is district Dir (upper) Khyber Pakhtunkhwa, where different MHP plants are operating in the area to provide electricity to the local population. Some of the plants are installed by Government organisations and some are installed by community itself. River Panjkora (river of five tributaries) is flowing in the area. The river as well as its tributaries offer a number of sites for small and Micro hydro power plants.

The existing studies on micro hydro power [e.g. Woodruff (2007b); Edvard (2011); Hanggoro (1998); Sarala (2009)] conducted the Cost Benefit Analysis (CBA) of Micro hydro power projects. The authors have used NPV and IRR as evaluation criteria for MHP projects. Arthur and Stephen (2006), has given the impact of micro hydro power projects on the rural population in terms of increased income through productive

<sup>1</sup>Micro Hydro Power is a technology for generating electricity on small streams and canals that require no dam or storage of water. It is also called as run of the river technologies. Its generating capacity ranges from 5Kw to 100Kw [Khennas and Barnett (2000)].

activities, employment creation, increase in working hours during night and increase in study hours for students. The methodology used to collect information was participatory rural appraisal tools, stakeholder analysis and Focused Group Discussion. Household survey, Transect Walks and household interviews were also used to collect data. A study [Condrea and Bostan (2008)] has discussed the sustainable management of Micro hydro power. It has identified different issues and explored lessons learned from the MHP projects. The study suggested that the experience and lessons learned from the existing projects should be taken into account while deciding the introduction of MHP projects in future. Dorji (2007) assessed the sustainable management of Micro hydro power. The study objective was to investigate the institutional mechanism that will ensure equitable, economically efficient and sustainable Micro hydro power for rural communities of Bhutan. Semi-structured interviews and key informant survey techniques are used for the study. Financial analysis of the study shows that revenue from the current tariff does not meet the combined cost of annual operation and maintenance. The development of MHP should be coupled with the development of income generating opportunities to increase the self-reliance of rural communities. The author estimated that the project was expected to generate about 580,000 kWh of energy annually and reduce 500 tones of CO<sub>2</sub> equivalent per year. The study further estimated that only 36 percent of the net generation is being utilised accounting for an estimated 12 percent distribution loss. However, these estimations depend on the site location, cultural and institutional environment in which they are operating. Mirza, *et al.* (2009)<sup>2</sup> identified the policy barriers to promotion of community based renewable energy technologies in Pakistan. These barriers are policy barriers, institutional barriers, fiscal and financial barriers, technological and social barriers. Only a few studies [e.g. Purohit (2008) and Shakya (2005) in India and Nepal] have assessed the environmental benefits of Micro hydro power (MHP) in the form of GHG emission reductions and CDM. Purohit (2008) estimated the gross potential of Small Hydro Power (SHP) as 15 GW in India with the annual Certified Emission Reductions (CER) potential of 24 million tones of CO<sub>2</sub> equivalent.

While in Pakistan, a little work is done on Micro hydro power. Therefore, the present study attempts to fill this gap and estimate the emission reductions that would have occurred in the absence of MHP plants/ projects.

Basic objectives of the study are (1) to show the role of Micro hydro power in generating electricity for rural communities in District Dir (upper), Khyber Pakhtunkhwa, (2) to assess the cost effectiveness and environmental sustainability of Micro hydro power and (3) to identify the issues and problems associated with Micro hydro power in rural areas.

The remainder of the study is organised as follows. Section 2 discusses the data and methodology of the study. Section 3 explains results and discussion while the final section concludes the study along with policy implications.

## 2. DATA AND METHODOLOGY

The study uses the primary data taken from the households of District Dir (Upper) Khyber Pakhtunkhwa, Pakistan. This study covers 100 main grid (WAPDA) connected

<sup>2</sup>Mirza, Ahmad, Harijan, and Majeed (2009).

households and 100 MHP connected households. Two separate questionnaires were designed for each category of households. This was done to capture the difference in the energy patterns, the difference in the expenditure made on energy between the two types of households and the relative cost of MHP and WAPDA electricity to the households. There are 2867 WAPDA connected households and 2160 MHP connected households in the sampled area. A sample size of 100 households is selected from each category. The sample size was calculated through sample size calculator. We have also taken the 35 MHP plants as a sample to get the relevant information. Qualitative data was taken through informal survey.

This study uses descriptive analysis to capture the socio-economic aspect of the households, their expenditure on energy items, and use of alternative sources of energy. Financial and Economic analysis is undertaken, which includes the estimation of Benefit Cost Ratio (BCR), Net Present Value (NPV), Internal Rate of Return (IRR) and Pay Back Period (PBP) of the Micro hydro power project using a discount rate of 12 percent. Per unit energy price of WAPDA and MHP electricity is also calculated using the electricity bills of the households. WAPDA connected households have proper metering system and receive bills along with the total units consumed. But the MHP plants have no metering system. The households pay a fixed flat tariff to the owner of the power plant regardless of how much electricity is consumed. Therefore, to arrive at per unit price of MHP electricity, we divide the total monthly bill on the total units consumed by the household (assuming an average consumption of 5 kWh per day).

Environmental analysis is also undertaken to arrive at the total emissions reductions from the MHP power plants. For this purpose we use energy baseline. Energy baseline is the fuel consumption of the technology that would have been used in the absence of project activity. The emission baseline is calculated using the aggregate of annual kWh output of all the MHP plants times the CO<sub>2</sub> emission factor for the fuel displaced [Pandey (2008)].

$$\text{Annual power generation (kWh/year)}^3 = \text{Plant Capacity (kW)} * \text{Plant Capacity Factor}^4 * \text{hours} \quad \dots \quad (1)$$

$$\text{Annual CO}_2 \text{ emission reductions (tones of CO}_2\text{eq)} = \text{Power generation (kWh/year)} * \text{Emission Factor (tones of CO}_2\text{/ kWh)} \quad \dots \quad \dots \quad (2)$$

Emission reductions from CDM projects in the power sector can be calculated based on the net electricity generated by the project and the difference between the emissions (CO<sub>2</sub>/kWh) of the baseline and the project activity [Akella, *et al.* (2009)].

$$E_{\text{reductions}} = E_{\text{B}} - E_{\text{Project}} \quad \dots \quad (3)$$

$E_{\text{reductions}}$  = Emission reductions

$E_{\text{B}}$  = Baseline Emissions

$E_{\text{Project}}$  = Project Emissions

<sup>3</sup>As there is no metering system and no proper book keeping of the per day electricity generation (in kWh) of the power plants in the study area, the annual electricity generation is estimated by simply aggregating the installed capacity of each MHP plant in hours.

<sup>4</sup>Plant Capacity Factor or load factor = Average Demand / Installed Capacity [Akella, Saini, and Sharma (2009)].

As emissions from Micro hydro power plants construction is negligible or zero, therefore, emission reductions are equal to base line emissions ( $E_B$ ). Moreover, MHP do not require the storage of water or dam and projects with less than 5 MW capacities required no Environmental Impact Assessment (EIA).

Total annual emission reductions can be calculated by multiplying  $E_B$  by the emission factor of the fuel displaced. An emission factor of  $1.83^5$  kg  $CO_2eq/kWh$  is used for the analysis.

$$\text{Baseline Emissions (tCO}_2/\text{yr)} = E_B (\text{kWh}) * 1.83 \text{ kg CO}_2\text{eq/kWh} * 1/1000 = \text{tCO}_2\text{eq} \quad (4)$$

The qualitative analysis has been done by using informal survey techniques such as focused group discussion and key informant survey etc. The informal survey techniques are also called as Participatory Rural Appraisal (PRA). Informal survey may be used as a supplement to the quantitative survey. Evidence shows that this type of survey is more reliable and valid as compared with data collected through other traditional methods [Kumar (1989)]

For this study we have arranged four focused groups. Each focused group consists of six to eight members taken from the community. The members had different socio economic backgrounds. The prospects and issues of MHP's were thoroughly discussed with the members of focused groups. Main findings were noted to reach conclusion.

Key informant survey is a loosely structured conversation with people who have specialised knowledge about the topic you wish to understand. This type of interview consists of open ended questions. I took a school teacher of village Tarpatar, ex-nazim of union council Jabar and health workers of rural health centre Tarpatar as key informants. Basic information of MHP plants and the issues associated with MHP were discussed.

### 3. RESULTS AND DISCUSSION

This section presents the results of descriptive analysis of important variables used in the study. It also gives the comparative cost analysis of MHP's and WAPDA electricity. Financial and Economic analysis followed by Environmental analysis (estimation of emission reductions) are also part of this section.

#### 3.1. Descriptive Analysis

Table 1 in Appendix gives the detail of Micro hydro power plants operating at Ushairy in the upper Dir district. These plants are mainly run by private sector. The total installed capacity of the 35 MHP plants is 1058 kW or 1.058 MW. The MHP units installed by government have a more capacity than the MHP's installed by the community. The reason is that they are installed with proper specification. While the community based units are installed through simple methods because of lack of funds and the required skills.

<sup>5</sup>Emission factor of  $1.83 \text{ kgCO}_2 \text{ eq /kWh}$  is based on a survey conducted in Gilgit, Chitral, and Baltistan. This is taken from the diesel generators sets that are being used in the area. For further detail see CDM, Project Design Document (PDD) Form Version 03, Community based Renewable Energy Development in Northern Areas and Chitral, Pakistan [Pandey (2008)].

Table 1

*Classification of MHP and Non-MHP Users with Respect to their Sources of Lighting*

Type of Users	Sources of Lighting					MHP
	WAPDA	Kerosene Oil	Solar Cells	Generators	DC Lamps	
Non-MHP (WAPDA) Users in %	7	19	2	10	62	0
MHP Users in %	0	2	0	0	13	85

Source: Field Survey.

**3.1.1. Main Source of Lighting**

As the duration of light in the households of users of hydro power is greater than the duration of light from WAPDA electricity, therefore non users uses other alternatives like kerosene oil, LPG and DC chargeable lamps to meet their needs. Majority of MHP users responded that their main source of lighting is MHP while the non-MHP users use DC chargeable lamps as the main source of lighting.

Table 1 shows the main source of lighting for MHP and non-MHP households. This is 62 percent of all other sources of light. On the other hand, the main source of lighting in the households connected with Micro hydro power is the electricity supplied by these MHP power plants. In other words 85 percent of households stated MHP as the main source of lighting. While the main grid electricity, kerosene oil and DC chargeable lights have 4 percent, 2 percent and 9 percent share in the source of lighting respectively. Moreover, the WAPDA connected households use DC chargeable lights as an alternative source of lighting. Households that use Kerosene oil is only 2 percent in case of MHP, while 19 percent of WAPDA connected households use kerosene oil. The consumption of kerosene oil is also higher in WAPDA connected households as compared to the MHP households.

**3.1.2. Daily Availability of Electricity**

The Table 2 below shows the electricity or the availability of light for both categories of households. The duration of light available to households using WAPDA electricity is 2-3 hours daily. While the duration of light available to the households using electricity from MHP is 8–12 hours daily. It means that about 20 hours load shedding is faced by non-MHP users.

Table 2

*Daily Availability of Electricity*

Type of Users	Availability of Light	Household Response in %
Non-MHP Users (WAPDA)	2-3 hours	95
	4-5 hours	5
MHP	8-12 hours	90
	13-17 hours	10

Source: Field Survey.

### 3.1.3. Monthly Electricity Bill and Connection Charges

The data in Table 3 shows a comparison of average monthly electricity bill and connection costs that household pay for using WAPDA electricity and electricity from MHP. Both types of households are significantly different with respect to their monthly payment and connection costs. The minimum and maximum bill households pay for WAPDA electricity are Rs 500 and Rs 3000 per month, respectively. On the other hand, the minimum and maximum bill that households pay for MHP is Rs 100 and Rs 400 per month respectively. The users of MHP pay a fixed sum of money to the operator or owner of the plant per month. The average connection charges of WAPDA electricity is Rs 6500, while that of MHP it is Rs 4000. In case of MHP, the users take their own connection from the power plant. The cost of wire depends on the distance between the plant and the household. The greater the distance the greater the connection cost. This analysis concludes that the use of electricity from MHP is cheaper than the WAPDA electricity in terms of monthly payment and connection costs.

Table 3

#### Monthly Electricity Bill and Connection Charges

Type of Users	Monthly Bill (Rs)			Connection Charges (Rs)		
	Min	Max	Mean	Min	Max	Mean
WAPDA Connected	500	3000	920	5000	7000	6500
MHP Connected	100	400	200	1000	7000	4000

Source: Field Survey.

### 3.1.4. Comparison of Fuel Wood and other Sources of Energy Used

This part of the analysis shows the amount of fuel wood and other energy sources used by MHP users and non-MHP users (Table 4). This analysis also estimates the difference in consumption of energy items and their associated cost of the two categories of households. As kerosene oil, LPG, Diesels and DC chargeable lights are used in greater quantities in non-MHP households; therefore the cost of using these items are also greater than the cost in the case of MHP households.

Table 4

#### Comparison of Fuel Wood and other Sources of Energy Used

Energy Sources	Unit	Non-users of MHP(WAPDA)			MHP Users		
		Min	Max	Mean	Min	Max	Mean
Quantity of fuel wood used per month	Maund	2	30	10	5	10	11
Monthly expenditure on fuel wood	Rs	800	20000	4650	1000	8000	4675
Monthly expenditure on kerosene oil	Rs	120	2000	525	240	500	350
Monthly expenditure on LPG	Rs	500	2700	1462	300	3000	1000
Monthly expenditure on others (DC lights, UPS, Diesels etc.)	Rs	300	7000	1750	100	4150	532

Source: Field Survey.

In the above analysis it is clear that the monthly expenditure of MHP households on energy is lower than the expenditure made by non- MHP households. Because the excessive load shedding from WAPDA compel people to shift their preferences to other alternatives. They use Liquefied Petroleum Gas (LPG), Diesel generators, Kerosene oil and DC chargeable lights for lighting and other purposes. This leads to an increase in expenditure on energy. On the other hand the MHP users use electricity for 8 to 12 hours per day and pay a nominal bill per month to the owner of the power plant. Thus, it is cost effective and economical for the households to use electricity of MHP instead of WAPDA electricity.

### 3.1.5. Degree of Satisfaction with Availability of Electricity

Majority of the respondents were not satisfied with the availability of WAPDA electricity. However, they were satisfied with the electricity available from MHP plants. The percentages of the respondents who are satisfied or otherwise are given in the Table 5 below.

Table 5

Type of Users	Satisfaction Categories				
	Highly Satisfied	Satisfied	Neutral	Dissatisfied	Highly Dissatisfied
MHP Users (%)	25	60	4	11	0
WAPDA Users (%)	0	12	2	56	30

## 3.2. Comparative Cost Analysis of MHP and WAPDA Electricity

### 3.2.1. Cost of Electricity Generated from Micro Hydro Power (MHP) Plant

In this section we estimate the relative unit capital cost (Rs /kW) and the unit energy price (Rs /kWh) of the Micro hydro power plant.

The average MHP plant size/ capacity = 30 kW<sup>6</sup>

Unit capital cost or installed capital cost = 400000/30= Rs 13333/kW

1 kWh= 1 unit of energy

The MHP plant operates for 10 hours on average per day. Therefore, the total energy generation per day will be 30 kW\* 10 hours= 300 kWh.

Assume that average household consumption = 5 kWh per day.

Per month consumption= 5 kWh \*30 = 150 kWh

The average bill that the consumers pay for using MHP electricity = Rs 200/ month, therefore the electricity price per unit= 200/150 kWh= Rs 1.33/ kWh

### 3.2.2. Cost of Electricity Generated from WAPDA

Per unit cost of WAPDA electricity in Pakistan is Rs 12. It is Rs 23/unit for High Speed Diesel [Pakistan (2013)].

<sup>6</sup>The average plant size or capacity is derived from the total capacity of 35 surveyed MHP plants in the area, which is 1058 kW i.e. 1058/35= 30kW.

The tariff rate is Rs 9 per unit for consumers whose consumption is in the range of 101- 200 units. For commercial consumers the rate is Rs 18/unit [IESCO (2013)].

Hydro power in the total energy mix in Pakistan is 35 percent. Furnace oil based is 34 percent of the total power supplies. The fuel cost of this energy generation is Rs 14.76 per unit. The gas based power generation is 25 percent. The diesel power generation cost is Rs 15.63 per unit. The average fuel cost of the power generation is Rs 6.07 per unit [Pakistan (2013)].

1 unit= 1 kWh

Price per unit of WAPDA electricity for consumers using 100kWh to 200 kWh equals Rs 9. Assume that per day consumption of a typical household is 5 kWh. Then, the monthly bill will be  $150 \times 9 =$  Rs 1350.

Table 6

<i>Electricity Price per Unit (in Rs)</i>			
	Household Energy Consumption in kWh/Day	Per Month Consumption	Electricity Price per Unit in Rs
MHP Electricity	5 kWh	150 kWh	1.33
WAPDA Electricity	5 kWh	150 kWh	9
Difference	–	–	7.67

### 3.3. Financial and Economic Analysis of MHP

The results of Financial and Economic Analysis are given in this section. Initial capital cost of MHP is Rs 402000. The life of the MHP projects ranges from 20 years to 35 years. But we have taken the life of the project as 25 years on average. Completion time for the project is one year. In case of MHP, the Financial Internal Rate of Return (FIRR) is 24 percent, which is greater than the discount rate of 12 percent. On the other hand, the Economic Internal Rate of Return (EIRR) is 27 percent and is greater than the FIRR. The reason is that the financial return takes into account only the benefits or return to the investor and does not take into account other benefits (tangible and intangible) to the whole society or the economy. In Economic analysis the benefits that accrue to the society increase through the multiplier effect. As both the FIRR and ERR are greater than the discount rate, therefore the project is acceptable from both investor and society's point of view.

The Financial NPV is 350, which is greater than zero. The Economic NPV is 459, which is also positive and hence the project is feasible and worth to undertake. The BCR in financial analysis is 1.25 and in the Economic analysis, it is 1.26, both are greater than one. Therefore, we can conclude that according to this criterion, the Micro hydro power project is viable and worthy to be undertaken.

In Financial Analysis, the Pay Back Period (PBP) is five years. While in Economic Analysis, the Pay Back Period is 3.6 years. The PBP of Financial analysis is more than the PBP in Economic analysis. The reason is that there are more returns from MHP projects due to its impact on the education, health and other economic and social activities through the multiplier effect. Detail of Financial and Economic analysis is given in Table 2 and Table 3 in Appendix.

The Table 7 shows the result of sensitivity analysis when capital cost is increased by 10 percent.

Table 7

*Sensitivity Analysis with 10 Percent Increase in Capital Cost*

Description	Financial Analysis	Economic Analysis
IRR	22%	23.10%
NPV	317.7	315.6
BCR	1.22	1.40
PBP	5 Years	5 years

### 3.4. Emission Reductions through MHP

As there is low access to national electricity grid due to remoteness and the difficult topography, there is more probability of using diesel generators by the local population. This practice will lead to more use of costly fuels. This will not only lead to more expenditure on fossil fuels but also cause Green House Gas (GHG) emissions. Therefore, the existing MHP plants and expected new power plants will reduce the green house gas emissions that would otherwise be produced from the use of diesel based generators.

The total installed capacity of the 35 MHP plants is 1058 KW, which is equal to 1.058 MW. From the household survey, we found that each MHP plant operates from 8-12 hours. Therefore, we take 10 hours as average operating time per day. This gives us electricity generation in kWh per day.

$$\begin{aligned} \text{Annual power generation (kWh)} &= \text{Plant Capacity (kW)} * \text{Plant Capacity Factor} * \text{hours} \\ \text{Annual power generation (kWh)} &= 1058 \text{ (kW)} * 0.45^7 * 3650 \text{ hours} \\ &= 3861700 \text{ kWh} * 0.45 \\ &= 1737765 \text{ kWh} \end{aligned}$$

Multiplying by the emission factor of 1.38kg CO<sub>2</sub>eq/ kWh, we get total baseline emissions.

$$\text{Annual Baseline Emissions (tCO}_2\text{)} = 1737765\text{kWh} * 1.38 \text{ kg CO}_2\text{eq/kWh}/1000 = \mathbf{3180 \text{ tones CO}_2\text{eq / annum.}}$$

Emissions from Micro hydro power plants construction are negligible or zero and MHP do not require the storage of water or dam. Moreover, projects with less than 5 MW capacities require no Environmental Impact Assessment (EIA). Therefore, emission reductions are equal to base line emissions (E<sub>B</sub>).

$$E_{\text{reductions}} = E_B - E_{\text{Project}}$$

$E_{\text{reductions}} = E_B - 0 = E_B = \mathbf{3180 \text{ tones CO}_2\text{eq / annum.}}$  This value is the estimated emissions that are reduced by the MHP plants.

<sup>7</sup>The installed Micro hydro power plants are expected to have an average load factor or capacity factor of 0.45. This also includes 2 percent of down time for the system for repairs. The demand for electricity reaches to the capacity of the power plant during evening peak hours [Pandey (2008)].

### 3.4.1. *Benefits of Micro Hydro Power Technologies through CDM*

Pakistan signed the United Nations Framework Conventions on Climate Change (UNFCCC) in 1992. Thus it qualifies to take benefits from market based flexible mechanism under the convention for addressing the issue of climate change. One of the mechanism is called Clean Development Mechanism (CDM) [Nizami and Bukhari (2010)].

Pakistan is a “Non- Annex 1” country.<sup>8</sup> It ratified the UNFCCC in 1994 on voluntary basis. Kyoto protocol of the UNFCCC is dealing with climate change mitigation. It is a milestone towards global carbon mitigation efforts [Ahmad and Salman (2012)].

The protocol led to the establishment of carbon markets through Clean Development Mechanism (CDM). Pakistan ratified the Kyoto Protocol in January 2005, and thus became eligible to benefit from CDM. While the CDM is a great opportunity for Pakistan, the country has not yet optimally utilised this mechanism to get financial benefits through selling Certified Emission Reductions (CERs). This may be due to the lack of knowledge and capacity building of the concerned ministry and investors in Pakistan. Therefore to get full benefits we have to initiate renewable energy projects as micro hydro power. This will on the one hand provide the needed energy to the rural population and on the other hand earn revenue through CDM by reducing green house gas emissions. Taking the current price of one tone of CO<sub>2</sub>eq as \$23,<sup>9</sup> if the given project of all the MHP's is registered with CDM, it will earn \$ 95400 per annum.

## 4. CONCLUSION AND POLICY IMPLICATIONS

The study attempted to find out the cost effectiveness, economic and financial viability and environmental sustainability of Micro hydro power plants in district Dir (upper), Khyber Pakhtunkhwa. The study is based on the primary data collected through questionnaires. The study is important because it carried out the financial and economic analysis and environmental analysis of Micro hydro power for the first time in Pakistan. To find out the viability of the MHP projects NPV, IRR, BCR and Pay Back Period are used and all these favoured the project under consideration. Monthly expenditure on kerosene oil is Rs 525 for WAPDA connected households while it is only Rs 350 for MHP connected households. Monthly expenditure on LPG is Rs 1462 for WAPDA and Rs 1000 for MHP connected households. Moreover, monthly expenditure on alternative sources of energy is Rs 1750 for WAPDA and Rs 532 for MHP connected households. It is estimated that the electricity provided by MHP to the households is cheaper than the electricity of WAPDA. This technology replaces the electricity generated by fuel based generators. The estimated emission reduction from MHP project is 3180 tones CO<sub>2</sub>eq per annum. These emission reductions can be traded through carbon markets by CDM to earn revenue. MHP plants have no adverse environmental impacts like, sedimentation, water logging, disturbance of ecosystem and habitat of animals and plants. The relevant issues

<sup>8</sup>Non-Annex 1 countries are mostly developing countries. These countries are not listed in Annex 1 to the UNFCCC. Certain developing countries are recognized by the convention as being more vulnerable to the adverse impact of climate change. Therefore, these countries are eligible to be the host parties for CDM projects. In other words they are not bound to reduce their emissions of GHG gases [UNFCCC (n.d.)].

<sup>9</sup>This is the price of 1 tones of CO<sub>2</sub> equivalent used in CDM projects [Sharon and Angela (2012)].

of finance, capacity building, training and other social issues (detail of issues is given in Table 5 in Appendix) need to be addressed so that the given projects may become a success story in the future. Based on these results and the highest potential of small and micro hydro power that exist especially in northern areas and KPK, it is suggested that the government should adopt the policy of small hydro power development. This will not only provide the much needed energy to the rural population but will also contribute to environmental protection.

## APPENDIX

Table 1

*Micro Hydro Power Plants Operating at Ushairy, District Dir (upper)*

S#	Name of Village	No of MHP's			Total Electricity Generation Capacity (KW)	Year of Installation	Organisation Who Installed	No of Beneficiaries (HH)
		Govt/NGO	Private	Total				
1	Samkote	1	2	3	100	2009	SRSP	180
2	Batal	1	2	3	100	2008	SRSP	160
3	Nashnamal	1	1	2	80	2009	UNICEF	140
4	Danele	–	2	2	50	2007	Community	70
5	Gur koi	2	–	2	70	2009	UNICEF	100
6	Shomai	1	1	2	80	2009	UNICEF	150
7	Jabai		2	2	40	2008	Community	90
8	Usharai Proper	1	–	1	48	2013	ACTED(Japan funded)	110
9	Usharai	–	1	1	30	2010	Private	60
10	Usharai	–	1	1	25	2010	Private	70
11	Tarpatar	1	–	1	40	2012	RAHA	120
12	Amrete	–	1	1	20	2009	Community	50
13	Amrete	–	1	1	20	2008	Community	40
14	Amrete	–	1	1	20	2008	Community	50
15	Amrete	–	1	1	20	2009	Community	50
16	Amrete	–	1	1	20	2009	Community	55
17	Amrete	1	–	1	20	2009	SRSP	60
18	Barkand	–	1	1	60	2007	Community	200
19	Almas	1	2	3	90	2011	MNA Funds	170
20	Choran	–	1	1	15	2008	Private	25
21	Kalkote	–	2	2	65	2003	Private	170
22	Nagasar	–	2	2	45	2004	Private	60
Total				35 units	1058 kW = 1.058 MW	–	–	2160 Households

Source: Field Survey.

Table 2

*Financial Analysis of Cash Flow of MHP Plant*

(In 000 Rs.)

Year	Initial Capital Cost	O and M Cost	Total Cost	Benefit of the Project	Net Benefit
0 2010	402	0	402	0	-402
1 2011	0	120	120	216	96
2 2012	0	120	120	216	96
3 2013	0	120	120	216	96
4 2014	0	120	120	216	96
5 2015	0	120	120	216	96
6 2016	0	120	120	216	96
7 2017	0	120	120	216	96
8 2018	0	120	120	216	96
9 2019	0	120	120	216	96
10 2020	0	120	120	216	96
11 2021	0	135	135	233	98
12 2022	0	135	135	233	98
13 2023	0	135	135	233	98
14 2024	0	135	135	233	98
15 2025	0	135	135	233	98
16 2026	0	135	135	233	98
17 2027	0	135	135	233	98
18 2028	0	135	135	233	98
19 2029	0	135	135	233	98
20 2030	0	135	135	233	98
21 2031	0	135	135	233	98
22 2032	0	135	135	233	98
23 2033	0	135	135	233	98
24 2034	0	135	135	233	98
25 2035	0	135	135	233	98
Net Present Value		350.01			
Benefit Cost Ratio		1.25			
Internal Rate of Return		24 percent			
Payback Period		5 Years			

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Source: Study Survey.

Table 3  
*Economic Analysis of Cash Flow of MHP*

		(In 000 Rs.)				
Year	Initial Capital Cost	O and M Cost	Total Cost	Benefit of the Project	Net Benefit	
0	2010	396.18	0	396.18	0	-396.18
1	2011	0	108	108	216	108
2	2012	0	108	108	216	108
3	2013	0	108	108	216	108
4	2014	0	108	108	216	108
5	2015	0	108	108	216	108
6	2016	0	108	108	216	108
7	2017	0	108	108	216	108
8	2018	0	108	108	216	108
9	2019	0	108	108	216	108
10	2020	0	108	108	216	108
11	2021	0	121	121	233	111
12	2022	0	121	121	233	111
13	2023	0	121	121	233	111
14	2024	0	121	121	233	111
15	2025	0	121	121	233	111
16	2026	0	121	121	233	111
17	2027	0	121	121	233	111
18	2028	0	121	121	233	111
19	2029	0	121	121	233	111
20	2030	0	121	121	233	111
21	2031	0	121	121	233	111
22	2032	0	121	121	233	111
23	2033	0	121	121	233	111
24	2034	0	121	121	233	111
25	2035	0	121	121	233	111
Net Present Value		459.16				
Benefit Cost Ratio		1.36				
Inter Rate of Return		27 percent				
Payback Period		3.6 Years				

Source: Study Survey.

Table 4  
Sensitivity Analysis of Cash Flow of MHP

		(In 000Rs.)				
Year	Initial Capital Cost of the Project	0 and M Cost	Total Cost	Benefit of the Project	Net Benefit	
0	2010	440.2	0	440.2	0	-440.2
1	2011	0	120	120	216	96
2	2012	0	120	120	216	96
3	2013	0	120	120	216	96
4	2014	0	120	120	216	96
5	2015	0	120	120	216	96
6	2016	0	120	120	216	96
7	2017	0	120	120	216	96
8	2018	0	120	120	216	96
9	2019	0	120	120	216	96
10	2020	0	120	120	216	96
11	2021	0	135	135	233	98
12	2022	0	135	135	233	98
13	2023	0	135	135	233	98
14	2024	0	135	135	233	98
15	2025	0	135	135	233	98
16	2026	0	135	135	233	98
17	2027	0	135	135	233	98
18	2028	0	135	135	233	98
19	2029	0	135	135	233	98
20	2030	0	135	135	233	98
21	2031	0	135	135	233	98
22	2032	0	135	135	233	98
23	2033	0	135	135	233	98
24	2034	0	135	135	233	98
25	2035	0	135	135	233	98
IRR	22%					
NPV	317.7					
BCR	1.22					
PBP	5.5 years					

Source: Study Survey.

Table 5

*Main Issues Identified through Informal Survey Techniques  
(Focused Group Discussion and Key Informant Survey)*

S #	Issues	Evidence	Causes	Solution
1	Unskilled operators	70% of the operators of MHP plants are illiterate	Poverty and low education facilities	Impart technical trainings to the operators for the successful operation of plants
2	Financial constraints	The electro mechanical equipments and civil works are not in accordance with proper specification and standards (personal observations).	Low income level of the people and lack of financing facilities. They cannot afford the expensive civil works for flood control.	Proper commercialisation of the technology and loans should be given to encourage the technology
3	Risk of electric shocks	3 to 4 children have been electrocuted in the past according to the information shared by the community members.	Majority of the poles that supply electricity from power plants to the houses are wooden. These poles often fall during rain, snow fall or cyclones and pose a risk to human lives.	Installation of steel or iron poles with proper transmission lines to the houses.
4	Disputes on site selection	Community members of two villages have a dispute on site selection of MHP project. As a result of this dispute about 12 electric poles were stolen by the members of another village and later on recovered.	Political interference from the local political figures for the selection of site for government project.	There should be an independent body for selection of sites and execution of project in view of the transparency and need of the local population.
5	Demand for more MHP connections	About 50 percent of households in those villages are without MHP electricity.	Low installed capacity ranging from 10 Kw up to 50 Kw	At least it should be $\geq 100$ Kw.
6	Non- cooperation of community members	They misuse electricity of the plant by using heaters etc. leading to the break down MHP plant.	Flat tariff charged from the consumers irrespective of the level of consumption.	Tariffs should be charged according to the consumption of electricity, household size and income level. The village committee should be empowered to tackle the issue of maintenance, repairing and collection of bills.
7	Fusing of electric generator in thunder storms	Information about these cases was provided by the respondents.	No transformer is installed.	Proper installation of step down transformer should be ensured to avoid fusing of lights and other appliances owing to higher voltage.
8	Lack of awareness	Misuse of electricity in different forms.	The community members consider the project as a public or free good.	Awareness workshops should be arranged for the local people and operators so that they can get the required skills.

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### **Comments**

It is a distinctive paper that uses the informal techniques for the analysis and truly unravels the hidden, firsthand information on the sustainable electricity generation in rural communities in Pakistan. This paper shares important information and provides the economic assessment on the feasibility of micro-hydro power generation. However, I would like to float few suggestions that I guess will help to further improve this work.

- (1) The write up needs a serious effort to improve the text. There are small paragraphs and the paper lacks in logical buildup of arguments.
- (2) The authors seems to be biased towards MHPs and therefore puts extra effort to support the already obvious economically viable solution i.e. micro-hydro power (MHP) plants.
- (3) There is a lot of material that is redundant in terms of an academic paper like details of cost-benefit techniques. Such information needs to be attached only as appendix if so necessary.
- (4) Tables sometimes makes the reader confused and authors should spare some time to make them presentable and easy to comprehend.
- (5) Repetition and irrelevant terms like names of statistical packages (SPSS, Excel) should be removed from the text.
- (6) The authors should only report the economic feasibility of MHP projects. Economic feasibility is more meaningful than that of financial feasibility. This will be more efficient in terms of time and space and for keeping the reader's interest intact.
- (7) Furthermore, it seems that authors have used hypothetical figures for costs and benefit flows related to MHP plants (at Tables 4.9 and 4.10). This is undesirable as we can see at appendix-A that there are plants operating as far as from 2003, therefore, it would be more meaningful to use actual cost and benefits figures where available.
- (8) The most remarkable contribution of this work to me is the calculation of revenue potential that Pakistan can benefit from via trade at carbon markets through Clean Development Mechanism and the authors should be praised for it.
- (9) Lastly, I would recommend that the paper should be concluded following section 4.5.3. The rest of the material (i.e. issues and findings from Focus Group Discussion) should either be removed from this paper or can be attached as appendix, if authors think these so important. This will help to keep the attention of the reader intact and to properly conclude following the chronological progression of the paper.

Last but not the least, this is a nice attempt and reflects the hard work done by the authors. The findings are expected to help the policy makers to find a solution to such an important need of Pakistan at this time i.e. efficient electricity generation.

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## Households' Willingness to Pay for Improved Tap Water Services in Karachi, Pakistan

SIDRAT ASIM and HEMAN D. LOHANO

### 1. INTRODUCTION

Access to safe water is a basic need for human survival and health. Water is one of the most important commodities for households, who use it for drinking and many other important household activities including cooking a meal, washing dishes, bathing, laundry, cleaning, and watering the home gardens. Households need safe water and its availability on regular basis. Irregular and uncertain access to safe water affects not only these activities directly but also households' health and workforce productivity indirectly. Thus, households give great importance to water, its quality and regular supply.

Karachi is the most populated city of Pakistan with population over 13 million in 2010 and is among top ten mega-cities of the world [Pakistan (2010)]. Insufficient access to safe water is one of the major challenges facing households in Karachi city due to its burgeoning population and increasing demand for water. According to City District Government Karachi (2007), only 60 percent of the households in Karachi are connected to piped water supply, provided by the city government through the Karachi Water and Sewerage Board (KWSB). Furthermore, water is delivered on schedule for only four hours per day, which is often irregular and uncertain in many locations due to poor infrastructure and inadequate maintenance of piped water supply system. Given the water shortage in the city, the residents buy water from private water tankers.

In addition to inadequate quantity of water, the quality of water is also a big issue. According to Pakistan Council of Research in Water Resources [PCRWR (2007)], water in Karachi is unsafe to drink as it is mostly contaminated with Coliforms and E. coli. PCRWR (2007) collected water samples from major parts of Karachi and found that 93 percent of the water samples were unsafe as they were contaminated with Coliforms and E. coli (86 percent) and had excessive level of mineral and elements (7 percent). Water provided to households in Karachi is unsafe to drink because it is not properly treated and is contaminated as a result of the leakage of sewage and industrial waste through

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damaged pipes. For drinking purpose, some households boil water, filter water, or purchase bottled water. Due to unawareness and other reasons, many households are not able to adopt these coping activities, and continue to face health issues caused by unsafe water. PCRWR (2007) reports that every fifth citizen in Pakistan suffers from illness caused by unsafe water. Thus, there is a need to address the issue of both quantity and quality of water.

There are a wide range of factors that contribute to water supply inefficiencies and unsafe water in Karachi, but one of the most significant is the poor infrastructure in piped water supply system. The existing water supply network in Karachi is over 100 years old and has become outdated and defective. According to a study conducted by Asian Development Bank [ADB (2004)], capital expenditure per connection in Karachi is only US\$7 per year, which is one of the lowest in the region. It is US\$78 in Delhi, US\$140 in Dhaka, and the average expenditure in major Asian cities is US\$88 (Table 1). Furthermore, only 0.3 percent of the water connections are metered in Karachi and the remaining connections (99.7 percent) are charged with flat rate tariff based on floor areas of domestic properties, resulting in unchecked high consumption of water by the connected households. The main reason of low expenditure on water supply infrastructure is insufficient revenue generated from collection of water bills, which does not even cover operations and maintenance costs. The estimated average tariff per cubic meter of water in Karachi is only US\$0.07, which is one of the lowest in the region (Table 1). The estimated average tariff rate is computed as total revenue from tariff divided by total consumption of water. Thus, the reasons for a low tariff rate in Karachi include flat tariff rate based on floor area, low collection efficiency (54 percent), and unchecked high consumption of water by the connected households. Given the poor infrastructure in the piped water supply system, Karachi needs more funds for improving tap water supply infrastructure as well as for its operation and maintenance in order to improve the water efficiencies and water quality in the city.

Table 1

*Performance Indicators of Water Services in Major Cities of South Asia*

	Colombo	Delhi	Dhaka	Jakarta	Karachi	Kathmandu
Per capita production per day (m <sup>3</sup> )	0.48	0.3	0.22	0.27	0.34	0.11
Water supply coverage (% of people)	69	69	72	51	58	83
24-hour availability (% of people)	60	1	0	92	0	0
Per capita consumption per day (liters)	119	110	115	77	197	68
Average tariff per m <sup>3</sup> (US\$)	0.22	0.07	0.06	0.29	0.07	0.09
Revenue collection efficiency (%)	95	70	82	98	54	70
Capital expenditure per connection (US\$)	8	78	140	47	7	17

Source: Asian Development Bank (2004).

Considering the importance of access to safe water, the government has been making efforts to improve the tap water services in Karachi. In July 2013, KWSB has launched a water supply project, named K-IV Project, in collaboration with the China International Water and Electric Corporation (CWE) with aims to augment the water supply and to improve the quality of water in Karachi in near future. Currently, the government is providing a subsidy on water services with flat rate tariff based on floor

areas of domestic properties in Karachi. According to a study by Briscoe, *et al.* (2005) the subsidised tariff benefits more to those living in higher income areas rather than the poor. As improvements in the tap water services will result in higher cost of the service, the cost recovery is the key requirement for providing the improved water services that can be sustained over time.

As water is a basic need, appropriate pricing policy must take into account how much consumers place value and are prepared to pay for improvement in the tap water services, which varies depending on household income and other factors. Thus, there is a need to examine the demand and willingness to pay for improved tap water services by different income classes of households, which will help the policy makers in designing an appropriate water tariff structure for generating sufficient revenue to cover the cost of improved water services.

Estimation of willingness to pay also provides the information on the monetary value of the benefits from improving the access to safe of water. This information is useful for policy makers in making investment decisions based on benefits and costs of improvement of water services. Furthermore, in developing countries, policy makers generally do not give its due consideration to investment for the provision of improved water supply schemes as they assume that the public is unwilling to pay a higher tariff and the cost of the project will fall onto the already heavily burdened national exchequer unless a donor or lending agency proposes to fund the service provision. Failure to designing proper pricing policy for water services in the past has resulted in under-investment, poor maintenance, slow progress in extending coverage, and wastage of water. Therefore, estimation of the willingness to pay will be useful for policy makers in making efficient investment decisions as well as in designing pricing policies for sustainable management and provision of water services that will improve the welfare of the society.

The objective of this study is to evaluate the households' willingness to pay (WTP) for improved tap water services by different income classes of households in Karachi. This study uses contingent valuation method (CVM) and uses the single and double bound dichotomous choice elicitation techniques. WTP is estimated by probit model, interval data model and bivariate probit model using survey data from sampled households connected to tap water services in Karachi.

The remainder of this paper is organised as follows. The next section presents a brief literature review. Section 3 specifies the model of this study. Section 4 presents the estimation methods. Section 5 describes study area, sampling and data collection methods. Section 6 presents the empirical results of the study. Finally, Section 6 draws conclusion and offers their policy implication.

## 2. LITERATURE REVIEW

CVM became popular for valuation of infrastructure projects in developing countries after Whittington (1987), who specifically used CVM as a tool for helping to evaluate water supply projects. According to Birol, *et al.* (2006), more than 5000 CVM studies have been conducted in over 100 countries to examine water related issues and other resource. Cities for which such studies have been conducted include Dhaka [Chowdhry (1999)], Calcutta [Guha (2007)], central Tanzania [Kaliba, *et al.* (2002)],

Colombo [Jones, *et al.* (2006)], Khulna [Gunatilake and Tachiiri (2012)], and cities in Pakistan including Abbottabad [Haq, *et al.* (2007)], Hyderabad [Sattar and Ahmad (2007)], Peshawar [Khan (2010)], and rural Punjab [Altaf, *et al.* (1992)]. This section presents the review of selected relevant studies.

Bogale and Urgessa (2012) estimated willingness to pay of rural households for improved water service in Haramaya district, Ethiopia. The study administered double bounded dichotomous choice method, and data were analysed using the bivariate probit model. It was revealed that households expressed a mean WTP of 27.30 cents per 20 liters. Main determinants of WTP were household income, education, sex, time spent to fetch water, water treatment practice, quality of water and expenditure on water, and age of the respondent.

The factors that explained citizens' willingness to pay in Ado Ekiti [Olajuyigbe and Fasakin (2010)] were main source of domestic water used by household, access to improved source of water, distance from main source to house, average time spent to fetch water, adequacy of supply, quantity of water used per person per day, quantity of water purchased per day, incidence of water borne diseases, performance of water providing institution and average amount spent on water during the dry season. There are several other studies that have been conducted all around the world that have given similar results.

Banda, *et al.* (2007) used a tobit model to analyse factors affecting the probability that a household is willing to pay for both improved quantity and quality of water in rural area of South Africa. The study found that households' income, availability of water, households' access to a tap and water per capital, monthly water consumption were significant determinants of WTP.

Lema and Beyene (2012) studied WTP for improved water services in Goro-Gutu district of Eastern Ethiopia. The study uses both binary and ordered probit models to examine the determinants of willingness to pay. The estimated mean and median willingness to pay was found to be Birr 6.83 and 5.87 per household per month.

A study by the World Bank shows that contingent valuation correctly predicted 91 percent of the decisions of investments in piped water system [Cropper and Alberini (1998)]. Wattage, *et al.* (2000) argue persuasively that contingent valuation (CV) is the most all-encompassing way to measure the benefits of water quality improvement investments.

Review of the previous studies show that there are a number of elicitation techniques and econometric models to estimate WTP. CVM is used for recovering the information about willingness to pay by direct questions. There are different types of elicitation techniques in CVM to elicit WTP information. The closed-ended dichotomous choice techniques have become credible approach in CVM studies [Haab and McConnel (2002)]. Therefore, this study uses dichotomous choice closed-ended questions.

With dichotomous choice closed-ended questions, most commonly used techniques are single-bound and double-bound dichotomous choice questions. In single-bound dichotomous choice, respondent is asked only once about WTP and is expected to answer yes or no. In this case, WTP can be estimated by probit model. In the double-bound dichotomous choice, respondent is asked a follow-up question contingent upon the response to the initial question. Hanemann, Loomis, and Kanninen (1991) showed that a

follow-up question significantly increases the statistical efficiency of willingness to pay estimates. In this case, WTP can be estimated by interval data model. However, the literature indicates that the respondent is likely to change or adjust the value of WTP when the second question is asked. To address this issue, bivariate probit model was used to estimate WTP. However, Haab and McConnell (2002) raises the concern that the researcher has to decide whether to rely on the WTP based on initial or follow-up response. Thus, with dichotomous choice closed-ended questions, most of the previous studies have used one of the following models: probit model, interval data model and bivariate probit model. For checking robustness of the results, the present study uses these three econometric approaches, namely, probit model, interval data model and bivariate probit model, to estimate the WTP for improved tap water services in Karachi.

### 3. MODEL

There are two broad categories of approaches to measure WTP: stated preference and revealed preference. Stated preference approaches, such as CVM, use survey techniques to elicit willingness to pay and allow the researcher to evaluate the benefits of specific changes or improvement in a service. Revealed preference approaches, such as hedonic pricing models and averting expenditure methods, are based on actual observable choices to estimate the value of improvement in service, directly inferred from those choices [Tietenberg and Lewis (2012)]. This study uses contingent valuation method of stated preference approach to measure the WTP for improved tap water services with continuous supply of good quality water that is potable without boiling or any other treatment. This section presents the economic theory of WTP in the context of CVM [Haab and McConnel (2002)], and specifies econometric model of WTP function.

#### 3.1. Economic Theory of WTP

Consider a household who maximises a utility function subject to a budget constraint, and the household's indirect utility function is as follows:

$$V = V(p, q, m) \quad \dots \quad (1)$$

where  $p$  is the vector of the prices of the market commodities,  $q$  is the status of tap water services acquired by the household, and  $m$  is the household income.

Denote  $q_0$  as the existing status of tap water services received by the household, and  $q_1$  as the improved status of tap water services. In this study, improved status is represented by a scenario such that the household will receive continuous water supply with sufficient pressure, and the water will be of good quality and potable without boiling or any other treatment. The value of the change to household in monetary terms is represented by the Hicksian measure, the compensating variation  $C$  which satisfies:

$$V(p, q_1, m - C) = V(p, q_0, m) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (2)$$

As the change in  $q$  from  $q_0$  to  $q_1$  is an improvement in the tap water services and raises the household's utility level,  $C$  would be positive. In this case,  $C$  measures the household's willingness to pay (WTP):

$$V(p, q_1, m - \text{WTP}) = V(p, q_0, m) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (3)$$



information. These include: open-ended question, bidding games, payment cards, closed-ended single-bound dichotomous choice question, and closed-ended double-bound dichotomous choice questions. Among these, the closed-ended dichotomous choice techniques have become credible approach in CVM studies [Haab and McConnel (2002)]. Therefore, this study uses both single-bound and double-bound dichotomous choice closed-ended questions.

In the single-bound dichotomous choice question format, the respondent is asked whether he or she would be willing to pay a certain monthly charge for improved tap water services. In this format, each individual is offered a single bid value and is expected to answer yes or no. The individual would answer yes if his/her WTP is greater than the offered bid amount, and would answer no if his/her WTP is less than the offered bid amount.

In the double-bound dichotomous choice, the respondent is followed up by a second question about willingness to pay contingent upon the response of the first question. The second question would be asked with a higher bid amount if the answer to the first question is yes, or with a lower bid amount if the answer to the first question is no. The respondent is expected to answer yes or no to the second question.

#### 4.2. Estimation Methods with Single-Bound Dichotomous Choice

WTP function in Equation (6) for an individual  $i$  can be written as:

$$\ln(\text{WTP}_i) = x_i\beta + \varepsilon_i \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (7)$$

In the single-bound dichotomous choice question format, the respondent is asked whether he or she would be willing to pay a certain monthly charge for improved tap water services. In this format, each individual is offered a single bid value and is expected to answer yes or no. The individual would answer yes if his/her WTP is greater than the offered bid amount, and would answer no if his/her WTP is less than the offered bid amount.

$\text{WTP}_i \geq \text{bid}_i$  if the answer is yes

$\text{WTP}_i < \text{bid}_i$  if the answer is no

Denote  $y_i = 1$  if the answer is yes, and  $y_i = 0$  if the answer is no. The probability of  $y_i = 1$  is a function of the explanatory variables and can be written as:

$$\Pr(y_i = 1 | x_i) = \Pr(\text{WTP}_i > \text{bid}_i) \quad \dots \quad \dots \quad \dots \quad \dots \quad (8)$$

$$\Pr(y_i = 1 | x_i) = \Pr(\ln(\text{WTP}_i) > \ln(\text{bid}_i)) \quad \dots \quad \dots \quad \dots \quad (9)$$

Plugging Equation (7) into Equation (9) yields:

$$\Pr(y_i = 1 | x_i) = \Pr(x_i\beta + \varepsilon_i > \ln(\text{bid}_i)) \quad \dots \quad \dots \quad \dots \quad \dots \quad (10)$$

$$\Pr(y_i = 1 | x_i) = \Pr(\varepsilon_i > \ln(\text{bid}_i) - x_i\beta) \quad \dots \quad \dots \quad \dots \quad \dots \quad (11)$$

For probit model, it is assumed that the error term  $\varepsilon_i$  has a normal distribution  $N(0, \sigma^2)$ . In this case, Equation (10) can be written as:

$$\Pr(y_i = 1 | x_i) = \Phi\left(\frac{x_i\beta}{\sigma} - \frac{\ln(\text{bid}_i)}{\sigma}\right) \quad \dots \quad \dots \quad \dots \quad \dots \quad (12)$$

where  $\Phi(\cdot)$  denotes the standard cumulative normal distribution function. There are two approaches to estimate this model. The first one is to use Equation (12) and apply maximum likelihood estimation methods to estimate  $\beta$  and  $\sigma$ . The other approach, which we use in this study, is to directly estimate the probit model with  $x_i$  and  $\ln(\text{bid}_i)$  as explanatory variables, which can be estimated in STATA or any other software. In this case, we obtain the estimates of  $\beta/\sigma$  and  $-1/\sigma$  after estimating the probit model (see Equation (12)). For the results of probit model, denote  $\hat{\beta}/\hat{\sigma}$  as the vector of coefficient estimates associated to each one of the explanatory variables and  $-1/\hat{\sigma}$  as the coefficient estimate on  $\ln(\text{bid}_i)$ . The expected value of WTP can be computed for individuals with given values of explanatory variables  $\tilde{x}$  as:

$$E(WTP|\tilde{x}) = e^{\tilde{x}\hat{\beta} + 0.5\hat{\sigma}^2} = e^{-\frac{\tilde{x}\hat{\beta}/\hat{\sigma}}{-1/\hat{\sigma}} + 0.5\hat{\sigma}^2} \quad \dots \quad \dots \quad \dots \quad \dots \quad (13)$$

**4.3. Estimation Methods with Double-Bound Dichotomous Choice**

In the single-bound dichotomous choice question format, the respondent is offered a single bid value and is expected to answer yes or no only once. In the double-bound dichotomous choice, the respondent is followed up by a second question about willingness to pay contingent upon the response of the first question. Denote  $\text{bid}_1$  as the bid amount in the first question. The second question would be asked with a higher bid amount ( $\text{bid}_{2(\text{max})}$ ) if the answer to the first question is yes, or with a lower bid amount ( $\text{bid}_{2(\text{min})}$ ) if the answer to the first question is no. The respondent is expected to answer yes or no to the second question.

With double-bound dichotomous choice questions, WTP can be estimated either by the interval data model or by a bivariate probit model.

**4.3.1. Interval Data Model: Ordered Probit Model**

This section describes estimation method by the interval data model (also referred to as ordered probit model) with double-bound dichotomous choice questions format. Given the responses of two questions, the bounds on the WTP depend on the answers to the two questions:

- (i)  $WTP \geq \text{bid}_{2(\text{max})}$  if the responses are yes and yes
- (ii)  $\text{bid}_1 < WTP \leq \text{bid}_{2(\text{max})}$  if the responses are yes and no
- (iii)  $\text{bid}_{2(\text{min})} < WTP < \text{bid}_1$  if the responses are no and yes
- (iv)  $WTP < \text{bid}_{2(\text{min})}$  if the responses are no and no

The probability of each one of the possible response sets given above is given as follows:

(i) Yes and Yes  
 $\Pr(y_{1i} = 1 \text{ and } y_{2i} = 1|x_i) = \Pr(WTP > \text{bid}_{2(\text{max})}) \quad \dots \quad \dots \quad \dots \quad (14)$

Following the procedure described in Section 4.1, Equation (14) can be written as:

$$\Pr(y_{1i} = 1 \text{ and } y_{2i} = 1|x_i) = \Phi\left(x_i \frac{\beta}{\sigma} - \frac{\ln(\text{bid}_{2(\max)})}{\sigma}\right) \dots \dots \dots (15)$$

(ii) Yes and No:

$$\Pr(y_{1i} = 1 \text{ and } y_{2i} = 0|x_i) = \Pr(\text{bid}_1 < WTP < \text{bid}_{2(\max)}) \dots \dots (16)$$

$$\Pr(y_{1i} = 1 \text{ and } y_{2i} = 0|x_i) = \Phi\left(x_i \frac{\beta}{\sigma} - \frac{\ln(\text{bid}_1)}{\sigma}\right) - \Phi\left(x_i \frac{\beta}{\sigma} - \frac{\ln(\text{bid}_{2(\max)})}{\sigma}\right) \dots (17)$$

(iii) No and Yes:

$$\Pr(y_{1i} = 0 \text{ and } y_{2i} = 1|x_i) = \Pr(\text{bid}_{2(\min)} < WTP < \text{bid}_1) \dots \dots (18)$$

$$\Pr(y_{1i} = 0 \text{ and } y_{2i} = 1|x_i) = \Phi\left(x_i \frac{\beta}{\sigma} - \frac{\ln(\text{bid}_{2(\min)})}{\sigma}\right) - \Phi\left(x_i \frac{\beta}{\sigma} - \frac{\ln(\text{bid}_1)}{\sigma}\right) \dots (19)$$

(iv) No and No:

$$\Pr(y_{1i} = 0 \text{ and } y_{2i} = 0|x_i) = \Pr(WTP < \text{bid}_{2(\min)}) \dots \dots \dots (20)$$

$$\Pr(y_{1i} = 0 \text{ and } y_{2i} = 0|x_i) = 1 - \Phi\left(x_i \frac{\beta}{\sigma} - \frac{\ln(\text{bid}_{2(\min)})}{\sigma}\right) \dots \dots (21)$$

The parameters of the model  $\beta$  and  $\sigma$  can be estimated by maximum likelihood estimation method using the above probability functions given in Equations (15), (17), (19), and (21). In this study, the model is estimated using the “doubleb” command in STATA 11. Given the maximum likelihood estimates  $\hat{\beta}$  and  $\hat{\sigma}$ , the expected value of WTP can be computed for individuals with given values of explanatory variables  $\tilde{x}$  as:

$$E(WTP|\tilde{x}) = e^{\tilde{x}\hat{\beta} + 0.5\hat{\sigma}^2} \dots \dots \dots (22)$$

#### 4.3.2. Bivariate Probit Model

Like the interval data model, the bivariate probit model is another method for two-response surveys with double-bound dichotomous choice questions. The bivariate probit model was initially introduced by Cameron and Quiggin (1994). It was argued that when the individuals are asked two questions, the respondents may reconsider about their WTP and the distribution of WTP may change from initial question to the follow-up question. The bivariate probit model allows for the possibility of different distributions of WTP across the initial and follow-up question while the interval data model assumes the same distribution of WTP during initial question and the follow-up question.

In the bivariate probit model, the two dichotomous choice responses are simultaneously modeled as single-bounded, i.e. two correlated WTP equations with jointly distributed normal error terms. The bivariate probit model relaxes the restrictive assumptions of the interval data model and solves the problem of potential bias caused by these assumptions. We use probit because it allows for non-zero correlation, while the logistic distribution does not. In the bivariate probit model, the WTP functions for an individual  $i$  can be written as:

$$\ln(WTP_{1i}) = x_i\beta_1 + \varepsilon_{1i} \dots \dots \dots (23)$$

$$\ln(\text{WTP}_{2i}) = x_i\beta_2 + \varepsilon_{2i} \quad \dots \quad (24)$$

It is assumed that the error terms,  $\varepsilon_1$  and  $\varepsilon_2$ , are normally distributed with mean zero and respective variances  $\sigma_1$  and  $\sigma_2$ , and have a bivariate normal distribution with correlation coefficient  $\rho$ . The bivariate probit model was estimated by the maximum likelihood estimation technique using “biprobit” command in STATA 11.

As the distributions of WTP are likely to be different across the initial question and follow-up question, the researcher has to decide which distribution to use for estimating WTP even after estimating the both distributions in the bivariate probit model. As used in most of the CVM studies, we use initial distribution of WTP as given in Equation (23). After estimating the bivariate probit model, the expected value of WTP can be computed for individuals with given values of explanatory variables  $\tilde{x}$  as:

$$E(\text{WTP}|\tilde{x}) = e^{\tilde{x}\hat{\beta}_1 + 0.5\hat{\sigma}_1^2} = e^{\frac{\tilde{x}\hat{\beta}_1/\hat{\sigma}_1}{-1/\hat{\sigma}_1} + 0.5\hat{\sigma}_1^2} \quad \dots \quad \dots \quad \dots \quad \dots \quad (25)$$

## 5. DATA

### 5.1. Study Area and Sampling Strategy

Karachi lies on Pakistan's southern coast, on the Arabian Sea just northwest of the Indus River Delta. It is also the principal seaport and financial center of Pakistan. The city consists of 18 towns, which are governed by elected municipal administrations responsible for infrastructure planning, development facilitation, and municipal services which include water, sanitation, solid waste, repairing roads, parks, street lights, and traffic engineering. The KWSB is a public sector organisation responsible for production, transmission and distribution of water services to the citizen of Karachi.

From 18 towns of Karachi, Gulshan-e-Iqbal town was selected for primary data collection keeping in view the geographical expanse of the city and budget limitation for sample size (see Figure 1 for a map). Gulshan-e-Iqbal town has a population of over a million people. Gulshan-e-Iqbal is selected because the town is a major residential area in the city and is known for its income and ethnic diversity. Two neighborhoods (Block 4 and 7) of Gulshan-e-Iqbal were selected for sampling. Both the towns are similar in terms of size (Figure 2); however bill collection in Block 4 is lower than in Block 7 (Table 2). Choosing two locations, which are adjacent but with unique neighborhood characteristics, will allow us to control for unobserved location specific heterogeneity for analysing the determinants of WTP.

A total sample of 400 households was selected using a random sampling method. Starting at a certain location, surveyors were asked to knock at every fifteenth house on their left, alternating between left and right at every turn. In case of non-response, they were asked to knock on the next door. As some of the respondent did not answer to question on income, the final dataset for the analysis included 373 observations. Out of the 2879 households connected to the piped water services, this sample size would be representative at 5 percent margin of error.

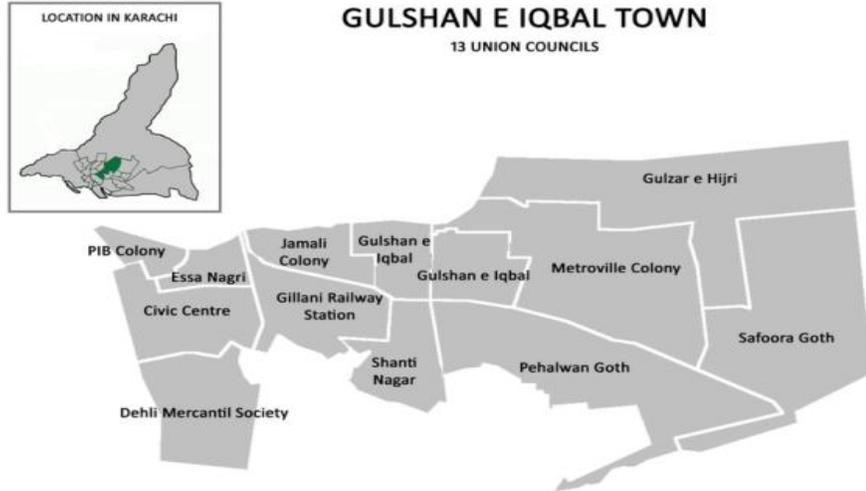
**Fig. 1. Map of Gulshan-e-Iqbal Town in Karachi****Fig. 2. Map of Block 4 and 7, Gulshan-e-Iqbal, Karachi**

Table 2

*Block-wise Revenue Collection*

	Total Number of Bills	Total Receipt (Rs/Month)
Block 7 in Gulshan-e-Iqbal town, Karachi	2201	7712460
Block 4 in Gulshan-e-Iqbal town, Karachi	2678	6473321

Source: KWSB (2012).

**5.2. Questionnaire and Data Collection Method**

While designing the questionnaire an attempt was made to minimise strategic, hypothetical and compliance biases which may arise from CV survey. To minimise strategic bias, an introductory statement was read to all respondents before interviewing

began to clarify the purpose of the survey. Hypothetical bias is unlikely to occur since the service in question is familiar to all respondents of the town. In order to reduce compliance bias, the survey was carefully designed, and the interviewers were trained. The questionnaire includes the following sections: existing water supply situation, incidence of water related diseases, CV questions on willingness to pay, and household characteristics and income.

### 5.2.1. Contingent Scenario

As given in the questionnaire, for eliciting the WTP, the respondents were informed about the contingent scenario. Improved status of tap water services is represented by a scenario such that the household will receive continuous water supply with sufficient pressure, and the water will be of good quality and potable without boiling or any other treatment.

### 5.2.2. Payment Vehicle and Bid Values

In the present study, we have chosen monthly water bill as payment vehicle for WTP. Households were asked whether they are willing to pay a certain monthly charge for improved water supply services. The questionnaire uses double-bounded dichotomous choice questions, where respondents were followed up by a second question contingent upon the response of the initial bid. To obtain a preliminary guess about the WTP distribution we conducted a pilot study to determine bid values. Very low bids elicited all “Yes” responses and very high bids elicited all “No” responses. The current bid structure gave a varied combination of the two. Table 3 presents the initial bid values and bid values in the follow-up question. The level of initial bid was randomly assigned to each household.

Table 3

<i>Bidding Structure</i>						
Bid	Notation	Bid Values (Rs/Month)				
Initial bid	bid <sub>1</sub>	500	1000	2000	4000	5000
Follow-up bid if response to initial bid is yes	bid <sub>2(max)</sub>	1000	2000	3000	5000	7000
Follow-up bid if response to initial bid is no	bid <sub>2(min)</sub>	250	500	1500	2500	3000

For estimating the interval data model and bivariate probit model, the survey was conducted to collect data for double-bounded dichotomous choice questions (two questions) using initial bid and a follow-up bid. For estimating the probit model with single-bound dichotomous choice, the data on responses to the initial bid were used for the analysis.

### 5.2.3. Data Collection Method

A household survey, as opposed to telephone interviews, was conducted keeping in view the suggestions from the NOAA panel report [Arrow, *et al.* (1993)]. Data were collected by surveying households and conducting in-person interviews using a structured questionnaire. The survey was conducted on weekends and public holidays in December 2012 so that household heads could be found at home. Eleven interviewers were trained

for data collection. Each interviewer conducted an average of 15 interviews a day. Fifty percent of the questionnaires were answered by household heads. However, it was made sure that all respondents were above the age of 18 years.

## 6. EMPIRICAL RESULTS

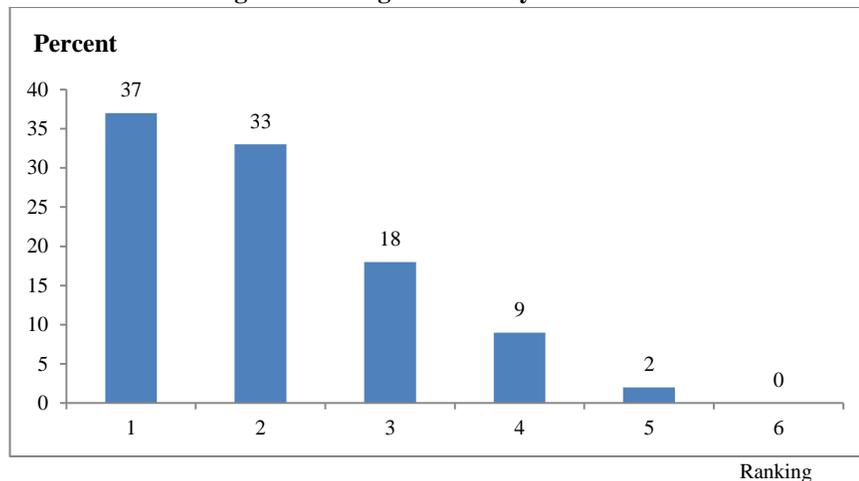
This section presents the empirical findings of our contingent valuation survey, and discusses the results obtained. We present descriptive statistics, regression results and WTP estimates.

### 6.1. Descriptive Statistics

The households were given the list of selected six social services (health, road, electricity, school, telephone and water) and were asked to rank in accordance with their priority of need: 1 being the most important, 6 being the least important. Survey results show that 37 percent of the respondents rated water as the most important public utility (Figure 3). Each utility was assigned a score according to the ranking given by the respondents. According to the scores, these six services were ranked in the following order: health, water, school, electricity, road, and telephone. Thus, overall, water is ranked second after health, indicating that water is an essential need of the public.

Inadequate and unreliable water supply has made consumer to move towards more reliable alternatives. In order to meet the daily water needs, the households need to use alternative water sources, such as mineral water, water tankers and boring wells, in addition to treat water due to unreliability of its quality. The Venn diagram in Figure 4 shows the percentage of people using water tankers, boring wells and mineral water. Eighty percent of the households run motors to pump water from the lines or from wells (for groundwater). Eleven percent of the respondents have a well installed in the residence. On average, respondents also run their electric motors for 3 hours per day. Twenty three percent of the households use water tankers to meet their water requirements while the 50 percent of households drink mineral water or canned water. Only 10 percent of the households did not use any of these alternate water sources.

**Fig. 3. Ranking of Water by Households**



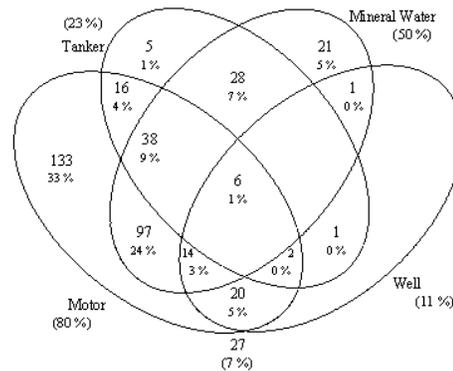
**Fig. 4. Coping Behavior**

Table 4 presents the summary statistics of the variables used in the model. Fifty four percent of the households responded yes to initial bid for WTP. In the follow-up bid, 43 percent of households responded yes. Four income classes were defined based on household's monthly income in the following ranges: less than Rs 20,000; Rs 20,000 – 50,000; Rs 50,001 – 100,000; and greater than Rs 100,000, designated as income class 1, 2, 3 and 4, respectively. The proportion of households in different income classes is reported in Table 4. Eight percent of households were in income class 1 while 38 percent, 32 percent and 22 percent of households were in income class 2, 3 and 4, respectively. On average, the households receive 27 hours of water supply in a week. Households were asked to rate their satisfaction from current piped water supply on a scale of 1 to 5 (1 being the lowest). The results show the households were only moderately satisfied with current water supply.

Table 4

*Summary Statistics*

Variable	Definition	Mean	Std. Dev.	Min	Max
Response to initial bid	yes=1; no=0	0.54	0.50	0	1
Response to follow-up bid	yes=1; no=0	0.43	0.50	0	1
Income class 1	1 if monthly household income < Rs. 20,000; 0 otherwise	0.08	0.27	0	1
Income class 2	1 if monthly household income in the range of Rs. 20,000 – 50,000; 0 otherwise	0.38	0.48	0	1
Income class 3	1 if monthly household income in the range of Rs. 50,001 – 100,000; 0 otherwise	0.32	0.47	0	1
Income class 4	1 if monthly household income > Rs. 100,000; 0 otherwise	0.22	0.42	0	1
Hours of water	Hours of water in a week	26.7	28.7	3	168
Water quality satisfaction	Household's rating for water quality (1 to 5)	2.58	1.17	1	5
Residence type	1 if single storied; 2 if double storied	1.73	0.44	1	2
Block	1 if Block 7; 0 if Block 4	0.34	0.47	0	1

## 6.2. Regression Results

To estimate WTP, three models are estimated: probit model, interval data model and bivariate probit model, as explained in Section 4. For examining the determinants of WTP, these models include the following explanatory variables: dummy variables for different income classes, number of hours of water per week received by the household, household's rating for water quality, residence type (single or double storied house), and block of study area (Block 4 or Block 7 of Gulshan-e-Iqbal town in Karachi). Given the four income classes, three dummy variables were created for all income classes except for the lowest income class, which is represented by the intercept (constant) of the regression model.

Table 5 presents the regression results of the three models. The results of all models show that dummy variables of income classes are statistically significant at 1 percent or 5 percent level of significance and the sign is positive as expected. This result is consistent with economic theory, which states that demand for a particular commodity depends on income. Results indicate that households with higher income are willing to pay more for an improved tap water service than those with lower income. Availability of water in terms of number of hours of water per week received is statistically significant.

Table 5  
*Regression Results*

Variables	Probit Model	Interval Data Model	Bivariate Probit Model	
			Initial Response	Follow-up Response
Constant	5.408*** (6.850)	6.223*** (17.04)	5.545*** (7.017)	0.813*** (2.608)
Income class 2	0.589** (1.977)	0.786*** (2.851)	0.630** (2.096)	0.813*** (2.608)
Income class 3	0.875*** (2.880)	1.078*** (3.831)	0.909*** (2.956)	1.079*** (3.414)
Income class 4	1.573*** (4.838)	1.776*** (5.910)	1.664*** (5.019)	1.631*** (4.908)
Hours of water	-0.00474* (-1.839)	-0.00590** (-2.515)	-0.00504* (-1.922)	-0.00572** (-2.298)
Water quality Satisfaction	-0.136** (-2.058)	-0.113** (-1.985)	-0.129* (-1.950)	-0.0802 (-1.328)
Residence type	0.224 (1.336)	0.344** (2.351)	0.237 (1.408)	0.361** (2.293)
Block	0.0310 (0.188)	0.101 (0.712)	0.0467 (0.282)	0.116 (0.773)
ln(bid <sub>1</sub> )	-0.808*** (-8.696)	-	-0.836*** (-8.834)	-
ln(bid <sub>2</sub> )	-	-	-	-0.597*** (-5.266)
Observations	373	373	373	373

z-statistics in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Results show that the household who receive more hours of water are willing to pay relatively less amount. Satisfaction of water quality perceived by households is also statistically significant. Results show that the household who are relatively less satisfied with the existing water quality are willing to pay relatively more amount. Residence type is significant in interval data model. Its positive sign indicates that the households with double-storied house are willing to pay more as compared to those with single-storied house. Regression results show that the natural log of bid amount is statistically significant at 1 percent level of significance and its sign is negative. This result is consistent with the economic theory. The probability of yes-responses decreases as the bid amount increases.

### 6.3. Average WTP for Improved Tap Water Services

The average WTP estimates based on results of three models are presented in Table 6. The table presents the average WTP for improved tap water services for each of the four income classes and the overall average for all households. The results show that the average WTP is between Rs 604 – 734 per month by households whose income is less Rs 20,000 per month. The average WTP increases as the income level increases. Households in income class 2 (Rs 20,000 – 50,000) are willing to pay between Rs 1,325 – 1,534 per month. Households in highest income class (with income greater than Rs 100,000) are willing to pay up to in the range of Rs 3,567 – 5,277 per month. The overall average WTP from all income classes is in the range Rs 1,922 – 2,126 per month. This amount is almost three times higher than the current average bill paid (Rs 703 per month).

Table 6

*Average WTP in Rupees per Month for Different Income Groups*

Income Group (Income in Rs/Month)	Probit Model	Interval Data Model	Bivariate Probit Model
Less than Rs 20,000	734	604	722
Rs 20,000 – 50,000	1,520	1325	1534
Rs 50,001 – 100,000	2,165	1774	2,141
Greater than Rs 100,000	5,140	3567	5,277
Overall Average	2,116	1,922	2,126

## 7. CONCLUSIONS AND POLICY IMPLICATIONS

This study uses a contingent valuation method to estimate the average WTP for improved tap water services and to examine the determinants of WTP using single and double bound dichotomous choice elicitation questions. Three models, probit model, interval data model and bivariate probit model, are estimated using household level data from Block 4 and Block 7 of Gulshan-e-Iqbal Town in Karachi. The results show that the overall average WTP by all households is in the range of Rs 1,922 – 2,126 per month whereas the current average bill paid is Rs 703 per month. These results show that the households are willing to pay much more than what they currently pay for a safe and regular water supply service.

A high WTP clearly indicates that there is a great demand for improved water services, and delivery institutions responsible for water supply should come up with projects that ensure a reliable and regular water supply. The result of the study shows that the demand for improved water services is significantly related to the income of the household. This study shows that a significant increase in water price is economically feasible as long as the poor households are properly subsidised.

The present study has focused on the demand side, studying about situation and attitude in water use, socio-economic condition, and people's willingness to pay for improved water supply service. However, this study does not deal with the institutional weakness of the KWSB or issues of bill collection and financial management. Increasing tariffs is thus a necessary but not a sufficient condition of making water delivery more efficient. The study was restricted to Blocks 4 and 7 of Gulshan-e-Iqbal town in Karachi. The findings of this study cannot be directly applied to other towns without first comparing other socioeconomic characteristics.

This study presents a strong case for investment in infrastructure projects that improve the water supply services in the city. The study presents strong evidence that cost recovery is possible by increasing tariffs for higher income households. A major implication of this study is imposition of cross subsidisation.

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### *Comments*

This is a decent paper focusing on the demand for better tap water services in Karachi, which is Pakistan's most populated mega city. The paper aims to identify the revenue potential and have brought to light important insights from Karachi. It not only expresses the situation in numbers but also discusses the theoretical underpinning that makes the environmental valuation an important topic. The most important aspect of this paper is that it expresses the topic in a light manner and makes things easy to understand even for a person who has not worked in environmental valuation before.

Following are few comments which is expected to further improve the paper.

- (1) First of all, there is slight repetition in the text that needs to be sorted out.
- (2) Secondly, the paper sometimes gives the impression of a report rather than an academic paper, i.e., at times too many information is shared. Hence, information that is not of utter importance should be either deleted or put as annexure.
- (3) The last paragraph at second page provides useful comparison related to water services for major Asian cities, however, I guess, if this can be presented in a Table, it will make comparison easy.
- (4) At page 7, authors present that how they had structured the WTP questions. Though there are a number of ways in which such questions can be framed and the one used in this paper is one of them. However for those interested in the topic for future research I would like to mention that instead of the closed-ended double-bound dichotomous choice, the last of the three WTP questions, should be open-ended. The reason is that there would be people who would like to pay lower or higher amounts than those mentioned by the researcher so the only way to capture such bounds is to through an open-ended question at the end of double-bound dichotomous choice question. This will save us from losing any important information which we are deprived of with the closed-ended WTP question; that does not makes the maximum/minimum WTP obvious.
- (5) Figure 1 is unnecessary and should be removed
- (6) **Empirical Estimation:** This is the section which needs the highest level of attention.
- (7) Above all, there should be a table presenting the descriptive statistics, so that the reader can get a feel of the data and it will make the inference easy
- (8) For the income classes, there are overlaps in the class-ranges (e.g. less than Rs 20000; Rs 20,000-50,000; Rs 50,000- Rs 100,000); this will lead to double counting of cases that lie at the extremes of each interval. This needs to be corrected as if it happens to be as mentioned, this will render the results for income groups incorrect.

- (9) Lastly, the authors leave some very important variables out of the model e.g. Household size, awareness, education which, the literature has identified, and has important bearing on the demand for improved water services. Hence such variable should be included in the model, if data permits.

At the end, I must congratulate the authors for such a decent effort and this paper offers a good contribution to literature.

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## **Human Capital and Economic Growth: The Role of Governance**

ALI MUHAMMAD, ABIODUN EGBETOKUN, and MANZOOR HUSSAIN MEMON

### **INTRODUCTION**

Economists agree that human capital is an important determinant of economic growth [Arrow (1962); Aghion and Howitt (1992)]. Human capital-led growth generally concludes the positive impact of the two with the help of existing developed theories and empirical evidences.

Nonetheless, the standard empirical result of a direct relationship between human capital (however measured) and economic growth, has been criticised on several fronts. First, the impact of other growth-related factors like quality of education, health of the labour force, inflation, corruption, unemployment, rule of law, etc. should not be ignored. These endogenous characteristics of a country are included in Becker's (1993) definition of human capital. In addition, as noted by Abramovitz (1986), social capabilities are important in the adoption and diffusion of technologies but countries differ in social capabilities. Therefore, to the extent to which human capital contributes to economic growth through innovation, its effect is conditioned by the country's social capabilities which include factors like quality of institutions and governance.

Thus, the effect of human capital on growth could be influenced by the environment within which it is deployed. Particularly, the relationship between human capital and growth might be different for countries with different governance frameworks. Such conditionality is largely ignored in the existing literature. In fact, the stylised fact in the literature is that, all else being equal, higher levels of human capital—particularly the proportion of the population that is educated—leads to higher economic growth. We re-visit this stylised fact, taking into account the contextual influence of governance. Our premise is as follows: Long-term growth requires the creation of new technologies, or at least an understanding of existing ones. Learning and innovation takes place via human capital. Appropriate policies are required to facilitate learning and innovation and hence human capital. Such policies, as the governance literature suggests, rest upon conducive governance conditions [Avellaneda (2006)]. As a result, the effect of human capital on growth will vary depending on the prevailing governance conditions.

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This paper, therefore, aims to explore the potential role of governance in the relationship between human capital and economic growth. We divided our sample of 134 countries into 'low', 'medium' and 'high' quality of governance using three similar but different methodologies. Using the Benhabib and Spiegel (1994), and Cohen and Soto (2007) models, we found that human capital has the highest impact on growth in countries with medium quality of governance. Growth in countries with low quality of governance is unaffected by human capital. Relative to the countries with medium quality of governance, human capital has a weaker effect on growth in the best governed countries.

The layout of the paper is led by a short review on previous selected studies on relationship between human capital and growth, and governance and growth. This followed by a conceptual framework of the study i.e. the role of governance in the human capital and growth nexus. Third section state the hypothesis, and the applied econometric model along with a brief note on the data used. Fourth is the empirical setup and estimated result, followed by a conclusion.

### **HUMAN CAPITAL, GOVERNANCE AND ECONOMIC GROWTH**

It is not possible to ignore the importance of human capital despite the rise of automation. The role of human behind the inventions, innovations and technological advancement is much pronounced in the scientific literature. As far as role of human capital in socio-economic and economic activities is concerned, the immense literature exists on it. There has been much theoretical and empirical investigations found in existing literature examining the human as a source and driver of economic activities and growth. Literature on human capital emphasises the role of human as a very important—if not the most important—source of growth [Arrow (1962); Aghion and Howitt (1992)]. General conceptualisation on the human role as a source of economic activities and economic growth refers to many attributes. These include the education, health, knowledge, skills and many other which are relevant for the economic activities [OECD (1998)]. In the existing literature, some these attributes were much more focused to identify the role of human capital in economic activities and growth.

As far as education is concerned, it is considered as the main ingredient in establishing human capital to ensure the economic growth [Lucas (1988); Barro (1991); Owen's, *et al.* (2009)]. The quality of the educational system has also been shown as a conditioning variable for the effect of human capital on growth. Primary education is found as the important in least developed countries (LDCs), while secondary education and tertiary education for intermediate countries and OECD countries, respectively [Gemmel (1996)].

Solow's (1956) growth model is considered as the pioneering in theorising the growth phenomenon. The standard neoclassical growth model follows Cobb-Douglas production function, characterised by returns to scale of all inputs with constant positive elasticity of input substitution. Subsequent to neo classical model, different economic growth models extended the theory embodied with human capital as an additional production factor and input for innovation.

$$Y_t = A_t \cdot f(K_t \cdot L_t)$$

$K$  is physical capital;  $L$  is labour (sometimes interpreted as population)

$t$  is time

$A$  is a technology or efficiency index

Khan (2005) provides evidence to the fact that an increase in human capital investment leads to higher future growth and incomes. The empirical analysis is based on Cobb-Douglas production function augmented with education and health indicators as a quality of human capital. The measure used in the model includes literacy rates, average years of secondary school enrolment and life expectancy. The model also used rate of inflation as a proxy for sound economic policies and the overall quality of institutions. A strong relationship was found between economic policies, quality of institutions such as law and order, absence of corruption and protection of property rights on growth.

Examining the impact of corruption on human capital productivity and growth in Lebanon, Farida and Ahmadi (2006) showed that corruption leads to inefficiency in the economy, reflected in a reduction in the magnitude of coefficients which affect positively on growth. Thus, corruption lowers investment, while the human capital productivity and expenditure effectiveness of the government also reduced.

The discussion so far highlights the fact that, as we claimed at the beginning, human capital is not necessarily directly related to growth. Certain contextual factors play conditioning roles in the relationship. These factors include the quality of the education system, the degree of law and order and a country's current level of development. Our analysis in this paper seeks to extend the existing literature by explicitly examining the role that quality of governance plays in the human capital-growth relationship. To the best of our knowledge, ours is the first study to specifically analyse this contextual role of governance.

Aspects of governance that enable learning and innovation are especially important and considered as critical factor that explain the difference in performance amongst different economies. Governance, reflected in state policies and programmes, and the extent of state intervention in the economy, influences social and economic outputs of a country. The countries that wish to attract international capital and technology are encouraged to improve governance framework of their economy, to disallow rent seeking and corruption [IMF (2002)]. Politics and institutions, according to Avellaneda (2006), are significant to the process of economic growth by affecting the incentives to accumulate, innovate and accommodate change. Evidence on governance roles suggests that countries that has achieved advancement have had implemented sound policies that led to rapid growth, learning and development.

Khan (2007) made a grouping of governance capabilities into what he termed 'market-enhancing' and 'growth-enhancing' governance. The structural limitations of markets in developing economies call for critical governance capacities to enhance growth and development. Also, with effective institutions, technologically backward economies have the potential to 'catch-up' with the technologically advanced nations. Market-enhancing governance capabilities include capability to maintain stable property rights, capability to ensure efficient and low-cost contracting and dispute resolution, and capability to efficiently deliver public goods and services. Efficient markets then in turn ensure the attraction and maximisation of investments

for technological advancements. In essence, countries with good and adequate governance are more likely to progress economically. China and India provide proof of the impact of governance on economic growth. Growth in both countries has been accompanied by average governance levels better than in most other poor countries [Keefer (2006)]. Political checks and balances play a significant role in improving the countries' governance outcomes.

If policy attempts to attract technology and capital through increasing efficiency of the market then it is less likely to be successful because capital and technology will be attracted to countries with adequate human capital to understand, use and sometimes develop the technology. Moreover, there is no universal strategy for technology acquisition as high growth countries have used very different strategies to achieve high growth rates.

### CONCEPTUAL FRAMEWORK

As exhibited in Figure 1, adequate governance attempts to attract technology and innovation, augmented by the quality of human capital for the absorption and improvement of these technologies. This eventually improves economic development of the country.

**Fig. 1. Governance as an Important Factor in Human Capital-led Growth**

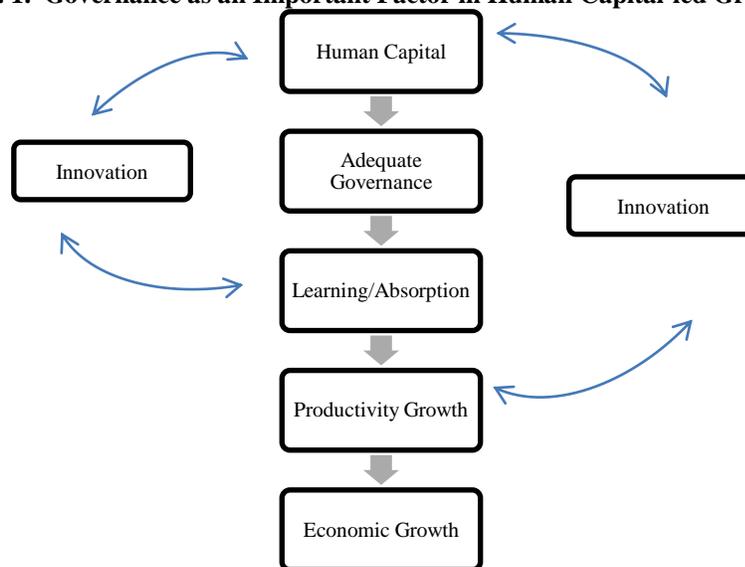
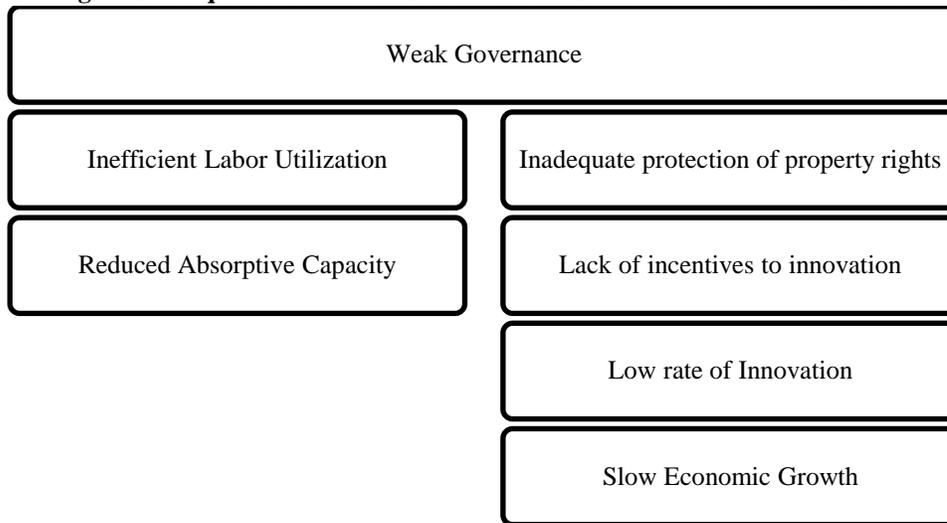


Figure 2 reveals the slow economic growth resulting from weak governance, indicated by deteriorated law and order conditions, corruption, ineffective governance, resulting in inefficient utilisation of human resources. The weak governance in turn reflected from lack of incentives and investment in the economy further weakens and slows down economic growth both in short run and in the long run.

**Fig. 2. Consequences of Weak Governance in Context of Human-led Growth**

### HYPOTHESIS

The relationship between human capital and economic growth, as discussed before, has been studied in various settings by many authors especially since the 1990s. Some of them were case studies while others were cross country comparisons under different settings. A caveat of these studies, especially in panel data studies, is the universal treatment of countries with respect to quality of governance. We propose that positive and significant relationship between human capital and economic growth might not be universal and that it might depend on the quality of governance in the country. We expect that countries with low quality governance might not be able to utilise its human capital to its potential. In language of econometrics, we expect the relationship between human capital and economic growth to be insignificant for countries with low level of governance.

**Hypothesis 1:** Relationship between human capital and economic growth is insignificant for countries with low level of governance.

### Model

Human capital-led growth literature provides various different model specifications for empirical estimations. In this paper we used models proposed by Benhabib and Spiegel (1994) (Equation 1) and Cohen and Soto (2007) (Equation 2).

$$\Delta \ln Y_{it} = \beta_0 + \beta_1 \ln HC_{it-1} + \beta_2 \Delta \ln K_{it} + \beta_3 \ln Y_{it-1} + \beta_4 \Delta \ln n_{it} + \varepsilon_{it} \quad \dots \quad (1)$$

Y = GDP at current PPP;                      HC = human capital index

K = capital stock at current PPP;        n = population

$$\Delta \ln y_{it} = \beta_0 + \beta_1 \ln HC_{it-1} + \beta_2 \Delta \ln K_{it} + \beta_3 \ln y_{it-1} + \varepsilon_{it} \quad \dots \quad (2)$$

y = GDP per capita at current PPP

HC = human capital index;                K = capital stock at current PPP

Equation 1 models growth in absolute GDP while Equation 2 uses growth in GDP per capita as dependent variable. Both studies used different variants of their main model for estimations i.e. included as an independent variable and as a lagged variable. Since qualification and experience reflect in output after some time lag, the latter attempted to analyse the lagged impact. This study also uses the second variant as shown in the equations above.

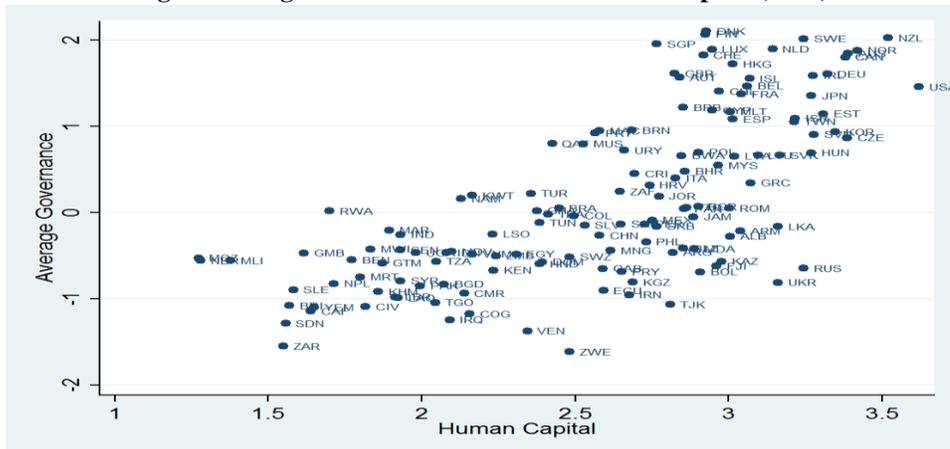
## DATA

Data used in this study was taken from two sources; Penn World Tables v.8 and World Governance Indicators of World Bank. Short data descriptions and sources can be found in Appendix Table A1.

### Governance Indicators

World Governance Indicators (WGI) provides six broad types of governance indicators which are generated using various secondary data sources. WGI aims to quantify the aspects of traditions and institutions being exercised in a country which includes the process of government selection, its monitoring and replacement; the ability of government of design and effectively implement sound policies as well as respect of state and citizens. These indicators are rescaled to follow normal distribution within the range of  $-2.5$  and  $+2.5$  (except for political stability which exceeds  $+2.5$  bound). An important note should be made here that higher numbers indicate better ‘control’ of government not vice versa. For example, value of 1.5 or higher for rule of law as compared to index of 1.0 or lower suggests better control of law. The six governance indicators voice and accountability; political stability and absence of violence / terrorism; government effectiveness; regulatory quality; rule of law; and control of corruption are defined in much detail in WGI documentation.<sup>1</sup>

**Fig. 3. Average Governance Index and Human Capital (2011)**



‘Voice and accountability’ and ‘political stability and absence of violence’ are least likely to have any influence on the effect of human capital on growth. This is mainly

<sup>1</sup>Definitions are provided in the full dataset of WGI under following link (accessed September 8<sup>th</sup>, 2014) <http://info.worldbank.org/governance/wgi/wgidataset.xlsx>

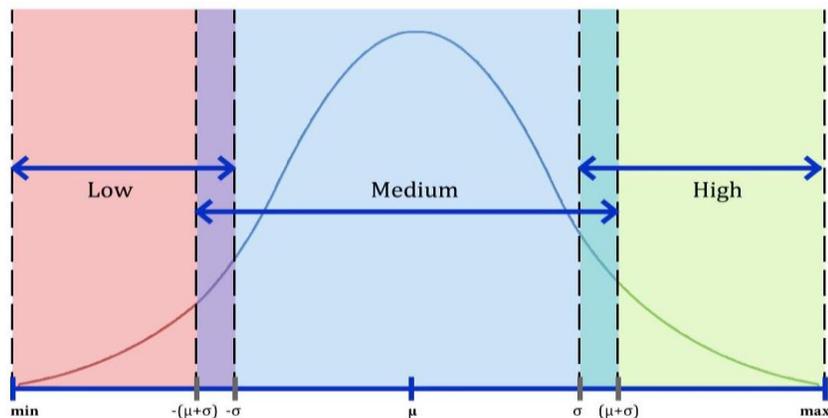
because they have had no relation to technical efficiency.<sup>2</sup> Therefore these indicators are excluded from the analysis. An additional overall governance indicator was also generated by taking average of government effectiveness, regulatory quality, rule of law and control of corruption to give the broader picture of governance.

Since this study attempts to connect human capital-led growth with governance, it is useful to visually assess the data to compare where countries stand with respect to their human capital as compared to their level of governance. In the following figures, human capital is plotted against all governance indicators used in this study for the year 2011. A first look at all these comparisons clearly shows a similar pattern in all figures. This pattern suggests that a country with high level of governance has high level of human capital. However, same is not true for countries with relatively low level of governance. The distribution at lower level of governance is quite widely spread which suggests that in presence of medium and low level of governance, countries can still have high or low levels of human capital. The impact of the level of human capital on growth in presence of different levels of governance still remains an open question which is the objective of this study. Scatter plots of rest of the governance indicators are available in the appendix.

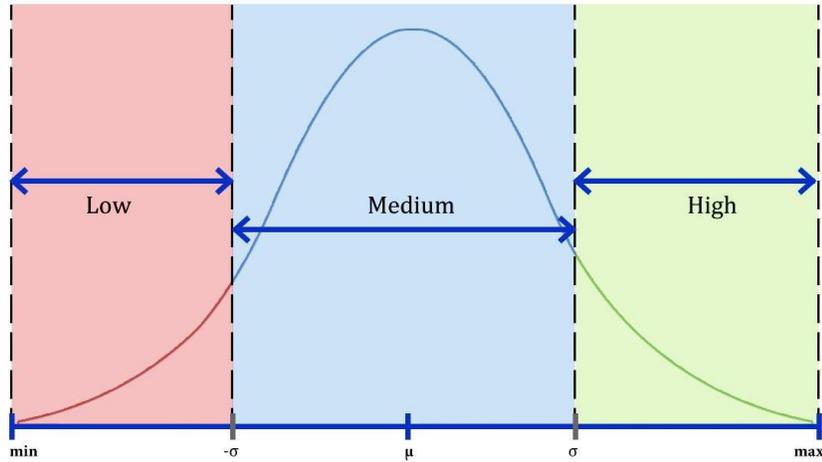
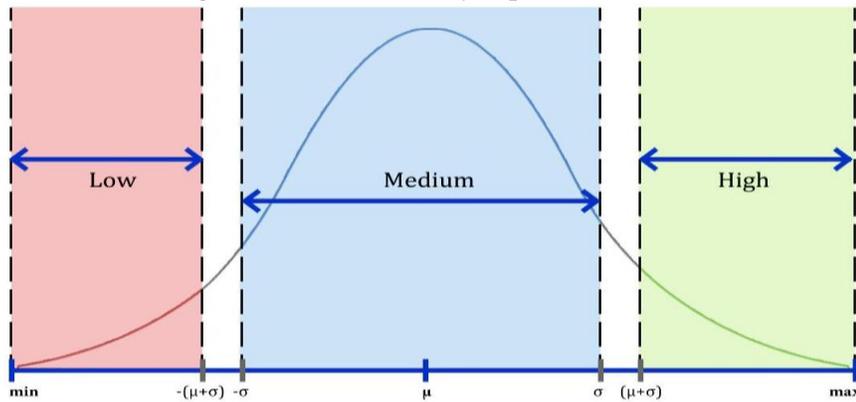
### METHODOLOGICAL FRAMEWORK

Since the objective of this study is to ascertain whether human capital affects economic growth differently in countries with better or worse level of governance, we split the sample in three groups for each variable i.e. 'low', 'medium' and 'high' level of control. Since WGI warns against over interpretation of minor differences in countries [Kaufmann, *et al.* (2010)], we used three slightly different schemes to split the sample. If borders of the sections are defined strictly with a number, then two countries on left and right of that border will be assigned to different sections but in reality they might not be very different (as warned by WGI). In order to account for this, we used three different schemes; 'Overlapping' (Figure 4), 'Separated' (Figure 5) and 'Strictly Separated' (Figure 6).

**Fig. 4. Scheme 1 - Overlapping Sections**



<sup>2</sup>Hurryvansh Aubeeluck, "Institutional Governance and Economic Growth, with special reference to Sub-Saharan Africa", African Studies Association of Australasia and the Pacific—AFSAAP, Conference Proceedings, 36th Annual Conference, 2013.

**Fig. 5. Scheme 2 - Separated Sections****Fig. 6. Scheme 3 – Strictly-Separated Sections**

### EMPIRICAL SETUP

Our sample includes a panel data for 134 countries from 1996 to 2011. A large panel data set of countries requires understanding of country-specific effects in a serious manner because of huge significant differences amongst them. Standard empirical methods are used for the analysis. Thus the stationary variables are pooled in the models of OLS, fixed effects and random effects. The latter two also attempts to account for country-specific effects under different assumptions. The determination of fixed or random effects to be used for estimation, we have used the Hausman specification test. Accordingly, fixed effects model was found efficient and consistent. Thus the fixed effects model is used to estimate the parameters of the models in this study.

Sensitivity of the results is checked using two different model specifications provided by the literature as well as using different schemes to distribute the data in three sections. Expectedly, there were minor differences in the estimated coefficients and standard errors when different procedures were used; however results as a whole did not change. Therefore, results of scheme 2, “Separated Sections” for Benhabib and Spiegel

(1994) model will be reported and interpreted in the text. The other models are available with authors on request.

### ESTIMATION RESULTS

The unrestricted base models of Benhabib and Spiegel (BS) and Cohen and Soto (CS) models are replicated before turning to the restricted models specific to our hypothesis. The results of fixed effects, random effects and pooled OLS estimations are presented in Table 1. The signs of the coefficients were in accordance with the economic theory. One striking feature of the results is very low coefficient of determination as

Table 1

<i>Base Models with Hausman Test for Method Selection</i>			
<b>Dependent Variable: Annualised Difference in Log GDP</b>			
	Benhabib and Spiegel (1994)		
	Pooled OLS	Fixed Effects	Random Effects
lnHC(t-1)	0.0209* (2.21)	0.622*** (9.44)	0.0215* (2.12)
ΔlnK	0.360*** (12.37)	0.345*** (10.06)	0.362*** (12.16)
Δlnn	0.741*** (4.89)	1.222*** (4.88)	0.721*** (4.54)
lnY(t-1)	-0.00188+ (-1.72)	-0.127*** (-13.03)	-0.00216+ (-1.83)
Constant	0.0140 (1.09)	0.860*** (10.68)	0.0169 (1.21)
N	2010	2010	2010
R-sq	0.099	0.135	-
adj. R-sq	0.098	0.071	-
Hausman test	Chi-Squared: 169.87, P-value: 0.000		
<b>Dependent Variable: Annualised Difference in Log GDP per Capita</b>			
	Cohen and Soto (2007)		
	Pooled OLS	Fixed Effects	Random Effects
lnHC(t-1)	0.0521*** (4.25)	0.470*** (8.23)	0.0573*** (4.32)
ΔlnK	0.360*** (12.55)	0.355*** (10.41)	0.362*** (12.32)
lnY(t-1)	-0.00730* (-3.17)	-0.148*** (-14.12)	-0.00853* (-3.42)
Constant	0.0262+ (1.92)	0.887*** (11.37)	0.0323* (2.18)
N	2010	2010	2010
R-sq	0.075	0.144	-
adj. R-sq	0.073	0.082	-
Hausman test	Chi-Squared: 188.69, P-value: 0.000		

**Hausman Test** Ho: FE consistent, RE efficient; Ha: FE consistent, RE inconsistent.

t statistics in parentheses

+ p<0.10      \* p<0.05      \*\* p<0.01      \*\*\* p<.0001

compared to the original studies of these models. However, R-squared improves when sub-samples are analysed in later models. Although signs and significance did not change

with different estimation methods, the coefficients of human capital and some other variables increased significantly when fixed effects were used, i.e. for human capital from 0.020 to 0.622, from pooled OLS and fixed effect, respectively in BS model. It suggests that controlling for country-specific effects is necessary which is also suggested by Hausman test. The null hypothesis of Hausman test states that fixed effects method is consistent and random effects is efficient while alternate hypothesis states that fixed effects is consistent but random effects is inconsistent. The result of the test suggests that it is better to use fixed effects compared to random effects model as results from random effects model will be inconsistent.

### **Effect of Human Capital on Economic Growth under Different Levels of Governance**

In order to test our hypothesis, as explained earlier, we divided our dataset into three categories (schemes) based on different levels of governance. These schemes serve as the tool for sensitivity analysis of our results. The scheming is also necessary because small changes in values of governance should not be over-interpreted therefore hard division of the distribution would result in two countries being in different groups even when their differences are quite low. We used three schemes to account for this potential caveat; scheme 1: “overlapping sections” where boundaries of the sections overlap with each other, scheme 2: “separated sections” where sections are created with hard division and scheme 3: “strictly separated sections” where there is a gap between the sections to exclude countries with very small differences. While estimations are carried out for all three schemes, we use scheme 2 as our base scheme and the other two schemes as extensions of this scheme for sensitivity analysis. Since results were not sensitive to the schemes, we will interpret the results of both BS and CS models estimated under the base scheme (scheme 2).

### **Benhabib and Spiegel (BS) Model with Scheme 2**

Estimation results of BS model under scheme 2 are reported in Table 2 where for each governance indicator, results are reported for three sub-samples based on ‘low’, ‘medium’ and ‘high’ levels of governance. An important clarification is due at this point. All governance variables are constructed in a way that high numbers represent better governance. For example, high number for corruption means high level of control for corruption instead of high of level of corruption. Results for the average governance support our hypothesis. The insignificance of human capital in low governance countries clearly states that in countries with low level of governance, human capital does not affect economic growth. Another observation is that magnitude of coefficient of human capital for medium level of governance is more than twice as large as its coefficient for high level of governance. Additionally, significance level was also much higher for countries with medium level of governance. These observations hint towards a threshold level of governance after which higher levels are not beneficial anymore. This also indicates the diminishing returns of human capital investment from a particular threshold level which to some extent can be observed in countries with high level of governance. Similar results were found for regulatory quality and government effectiveness with the exception that coefficient of human capital for countries with medium level of regulatory

quality was higher but less than twice the magnitude for countries with high level of regulatory quality.

Table 2

*Fixed Effects Estimation Results: Scheme 2- Separated Sections (BS Model)*

Dependent variable: Annualised Difference in log GDP									
Benhabib and Spiegel (1994)									
	Governance Average			Rule of Law			Control for Corruption		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
lnHC <sub>(t-1)</sub>	0.566 (1.62)	0.641*** (8.80)	0.284* (2.38)	0.542* (2.18)	0.661*** (8.64)	0.303* (2.53)	0.735* (1.99)	0.711*** (9.48)	0.282* (2.32)
ΔlnK	0.629* (2.80)	0.355*** (9.14)	0.244*** (5.68)	0.524*** (4.67)	0.335*** (7.42)	0.221*** (5.17)	0.609* (2.05)	0.358*** (9.10)	0.227*** (4.97)
Δlnn	6.606*** (4.44)	0.688* (2.51)	-0.0730 (-0.12)	5.755*** (5.18)	0.768* (2.66)	2.064* (2.60)	8.004*** (4.70)	0.919* (3.17)	-0.168 (-0.47)
lnY <sub>(t-1)</sub>	-0.156* (-3.61)	-0.103*** (-9.39)	-0.187*** (-9.37)	-0.130* (-3.94)	-0.114*** (-9.77)	-0.208*** (-9.99)	-0.116* (-2.66)	-0.123*** (-10.62)	-0.184*** (-9.47)
Constant	1.021* (2.99)	0.587*** (6.57)	2.008*** (11.77)	0.832* (3.27)	0.688*** (7.11)	2.248*** (12.59)	0.560 (1.46)	0.732*** (7.85)	2.004*** (11.80)
N	221	1357	432	292	1300	418	193	1418	399
R-sq	0.233	0.133	0.279	0.238	0.124	0.312	0.213	0.138	0.283
adj. R-sq	0.112	0.059	0.213	0.134	0.045	0.241	0.049	0.063	0.207

t statistics in parentheses

+ p<0.10 \* p<0.05 \*\* p<0.01 \*\*\* p<.0001"

Table 2

*Fixed Effects Estimation Results: Scheme 2- Separated Sections (BS Model) (Continued)*

Dependent Variable: Annualised Difference in Log GDP						
Benhabib and Spiegel (1994)						
	Regulatory Quality			Government Effectiveness		
	Low	Medium	High	Low	Medium	High
lnHC <sub>(t-1)</sub>	0.474 (1.53)	0.657*** (8.69)	0.406* (3.37)	0.459 (1.17)	0.587*** (8.26)	0.349* (2.89)
ΔlnK	0.477* (3.06)	0.386*** (8.76)	0.215*** (5.16)	0.614* (2.73)	0.308*** (7.99)	0.213*** (4.79)
Δlnn	6.522*** (4.70)	0.794* (2.77)	0.695 (1.01)	6.674*** (4.12)	0.621* (2.48)	0.511 (0.76)
lnY <sub>(t-1)</sub>	-0.108* (-3.08)	-0.112*** (-9.39)	-0.192*** (-10.15)	-0.139* (-2.91)	-0.0947*** (-8.93)	-0.190*** (-9.48)
Constant	0.650* (2.28)	0.671*** (6.85)	1.907*** (12.40)	0.891* (2.40)	0.545*** (6.35)	1.976*** (11.68)
N	215	1279	516	194	1364	452
R-sq	0.228	0.134	0.256	0.198	0.113	0.258
adj. R-sq	0.126	0.057	0.185	0.079	0.040	0.187

t statistics in parentheses

+ p<0.10 \* p<0.05 \*\* p<0.01 \*\*\* p<.0001"

We did not find support for our hypothesis for control of corruption and rule of law. We found that, contrary to our expectations, human capital had positive and significant coefficient for countries with low level of rule of law and control of corruption. This result suggests that level of corruption and rule of law does not matter for human capital-led growth. Similar to the findings discussed in the last paragraph, we found much higher magnitude of the coefficient of human capital for countries with

medium level of rule of law and control of corruption *vis-à-vis* countries with high level governance.

### Cohen and Soto (CS) Model with Scheme 2

Similar to the previous exercise, the estimations were carried out for CS model under scheme 2; the results are presented in Table 3. Contrary to the results of BS model, we found support of our hypothesis for all governance indicators in CS model. We found that the relationship between human capital and growth is insignificant for countries with

Table 3

*Fixed Effects Estimation Results: Scheme 2- Separated Sections (CS Model)*

Dependent Variable: Annualised Difference in Log GDP per Capita									
Cohen and Soto (2007)									
	Governance Average			Rule of Law			Control for Corruption		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
lnHC <sub>(t-1)</sub>	0.345 (1.10)	0.534*** (8.45)	0.324* (2.91)	0.352 (1.59)	0.547*** (8.24)	0.268* (2.41)	0.441 (1.25)	0.561*** (8.79)	0.339* (2.92)
ΔlnK	0.686* (2.98)	0.361*** (9.36)	0.253*** (6.05)	0.541*** (4.66)	0.346*** (7.74)	0.238*** (5.70)	0.758* (2.46)	0.363*** (9.28)	0.244*** (5.48)
lny <sub>(t-1)</sub>	-0.221*** (-4.45)	-0.124*** (-10.80)	-0.263*** (-11.31)	-0.165*** (-4.48)	-0.142*** (-11.43)	-0.256*** (-11.00)	-0.172* (-3.23)	-0.141*** (-11.84)	-0.266*** (-10.87)
Constant	1.384*** (4.10)	0.607*** (7.30)	2.360*** (13.59)	1.002*** (4.16)	0.755*** (8.20)	2.349*** (13.71)	0.983* (2.65)	0.731*** (8.42)	2.380*** (13.02)
N	221	1357	432	292	1300	418	193	1418	399
R-sq	0.163	0.147	0.326	0.160	0.145	0.343	0.109	0.153	0.322
adj. R-sq	0.036	0.076	0.266	0.049	0.069	0.277	-0.070	0.081	0.253

t statistics in parentheses  
+ p<0.10      \* p<0.05      \*\* p<0.01      \*\*\* p<.0001"

Table 3

### *Fixed Effects Estimation Results: Scheme 2- Separated Sections (CS Model) (Continued)*

Dependent Variable: Annualised Difference in Log GDP per Capita						
Benhabib and Spiegel (1994)						
	Regulatory Quality			Government Effectiveness		
	Low	Medium	High	Low	Medium	High
lnHC <sub>(t-1)</sub>	0.289 (1.00)	0.514*** (7.92)	0.396* (3.53)	0.174 (0.50)	0.492*** (7.97)	0.382* (3.39)
ΔlnK	0.546* (3.41)	0.392*** (8.93)	0.231*** (5.69)	0.726* (3.22)	0.318*** (8.28)	0.228*** (5.29)
lny <sub>(t-1)</sub>	-0.152* (-3.77)	-0.132*** (-10.55)	-0.239*** (-11.52)	-0.210* (-3.94)	-0.116*** (-10.26)	-0.263*** (-11.20)
Constant	0.944* (3.53)	0.684*** (7.47)	2.022*** (13.68)	1.380* (3.82)	0.574*** (7.07)	2.290*** (13.28)
N	215	1279	516	194	1364	452
R-sq	0.142	0.147	0.289	0.128	0.128	0.303
adj. R-sq	0.034	0.072	0.222	0.004	0.057	0.239

t statistics in parentheses  
+ p<0.10      \* p<0.05      \*\* p<0.01      \*\*\* p<.0001"

low level of 'governance (average)', 'rule of law', 'control of corruption', 'regulatory quality' and 'government effectiveness'. This finding suggests that human capital in countries with low level of governance will not increase economic growth unless it is combined with the policy of improving governance. While coefficients of countries with

medium level governance reveals similar results as in BS model and are highly significant in all governance indicators *vis-à-vis* countries with high level of governance.

### CONCLUDING REMARKS

Empirical literature on relationship between human capital and economic growth provides contradictory results. This has been studied by number of authors by using different models, settings, data set and time specifications. The cross country comparisons implicitly assume homogenous governance systems/quality in all countries which, in our opinion, is a strong assumption. In this study we used data for 134 countries and divided the sample based on the level of governance in the countries. Using fixed effects model for estimation, in most of the cases we found that the relationship between human capital and economic growth is insignificant (or weaker) for countries with low level of governance. We also found that coefficient of human capital was larger for countries with medium level of governance *vis-à-vis* countries with high level of governance. This finding hint towards the threshold level of governance after which there might be diminishing returns. The results were robust to the method of data division.

There is a potentially important role of human capital in supporting countries' economic growth. However, the findings in this paper suggest that increase in human capital might not reflect in the economic growth if the country has bad governance. In the absence of proper regulatory framework and control of corruption, the system will not be able to utilise and optimise its human capital potential.

This study extends the literature that suggests the need to strengthen the link between human capital and economic growth. The novelty of the paper lies in the fact that it uncovers the role of governance as a conditioning factor in this link. In general, better-governed states make better use of their human capital and thus tend to accumulate more wealth. However, comparing averagely well governed states with the best-governed ones reveals that there might be a threshold beyond which the role of governance in human capital-led growth. The research implication of this finding is two-fold: one, the widely reported impact of human capital on economic growth, while positive, might have been exaggerated; two, future research on the link between human capital and economic growth needs to take the conditioning effect of governance into account.

## APPENDIX

Table A1

Variable	Description/Unit	Source
Y	Output-side real GDP at current PPPs (in mil. 2005US\$)	Penn World Tables 8.0
n	Population (in millions)	Penn World Tables 8.0
y	Y/n	Penn World Tables 8.0
HC	Index of human capital per person, based on years of schooling (Barro/Lee, 2012) and returns to education (Psacharopoulos, 1994)	Penn World Tables 8.0
K	Capital stock at current PPPs (in mil. 2005US\$)	Penn World Tables 8.0
ROL	Rule of Law index (range -2.5 to 2.5)	World Governance Indicators
COR	Control of Corruption index (range -2.5 to 2.5)	World Governance Indicators
Govt.Eff	Government Effectiveness index (range -2.5 to 2.5)	World Governance Indicators
REG	Regulatory Environment index (range -2.5 to 2.5)	World Governance Indicators
Gov	Average Governance (ROL+COR+Govt.Eff+REG)/4	World Governance Indicators

Table A2

## Correlation Matrix

	$\Delta \ln Y$	$\Delta \ln y$	$\ln h(t-1)$	$\Delta \ln ck$	$\Delta \ln n$	$\ln Y(t-1)$	$\ln y(t-1)$
$\Delta \ln Y$	1						
$\Delta \ln y$	0.9862	1					
$\ln h(t-1)$	-0.0588	0.0249	1				
$\Delta \ln ck$	0.2937	0.2573	-0.1378	1			
$\Delta \ln n$	0.1702	0.0044	-0.5027	0.2417	1		
$\ln Y(t-1)$	-0.0584	-0.0126	0.4433	-0.035	-0.2772	1	
$\ln y(t-1)$	-0.0497	-0.0031	0.779	-0.0327	-0.2811	0.5527	1

Table A3

<i>Descriptive Statistics</i>					
Variable	Obs	Mean	Std. Dev.	Min	Max
$\Delta \ln Y$	2010	0.041222	0.090408	-0.93698	1.12034
$\Delta \ln y$	2010	0.026929	0.089091	-0.94246	1.115328
$\ln h(t-1)$	2010	0.869949	0.252762	0.127135	1.286128
$\Delta \ln ck$	2010	0.05291	0.067864	-0.4877	0.971869
$\Delta \ln n$	2010	0.014293	0.014988	-0.01841	0.185883
$\ln Y(t-1)$	2010	10.99621	1.964236	5.704933	16.39151
$\ln y(t-1)$	2010	8.717786	1.334267	4.914746	11.60562
Avg.Governance	2010	0.116643	0.970479	-2.12292	2.201406
Rule of Law	2010	0.049999	1.002271	-2.22985	1.99964
Control of Corruption	2010	0.080258	1.042928	-2.05746	2.585616
Regulatory Quality	2010	0.187996	0.935579	-2.41273	2.247345
Government Effectiveness	2010	0.14832	0.998738	-1.98201	2.429652

Table A4

*Fixed Effects Estimation Results: Scheme 3- Strictly Separated Sections (BS Model)*

	Dependent Variable: Annualised Difference in Log GDP								
	Benhabib and Spiegel (1994)								
	Governance Average			Rule of Law			Control for Corruption		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
$\ln HC_{(t-1)}$	0.625 (1.12)	0.641*** (8.80)	0.323* (2.57)	0.542+ (1.83)	0.661*** (8.64)	0.363* (2.90)	1.392* (2.22)	0.711*** (9.48)	0.300* (2.32)
$\Delta \ln K$	0.379 (1.07)	0.355*** (9.14)	0.230*** (4.95)	0.536*** (4.32)	0.335*** (7.42)	0.222*** (5.13)	0.348 (0.85)	0.358*** (9.10)	0.214*** (4.45)
$\Delta \ln n$	7.417*** (4.19)	0.688* (2.51)	0.898 (1.26)	5.723*** (4.79)	0.768* (2.66)	2.124* (2.64)	11.76*** (5.20)	0.919* (3.17)	0.0626 (0.10)
$\ln Y_{(t-1)}$	-0.149* (-2.70)	-0.103*** (-9.39)	-0.195*** (-9.36)	-0.132* (-3.62)	-0.114*** (-9.77)	-0.217*** (-10.18)	-0.124* (-2.08)	-0.123*** (-10.62)	-0.186*** (-8.70)
Constant	0.910* (2.10)	0.587*** (6.57)	2.062*** (11.37)	0.851* (3.08)	0.688*** (7.11)	2.303*** (12.63)	0.137 (0.26)	0.732*** (7.85)	2.009*** (10.75)
N	153	1357	395	259	1300	397	123	1418	382
R-sq	0.224	0.133	0.273	0.234	0.124	0.320	0.296	0.138	0.262
adj. R-sq	0.099	0.059	0.202	0.121	0.045	0.254	0.132	0.063	0.185

t statistics in parentheses

+ p&lt;0.10 \* p&lt;0.05 \*\* p&lt;0.01 \*\*\* p&lt;0.001"

Table A5

*Fixed Effects Estimation Results: Scheme 3- Strictly Separated Sections*

*(BS Model) (Continued)*

	Dependent Variable: Annualised Difference in Log GDP Benhabib and Spiegel (1994)					
	Regulatory Quality			Government Effectiveness		
	Low	Medium	High	Low	Medium	High
lnHC <sub>(t-1)</sub>	0.756+	0.657***	0.370*	0.702	0.587***	0.270*
	(1.73)	(8.69)	(2.79)	(1.45)	(8.26)	(2.16)
ΔlnK	0.376	0.386***	0.190***	0.434	0.308***	0.173*
	(1.24)	(8.76)	(4.12)	(1.18)	(7.99)	(3.74)
Δlnn	7.130***	0.794*	0.468	6.651*	0.621*	0.885
	(4.28)	(2.77)	(0.68)	(3.66)	(2.48)	(1.31)
lnY <sub>(t-1)</sub>	-0.159*	-0.112***	-0.168***	-0.188*	-0.0947***	-0.177***
	(-3.26)	(-9.39)	(-8.18)	(-3.11)	(-8.93)	(-8.60)
Constant	0.977*	0.671***	1.674***	1.184*	0.545***	1.912***
	(2.58)	(6.85)	(9.82)	(2.64)	(6.35)	(10.81)
N	161	1279	401	147	1364	392
R-sq	0.241	0.134	0.218	0.225	0.113	0.250
adj. R-sq	0.139	0.057	0.133	0.102	0.040	0.172

t statistics in parentheses

+ p&lt;0.10 \* p&lt;0.05 \*\* p&lt;0.01 \*\*\* p&lt;.0001"

Table A6

*Fixed Effects Estimation Results: Scheme 3- Strictly Separated Sections (CS Model)*

	Dependent Variable: Annualised Difference in Log GDP per Capita Cohen and Soto (2007)								
	Governance Average			Rule of Law			Control for Corruption		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
lnHC <sub>(t-1)</sub>	0.477	0.534***	0.354*	0.389	0.547***	0.343*	0.521	0.561***	0.343*
	(0.93)	(8.45)	(3.00)	(1.47)	(8.24)	(2.95)	(0.84)	(8.79)	(2.84)
ΔlnK	0.597	0.361***	0.247***	0.567***	0.346***	0.242***	0.761+	0.363***	0.236***
	(1.65)	(9.36)	(5.45)	(4.45)	(7.74)	(5.74)	(1.72)	(9.28)	(5.02)
lny <sub>(t-1)</sub>	-0.231*	-0.124***	-0.266***	-0.177***	-0.142***	-0.271***	-0.183*	-0.141***	-0.264***
	(-3.59)	(-10.80)	(-10.95)	(-4.29)	(-11.43)	(-11.33)	(-2.39)	(-11.84)	(-10.61)
Constant	1.366*	0.607***	2.367***	1.058***	0.755***	2.428***	1.003+	0.731***	2.356***
	(3.11)	(7.30)	(12.96)	(4.01)	(8.20)	(13.93)	(1.91)	(8.42)	(12.68)
N	153	1357	395	259	1300	397	123	1418	382
R-sq	0.126	0.147	0.321	0.159	0.145	0.358	0.107	0.153	0.318
adj. R-sq	-0.006	0.076	0.257	0.040	0.069	0.297	-0.089	0.081	0.249

t statistics in parentheses

+ p&lt;0.10 \* p&lt;0.05 \*\* p&lt;0.01 \*\*\* p&lt;.0001"

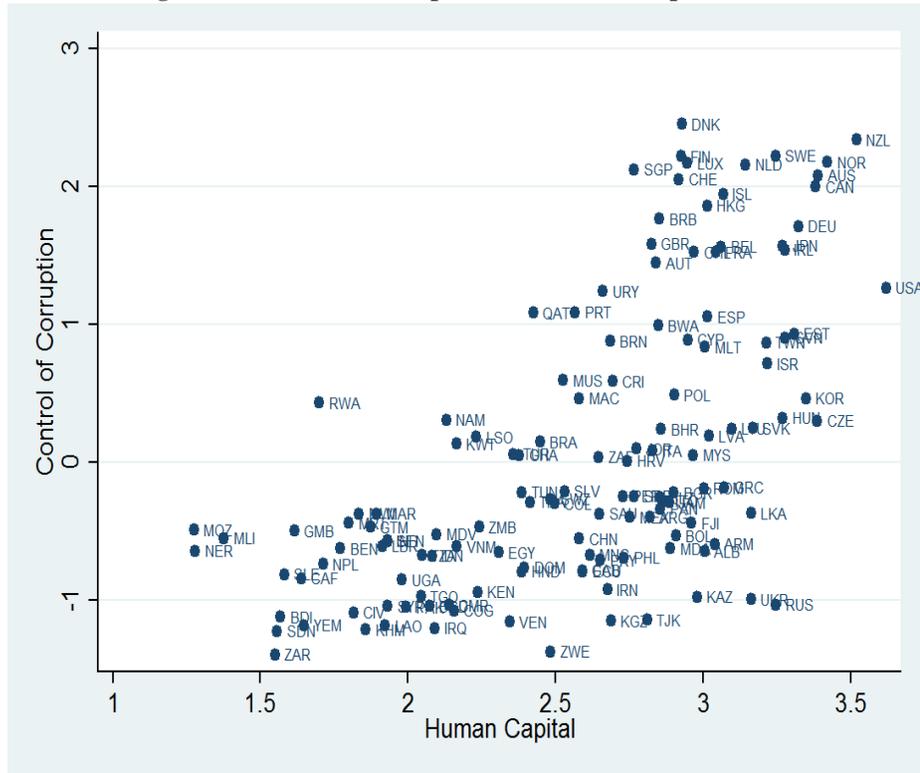
Table A7

*Fixed Effects Estimation Results: Scheme 3- Strictly Separated Sections (CS Model)  
(Continued)*

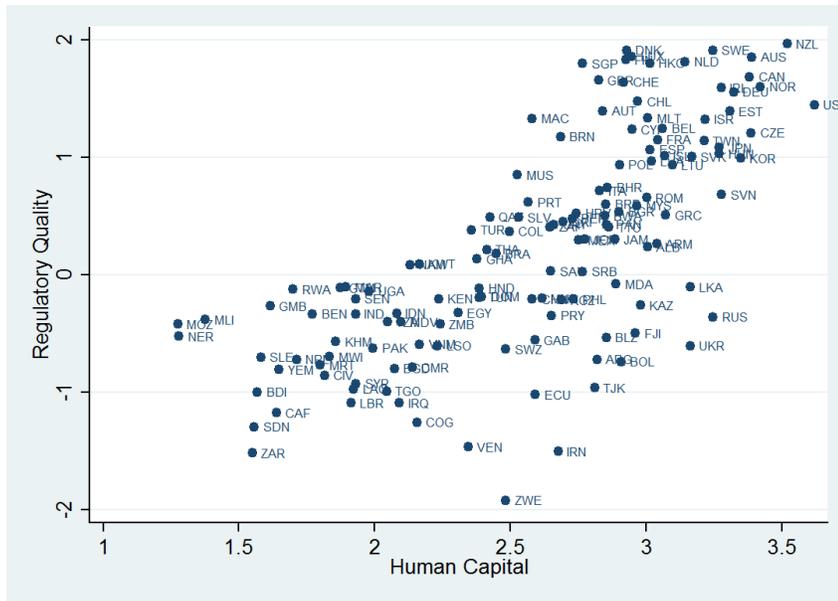
Dependent Variable: Annualised Difference in Log GDP per Capita						
Benhabib and Spiegel (1994)						
	Regulatory Quality			Government Effectiveness		
	Low	Medium	High	Low	Medium	High
lnHC <sub>(t-1)</sub>	0.632 (1.54)	0.514*** (7.92)	0.386* (3.14)	0.262 (0.63)	0.492*** (7.97)	0.296* (2.51)
ΔlnK	0.493 (1.57)	0.392*** (8.93)	0.204*** (4.52)	0.574 (1.55)	0.318*** (8.28)	0.191*** (4.23)
lny <sub>(t-1)</sub>	-0.230*** (-4.09)	-0.132*** (-10.55)	-0.222*** (-9.71)	-0.285*** (-4.23)	-0.116*** (-10.26)	-0.240*** (-9.96)
Constant	1.307* (3.73)	0.684*** (7.47)	1.870*** (11.32)	1.821*** (4.19)	0.574*** (7.07)	2.170*** (12.15)
N	161	1279	401	147	1364	392
R-sq	0.149	0.147	0.261	0.160	0.128	0.293
adj. R-sq	0.042	0.072	0.184	0.034	0.057	0.222

t statistics in parentheses  
 + p<0.10    \* p<0.05    \*\* p<0.01    \*\*\* p<.0001"

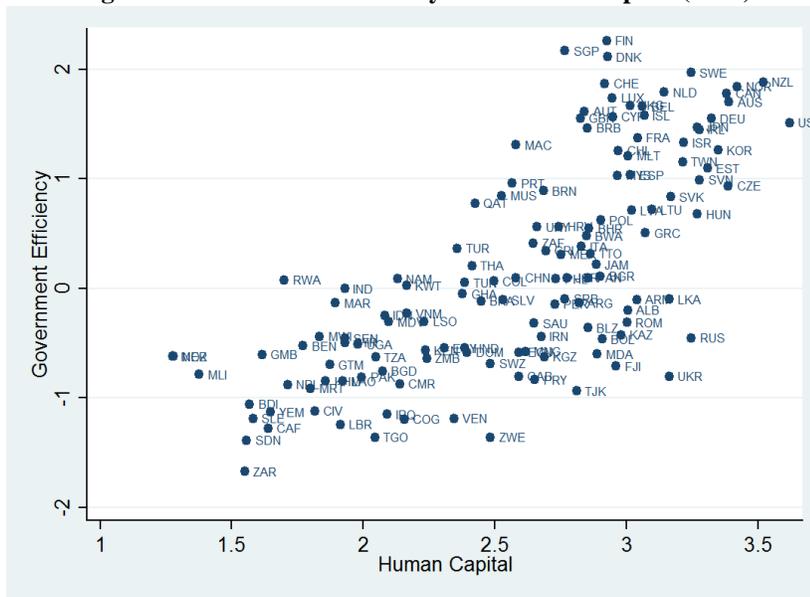
**Fig. A1. Control of Corruption and Human Capital (2011)**



**Fig. A2. Regulatory Quality and Human Capital (2011)**



**Fig. A3. Government Efficiency and Human Capital (2011)**



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### ***Comments***

Although the paper laid its foundation on well-established Benhabib and Spiegel, but how the reduced form equation 1 is derived from Cobb-Douglas is not properly mentioned in paper. Thus it is difficult to understand the channel between human capital and productivity through governance.

Beside other results paper also hint towards the threshold level of governance after which there might be diminishing return to scale. How this parabolic relationship is formed is not explained. Also, authors do not address the issue of non-linearity. Here I think more advanced methods like semi parametric techniques, which control the parameter heterogeneity problem can be considered.

Finally, to examine the effect of governance in growth regression why *governance* variable is not included in the regression itself? Why authors preferred to make sub samples?

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# **Gender Inequality in Labour Force Participation: An Empirical Investigation**

MUHAMMAD SABIR

## **1. INTRODUCTION**

Economic growth and development of the nations largely depend on the quantity and quality of their labour force. In Pakistan, a sizeable segment of population is considered as out of labour force. For instance, the overall labour force participation rate for the age 15 years and above remained roughly in the range of 49 percent to 53 percent during 1974-75 to 2012-13. This means that of the total population in 2012-13, aged 15 years and above, 53 percent is economically active or part of labour force whereas 47 percent is economically inactive or out of labour force. And more than 75 percent of the women population is considered as economically in-active. In addition, the labour market statistics show that a smaller proportion of women than men, age 15 years and above, are employed. The unemployment rate among women is higher than men. One of the possible explanations of this gender gap is gender discrimination in the labour market.

In this context, this paper aims to analyse the behaviour of female and male in labour force participation by empirically investigating the determinants of labour force participation, and access to paid job for both female and male. It also shed light on occupational gender inequalities. It is believed that these types of analyses help designing better policies to increase employment opportunities for both females and males. They also facilitate suggesting various practical measures that can be incorporated in gender sensitised employment policies that in turn could lead towards greater labour force participation.

The rest of the paper is as follows: Section 2 presents the trend in labour force of Pakistan; Section 3 gives the both the theoretical and empirical review of literature on gender discrimination in the labour market; Section 4 describes the empirical strategy employed in the paper; Section 5 gives the estimated results and Section 7 concludes the paper by mentioning some relevant policy implications.

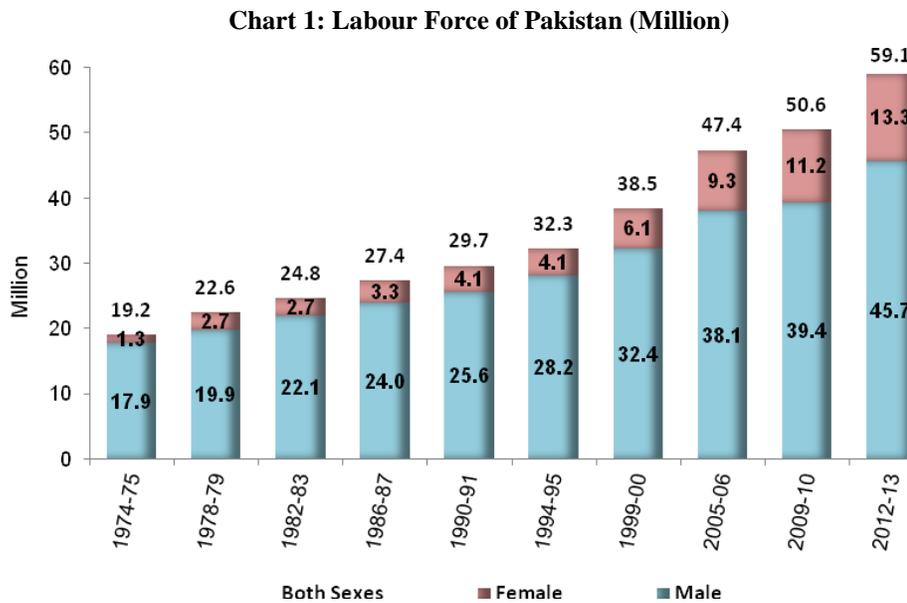
## **2. TREND IN LABOUR FORCE**

The section presents sex disaggregated trend in labour force of Pakistan for the period 1974-75 to 2012-13.

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## 2.1. Magnitude of Labour Force

Total labour force of Pakistan, aged 15 years and above, constitutes 19.2 million in 1974-75 of which 1.3 million were women and 17.9 million were men. In 2012-13 it increased to 59.1 million of which 13.3 million were women and 45.7 million were men (Chart 1). This indicates that male labour force dominates over the female labour force. However, it is worth mentioning that in 1974-75 women labour force constitutes less than one-tenth of men labour force whereas in 2012-13 this proportion gone up to more than one-fourth.



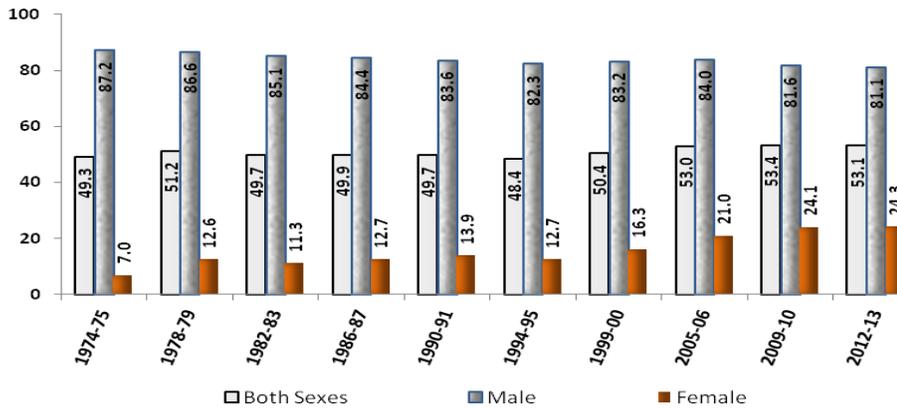
Source: Estimates based on Labour Force Survey (various issues).

## 2.2. Labour Force Participation Rate

The refined Labour Force Participation rate (LFP) is the ratio of labour force (employed and unemployed but seeking work) to the population of respective age cohort. It is therefore, a key determinant of the currently active population or an indicator of the magnitude of the supply of labour in the economy and a crucial component of long term economic growth.<sup>1</sup> The LFP rate can be used as an essential tool in designing employment policies as well as of human resource development and training policies.

In Pakistan, the overall LFP rate remained roughly in the range of 49 percent to 53 percent during 1974-75 to 2012-13. This means that of the total population in 2007-08, aged 15 years and above, 53.1 percent was economically active or part of labour force whereas 47.5 percent was economically inactive or out of labour force.

<sup>1</sup>The employed include those who are in paid employment as well as those who are unpaid family helpers.

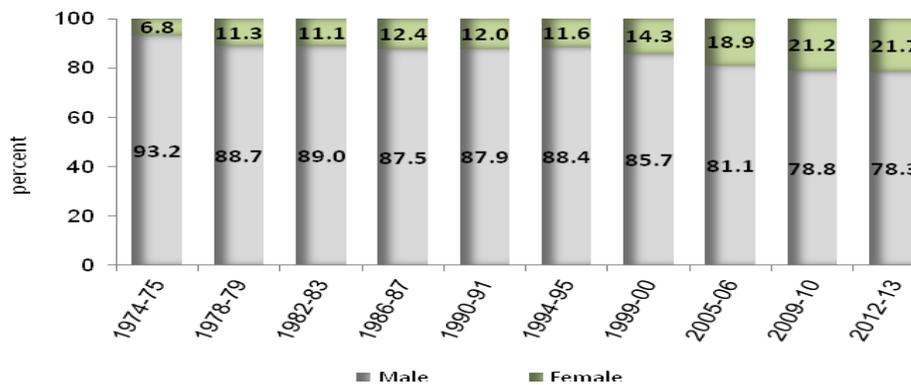
**Chart 2: Labour Force Participation Rate (percent)**

Source: Federal Bureau of Statistics, Labour Force Survey.

As for the LFP rate by gender, the participation rate of men declined from 87.2 percent in the 1974-75 to 83.6 percent in 1990-91 while remained more than 80 percent during the 1990s, in the 2000s and 2010s. As against, the LFP rate of women persistently rose from 7 percent in 1974-75 to 24.3 percent 2012-13. Apparently, this indicates that the overall gender gap in labour force participation rates has tended to reduce in Pakistan. However, it is still distressing that of the total female population 15 years and above only 24 percent is part of labour force compared to 81 percent of their male counterpart.

### 2.3. Employed Labour Force

Chart 3 gives the share of male and female in the employed labour force of Pakistan. According to this Chart, 93.2 percent of the total employed persons were male and only 6.8 percent were female in 1974-75. With time, the share of women in employed labour force has increased while that of male has declined. In 2012-13, female constitute 21.7 percent and male constitute 78.3 percent of the total employed persons in Pakistan.

**Chart 3: Share of Female and Male in Employed Labour Force (percent)**

Source: Federal Bureau of Statistics, Labour Force Survey.

### **3. GENDER GAPS IN LABOUR MARKET: A REVIEW OF LITERATURE**

Gender discrimination in the labor market is a complex subject and theories explaining this discrimination can be classified into two broad categories: feminist theories largely directed towards the “Devaluation Hypothesis” and neo-classical human capital theories leading towards “The Specialised Human Capital Hypothesis.”

#### **3.1. Feminist Theories and the Devaluation Hypothesis**

Feminist theories emphasise that women's disadvantaged position in the labor market is caused by, and is a reflection of patriarchy as well as the subordinate position of women in society and in the family. In other words, the role of gender stereotypes held by employers and societies at large affect differential occupational attainment of men and women. These theories predict that women gravitate towards occupations that are most consistent with their “female” characteristics e.g. caring, nurture [Anker (1998)]. Moreover, feminists argue that occupations classified as “female occupations” tend to receive substantially lower wages than male occupations. This wage penalty on female occupations is thought to be a form of sex discrimination. The assignment of lower wages to occupations done mostly by women may also reflect a culture of discrimination against women's work. Feminists tend to believe that occupations with more female workers, on average, command lower wages than comparable occupations with more male participants. This theory is referred to as the Devaluation Hypothesis [Ruijter and Huffman (2003); Cohen and Huffman (2003) and Tam (1997)].

#### **3.2. Neo-Classical Theories and the Specialised Human Capital Hypothesis**

Emergence of non-competing groups in the labor market in the 1880s set the theme for occupational specialisation while creating gender segmentation in the economic system. The Specialised Human Capital Hypothesis based on two basic ideas of human capital theory can be used to explain gender inequality in the market [Becker (1975)]. First, investment in any human capital is costly and thus has to be compensated to ensure its adequate supply. Just as employers have to compensate for workers' investments in general human capital is required for their work. They also have to compensate for workers' investments in specialised human capital. Second, the wage premium for specialised human capital depends on the supply and demand for that particular kind of specialised human capital. The supply and demand for a skill are contingent on a wide range of factors. The investment cost of a skill is often an important factor [Tam (1997)].

#### **3.3. Empirical Findings of Earlier Research**

Tam (1997) examines the Devaluation and the Specialised Human Capital Hypotheses to explain the wage effects of occupational sex composition in the United State by using data of Population Survey. His findings entails that differences in the length of specialised training across occupations and industries, together with a few demographic and human capital attributes, were able to completely explain most of the sex composition effects among women and men and whites and blacks. The central results are difficult to reconcile with the Devaluation Hypothesis but are consistent with the Specialised Human Capital Hypothesis. However, the issue turns to access to education and training opportunities by women.

Semyonov and Frank (1998) in their analysis of data on 56 countries show that measures of nominal segregation are not equivalent to measures of hierarchical inequality. They further argue that occupational segregation should not be equated with occupational inequality. Findings are illustrated by means of two summary indices - SEGR (nominal segregation) and ORDI (ordinal status inequality).

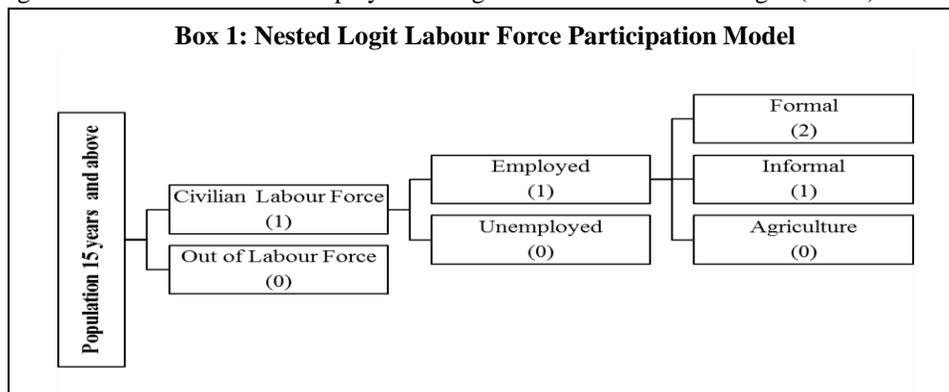
Manpower Research and Statistics Department, Singapore (2000) conducted a study of occupational segregation to determine the extent to which women and men are employed in different occupations and changed over time in Singapore. Moreover, they examined the degree to which women have entered traditionally “male” occupations and vice versa. They also discussed causes for occupation segregation and computed two summary statistics to highlight gender disaggregation i.e. the Index of Dissimilarity (ID) and the Marginal Matching (MM) Index.

Blackburn, Brooks, and Jarman (2005) discussed the effect of standardisation on the measurement of segregation in 16 developed countries with different occupational sample sizes. They established an inverse relation between horizontal and vertical segregation illustrating that increases (decreases) in vertical segregation bring decreases (increases) in horizontal segregation.

Chzhen (2006) explores the role of labor market discrimination in determining occupational distributions of men and women in Europe. Using data from the eighth wave (2001) of the European Community Household Panel (ECHP), the paper documents the degree of occupational segregation in a sample of three Western European countries with different occupational sex segregation regimes namely Denmark, Germany and the United Kingdom (UK). The result shows that labor market discrimination appears to play the largest role in Germany, though the overall degree of discrimination does not vary substantially across the three countries.

#### 4. EMPIRICAL STRATEGY

The empirical strategy adopted in this study consists of estimating a nested logit model of labour market participation. In this model, the labour market outcomes can be divided into a three-level possibility framework. The first level consists of the possibilities of whether or not a person is part of the labour force. The second level is a possibility of employed and unemployed for those who decide to participate in labour market and leaves the non-participants as they are. The third level possibilities distinguish between formal, informal and agriculture for those who are employed leaving the other branches unchanged (Box 1).



The computation of above mentioned possibility framework requires the following three distinct steps. In the first step a logit model for labour force participation is estimated by using a dichotomous variable having value 1 for either employed or unemployed and zero for all others. In the second step, another logit model for employed is estimated by using a dichotomous variable having value 1 for employed and zero for unemployed. Finally, a multi-logit model for occupational choices is estimated by using a variable having value zero for agriculture, 1 for informal and 2 for formal sector. This three step estimation is applied separately for all male and female aged 15 years and above in 2012-13. Heckman procedure is used to avoid selectivity bias.

In line with economic theory, a set of explanatory variables are used in the estimation of above mentioned empirical framework. These include a set of educational dummies indicating various highest level of educational attainments. It also includes demographic variables like age and square of age, marital status and family size together with regional dummies. In order to get an idea of reservation wage family income is also included in the analysis (complete list of variable is available in Appendix).

Micro-dataset of Pakistan Labor Force Surveys 2012-13 is employed for empirical investigation. The survey collects comprehensive information on various activities of workers. The information about employment status and distribution of employed labour force by occupation categories, gender and regions is particularly important for this study. A comparison of LFS with other data sources shows the superiority of LFS because of greater internal and external consistencies [Zeeuw (1996)]. For the purpose of our analysis we restrict our sample to persons of 15 to 65 years of age in both years.

## 5. ESTIMATED RESULTS

This section presents the results of the estimated three step nested logit framework discussed in empirical strategy. These logit equations were regressed on a set of independent variables like age (a proxy for experience), education level, household size, marital status, urban etc by using micro-datasets of Labour Force Survey (LFS) 2012-13. Based on these estimated equations, three sets of probabilities including labour force participation, employment and formal, informal and agriculture were estimated each with respect to education levels by gender. Almost all variables included in the analysis are statically significant and have expected signs (Table A2).

The aim of estimation of three step nested logit framework is to compute the probabilities of various outcome with respect to educational attainment, therefore, the regression estimates, using the logit and multi-logit modes, are provided in the Appendix.

### 5.1. Probabilities of Labour Force Participation

Table 1 shows the resulting probabilities of LFP and Not Economically Active (NEA) women and men (15 years and above) with respect to level of education for 2012-13. These probabilities show three patterns: (1) probabilities of LFP are increasing with the level of education in women and U-shaped (decreasing till intermediate and then increasing) in men, (2) technical education plays a vital role in LFP, reflected through higher probabilities both in male and female, and (3) there are significant differences in probabilities among men and women with same level of education.

It is ten times more likely that a woman with primary education would be NEA as compared to a primary pass man. Similarly, it is less likely that a woman primary education find a place in labour market compared to a woman with graduate or post graduate levels of education (Table 1). For instance, in the case of a woman having only primary education, the chances of being NEA is more than 90 percent. For women with postgraduate degrees however it declines to around 50 percent. This is indicative that investing in female education has a positive impact on labour force participation.

Table 1

*Probabilities of Labour Force Participation by Level of Education and Gender based on Logit Regression – 2012-13*

Level of Education	Female Sample		Male Sample	
	LFP	NEA	LFP	NEA
Primary	0.0938	0.9062	0.9022	0.0978
Matric	0.0912	0.9088	0.8498	0.1502
Intermediate	0.1164	0.8836	0.7350	0.2650
Graduate	0.1968	0.8032	0.8110	0.1890
Post Graduate	0.4871	0.5129	0.8877	0.1123
Technical Training	0.2605	0.7395	0.9806	0.0194

This trend is not pronounced in men as in women. In men, probability of labour force participation is 0.90 at primary level, which is relatively higher and then it declined to 0.73 at intermediate and then subsequently increased to 0.88 at post graduate level. This trend shows that primary, matric and post graduate are terminal education levels where large number of men dropout from education and join labour force, while intermediate and graduate level of educations are not terminal level where a sizeable portion of educated men prefer to continue their education.

Moreover, the probability of a woman or man with technical training being part of the labour force holds more significance than the probability of education levels in both men and women. For example, the probability of a woman with technical education being a part of the labour force is almost one-third, while for males it is more than 98 percent. This is greater than the rest of the education categories combined except post graduation in case of women. Finally, the probability of a man being part of the labour force as compared to a woman with same level of education is higher in all education levels. In case of women with only primary or matric education, the chances of being NEA is more than 90 percent, while for men with only primary education the chances of being NEA is slightly less than 10 percent.

## 5.2. Probabilities of Access to Paid Jobs

Table 2 gives the gender disaggregated probabilities of being employed and unemployed with respect to level of education in 2012-13. These probabilities reveal two important messages: (1) the probabilities for being employed are higher for men as compared to women at every level of education, (2) unemployment in both male and

female increased with increasing levels of education and peaked at post graduate level in men and at graduate level in women afterward it decline. Moreover, chances of being unemployed with technical education is low in both men and women. Moreover, probability of being employed is highest at post graduate and technical education in women while for men at primary and technical education level.

Table 2

*Probabilities of Access to Paid Jobs by Level of Education and Gender  
based on Logit Regression – 2012-13*

Level of Education	Female Sample		Male Sample	
	Employed	Unemployed	Employed	Unemployed
Primary	0.8711	0.1289	0.9621	0.0379
Matric	0.7938	0.2062	0.9452	0.0548
Intermediate	0.7757	0.2243	0.9256	0.0744
Graduate	0.7754	0.2246	0.9133	0.0867
Post Graduate	0.8553	0.1447	0.9070	0.0930
Technical Training	0.9156	0.0844	0.9735	0.0265

What explains the differences in probabilities of employment? There are three possible explanations: (1) vertical segmentation in labour market, (2) different reservation wages for men and women, and (3) higher demand for low skilled labour force.

The argument of vertical segmentation in labour market explains that men and women are working in different occupations, which require different level of education attainment and skills. It can be said from the pattern of probabilities that labour market in Pakistan creates greater job opportunities for women in elementary occupations or occupations with higher level of education. As a consequence, there are higher probabilities of getting job for women with primary level of education or post graduate level of education. This also explains the low LFP at mid-level of education. The relatively high unemployment at mid-level education discouraged other women to enter in the labour force.

The reservation wage argument explains that women with graduate and post graduate level of education might have higher reservation wage—the lowest wage rate at which a worker would be willing to accept a particular type of job—as compared to men with same level of education. This argument is based on the assumption that women's reservation wage depends on her marital status and family earnings. This implies that reservation wage of a woman belonging from a family having low income would be low as compared to the reservation wages of a woman belonging from a family having high income.

The third explanation is linked to macroeconomic environment. With low economic growth and decline private investment as a percentage of GDP created less opportunities for highly qualified and skilled men and women. Consequently, the probabilities are higher at either primary level or with technical education.

### 5.3. Probabilities of Gender Inequalities in Formal Job

Table 3 shows the computed probabilities for women and men by three broad categories: namely agriculture, informal and formal sectors with their associated levels of education in 2012-13. The probabilities that women work in agriculture sector is higher compare to men at all level of education. Moreover, among women probability of being working in agriculture sector is high with primary and matric educational levels and it further increases with technical education. In contrast, probabilities of being in agriculture is lower compared to other sectors within male sample and it declining with increase in level of education. There is less than five percent chances that an employed man with graduate or postgraduate level of education working in agriculture sector.

Another striking finding is that probability of a man working is informal sector is high compared to women at all level of education. However, probabilities of working in informal sector decline with increase in education level both in women and men. Finally, there is mixed pattern in probabilities working in formal sector. These probabilities vary among both men and women depending on their levels of education, for instance, chances of women working in formal sectors increase with levels of education and are highest among women with post graduate degrees and professional education. Moreover, the probability that a woman would be working in a formal sector is high for intermediate and postgraduate levels compared to men with similar qualifications. This is largely because women with intermediate and postgraduate levels of education are generally employed in education institutions.

Table 3

*Probabilities of Economic Sectors by Level of Education and Gender  
based on Multi-Logit Regression – 2012-13*

Level of Education	Agriculture	Informal	Formal	Sum
<b>For Female Sample</b>				
Primary	0.5743	0.3478	0.0779	1.0000
Matric	0.3901	0.2910	0.3189	1.0000
Intermediate	0.1789	0.1278	0.6933	1.0000
Graduate	0.3644	0.1305	0.5051	1.0000
Post Graduate and Professional	0.1499	0.0395	0.8106	1.0000
Technical Training	0.5852	0.3860	0.0288	1.0000
<b>For Male Sample</b>				
Primary	0.1296	0.6387	0.2317	1.0000
Matric	0.0862	0.5472	0.3666	1.0000
Intermediate	0.0590	0.4054	0.5356	1.0000
Graduate	0.0310	0.2931	0.6759	1.0000
Post Graduate and Professional	0.0162	0.1780	0.8058	1.0000
Technical Training	0.0293	0.7899	0.1808	1.0000
<b>Difference (Female - Male)</b>				
Primary	0.4447	-0.2909	-0.1538	0.0000
Matric	0.3039	-0.2562	-0.0477	0.0000
Intermediate	0.1199	-0.2776	0.1577	0.0000
Graduate	0.3334	-0.1626	-0.1708	0.0000
Post Graduate and Professional	0.1337	-0.1385	0.0048	0.0000
Technical Training	0.5559	-0.4039	-0.1520	0.0000

## 6. CONCLUSION AND RECOMMENDATIONS

The role of labour market in attracting both female and male workers and providing decent jobs to them is a complex matter and requires empirical investigation in both developed and developing countries including Pakistan. An attempt is made in this paper to investigate this issue in a comprehensive manner by focusing on three aspects including labour force participation, access to paid jobs and inequality in accessing formal jobs for 2012-13 by applying a nested logit model. The result shows that women are highly disadvantaged in labour force participation reflected through estimated probabilities. This is attributed not to less human capital among women as compared to men but to unobservable factors called discriminatory factors. It is hypothesised that once these unobservable factors are eliminated from society, women labour force participation as well as overall labour force participation will increase in Pakistan.

A prime reason of less participation of women in labour force is their less chances of being employed and has higher chances of unemployment if participating in labour force activities. This discourages women to actively participate in labour market. Moreover, they have fewer chances to get into jobs in formal sector with less than postgraduate level of education as compared to men.

In order to improve labour force participation in Pakistan, the following policy measures are recommended.

- Increase in female and male education which plays a positive role in attracting both sexes into labour force. Therefore, greater investment in education is needed, with other gender friendly measures and through gender responsive budgeting.
- In order to provide more opportunities to women in formal sector, a tax credit can be provided to women employees.
- There should be an equal-employment opportunities policy aimed at tackling direct or indirect gender discrimination, equal opportunities policy aimed at encouraging women to have continuous employment patterns, without discouraging men, and de-segregating employment by gender; and wage policies aiming at reducing wage inequality and improving the remuneration of low-paid and/or female-dominated jobs.

## APPENDIX

Table A1

*Definitions of Variables*

Variable	Description
<b>Dependent Variables</b>	
LFP	value 1 for those who are either employed or unemployed otherwise 0
Employed	value 1 for employed otherwise 0
Economic Sectors	value 0 for working in agriculture, 1 for working in informal sectors and 2 for working in formal sector
<b>Explanatory Variables</b>	
age	Age in years
Age <sup>2</sup>	Square of Age
Never Married	value 1 for never married otherwise 0
Married	value 1 for married otherwise 0
Widowd	value 1 for widowed otherwise 0
num_infant	Number of infant in a household
fhh	value 1 for female headed household otherwise 0
hh_size	Number of person in a household
Urban	value 1 if living in urban area, otherwise 0
Punjab	value 1 for all household in Punjab otherwise 0
Sindh	value 1 for all household in Sindh otherwise 0
KP	value 1 for all household in Khyber Pakhtunkhwa otherwise 0
Primary	value 1 if the highest level of education is primary, otherwise 0
Matric	value 1 if the highest level of education is matric, otherwise 0
Intermed	value 1 if the highest level of education is intermediate, otherwise 0
Graduate	value 1 if the highest level of education is graduation, otherwise 0
Post_pro	value 1 if the highest level of education is either post graduation or professional education, otherwise 0
tech_train	value 1 for the person having technical trainings otherwise 0
hhinc_fem	Total household earnings excluding female earnings
Female	value 1 for female otherwise 0

Table A2

*Estimated Results of Logit Models for Labour Force Participation: 2012-13*

	Female Sample		Male Sample	
	Coefficient	Std. Error	Coefficient	Std. Error
age	0.1108	0.008	0.3977	0.012
age2	-0.0013	0.000	-0.0052	0.000
married	0.1979	0.093	0.8467	0.135
never_married	0.6842	0.110	-0.6200	0.160
num_infant	-0.1472	0.028	-0.0668	0.033
fhh	0.0655	0.094		
urban	1.2140	0.044	0.2711	0.049
punjab	1.6344	0.074	0.0975	0.077
sindh	1.0805	0.078	0.2511	0.084
kp	0.5784	0.079	-0.5060	0.079
primarym	-0.6467	0.054	-0.8130	0.065
matric	-0.6173	0.075	-1.2526	0.074
intermed	-0.3032	0.102	-1.8949	0.090
graduate	0.3383	0.101	-1.3841	0.122
post_pro	1.7079	0.121	-0.7302	0.181
tech_train	0.7489	0.058	1.3348	0.103
_cons	-5.3787	0.198	-3.6407	0.285
Pseudo R2		0.112		0.391
Number of obs		64,964		68433

Table A3

*Estimated Results of Logit Models for Employed: 2012-13*

	Female Sample		Male Sample	
	Coefficient	Std. Error	Coefficient	Std. Error
age	-0.0838	0.047	0.088996	0.008411
age2	0.0006	0.001	-0.00117	9.57E-05
never_married	-1.3258	0.227		
married			1.438457	0.059815
fhh	0.5893	0.333		
urban	-1.0473	0.440	0.434404	0.041824
punjab	-2.8976	0.660	-0.18918	0.06346
sindh	-2.1741	0.513	0.191841	0.068633
kp	-2.1591	0.376	-0.5487	0.068329
primarym	0.1861	0.278	-0.07686	0.054006
matric	-0.3521	0.287	-0.52204	0.059816
intermed	-1.0597	0.249	-0.82258	0.07392
graduate	-2.4064	0.234	-0.98627	0.080718
post_pro	-3.3983	0.579	-1.04945	0.091313
tech_train	-1.4422	0.295	0.372889	0.060923
mills	-1.9574	0.425		
_cons	11.6216	2.303	0.940695	0.150813
Pseudo R2		0.170		0.105
Number of obs		12573		54,740

Table A4

*Estimated Results of Multi-Logit Models for Economic Sector 2012-13*

Variables	Female Sample		Male Sample	
	Coefficient	Std. Error	Coefficient	Std. Error
	<b>Informal</b>		<b>Agriculture</b>	
age	-0.1647	0.0320	-0.0677	0.0046
age2	0.0020	0.0004	0.0011	0.0001
fhh	0.5863	0.2371		
urban	-4.3144	0.3906	2.9317	0.0358
punjab	-3.8497	0.5400	-0.5978	0.0363
sindh	-3.6143	0.4148	-0.0160	0.0384
kp	-2.1651	0.3020	-1.1075	0.0431
primarym	1.5689	0.2365	-0.4034	0.0284
matric	1.6628	0.2756	-0.5589	0.0394
intermed	1.5771	0.3622	-0.6566	0.0639
graduate	0.8703	0.3379	-0.9785	0.0957
post_pro	0.5613	0.7336	-1.0067	0.1471
tech_train	1.6474	0.2389	-2.1721	0.0585
mills	-1.9917	0.3596		
_cons	10.5645	1.7137	-0.9371	0.0928
	<b>Formal</b>		<b>Formal</b>	
age	0.1090	0.0676	0.1097	0.0061
age2	-0.0011	0.0009	-0.0012	0.0001
fhh	0.5744	0.3976		
urban	-3.2811	0.5869	0.0989	0.0271
punjab	-3.7676	0.8584	-0.6741	0.0382
sindh	-3.7413	0.6784	-0.4597	0.0398
kp	-1.7608	0.5014	-0.8873	0.0448
primarym	2.1598	0.4540	0.2864	0.0365
matric	3.8740	0.4171	1.0040	0.0385
intermed	5.3714	0.3829	1.6245	0.0465
graduate	4.3237	0.4024	2.2116	0.0506
post_pro	5.7700	0.8386	2.9020	0.0635
tech_train	0.9909	0.4052	-0.2047	0.0336
mills	-1.4444	0.5583		
_cons	1.0239	2.7794	-3.3941	0.1179
Pseudo R2	0.4151		0.2524	
Number of obs	11,184		51,863	

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**Comments**

Paper dedicated a significant part to literature review, which is definitely a good thing. All most all the literature review revolve around the two popular hypotheses of sociological literature i.e., “Devaluation Hypothesis” and “The Specialised Human Capital Hypothesis” the devaluation hypothesis asserts that no economic factors can fully explain the sex composition effects because cultural bias against women’s labour overrides market considerations. By contrast, the specialised human capital hypothesis asserts that the same worker is expected to receive different wages because of their gender. However, the empirical strategy doesn’t include cultural factors as suggested by devaluation hypothesis or wage differentials as recommended by the specialised human capital hypothesis.

Further I have few minor comments on empirical specification:

Overall wage income of other household members is used as proxy for reservation wage. Here my concern is this proxy do not take account the skill level of women, unless we consider the skill level this seems a very weak proxy.

Table 3, 4 and 5 provide the gender based difference of probabilities to get a job, and to get a job in particular occupation etc. The difference of coefficient is not enough to draw any conclusion, I feel you should also provide the statistical significance of differences.

The nine major occupational categories are further categorised as low, mid and high occupations, the criteria is not clear in the text.

Why inverse mills are included in only female equation and not in male equation. I think unobservable factors effect both male and female as suggested by Heckman (1979).

Finally, in female participation equations a variable female headed household is dropped, if this is for purpose like identification, this is an important variable and shouldn’t be dropped in participation equation.

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## **The Development of India's Financial Inclusion Agenda—Some Lessons for Pakistan**

MUNEEB HUSSAIN GATTOO AND S. M. JAWED AKHTAR

### **SECTION I: INTRODUCTION**

Financial Inclusion has assumed a vital position in the Public Policy discourse of developing economies. Provision of financial services to the otherwise excluded strata of the society enhances their potential to climb the economic ladder of opportunity and prosperity. Access to financial services to the otherwise excluded impacts their quality of life and enables the less privileged to increase and diversify their incomes, improve their social and economic conditions. Due to lack of access to financial services, most poor households have to rely on their meagre savings or money lenders which limit their ability to actively participate and benefit from the development process. The main theoretical arguments that economic theory postulates regarding the failure of financial markets in percolating poor and rural areas are of informational asymmetries, difficulties in contract designing and enforcement, greater transaction costs. The demand side aspects may be low demand for such services, arising from illiteracy, less investment opportunities in rural areas and difficult loan contracts [Basu (2006)]. When households are access constrained with respect to financial services, it becomes one of the important reasons for persisting inequalities. Economic theory suggests that unrelenting inequalities has a negative impact on the long term growth prospects of an economy [World Bank (2007)]. While establishing causality between financial development and economic growth has been quite tedious, with no simple answers, the evidence of a strong link between financial development and economic growth has continued to rise [Gattoo and Akhtar (2014)]. The interest in the financial inclusion discourse across developing and developing world stems from the recognition that a strong and vibrant financial system does not necessarily imply increasing financial to all across the societal divide [Honohan (2003)].

### **Financial Development and Financial Inclusion and Consumption Smoothing**

A modern financial sector is characterised by liberalised financial markets, however, on the other hand, financial inclusion depicts the processes that relate to enhancing access to financial sector to the section of society not served so far on a sustainable basis. Financial inclusion focuses on redistributive aspects of financial development and deals with the phenomena of enhancing access to financial services to the traditionally unserved strata of population. If efficiency is the focus of Financial development, it is the notion of social justice and equity that lies at the heart of the discourse of financial inclusion. Pertinent to mention here is the fact that financial inclusion has different aspects, which include, credit services, savings, insurance, remittances and payments etc. However, the first three form the most vital part of the

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system, at least for those economies where financial inclusion as a development strategy is yet to take off properly. One more thing that needs proper elucidation is that financial inclusion should not be made synonymous to access to credit. Financial inclusion is much bigger in its concept, scope, usage and impact. In the ambit of financial inclusion, it is not just credit but all the major financial services that have been otherwise left un-served to the poor strata of society. Consumption smoothening is associated with the credit usage of a poor household, instead of or in addition to the credit usage for productive investments. Hence, the notion of consumption smoothening is very well a part of financial inclusion, through one its dimensions i.e., credit services.

There are different approaches with which we may describe financial inclusion. Leyshon (1995) highlights that exclusion of some groups and individuals from gaining access to formal financial system, while Sinclair (2001) emphasises on the inability to access appropriate financial services in a suitable form. Financial inclusion as defined by Sarma (2008), incorporates different aspects of inclusion. Sarma (2008) views financial inclusion as a process that ensures the ease of access, availability, and usage of financial services of all members of society. Sarma builds the concept of financial inclusion based on several dimensions, including accessibility, availability, and usage, which can provide some meaningful insights into different aspects of financial inclusion<sup>1</sup>. The 2015 ADB working paper<sup>2</sup> using Sarma (2008) methodology to calculate IFI for 176 countries places Pakistan at a dismal 134 position with an index score of 12.40, even behind countries like Nepal, Bhutan and Kenya. India is at 104 position, with an index score of 24.14.

The present paper is an attempt to present the trajectory of India's financial inclusion discourse since 1947 to present times and relates it to Pakistan's financial inclusion regime. The basic underlying theme of the paper is to showcase the evolution of the financial inclusion discourse in both India and Pakistan and to highlight how India's financial inclusion regime can have some important policy prescriptions for Pakistan in its attempt to further the agenda of Financial Inclusion. Section II highlights the importance of financial inclusion for promoting inclusive growth. Section III provides a retrospective outlook of the financial inclusion discourse in India post 1947 till date. Section IV throws light on the contours of Financial Inclusion in Pakistan. Section V tries to relate India's financial inclusion initiatives to Pakistan's setting to draw some policy perspectives. Section VI provides some concluding remarks regarding the debate.

## SECTION II

### 2.1. Inclusive Growth and Financial Inclusion

Inclusive growth fundamentally refers to broad based or balanced growth which will benefit the poor and the underprivileged. It has the potential to impact the poverty

<sup>1</sup>In fact during the presentation of this paper, the discussant had suggested the author to probe into the discourses of financial in India and Pakistan through the prism of this index. However due to lack of the relevant data at present, this point could not be entertained in this paper. The author(s) strongly believe that comparing India and Pakistan in terms of index of financial inclusion [Sarma (2008)] very well qualifies for a separate research paper. The author(s) intends to probe the above mentioned question in a separate paper in future.

<sup>2</sup>Sarma (2008), first computes a dimension index for each of the three dimensions of financial inclusion and then aggregates each index as the normalised inverse of Euclidean distance. The distance is calculated from a reference ideal point, and then normalised by the number of dimensions included in the aggregate index. The obvious advantage of this approach is its ease of computation. Also it does not impose varying weights for each dimension viz-a-viz accessibility, availability, and usage.

levels in a country and enhance the involvement of people into the growth process of the country. Inclusive growth basically implies an equitable allocation of resources or providing equitable opportunities to all in accessing resources such that it benefits the society at large. In Inclusive Growth is embedded the idea of equality of opportunity for all in terms of access to markets and resources, an unbiased regulatory environment for employment, standard of living etc. Inclusive growth should ideally ensure the economic and financial progress cutting across the different sections of the society resulting in balanced, democratically sustainable and optimal growth.

The current state of Indian economy presents a strong case of an economy gaining some momentum out of poverty and destitution. The growth rates have been very impressive (more so for pre- global slowdown period), with the growth rate approaching 10 percent during some years of last decade<sup>3</sup>, post financial crisis scenario has lowered the growth rates, but there are encouraging signs of recovery now as far as India is concerned. Such a phenomenal growth rate places India among those developing economies that have enormous prospects to emerge out of poverty and destitution in a time bound framework, provided the benefits of growth are translated across the societal divide on equitable terms. If growth percolates into the so far excluded sections of the society, only then shall the Indian dream of a developed economy may be realised.

The reality of India's growth story however has been its 'exclusivity', for in reality it has accentuated the imbroglio of 'shining India' and 'rural Bharat'. The growth story is embedded in the deep social exclusion phenomenon. The growth process is accompanied by growing inter-regional, intra- regional and interpersonal inequalities of wealth and income. The urban- rural divide with respect to any development variable is getting widened. India is still the country with largest number of mal nourished children in the world. According to a 2006 report<sup>4</sup> almost 370 million people are facing some form of deprivation. In particular, those in rural and tribal areas continue to be acute victims of deprivation. What is clear is the fact that the growth process has been quite exclusive, bypassing a large section of the population. The political economy of growth suggests that such a growth process not only is unstable but it has potential to increase tensions in the society, threatening unity of the country.

Recognising this, the government of India right from top to bottom has been involved in various initiatives and policy prescriptions that aim at enhancing inclusiveness in the growth process. The 11th and 12th five year plans have inclusive growth as the central agenda.<sup>5</sup> The inclusive growth agenda of the government was complimented by various national level measures resulting in huge investments in social sector<sup>6</sup> during the 11th 5 year plan period and continues unabated in the 12th 5 year plan as well. In the scheme of things, Financial Inclusion fits in as one of the important policy perspectives that can promote inclusiveness in growth phenomenon of the country. The Rangarajan Committee describes financial inclusion as *the process of ensuring access to financial services and timely and adequate credit where needed by vulnerable groups*

<sup>3</sup>In the four years (2003-04 to 2006-07), the Indian economy grew by 8.8 per cent. In 2005-06 and 2006-07, the Indian economy grew at a higher rate of 9.4 and 9.6 percent, (Planning Commission) respectively.

<sup>4</sup>National Commission for Enterprises in the Unorganised Sector, chaired by Arjun Sengupta, 2006.

<sup>5</sup>The policy document of 11th 5 year plan (2007-2012) reads, "towards faster and more inclusive growth" and the same document for 12th 5 year plan (2012-2017) reads, "towards faster, sustainable and more inclusive growth".

<sup>6</sup>The national flagship programmes like MGNREGA, Bharat Nirman, PMGSY, NRLM, NRHM etc. are a case in point.

such as weaker sections and low income groups at an affordable cost. Credit may be one of the important components of financial inclusion, but most certainly financial inclusion is not synonymous with access to credit alone. In fact financial services such as saving facilities may be preferred more by the poor households over credit services (World Bank, 2007). Thus, financial inclusion has to be a comprehensive package encompassing credit, savings, insurance, payment services on a sustainable basis that have both short term and long term implications for household welfare. The next session details on the development of financial inclusion discourse post 1947 scenario.

### SECTION III

#### Financial Inclusion in India—A Retrospective Recourse

The policy in the country has substantially evolved over the past six decades without the nomenclature of Financial Inclusion. Initially the development of financial policy invariably focused mostly on credit than on any other financial service [Rao (2007)]. Since 1947, the development of India's financial sector has resulted in impressive upgradation and consolidation of access to banking services (credit) in rural areas. The first of its kind, All India Rural Credit Survey- 1951(AIRCS) was conducted to assess the rural indebtedness. The survey was conducted by the central bank of the country, RBI. The survey concluded that more than 90 percent of rural credit needs were being met by moneylenders or other informal sources. The share of banks in total credit was too low as 1 percent in total rural debt (Table 1). This type of limited access to credit services called upon the government forces to arrest this trend and intervene with regards to rural financial markets.

Table 1

*Break-up of Institutional and Non-Institutional Rural Credit ((Percent)*

	1951	1961	1971	1981	1991	2002
<b>Institutional Agencies</b>	<b>7.2</b>	<b>14.8</b>	<b>29.2</b>	<b>61.2</b>	<b>64</b>	<b>57.1</b>
Government	3.3	5.3	6.7	4	5.7	2.3
Co-op. Society/Bank	3.1	9.1	20.1	28.6	18.6	27.3
Commercial Bank incl. RRBs	0.8	0.4	2.2	28	29	24.5
Insurance	–	–	0.1	0.3	0.5	0.3
Provident Fund	–	–	0.1	0.3	0.9	0.3
Others Institutional Agencies*	–	–	–	–	9.3	2.4
<b>Non-Institutional Agencies</b>	<b>92.8</b>	<b>85.2</b>	<b>70.8</b>	<b>38.8</b>	<b>36</b>	<b>42.9</b>
Landlord	1.5	0.9	8.6	4	4	1
Agricultural Moneylender	24.9	45.9	23.1	8.6	6.3	10
Professional Moneylender	44.8	14.9	13.8	8.3	9.4	19.6
Traders and Commission Agents	5.5	7.7	8.7	3.4	7.1	2.6
Relatives and Friends	14.2	6.8	13.8	9	6.7	7.1
Others	1.9	8.9	2.8	4.9	2.5	2.6
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

Source: All India Rural Credit Survey (1954); All India Debt and Investment Survey (Various Issues).

\*Includes financial corporation/institution, financial company and other institutional agencies.

–denotes not available.

In 1955, the State Bank of India (SBI) was established to extend banking facilities on a large scale, particularly to the rural and semi-urban areas in the country, and

also to serve various other public purposes. To strengthen financial access to the poor, the Indian government nationalised the commercial banks in July 1969 when a major portion of the banking system (i.e. fourteen big Commercial banks) were brought under the public sector to better serve the development needs of the economy in conformity with the country's national policies and objectives. Further, six more banks were nationalised in April 1980. India undertook a colossal drive for bank branch expansion, particularly in the rural areas in the 1970s and 1980s. In addition to SBI, Regional Rural Banks (RRBs) were established to cater to the need of rural farmers. As a result, India witnessed a phenomenal growth in its formal rural banking system not only in terms of geographical spread, but also with regards to deposit mobilisation and disbursement of credit. Public sector banks accounted for more than 90 percent of the commercial banking business. Number of bank branches expanded quite robustly leading to (more than six times) reduction in population per office reaching 10,000 people per office in 2012 from 64 thousand per office in 1969. [Basu and Srivastava (2006)], *Trend and Progress of Banking in India*, 2013). Following bank nationalisation, the share of banks in rural household debt increased to about 29 per cent in 1981 and 1991 while the share of formal or institutional sources in total debt reached 61.2 per cent before declining in 1991. Correspondingly, the share of moneylenders apparently declined steadily over these four decades, from 69 percent in 1951 to less than 16 percent in 1991 [AIDIS (1991)]. However the same figure rose to about 30 percent for the year of 2002 [AIDIS (2002)].<sup>7</sup>

These surveys do point towards the fact that lot of affirmative action has been done by various institutional agencies to percolate the rural credit markets, more so till economic reforms were initiated in 1991. Till the reforms a strict government policy did ensure the development of rural credit markets, however at the cost of the financial efficiency. After 1991 economic reforms the state phased out of rural credit markets paving way to competition and efficiency regime. India being such a vast country geographically, variations in access to credit and rural indebtedness with respect to various regions and even within various regions has long been witnessed and continues even today. Each region has its own developmental problems and peculiar specificities in relation to rural financial markets. Money lenders thus continue to be an important source of providers of credit services in rural areas. Moneylenders have advantage over formal financial institutions, such as banks because they know their clients much better than formal institutions. Therefore, they are in a better position to enforce contract with clients and offer more flexible financial services in line with the needs of the borrowers [Basu and Srivastava (2006)].

While the economic strategies post 1991 dominated by the notion of liberalisation, where markets took the centre stage of economic policy, the acceleration of growth was given primary importance and re-distribution and social aspect of economic policy however took a back seat. The economy took off in terms of impressive growth statistics since then all the way till the most part of the first decade of this century. However the enigma surrounding this growth imbroglio had been its "exclusionist" tendencies. This

<sup>7</sup>The institutional shift after 1991 economic reforms withered away institutional finance channels in rural areas to a considerable extent, providing the exploitative money lenders greater scale and scope of operation once again.

impressive growth did not translate into the larger social good. The lack of “redistribution” or “trickle down” effect of this growth trajectory was now being considered a big drawback. This led to a policy alteration in Indian economic development focusing on *inclusiveness* in its growth phenomenon. The agenda of Financial Inclusion fits in this framework of India’s larger development discourse. Increasing inclusiveness in India’s growth process, which also benefits lower strata of society, can only be achieved by promoting inclusiveness in the provision/access to financial services [Gattoo and Akhtar (2014)].

### **Financial Inclusion—A Decade Long Trajectory**

For almost a decade now, the GoI has been involved in extending the provision of a whole set of financial services to those who have been historically left out of the sector. RBI, in the year 2010, took a lead and made it mandatory on the part of banks to provide no-frills savings accounts without no minimum balance requirement. The transaction charges involved were quite negligible and small overdrafts were allowed for such accounts. However from august 2012, RBI asked the banks to shun away with the tag “no-frills”, as the nomenclature had been stigmatised. RBI asked the banks to convert the existing “no-frills” accounts to Basic Savings Bank Deposit Account. This initiative of RBI has proved to be quite effective as the banking system has opened 182 million such accounts amounting to Rs.183 billion by March, 2013 under the Financial Inclusion Plan (FIP). The figures, respectively, were 139 million and Rs 120 billion in March, 2011 (Table 3). The table below gives a holistic picture of what RBIs drive with regards to financial inclusion has achieved so far. There is a clear progress being made on account of different aspects of financial inclusion in India.

With the objective of facilitating uniform branch growth, RBI has permitted banks to freely open branches in tier III to tier VI centres with population less than 50,000 under general permission consent, subject to reporting (since December 2009). On the other hand, banks can open branches in any centre-rural, semi-urban or urban—in the North-east without applying for permission each time, again subject to reporting. Banks have been advised to consider introduction of a General Purpose Credit Card (GCC) facility up to Rs 25,000/- at their rural and semi-urban branches. The credit facility is in the nature of revolving credit entitling the holder to withdraw up to the limit sanctioned. Based on assessment of household cash flows, the limits are sanctioned without insistence on security or purpose. Interest rate on the facility is completely deregulated. Banks have offered 4 million GCCs with an amount of Rs 76 billion by the end of March, 2013.

Kisan Credit Cards to small time farmers have been issued by banks. As on March 2013, the total number of KCCs issued has been reported as 34 million with a total amount outstanding to the tune of Rs 2,623 billion. The figures respectively, were 30million and Rs 2,060 billion on March, 2012 (Table 3).

Table 2  
*Outstanding Cash Debt of Major States as on June 30, 2002 – Credit Agency Wise*

(percent)

<b>States</b>	Government	Coop. Society Bank	Commercial Bank	Insurance	Provident Fund	Commercial Instn.	Financial Company	Other Institutional Ag.	Landlord	Agriculturalist Money-lender	Professional Moneylender	Traders	Relatives and Friends	Others
Andhra Pradesh	0.7	11.7	13.3	0.4	0	0	0.8	0.4	3.3	27.7	29.7	5	1.5	5.6
Assam	15.4	5.2	23	0.1	7.3	2.2	0.8	3.9	0.2	2.4	23.8	1.4	12.4	1.9
Bihar	2.3	6.2	27	0.2	0	0.1	0.1	0.6	1.1	18.7	27.8	1.4	7.4	7.1
Chattisgarh	2.5	23.9	56.5	0.1	1.1	0	0.9	0.2	1.2	1.4	6.6	1.2	3.5	0.7
Gujarat	2.9	40.1	22.4	0	0.1	1.2	0.2	0.5	0	0.3	8	3.9	20.5	0
Haryana	0.4	22.7	25.7	0	0	1	0	0	1.3	15	26.5	1.4	3	2.9
Himachal Pradesh	4.5	25.1	40.3	0	0.7	0.2	2.3	0.5	0.2	0.2	3	0.5	17.6	4.8
Jammu and Kashmir	0.7	11	60.9	0	0	0	0	0	0	0.8	0	0	26.5	0
Jharkhand	10.5	9.5	46.9	0	3.3	0	0.1	0.3	0.7	3.5	13.6	0.7	10.7	0.2
Karnataka	1.2	35.3	28.9	0.1	0	0.8	0	0.3	1.8	9.5	14	2	5	1
Kerala	4.8	46.2	23	0.5	0.1	5.2	0.2	1.3	0	0.1	7.8	0.1	9.1	1.6
Madhya Pradesh	0.9	33.6	23.8	0.1	0	0	0.1	0.1	0.3	9.8	21.1	3.3	1.8	5.1
Maharashtra	1	60.3	20.9	0.8	0.3	0.7	0.3	0.5	0.1	2.4	4	0.3	6.6	1.8
Orissa	1.4	29.3	31.8	0	1.6	9.5	0	0.4	0.1	4.4	18.2	0.1	2.4	0.7
Punjab	1.1	19	28.6	0.1	0	1.2	6.3	0.2	2.6	16.5	7.8	1.5	13.9	1.4
Rajasthan	0.6	11.8	21	0	0	0.1	0.2	0	0.5	16.8	32.1	10.6	4.5	1.7
Tamil Nadu	2.8	23.8	17.2	0.9	0.6	0.1	0.4	0.9	0.6	4.2	42.2	0.6	4.3	1.4
Uttaranchal	1.4	12.2	44.9	0	0	0.1	0	0	0	1.9	12.8	0.1	25.3	1.3
Uttar Pradesh	2.5	11.7	38.6	0	0.1	0.1	0.1	2.8	0.5	9.3	20.2	1.5	9.9	2.7
West Bengal	11.9	14	35.6	0.2	2	2.7	0.3	0.8	0.4	2.1	10.8	2.9	14.2	2.1
<b>All India</b>	<b>2.3</b>	<b>27.3</b>	<b>24.5</b>	<b>0.3</b>	<b>0.3</b>	<b>1.1</b>	<b>0.6</b>	<b>0.7</b>	<b>1</b>	<b>10</b>	<b>19.6</b>	<b>2.6</b>	<b>7.1</b>	<b>2.6</b>

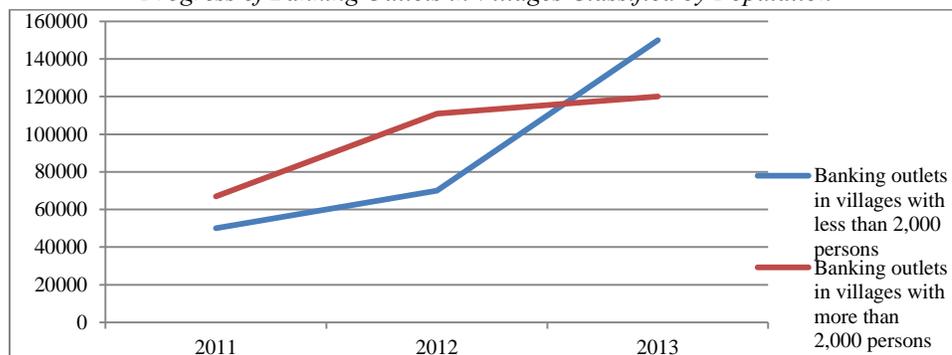
Source: All India Debt and Investment Survey, 2001-02.

Table 3

No.	Variable	Max-10	Max-11	Max-12	Max-13	Absolute Change (2010-2013)	Percentage Change (2010-2013)
1	Banking Outlets in Villages > 2,000	37,949	60,605	1,12,288	1,19,453	81,504	214.8
2	Banking Outlets in Villages <2,000	29,745	49,603	69,465	1,49,001	1,19,256	400.9
3	Banking Outlets in Villages – Branches	33,378	34,811	37,471	40,837	7,459	22.3
4	Banking Outlets in Villages – BCs	34,174	80,802	1,41,136	2,21,341	1,87,167	547.7
5	Banking Outlets in Villages – Other Modes	142	595	3,146	6,276	6,134	4,319.7
6	Banking Outlets in Villages – Total	67,694	1,16,208	1,81,753	2,68,454	2,00,780	296.6
7	Urban Locations Covered through BCs	447	3,771	5,891	27,143	26,696	5,972.3
8	Basic Savings Bank Deposit Account (BSBDA) through Branches (No. in million)	60	73	81	101	41	67.5
9	Basic Savings Bank Deposit Account (BSBDA) through Branches (Amt. in million)	44	58	110	165	120	271.5
10	Basic Savings Bank Deposit Account (BSBDA) through BCs (No. in million)	13	32	57	81	68	512.4
11	Basic Savings Bank Deposit Account (BSBDA) through BCs (Amt. in billion)	11	18	11	18	8	70.4
12	BSBDA Total (in million)	73	105	139	182	109	147.9
13	BSBDA Total (Amt. in billion)	55	76	120	183	128	232.5
14	OD Facility availed in Basic Savings Bank Deposit Account (No. in million)	0.2	1	3	4	4	2,094.4
15	OD Facility availed in Basic Savings Bank Deposit Account (Amt. in billion)	0.1	0.3	1	2	1.5	1,450.0
16	KCCs Total (No. in million)	24	27	30	34	9	39.0
17	KCCs Total (Amt. in billion)	1,240	1,600	2,068	2,623	1,383	111.5
18	GCCs Total (No. in million)	1	2	2	4	2	161.2
19	GCCs Total (Amt. in billion)	35	35	42	76	41	117.4
20	ICT A/Cs-BC Total Transactions (No. in million)	27	84	156	250	224	844.4
21	ICT A/Cs-BC Total Transactions (Amt. in billion)	7	58	97	234	227	3,279.8

As an innovative financial inclusion scheme, the Reserve Bank permitted banks to engage BCs and BFs as intermediaries for providing financial and banking services. The BC model allows banks to provide doorstep delivery of services, especially cash-in-cash-out transactions, thus addressing the last-mile problem. With effect from September 2010, profit companies have also been allowed to be engaged in BCs. Under FIP out of total banking outlets in villages BCs are 2,21,341 by the end of March, 2013. The figure was 1,14,136 in March, 2012. The urban locations covered through BCs are 27,143 by the end of March, 2013. The figure was 5,891 in March, 2012 (Table 3).

Table 4  
 “Progress of Banking Outlets in Villages Classified by Population”

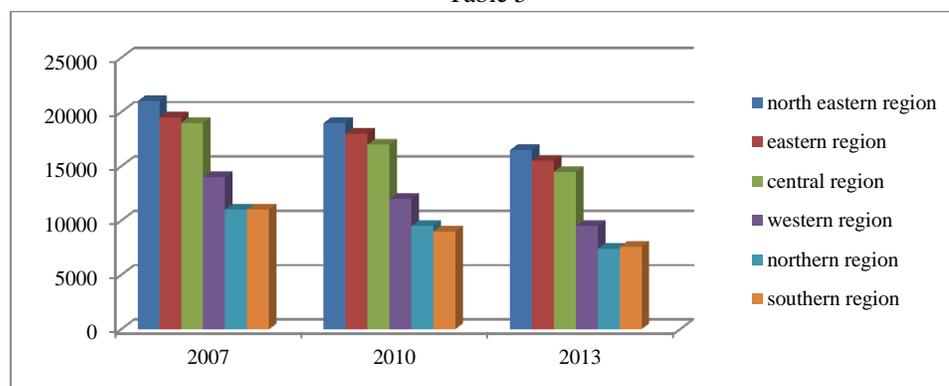


Source: “Report on Trend and Progress of Banking in India 2012-2013”

To target excluded section of society in rural locations attention was given to expansion and opening of bank branches in those centres. Consequently, banks have been mandated in the Monetary Policy Statement to target at least 25 per cent of the total number of branches to be opened during a year in unbanked rural centres April (2011). With the completion of three years of financial inclusion plans, there have been signs of considerable progress in terms of expanding the outreach of banking through both branch and non-branch means. There was a steady rise in the number of newly opened branches in Tier 5/6 centres with a population of less than 10,000 during 2010-13. While banking outlets were provided in almost all identified unbanked villages with a population of more than 2,000, the process of bringing in unbanked villages with a population of less than 2,000 was in progress during the year. The share of ATMs in rural and semi urban centres was on a rise. This trend should be seen as a positive step towards inclusive banking in the country.

Probably one of the most fulfilling aspects of financial inclusion policy initiative are the signs of narrowing of regional gap in terms of banking penetration (Table 5). On account of the increased penetration of branches, the major beneficiaries have been the under-banked regions, viz., the north-eastern, eastern and central regions. Consequently, the regional gap in terms of banking penetration has narrowed over recent years as shown by a steady decline in the range (maximum-minimum) in the population per bank branch.

Table 5



Source: "Report on Trend and Progress of Banking in India 2012-2013".

The Ministry of Rural Development, Government of India has restructured the self-employment initiative, Swarnajayanti Gram Swarozgar Yojana (SGSY) as the National Rural Livelihood Mission (NRLM) with effect from April 1, 2013. NRLM is implemented through scheduled commercial banks (including RRBs). NRLM will ensure that at least one member from each identified rural poor household, preferably a woman, is brought under the SHG network in a time bound manner. The scheme will further ensure that the poor are provided with requisite skills for: managing their institutions, linking up with markets, managing their existing livelihoods, and enhancing their credit absorption capacity and credit worthiness. NRLM will work towards achieving universal financial inclusion from both the demand and supply side. On the demand side, it will promote financial literacy among the poor and provide catalytic capital to SHGs and their federations. On the supply side, it will coordinate with the financial sector and encourage use of ICT based financial technologies, business correspondents and community

facilitators like 'Bank Mitras'. NRLM is expected to reach all districts by the end of 12th Five-Year Plan i.e., 2017. With regards to financial inclusion in the country, noteworthy is also the role of civil society.<sup>8</sup> The civil society has mainly played role at two levels. First is the generation of financial knowledge base to the rural populace. The second being the role of facilitators and mediators, between the banks and the rural customers.

### **Indian Financial Inclusion Progress in 2014**

For the six months period from April 2014 to September 2014, an increase of 62,948 banking outlets during the first half of 2014 fiscal taking the total number of banking outlets to 446,752 as at the end of September 2014. BSBDA's were 305 million by the end of September 2014 implying an increase of 62 million accounts during this period. Business Correspondent-ICT transactions in BSBDA's showed some progress with 220 million transactions for the half year ended September 2014 as against 329 million transactions recorded for year ended March 2014. KCCs which are indicative of flow of credit to agriculture and allied sectors enhanced by 1.2 million during the first half of 2014 fiscal. GCCs reflecting flow of credit to non-farm sector entrepreneurial activities increased by 1.3 million during the half year ended September 2014. As at end September 2014, 8.8 million accounts were outstanding with a balance of 1,165 billion.

## **SECTION IV**

### **Financial Inclusion—The Case of Pakistan**

Pakistan presents a very interesting case of a developing economy- battling not only poverty, unemployment and population growth but has huge security concerns as well. For quite some time now the annual growth rate has been very modest, hovering around 3 percent. Government on its part has been involved in various policy initiatives to reduce poverty and enhance access to poor and underserved sections of the society. The establishment of Agricultural Development Bank of Pakistan (ADBP) in 1961. Federal Bank for co-operatives was formed in 1976. Apart from this, mandatory indulgence of commercial and co-operative banks in agricultural lending since 1972 were all meant to improve the rural institutional financial landscape. Thus, initially the policy of the government was to provide cheap and subsidised credit to small farmers to modernise agriculture and raise their standard of living [Qureshi and Akhtar (1995)]. However, the social and political power structure deep rooted in rural Pakistan led to the cheap and subsidised credit in the service of big landlords, defeating the very purpose of cheap credit. This further led to the growing inequities in the Pakistani society while at the same time financial markets grew weaker due to inefficient allocation of credit.

It was in early 1990's that Pakistan ushered into a new era dominated by liberalisation and privatisation, leading to financial sector reforms as well.

Pakistan has successfully implemented significant financial sector reforms over the past about 15 years, starting with grant of licenses to a number of new private banks in the early 1990s, modernisation of the governance and regulatory framework of the banking sector in the late 1990s, and the privatisation of major public sector banks since the early to mid-2000s. The authorities have taken steps to phase out and reorganise most of the government-owned development finance institutions, have put in place several initiatives to promote the growth of the microfinance sector, and have allowed more

<sup>8</sup>Sewa, Myriad, MFA (Microfinance Academy) are some examples.

freedom to insurance companies. In line with these reforms, the private sector credit touched the figure of Rs 2,523 billion in May 2008, as compared with Rs 356.3 billion a year earlier. SME credit has increased from Rs 18 billion in fiscal 2000 to Rs 403 billion on March 31, 2008, though the increase is entirely accounted for by medium, not small enterprises [SBP (2008)]. Consumer credit accounted for 14 percent of total outstanding advances at the end of March 2008. Agriculture credit rose from less than Rs 40 billion in fiscal 2000 to Rs 200 billion in fiscal 2008. The aggregate number of borrowers has risen, from 2.7 million in 2003 to about 5.5 million by December 2006. House building loans stood at Rs 64.94 billion in May 2008 whereas the total housing finance market of Pakistan stood at Rs 126 billion on December 31, 2007 [SBP (2008)], doubling its size from 2005. Microfinance loans (microcredit, microsavings, and microinsurance) worth Rs 22.6 billion were disbursed in 2007 through extension of 1.8 million microloans. Presently, the active clients of microcredit are around 1.7 million.

In spite of recent achievements, access to financial services remains quite limited in Pakistan. The predominant share of the financial system, the banking sector, is mostly focused on large enterprise lending, with an increasing interest in consumer financing (though still on a very small scale), to the relative neglect of SMEs, rural areas, microfinance, and the poor. There is little understanding of the main barriers to wider provision of financial services, or the opportunities that exist for financial companies in underserved market segments. One of the reasons for the lack of improvements in access provision is the limited availability of data on patterns of access to and usage of financial services among different population groups.

## SECTION V

### **Enhancing Financial Inclusion in Pakistan—Some Lessons from Indian Experience**

India presents a worthy case for Pakistan to peep into its financial inclusion discourse to draw some finer policy perspectives. Although it needs to be stated that the issues related to financial inclusion discourse in India are far from over. But in comparison to Pakistan, India has most certainly accelerated ahead with its policy perspective both in terms of geographical spread and quantum of financial services to rural unserved locations (Table 3). The first and foremost issue that Pakistan continues to face is the fact that the commercial banks continue to be off from lending in rural areas and SME's.

Commercial banks in Pakistan mostly provide credit facility to corporations, with less than 20 percent for consumer and agricultural finance together (Table 6). What is more disturbing is the fact that Most of the bank lending is concentrated in a few large manufacturing companies. Aggregate data for all credit by borrower size shows a skewed distribution: 0.4 percent of bank borrowers account for 65 percent of all bank credit—and more than 5 million borrowers account for the remaining one-third of loans [SBP (2008)]. This kind of exclusion and skewness in the provision of finance (credit) does not augur well, more so for a country that is deeply rooted in the tradition of landlordism, with all powers converging in them.

Table 6

*Breakdown of Loans (Domestic Operations) by Sector*

	Loans Outstanding		Number of Borrowers	
	Amount (Rs. Bn)	Share (%)	Number (Rs 000)	Share (%)
Corporate Sector	1647.1	58.4%	25.9	0.6%
SMEs	409.5	14.5%	198.4	4.3%
Agriculture Production	147.6	5.2%	1354.3	29.3%
Consumer Finance	365.3	12.9%	2918.5	63.1%
Commodity Operations	182.0	6.4%	3.0	0.1%
Staff Loans	53.8	1.9%	92.0	2.0%
Other	17.1	0.6%	34.4	0.7%
Total	2822.5	100.0%	4626.4	100.0%

Source: SBP figures for March 2008.

In spite of government efforts, commercial banks have not shown the level of involvement in Microfinance sector. Commercial banks in Pakistan have somehow failed to view Microfinance as a business opportunity that serves social policy objectives as well. The dominant view point among commercial banks with regards to Microfinance seems to be one of liability and economically least remunerative.

India on other hand has broadened its access to formal financial sources in a more holistic manner. As per All India Debt and Investment Survey, NSSO 59th Round, 57 percent of the outstanding cash-debt was from institutional sources, comprising mostly of commercial, co-operative and regional rural banks. Since 2005, when financial inclusion was adopted as a national policy, RBI, the central bank has been encouraging the commercial banks to open branches in rural unserved areas. This has led to an impressive increase in the percolation of banking services in rural areas. Pakistan's central bank needs to work proactively when it comes to financial inclusion agenda. Not only the already functional microfinance banks, but the commercial banks need to be involved in the process with a more specified operational dynamics as has the case been in India.

### **The Dynamics of Microfinance in India and Pakistan**

Microfinance in India started almost a decade later as compared to Pakistan<sup>9</sup>. But with time the phenomenon has become more deep rooted and effective in India as compared to Pakistan. The self-help group (SHG)-bank linkage programme started in 1992 as a pilot project initiated by NABARD and involving three agencies, viz., the SHGs, banks and NGOs. Though progress under the SHG-bank linkage programme was slow during the initial years of commencement, it started expanding rapidly after 1999. At end-March 2012, about 103 million rural households had access to regular savings through 7.96 million SHGs linked to different banks. In recent years, micro-finance institutions (MFIs) have emerged as an important means of channelling credit to the rural parts of the country due to their widespread reach in these areas as well as the ability to offer customised and flexible financial products, suited to the needs of average rural customers. The credit linkage of Self Help Groups (SHG) and Joint Liability Groups (JLG) by Commercial Banks has emerged as one of the major initiatives to bring low income poor people into the banking stream. Along with SHG's, Joint liability groups (JLGs) too have emerged as successful non-collateralised credit instruments for financing livelihood activities for small farmers in general and tenant cultivators in particular.

<sup>9</sup>AKRSP in Pakistan was started in 1982, while SHG-BANK linkage was initiated in 1992 in India.

However, the SHG-bank linkage continues to be a more dominant mode of microfinance with banks financing over 1 million SHGs in 2012-13. However, by contrast, in recent years, there has been a decline in the number of microfinance institutions (MFIs) financed by banks. In part, this could be attributed to concerns about the operations of certain MFIs in Andhra Pradesh and the regulatory initiatives in response to these concerns in the recent past (Trends and Progress in Banking 2012-13).

With regards to the regulation of MFI's Malegam Committee Report [RBI (2011)] was constituted to study issues and concerns in the MFI sector in the wake of Andhra Pradesh micro finance crisis in 2010. The Committee, inter alia, recommended (i) creation of a separate category of NBFC-MFIs; (ii) a margin cap and an interest rate cap on individual loans; (iii) transparency in interest charges; (iv) lending by not more than two MFIs to individual borrowers; (v) creation of one or more credit information bureaus; (vi) establishment of a proper system of grievance redressal procedure by MFIs; (vii) creation of one or more "social capital funds"; and (viii) continuation of categorisation of bank loans to MFIs, complying with the regulation laid down for NBFC-MFIs, under the priority sector. The Reserve Bank has accepted the broad framework of regulations recommended by the Committee Report.

The Micro Finance Institutions (Development and Regulation) Bill (2012) envisages that the Reserve Bank would be the overall regulator of the MFI sector, regardless of legal structure. The Reserve Bank has provided the views on the Bill to the Government of India. The aims of the Bill are to regulate the sector in the customers' interest and to avoid a multitude of microfinance legislation in different states. The proper balancing of the resources at the Reserve Bank to supervise these additional sets of institutions besides the existing regulated institutions could be an important issue. Requiring all MFIs to register is a critical and necessary step towards effective regulation. The regulation of MFI's directly by RBI shall go a long way in institutionalising the microfinance movement in India. The institutionalisation and the reach of microfinance in rural India has a huge potential to be one of the most successful rural development initiatives aiming at inclusiveness.

However, the case of Pakistan provides a different story when compared to India's microfinance regime. Pakistan's NRSP is one such initiative that resembles to some extent with India's SHG-Bank linkage programme. The Aga Khan Rural Support Programme (AKRSP) in 1982, which eventually lead to the government, adopting the methodology of AKRSP programme at a national level through National Rural Support Programme (NRSP) in 1992 was the first such rural development initiative in Pakistan. It has a presence in 46 districts in all the four provinces including Azad Jammu and Kashmir. NRSP is currently working with more than half a million poor households organised into a network of more than 55,366 community organisations. With sustained incremental growth, it is emerging as Pakistan's leading initiative for poverty reduction and rural development. NRSP manages one of the largest microcredit portfolios in Pakistan, with 282,421 active loans as of March 2007, and holds 25 percent of the microfinance market [SBP (2008)].

Although India has no specialised microfinance banks like Pakistan, the country has been comparatively better placed in enhancing access of financial services to rural unserved. Various estimates of potential market demand for microfinance in Pakistan place potential client figures in the tens of millions, as compared with actual client figures of 1.7 million currently (out of a total population of over 160 million).

Microfinance penetration in the region is much higher,<sup>10</sup> than what it is in Pakistan [Bringing Finance to Pakistan's Poor (2009)].

The SHG-Bank linkage has been able to reach to a much larger proportion of unserved rural poor in India, as MFI's continue to evolve in India, they seem to be incrementally increasing their influence on rural credit markets- much larger than what MFI's have been able to do in Pakistan. India's SHG-Bank linkage programme thus provides a very interesting case for Pakistani policy makers to analyse its relative merits and its channels of operation.

Another important policy lesson for Pakistan from India's financial inclusion discourse is the integration of various livelihood generation programmes and rural development initiatives with the banks, with the payments being directly transferred to the bank account of beneficiaries, covering an aspect of financial inclusion.

## SECTION VI

### CONCLUSION

India has been registering impressive statistics in terms of annual growth rates. The concern however has been of economic inclusion that has a direct relevance for social inclusion of various strata of the society. To enhance inclusiveness in growth, financial inclusion assumes all the more relevance in development discourse of the economy. For Financial Inclusion to evolve as universal phenomenon across regional divide of the country, both the state and civil society has been actively engaged in the process. The results may not be too satisfactory thus far, but without a doubt India has traversed a long way in its pursuit of financial inclusion. Not only the state, the private sector civil society and has played an active role in provision of financial services.

On the contrary, Pakistan's journey of financial inclusion so far has not been as proactive as India's, and has lot to learn and apply as per its contextual demands. The state with respect to its central bank has not vigorously involved its commercial banking network in microfinance sector. The civil society also has not been much active either in enhancing financial inclusion in the country. The evolution of Self Help Groups with regards to microfinance, the involvement of commercial banks in Financial Inclusion and the integration of various rural development initiatives are some important policy perspectives that Indian indulgence with financial inclusion provides to Pakistan.

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<sup>10</sup>Bangladesh-35 percent, India- 25 percent, and 29 percent in Sri Lanka.

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**Comments**

It is amazing to see a Scholar from Aligarh University. We as students, read a lot about Aligarh movement, Sir Syed Ahmad Khan and Aligarh University. Believe, almost every matriculate student in Pakistan knows about Ali Garh University. Welcome to Pakistan.

Your paper provides a detailed review of Indian financial sector development. But, this manuscript needs a lot of improvement.

- (1) Is financial inclusion is different from financial development? Or financial inclusion is just a new nomenclature of financial development
- (2) I can't find the theoretic link between financial inclusion and macroeconomic indicators. I mean, why financial inclusion is important to discuss?
- (3) Different studies used different indicators of financial inclusion. Specifically, Sarma (2008) proposed a measure by which the level of financial inclusion can be measured. You also can think about those financial inclusion indices. Sarma (2008) did for India. What you can do. Plot the financial inclusion index with macroeconomic indicators to motivate the researchers.
- (4) There is concept of consumption smoothening and investment smoothening through financial sector development. What is the difference between financial inclusion and consumption smoothening? How your work is different that consumption smoothening concept? I think these concepts are closely related.

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## **Inequality and the Financial System— The Case of Germany**

DANIEL DETZER

### **1. INTRODUCTION**

Income inequality is rising in Germany. This is true for both functional as well as personal income distribution. After reunification in 1990, a general increase in inequality can be observed. This trend becomes particularly pronounced in the 2000s. In the literature on financialisation a link between the developments in the financial sector, the financing behaviour of firms, and income distribution is established. Also, in the varieties of capitalism literature a connection between the prevailing institutions, among them the financial institutions, and the tendency of an economy towards higher or lower inequality is made. This study attempts to investigate if changes in the financial sphere may have caused the higher inequality in Germany. There are different ways in which the financial sector could have contributed to the increased inequality. Growth of the financial sector or large increases in incomes paid in this sector could lead to higher inequality directly. Alternatively, different behaviour of financial institutions and new financial actors could affect distribution in the non-financial sector so that the financial sector indirectly affects inequality.

In this study, both channels will be examined. For the reader not accustomed to the German case, first, an overview about the general trends in inequality is given and, then, main features of the structure and the relevant developments of the German financial system are outlined. Following this, employment and incomes in the financial sector are examined to verify whether it directly has contributed to the observed increases in inequality. Thereafter, it looks at the links between the financial sector and non-financial corporations. Here the influence of the financial system on the corporate governance

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system in Germany and the distributional consequences of these changes are examined. In the last section, the main results are summarised and some general conclusions are drawn.<sup>1</sup>

## 2. TRENDS IN INCOME DISTRIBUTION IN GERMANY<sup>2</sup>

Looking at the adjusted wage share<sup>3</sup> in Figure 1, one can observe a downward trend starting in 1980. The wage share fell from 71 percent in 1980 to 65 percent in 1990. It recovered in the early 1990s with reunification, due to a higher wage share in East Germany. A slow decline resumed in 1994. This decline became more pronounced after 2000 and the wage share fell to 61 percent in 2007. It recovered with the outbreak of the financial crisis and stood at 65 percent in 2012. Krämer (2011) looked at the labour share of income<sup>4</sup> and found similar developments. The labour income share fluctuated around 80 percent in the 1990s and then collapsed after 2000 to only 72.3 percent in 2007. When he looked more closely at the components that caused the change between 1999 and 2010 he found that the relatively low distribution margin<sup>5</sup> of on average 0.73 percent in this period was only, to a very minor degree, used for the increase of the real wages (0.13 percent on average).

**Fig. 1. Adjusted Wage Share, Germany, 1960 – 2012 (% of GDP)**



Source: European Commission (2013).

<sup>1</sup>Due to space limitation there will be no detailed theoretical discussion of the links between inequality and financialisation, but only short remarks of those links within the analysis. For a theoretical discussion of those links see Hein and Detzer (2014). A more general discussion of financialisation in Germany can be found in Detzer and Hein (2014).

<sup>2</sup>For a more extensive analysis of the changes in income distribution in Germany see Hein and Detzer (2014).

<sup>3</sup>The wage share is the ratio of compensation of employees and GDP. Here it is adjusted, so that it does not reflect the changes in composition of employment (employees and self-employed), but only the changes in relative income.

<sup>4</sup>The labour share of income adds to the wage share an estimated wage for self-employed persons.

<sup>5</sup>Relates to the change in productivity per worker. If it is fully used for real wage increase, functional income distribution would not change.

Also, personal income distribution has become more unequal. The Gini Coefficient for market incomes in Germany increased from 0.429 in 1990 to 0.471 in 2000. From 2000 to 2004 it increased further to 0.499. By 2010 it had decreased a little to 0.492. Further, if one looks at the distribution of disposable income (after redistribution through taxes and transfers), one can see a remarkable increase of inequality, which largely occurred during the 2000s. In the period from 1990 to 2000, the Gini Coefficient increased from 0.256 to 0.264. From 2000 to 2010, it increased to 0.286 [OECD (2013)].

Overall, income inequality in Germany has increased. Functional income distribution has changed in favour of profits at the expense of wages. At the same time, personal income distribution has become more unequal. The general trend could be observed already during the 1990s but the strongest increase of inequality was observed after 2000. In the following I will look at the changes in the financial system that occurred since the 1980s and investigate of whether the changes in income inequality can be related to changes in the financial system.

### 3. THE GERMAN FINANCIAL SYSTEM—AN OVERVIEW

The German financial system has been classified as a prime example of a bank-based financial system. Despite attempts in the 1990s to promote security markets and certain regulatory changes conducive to their development, banks are still the main actors in Germany's financial system. Detzer, *et al.* (2013) showed that the main quantitative indicators still point to a bank-based financial system. Ratios of balance sheet size, bank deposits or bank loans to GDP are still much higher in Germany than, for example, in the USA, which is classified as a typical market-based financial system. At the same time financial markets are less developed in Germany. Stock-market capitalisation and trading activity are low compared to countries with market-based financial systems; domestic markets for private debt securities are also less developed.

#### 3.1. The German Banking Sector

In contrast to most other developed capitalist countries a large part of the German banking system consists of publicly-owned and cooperative banks. The German banking act puts no restriction on the conduct of investment and commercial banking. Therefore, most German banks are principally universal banks.

In 2012, private banks held 38 percent of the banking sector's assets, publicly-owned banks held 29.4 percent and the cooperative banks 11.8 percent. Additionally, there are some special purpose banks that are largely related to the financing of real estate, which account for 20.4 percent of total assets (Table 1).

The largest four banks among the private banks already account for 25.3 percent of total banks' assets. Those are Deutsche Bank, Commerzbank and Unicredit. The fourth private big bank is Postbank. However, Deutsche Bank holds 93.7 percent of its shares, so that it cannot really be regarded as a separate institution. These big banks have traditionally acted as house banks to the German large industrial firms. Banks and industrial firms were connected through cross-shareholdings and supervisory board seats. However, the need for external finance from these firms has declined since the 1970s. After attempts to enter the business with small and medium sized enterprises remained unsuccessful because savings and cooperative banks dominated this market, the big banks

Table 1

*Banks by Banking Group, Germany, 1980 – 2012*

	1980		2000		2007		2012	
	Number	% assets						
Total	3,359	100.0	2,987	100.0	2,038	100.0	1,988	100.0
Private banks	162	23.5	290	27.1	254	29.4	284	38.3
Big banks	6	9.8	4	15.4	5	18.6	4	25.3
Regional banks	100	10.5	199	9.8	157	8.9	168	9.4
Branches of foreign banks	56	1.7	87	2.0	92	2.0	110	3.6
Savings bank sector	611	38.6	580	35.3	461	33.9	436	29.4
Landesbanken	12	16.5	13	19.8	12	20.2	10	16.7
Primary savings banks	599	22.1	567	15.5	449	13.7	426	12.7
Cooperative sector	2,304	14.8	2,039	12.5	1,259	11.7	1,123	11.8
Regional institutions	10	4.0	4	3.6	2	3.4	2	3.4
Primary cooperative banks	2,294	10.7	2,035	8.8	1,257	8.3	1,121	8.4
Special banks								
Mortgage banks	39	13.6	32	14.6	22	11.5	18	6.9
Building and loan associations		0.0	32	2.5	26	2.6	23	2.3
Special purpose banks	17	6.4	14	7.9	16	10.9	17	11.2
Memo item								
Foreign banks			148	4.1	138	11.4	150	12.1
of which majority owned foreign banks			61	2.1	46	9.4	40	8.5

Source: Detzer, et al. (2013), p. 75.

focused on investment banking activities instead. To increase business in this area, they were also the main proponents of the development of securities markets in Germany. At the same time their strong links with industrial firms made their neutrality in investment banking activities questionable and, therefore, they started to reduce their shareholdings as well as their supervisory seats in non-financial firms [Deeg (2002)].

The savings bank sector consists of primary savings banks, the regional Landesbanken and the Deka Bank. The savings banks are usually owned by the local city or county governments. Each savings bank is independent and managed locally. Its business activities are restricted to customers within its locality and actively trying to expand business to customers in other areas is prohibited. The main distinct feature of savings banks is that their main purpose is not profit making. Instead, they are required to serve the public interest of their local community. The usage of occurring profits is regulated differently and depends on their statute. Savings banks put most of their profits into reserves, distribute them to the respective public owner or use them directly to finance charitable and public projects. According to Deeg (2002) they focused on the provision of low-cost, long-term financing and use this to compete with other banking groups. This would pressure other banking groups to also provide long-term financing. Additionally, the institutional structure provides incentives to the savings banks (the same is true for the cooperative banks) to provide long-term funding to the local non-financial sector. Due to being restricted to respective local markets, they have to be interested in the long-term viability of their local clients. Also, they have strong incentives not to harm their reputation as long-term they have reliable partnership with their clients. Despite their not-profit maximising behaviour, their engagement to support the local economy

and community and possible influences due to their state ownership, they seem not less competitive than their private counterparts. Their ability to maintain their market share in commercial lending appears to confirm this. Also, regarding profitability or efficiency savings banks do not seem to be inferior to private banks.<sup>6</sup>

On a second level in the savings bank sector there are the regional *Landesbanken*. Their original purpose was to function as a banker to regional state governments and as a central bank to the savings banks in their region. Additionally, they developed a wide range of commercial and investment banking activities, through which they compete directly with the big private banks. During the financial crisis in 2008, the *Landesbanken* were criticised because they registered large losses due to their trading activities in complex financial instruments.

A third level of the savings bank sector is made up by the Deka Bank, which serves as the central asset manager of the savings bank group.

Within the group many functions have been centralised so that the local savings banks can profit from the economies of scale of a big bank, without giving up their local focus.

The cooperative banking sector consists of the primary cooperative banks that act on a local level and two regional institutions. The primary cooperative banks are also limited to local markets and focus mainly on traditional bank lending instead of investment banking activities. They are owned by their members and are, like the savings banks, not strictly profit maximising. Instead they are required to serve the interests of their members. The two regional institutions act as central banks for the primary cooperative banks. They also compete with the big private banks and the *Landesbanken* for commercial and investment banking business [Detzer, *et al.* (2013)].

### 3.2. Securities Markets

As mentioned above, securities markets in Germany are relatively undeveloped. Bank loans are the main source of external finance for non-financial firms, while shares and bonds play only a negligible role. German domestic bond markets have mainly been used by banks to raise additional finance but recently other financial institutions take part as well. The stock markets are also relatively undeveloped. Trading value, stock market capitalisation and turnover ratios did increase with the stock market boom at the end of the 1990s. However, figures are still low compared to the US or the UK.

German private investors mostly hold their financial savings in the form of bank deposits and insurance policies. The proportion of savings held directly in the form of shares and bonds is relatively low and confined to few individuals [Detzer, *et al.* (2013)]. At the same time foreign investors were not particularly present in the German market partly due to the regulatory framework, which was opaque for outsiders. Stock markets were largely self-regulated and rules regarding insider trading were lax. The lack of attractive product innovations and relatively high trading fees were two additional reasons that explain the reservations of foreign investors towards the German financial markets. According to Lütz (2002) this system was beneficial for the big German banks but at the same time depended also on their support. Simultaneously, the Bundesbank

<sup>6</sup> For an overview regarding research on profitability and efficiency see Detzer, *et al.* (2013), Chapters 8 and 9.

played a moderating role regarding the spread of new financial instruments and actors in Germany, mainly because of concerns about the effectiveness of monetary policy.

The modernisation and regulative reconstruction of the German system of financial markets occurred mainly during the 1990s and therefore much later than in the US or the UK. As mentioned above, banks lost their interest in maintaining the existing system due to their strategic reorientation. They started to establish their investment banking activities mainly through acquisitions of existing international investment banks. At the same time, they pushed their idea of establishing Germany as an international financial centre. In 2003, one of their main platforms for this purpose was founded—the initiative “Finanzstandort Deutschland” (Germany as a financial centre). It was closely linked to political actors, since the German Ministry of Finance and the *Deutsche Bundesbank* were also members of this platform. The initiative was closed in 2011 during the financial crisis.<sup>7</sup>

Starting in 1984, first the *Bundesbank* and later the government passed a variety of deregulatory measures, which abolished hurdles for foreign engagements (e.g. certain tax laws) and allowed more financial innovations [Domanski (2003)].

The First Financial Market Promotion Act (*Erstes Finanzmarktförderungsgesetz*) in 1990, introduced a range of legislative steps to modernise the financial market structure to become more similar to the US and UK markets. The core part established with this act was the Prospectus Act (*Verkaufsprospektgesetz*), which governed the requirements for the prospectus for securities offered for the first time to the public. It was the first legislative act whose primary goal was to protect investors in German capital markets.

The Second Financial Market Promotion Act (*Zweites Finanzmarkt förderungsgesetz*), which came into effect in 1995, had far reaching securities trading provisions. One of its main issues was the regulation of insider trading and ad-hoc news announcements. But it also established a federal agency (*Bundesaufsichtsamt für den Wertpapierhandel*) responsible for the regulation of securities markets, which was similar to the US Securities and Exchange Commission.

The Third Financial Market Promotion Act (*Drittes Finanzmarktförderungsgesetz*), including the Control and Transparency in Business Law (*Gesetz zur Kontrolle und Transparenz im Unternehmensbereich*) was passed in 1998. The law affected the activities of corporations and stock exchanges and influenced accounting practices. It is interesting to note that the Ministry of Finance in its press release explicitly related the law towards the promotion of shareholder value policies. Some of the most important changes in the law regarded the use of proxy voting by banks, the enabling of stock option programs and of share buybacks, the disclosure of inter-corporate share ownership, limitations on serving on multiple boards and the use of voting caps.

In 2001, this was followed by the Tax Reduction Act (*Steuersenkungsgesetz*), which eliminated corporate capital gains taxes. This removed an important barrier to the reduction of inter-corporate cross-shareholdings.

The last most relevant change was the Securities Acquisition and Takeover Act (*Wertpapiererwerbs- und Übernahmegesetz*) in 2002, which formally regulated merger and acquisitions and severely limited the defence measures a firm, targeted by a hostile takeover attempt, could take [Bradley and Sundaram (2003)].

<sup>7</sup> “Banken dämpfen Lobbyarbeit ein”, Handelsblatt Online, 28.06.2011.

Following legislative steps, including the Fourth Financial Market Promotion Act (*Viertes Finanzmarktförderungsgesetz*), did enlarge the investment opportunities for institutional investors and allowed new financial investors, like hedge funds and others, to become active in Germany in 2004.

Those legal changes made the German market more transparent and more accessible for foreign investors, as it allowed for more outsider control. At the same time they unravelled the German corporate network and facilitated the establishment of a market for corporate control.

A range of privatisations of former state owned corporations gave an important impetus to the growth of stock markets in Germany during the 1990s. In the course of the new technology boom at the end of the 1990s, Germany's stock markets boomed and many German households started to invest in shares for the first time. The establishment of a shareholder culture in Germany seemed successful. However, with the collapse of stock prices and the closure of some market segments established during the boom, German households retreated again from the stock-market and the new equity culture seemed to have been a rather short-lived fancy [Detzer, *et al.* (2003)].

### **3.3. Employment and Incomes in the Financial Sector and Their Contribution to Inequality**

In some countries, such as the UK or the US, the size of the financial sector in the economy has grown significantly. This is true in terms of value added as well as for the number of people employed. The OECD (2012) remarks that a higher share of the financial intermediation sector in total employment contributes to higher labour income inequality, since the gains from working in this sector are greater for high income workers. Additionally, some studies found that the strong rise in incomes in the financial sector had contributed much to increase inequality in many countries. Here, the rising incomes of the very top earners in this sector were the driving factor.

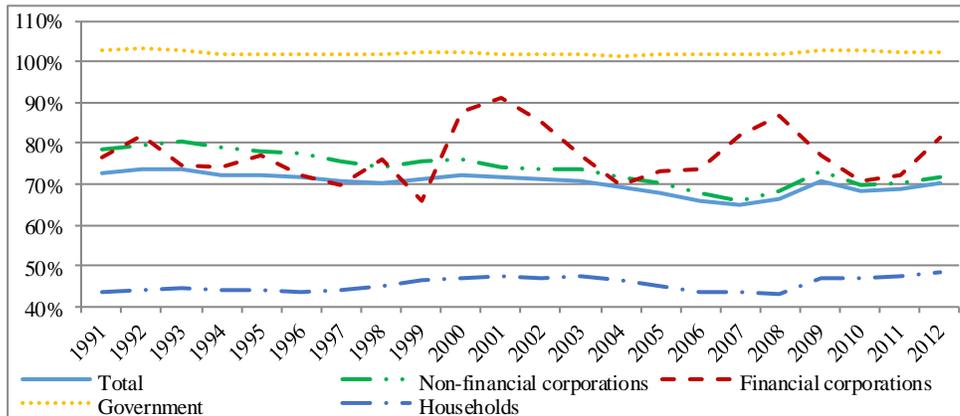
#### ***Incomes in the Financial Sector***

Figure 2 shows the compensation of employees in percent of net value added in different sectors of the German economy. It clearly shows that since around 2000 there was an upward shift in the compensation of employees in the financial corporate sector. At the same time, the share exhibits much larger fluctuations than in the period before. The upward shift of the wage share in the financial sector should have positively affected the overall wage share in Germany. Thus, the reasons for its downward trend should be found in the non-financial corporate sector, where the share going to labour decreased between 1993 and 2007. The downward trend in the non-financial corporate sector was partly balanced by an increasing share going to employees in the household sector in the period between 1997 and 2003, although, after this also in the household sector the share going to employees decreased until 2008.

Looking at the net value added of financial corporations in total value added Figure 3 shows that the share was relatively stable until 1999. After, it exhibits much larger fluctuations and shows a slight downward trend. Therefore, Germany does not follow the international trend of an increasing importance of the financial sector in the economy. Given the slightly higher wage share in the financial sector as compared to the

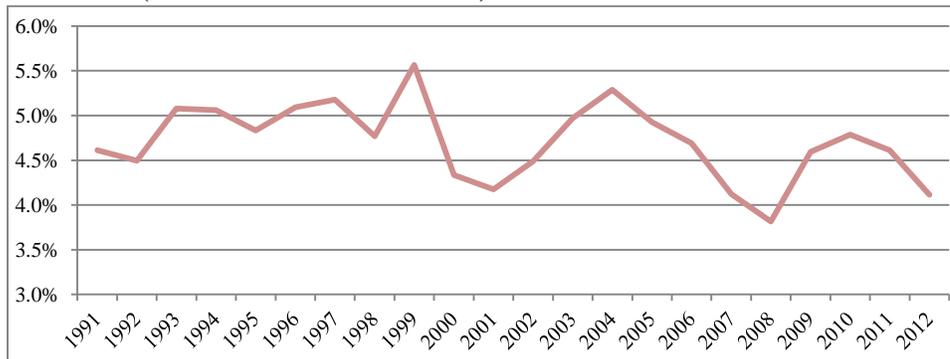
rest of the economy, its relative loss in net value added in Germany could contribute to the explanation of the declining total wage share. However, given the financial sectors' relatively small overall share in total net value added and the relatively small difference between the wage share in the financial sector and in Germany as a whole, the explanatory power is rather low.

**Fig. 2. Compensation of Employees by Sector, Germany, 1991 – 2012  
(% of Net Value Added)**



Source: Statistisches Bundesamt (2013).

**Fig. 3. Net Value Added of Financial Corporations, Germany, 1991 – 2012  
(% of Total Net Value Added)**



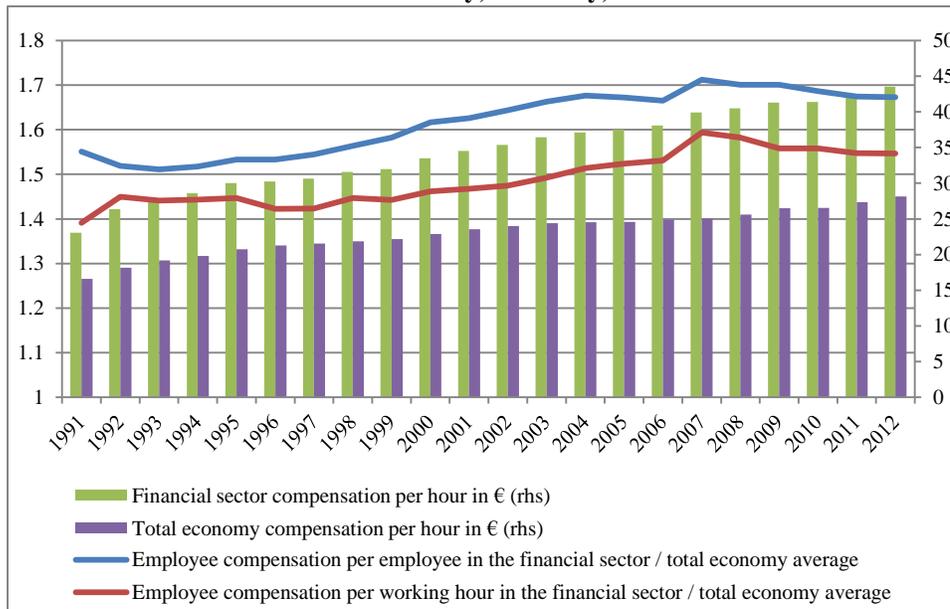
Source: Statistisches Bundesamt (2013).

### ***Incomes and Employment in the Financial Sector***

In many countries increases in personal income inequality and in particular wage inequality were partially related to the large wage increases in the financial sector as compared to the rest of the economy [e.g. Rosnick and Baker (2012) for a cross sample of OECD countries; Bell and Van Reenen (2010) for the UK; Godechot (2011) for France]. In the US, for example, the share of total compensation going to employees in the financial sector increased from 4.5 percent in 1980 to 7.7 percent in 2006, while the financial sectors contribution to total employment fluctuated around 5 percent during the same period [Orhangazi (2008)].

In Germany, hourly compensation and compensation per employee are higher in the financial sector (Figure 4). In 1992, the average hourly wage in the financial sector was about 1.45 times that in the economy as a whole. In 2000, the ratio had not changed much and was at 1.46. From then on, the hourly wages in the financial sector increased faster than in the rest of the economy, so that in 2007 an employee in the financial sector earned on average almost 1.6 times the average hourly wage. On a per employee basis the general trend is similar, but at a higher level. As a result, financial sector employees improved their position relative to other employees. With the financial sector wages already at a higher level, this has contributed to higher wage inequality as well as to higher inequality in personal income distribution.

**Fig. 4. Compensation of Employees in the Financial Sector Compared to the Rest of the Economy, Germany, 1991–2012**



Source: Statistisches Bundesamt (2013).

However, the increases in the average financial sector pay were not extraordinary large. Hourly wages in the financial sector grew at an average annual rate of 4.2 percent in the period 1991 to 1999 (Table 2). Excluding the exceptionally strong year 1991 hourly wages grew in line with the average wage and GDP growth in this period. Between 2000 and 2007 the average growth of wages in the financial sector was 2.6 percent. This was above average but still in line with GDP growth and conformed to target inflation plus the distribution margin (productivity growth) of 0.73 percent calculated by Krämer (2011) for this period. However, the average wage growth in Germany fell to 1.3 percent during the same period. The increasing income dispersion therefore, does rather seem to be related to the sluggish wage growth in the rest of the economy. The opposite was true after the crisis. Financial sector compensation grew slower, while in all other sectors wage growth picked up.

Table 2

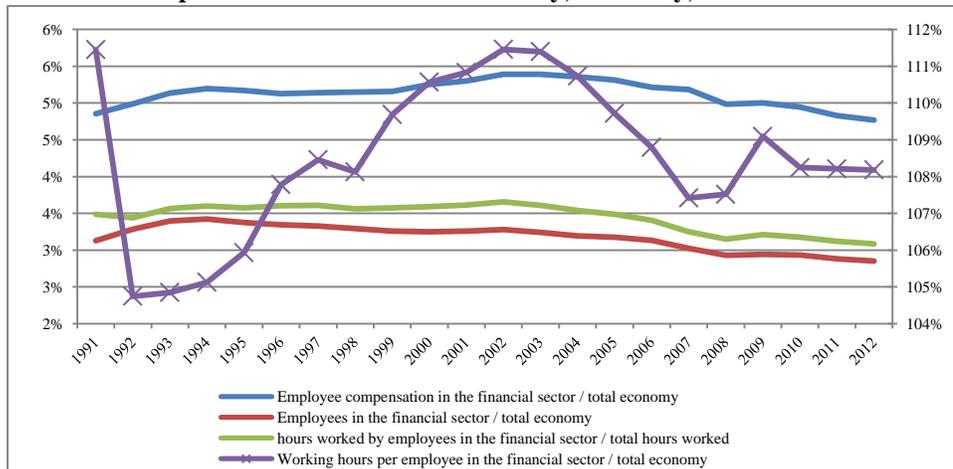
*Average Annual Growth Rates of Nominal Hourly Wages in  
Different Sectors, Germany, 1991–2012*

	1991-2012	1991 - 2000	2000 – 2012	2000 - 2007	2007 - 2012
Agriculture, forestry and fishing	1,6%	3,0%	0,5%	-0,7%	2,1%
Industry, excluding construction	3,2%	4,5%	2,1%	1,9%	2,4%
Manufacturing	3,2%	4,6%	2,2%	2,0%	2,4%
Construction	2,2%	3,0%	1,6%	1,1%	2,3%
Trade, transport, accommodation and food services	2,3%	3,4%	1,5%	1,3%	1,9%
Information and communication	3,3%	4,9%	2,1%	1,8%	2,5%
Financial and insurance services	3,1%	4,2%	2,2%	2,6%	1,7%
Real estate activities	2,4%	3,8%	1,3%	0,4%	2,6%
Business services	2,4%	3,3%	1,7%	0,7%	3,1%
Public services, education, health	2,4%	3,3%	1,8%	1,1%	2,8%
Other services	2,3%	3,5%	1,5%	0,3%	3,1%
Total	2,6%	3,6%	1,7%	1,3%	2,4%
Nominal GDP growth	2,6%	3,3%	2,2%	2,5%	1,7%

Source: Statistisches Bundesamt (2013).

In Germany, the share of total compensation paid to employees in the financial sector slightly increased from just under 4.9 percent in 1991 to 5.4 percent in 2002 (Figure 5). After, a downward trend can be observed and by 2012 the share was at 4.8 percent. Looking at the financial sector's contribution to employment the graph clearly shows a downward trend starting in 1994, while the share of total hours worked in the financial sector stayed roughly stable. This means relatively fewer employees worked relatively more hours, so that total compensation was split among fewer workers. Only from 2002 on, the share of hours worked in the financial sector also declined. In general the working hours per employee in the financial sector are between 4 and 12 percent higher than average working hours per employee in the rest of the economy.

**Fig. 5. Working Volume and Employee Compensation in the Financial Sector Compared to the Rest of the Economy, Germany, 1991–2012**



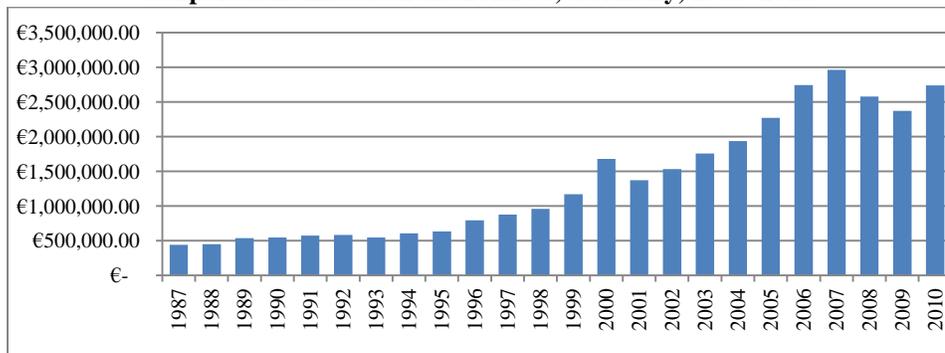
Source: Statistisches Bundesamt (2013).

Two conclusions can be drawn: Overall, employment in the financial sector and compensation of employees in this sector are relatively low as compared to the US. Also, an extraordinary growth of the financial sector or the compensations in that sector could not be observed. The higher average compensation on a per employee basis may have contributed to inequality in Germany; however, regarding the overall importance of the sector and the magnitude of the changes, it can only explain a small part of the observed increases in inequality.

Looking at the average figures alone shows only part of the picture. If wage dispersion has increased in the financial sector, so that top earners increased their incomes while lower level workers' wages decreased or stagnated, this would have contributed to inequality. Especially for the US, the OECD reports that the amount of top earners that come from the financial profession has increased rapidly [OECD (2011)]. One extreme example are the incomes of the top 25 hedge fund managers. In 2001, they earned a cumulative 5 billion USD and this grew to well over 25 billion USD in 2009 [Fichtner (2013)]. If a similar trend is apparent in Germany, it would contribute to inequality.

The payments to management boards in the top-listed German companies provide a first idea of the prevailing trends. The compensation for members of the management boards of big German companies listed in the DAX30 (the German index for blue chip companies) grew moderately until 1995 (5 percent per year), but then compensation started to increase strongly until 2007 with an average annual growth rate of 15 percent (Figure 6). Thereafter, average compensation fell until 2009. Therefore, top management compensation followed the international trends and increased strongly, even though it has not reached levels comparable to the US, where the average annual pay in 2010 was close to 10 million Euros [DSW (2011)]. The financial sector data for Germany in Table 3 shows that Deutsche Bank in particular paid very high compensation.<sup>8</sup> Allianz also paid above average compensation, while Commerzbank and Munich Re paid compensations below average. Despite the fact that the picture might be affected by the crisis, it does not seem that the financial sector has generally higher management compensation than the non-financial sector, but that it rather followed the overall trend.

**Fig. 6. Average Management Board Member Compensation Per Head for Corporations Listed on the DAX 30, Germany, 1987–2010**



Source: Schwalbach (2012).

<sup>8</sup>Chairman of the Deutsche Bank Josef Ackermann was the highest paid Dax chairman with almost 14 million Euro in 2007.

Table 3

*Average Management Board Pay Per Member for Financial Institutions  
Listed in the DAX30, Germany, 2007 – 2010, in 1,000 €*

	2007	2008	2009	2010
DAX30 average	2,964	2,576	2,371	2,738
Munich Re	1,704	2,310	1,974	1,295
Deutsche Bank	6,636	895	4,872	4,153
Commerzbank	1,956	1,109	534	527
Allianz	3,529	2,388	2,572	3,783

Source: Schwalbach (2012).

To conclude, while the strong increase in payments to top management surely has increased inequality, this trend does not seem to be confined uniquely to the financial sector. Instead, it seems to be an overall trend in large German corporations. The tendencies in top management compensation however, are in line with a turn towards shareholder value in German companies, which we will discuss below.

#### 4. RELATION BETWEEN THE FINANCIAL AND THE NON-FINANCIAL SECTOR

While the concept of stakeholder value prevailed in German management boards for a long time, a trend to give higher priority to profitability and to shareholder value was apparent in the past decades. This should not only lead to changes in the functional income distribution in favour of profits, but with very unequally distributed wealth in Germany (the richest 10 percent households own 59 percent of total net-wealth (47 percent for the Euro Area w/o Germany)), also to increases in personal income inequality.

There are different hypothesis about, why German non-financial corporations have adopted shareholder value strategies. Höpner (2003) identified four main arguments. For Germany the most relevant ones that are related to the financial sector are the following ones. First, owners of German firms have become more profit oriented so that those investors pressure management for shareholder friendly policies. Second, the institutional framework in Germany has changed allowing a market for corporate control to emerge, which forces managers to adopt shareholder-value policies. The following section will examine those hypotheses for the case of Germany.

##### 4.1. Shareholder Value Orientation Due to the Pressure by Institutional Investors

Höpner (2003) argued that the capital market orientation of firms depends on their ownership structure and that the share of institutional investors in the ownership structure is positively correlated with shareholder value orientation. He found that private households have delegated their direct shareholdings to institutional investors during the 1990. Additionally, during the 1990s more foreign institutional investors, in particular US investment funds, have also invested in German companies. Those institutional investors became influential shareholders of firms and passed their performance pressure on to the management of the non-financial firms so that those were pressured to follow a strategy of shareholder value und profit maximisation.

Data on shareholdings of different groups of investors for the period 1991 to 2012 confirms those tendencies in ownership structure (Table 4). The share of domestic investment firms and financial institutions increased in particular until 2000. The data also confirms the increasing importance of owners from the rest of the world. Unfortunately, the flow of funds accounts do not distinguish where the foreign holders of German stocks come from. However, Beckmann (2007) noted that a large part of foreign shareholders in 2002 were institutional investors from Britain and the US. Additional evidence for large shareholdings of US investors was delivered by a report from Kleinwort (2007), which claimed that the share of US-investors increased from 3 percent to 18 percent of total shares between 1998 and 2006. Hence, it can be confirmed that institutional investors as owners of German joint stock corporations have become more important.

It can be argued that some investors have strategic and not only financial interests in their stock holdings. This leaves managers room for other strategies than profit maximisation. If the share of purely financially interested shareholders increases, this room should be tightened. Assuming that the groups of the rest of the world, investment firms and other financial institutions, and private households largely hold their shares to gain financial returns, while all other groups also have strategic interests, one can see that between 1991 and 2007 investors with a financial interest have become more dominant (Table 4). Additionally, if one distinguishes the group of financial investors into institutional and private investors, one can see that the share of private direct shareholdings has decreased. This is important, because the investment behaviours and strategies of private investors normally leave the management more room for manoeuvre than those of professional investors [Höpner (2003)].

Table 4

*Ownership of Domestic Joint Stock Corporations, Germany, 1991–2012*  
(% of Total Shares at Market Value Outstanding)

	1991	1995	2000	2005	2007	2012
Non-financial corporations	42.7%	43.7%	32.2%	35.5%	30.5%	36.4%
Banks	11.2%	11.3%	12.2%	9.0%	4.9%	4.2%
Investment firms and other financial Institutions	3.8%	5.9%	12.2%	12.3%	12.5%	10.3%
Insurance firms	4.8%	5.7%	4.4%	4.6%	5.0%	7.3%
Government	5.2%	5.7%	3.1%	2.8%	1.8%	2.1%
Private households	19.5%	18.6%	15.8%	13.9%	11.6%	10.3%
Rest of the world	12.8%	9.1%	20.1%	21.9%	33.7%	29.3%
Strategic investors	64.0%	66.4%	51.9%	51.9%	42.2%	50.1%
Financial investors	36.0%	33.6%	48.1%	48.1%	57.8%	49.9%
Institutional	16.6%	14.9%	32.3%	34.2%	46.2%	39.6%
Private	19.5%	18.6%	15.8%	13.9%	11.6%	10.3%

*Source:* Deutsche Bundesbank (2013), own calculation.

*Notes:* For the calculation of the figures it had to be assumed that all domestic sectors hold an equal share of stocks in foreign companies in their portfolios. It is assumed that non-financial corporations, banks, insurance firms and the government have strategic interests in their holdings, while private households, investment firms and other financial institutions and investors from the rest of the world are only pursuing financial interests. In particular the banks and insurance companies seem to have become more of financial than strategic investors over the period [Höpner and Krempel (2006)], so that they could be counted also towards financial investors.

Fichtner (2009) looked at similar figures and also confirmed that the number of strategic investors has declined. Additionally, he looked at the number of blockholders, which can shield company managers from market demands (and from hostile takeovers), in large German companies – those have declined. In 1991, 85 percent of the firms had a shareholder with a block above 25 percent. This number had fallen to 56 percent by 2008.

The remaining question in this regards is how institutional investors are able to influence the management to pursue a shareholder oriented strategy. In the US, meetings of larger investors and management are not unusual and investors try to directly influence management boards. Studies on investor behaviour from 1998 and 2000 show, however, that direct influence on managements was rather rare in Germany. Therefore, the main channel seemed to have been the threat of selling shares which would correspond to a decline in share prices.

However, this seemed to have changed in the course of the 2000s. More recent surveys show that managers of big German companies conform to the demands of US-investors for more meetings, transparency and regular communication. Additionally, German managers predicted in 2007 that the most important investors over the next five years will be located in the US or the UK and not in Germany or Europe [Kleinwort (2007)]. That can be a reason for them to pursue management strategies that are more common in those countries. The general hypothesis that the composition of owners is relevant for the corporate strategy is confirmed by a survey conducted by Achtleiter and Bassen (2000), which investigated the reasons for the increased shareholder-value orientation in Germany. The main reason given was the increased focus on returns by shareholders. Therefore, there is evidence for the fact that increased financial interests of shareholders have influenced management to follow strategies more in line with the shareholder value concept.

The pressure from institutional investors seemed to have reached a new qualitative stage due to the intensified activities of so-called activist hedge funds. They buy substantial stakes in companies and then publicly pressure them to follow certain demands to increase (short term) shareholder value.<sup>9</sup> The usual demands are: share buy-back programmes, special dividends, either from surplus cash or even by taking on additional debt, and the sale of divisions that are not part of the core business area of the company. They substantially influence long-term management decisions and very often profit from an asset transfer from other stakeholders, such as workers, suppliers or creditors, to shareholders. Empirical studies, mainly for the US, show that the involvement of an activist hedge fund in a firm led to higher stock returns, but also that the average targetted firm of an activist hedge fund has significantly increased its long term debt load, while doubling dividends and decreasing its short term investment and its cash position [Fichtner (2009)]. For Germany, Bessler, *et al.* (2008) showed that short

<sup>9</sup>One prominent example was the investment of the hedge fund manager David Einhorn (Greenlight Capital) in Apple. In TV and press he publicly criticized Apple for holding too much cash and that they should pay out part of it to investors. The high involvement in the firm's policies can also be seen by the fact that they filled a suit against some changes in Apple's bylaw [Handelsblatt (2013)]. Eventually, Apple gave in and issued debt to start a stock-repurchase programme and to increase its dividend in April 2013 [Bloomberg (2013)]. Apple is currently again confronted with similar claims by the activist investor Carl Icahn, which, despite having a share of below once percent actively tries to influence the firms policies [Frankfurter Allgemeine Zeitung (2013)].

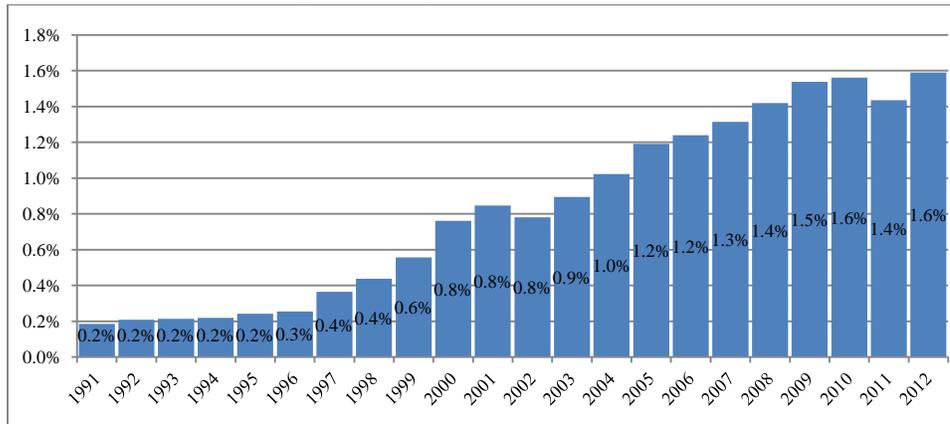
and long term shareholder value increased by firms targeted by activist hedge funds. Fichtner (2009) used a qualitative approach to look at the impact of activist hedge funds in Germany. He examined the ten most prominent cases of hedge fund involvement in Germany. He found that companies in which strategic block holders owned the largest holdings of shares, the demands from hedge funds could very often be averted. If however, the hedge funds had a larger share, their demands were usually fulfilled. Therefore, the observed decline of large strategic investors increased the threat of being targeted by activist hedge funds. Fichtner (2009) pointed out, that the activism of hedge funds in Germany, the ability to act in concert (wolf-pack tactics) and the reputation they built up in high-publicity cases [e.g. Deutsche Börse in (2005)] have enabled them to establish “a tightly knit grid of material coercion” for German listed companies that are not protected by a large strategic stakeholder. This “disciplinary power” forces unprotected corporations, even though they are not currently targeted by an activist hedge fund to pursue shareholder value enhancing strategies, such as share buy-backs and increased dividends.<sup>10</sup>

While activist hedge funds mostly invest in listed stock corporations, similar pressure is exerted by private equity funds<sup>11</sup> on non-listed companies. Private equity funds normally invest in a company's equity, reorganise the company and sell it in the medium term to another investor for a higher price. Supporters of private equity (PE in the following) see their activity as a driver for a more efficient allocation of capital and higher production efficiency and therefore, as beneficial to shareholders, since the value of the firm increases. Additionally, their activity leads to less expensive or higher quality goods and also to more jobs benefitting society as a whole. Critics argue that PE makes its gains through financial engineering at the expense of other stakeholders such as debtors, other shareholders and future interests of employees. PE funds increase the debt/equity ratio or extract resources through special dividends and the like. Increased operational efficiency is achieved by choosing a low road approach, i.e. reducing wages, cutting employment, reducing R&D and capital investment. That allows them to increase short term profitability at the expense of long run growth and innovation. Last but not least, they use tax subsidies for debt relative to equity and therefore, part of the gains are achieved by transferring income from tax payers to PE investors. Vitols (2008) reviewed international empirical evidence on the impact of private equity. His overall assessment stated that there is no evidence of a clear gain for either private equity investors or for employment. In particular studies for Germany did not show any positive employment or profitability effect. However, case studies for German companies showed that there seemed to be a wide range of cases showing overall positive effects to strong negative effects. Additionally, they showed that when a PE firm gets involved in a company, the degree to which employee rights for information and consultation are respected often deteriorates.

<sup>10</sup>Alternatively, other firms have started looking for a stable anchor investor that could protect them from activist hedge funds.

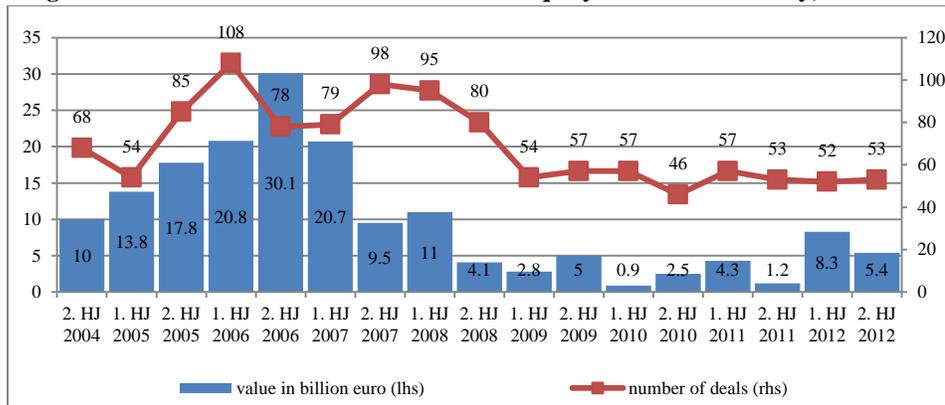
<sup>11</sup>Very often the term private equity refers to funds exerting buyouts and providing venture capital. Here it is only referred to funds that perform buyouts.

**Fig. 7. Funds under Management by German Private Equity Firms and Funds of Foreign Companies Invested in Germany, Germany, 1991 – 2012 (% of GDP)**



Source: Bundesverb and Deutsche Beteiligungsgesellschaften (2013).

**Fig. 8. Total Value and Number of Private Equity Deals in Germany, 2004–2012**



Source: Ernst and Young (2012).

The empirical evidence for Germany suggests that the negative view prevails. Thus, the activities of private equity investors may lead to higher inequality on the one hand, by squeezing labour, i.e. lower wages and employment and on the other hand, by reducing tax revenues and therefore, trimming down the ability of the state for transfers.

While private equity funds played a modest role in Germany for a long time, they have grown tremendously in size and activity since 1996. Funds under management by German private equity firms have grown strongly from 0.25 percent of GDP in 1996 to 1.6 percent of GDP in 2012 (Figure 7). More importantly, the investment activity of those funds in Germany increased strongly as well. While in the first half of 2003 there were about 35 transactions with an overall value of about 6 billion Euros [Vitols (2008)], this has increased to 78 transactions with a total value of 30 billion Euros in the second half of 2006. Thereafter, PE investment decreased strongly with the onset of the financial crisis and only has been recovering slowly since 2012 (Figure 8). Even though there is

no direct empirical evidence for the effect of PE on inequality, it is notable that the rise of PE firms coincided with the increase in income inequality in Germany.

#### **4.2. The Occurrence of a Market for Corporate Control**

Another reason also related to ownership structures that lead to the increased shareholder value orientation by management is the new pressure occurring through the emergence of a German market for corporate control. The argument states that managers have an interest to keep share prices high, if a market for corporate control exists. The market for corporate control cannot be strictly separated from the stock markets in general. It describes the market where investors can acquire control over a firm by gaining a majority position in the firm. A company can be listed at the stock market, but does not necessarily need to be on the market for corporate control. For example, if a majority stake is held by one or more shareholders that are unwilling to sell, or if there are other legal or practical barriers that protect the firm against takeovers, corporate control cannot be reached. If a market for corporate control exists and if it is relatively active, there are two main reasons for managers to pursue a shareholder value strategy to keep the share prices high in the secondary markets. First, a high share price protects against hostile takeovers. If a company is taken over, there is a risk for the management board to get replaced. So the managers have a self interest in avoiding a takeover. Second, if the firm thinks about acquiring other firms, a high share price gives them a better position to offer a stock swap. Therefore, the existence of a market for corporate control and a firm's exposure to it gives an incentive to managers to follow shareholder value strategies and therefore, has distributional consequences, as shown by a study of de Jong (1997). He showed that companies in Western Europe, where markets for corporate control are less active, retain or distribute in the form of wages to workers most of their net-value added, while the dividends paid out are below average. In companies in Anglo-Saxon countries, where markets for corporate control are more relevant, the relation is reversed—low retained earnings and low wages but high dividends. The management seems to solve the conflicting targets of long term growth and investors' interests differently depending on the existence of a market for corporate control.

For a long time merger and takeover activity in Germany was low compared to other European countries. This can be explained by a range of reasons. On the one hand, due to cross-shareholdings among industrial firms and the financial sector there were only few shares available for trade in the market (low free float), so that hostile takeovers were more difficult or even impossible for most companies. On the other hand, the legal framework and accounting rules were not conducive to takeovers. At the same time, politicians, elites and the general public frowned upon hostile takeovers [Höpner and Jackson (2006)]. Nevertheless, merger activities picked up in Germany and the threat of takeovers has increased. During the 1970s on average 373 mergers were reported to the Federal Cartel Office annually. This already increased to 827 during the 1980s. From 1991 to 1997, partially due to a large wave of mergers with East German firms and the integration and liberalisation of European markets, there were 1,479 deals annually valued at about 1.4 percent of GDP. This increased to 1,607 deals and 7.5 percent of GDP annually for the period from 1998 to 2005. While this is still below the value and number of deals in the UK, the actual threat of being taken over seems similarly high. In

Germany between 1998 and 2005, 11 percent of listed companies were targeted in M&A transactions, as compared to 9 percent in the UK and 10 percent in the US. This suggests that something has changed in Germany that facilitated the occurrence of a market for corporate control. Many reasons can be identified. Facilitated by capital market orientation of large companies and legal changes on the German national and the EU level, more and more firms use International Accounting Standards, which are more transparent and favoured by financial investors. This is in general more conducive for takeovers. Additionally, in 1995 a voluntary takeover code was established and later the Securities Acquisition and Takeover Act (*Wertpapiererwerbs- und Übernahmegesetz, WpÜg*) was passed in 2002 [Höpner and Jackson (2006)]. It established mandatory bid rules, required board neutrality and limited the defensive actions the board can take against hostile takeovers [Detzer, *et al.* (2013)]. Höpner and Jackson (2006) conclude that the defensive actions are limited to share buy backs, engaging in alternative acquisitions or searching for a white knight. However, the introduction of the takeover act occurred when M&A activities had already picked up and therefore, it should be seen as an accommodating action of the legislator rather than as a cause of the increased activity.

Hence, the rise of the market for corporate control has to be related to other factors. One factor inhibiting the emergence of a market for corporate control was the existence of the so called German Inc. (*Deutschland AG*). The German business sector was characterised by a dense network of cross-shareholdings among firms. The network was built around large German financial institutions (Allianz, Commerzbank, Deutsche Bank, Dresdner Bank, Hypo-Vereinsbank, Munich Re), which had board seats and large holdings in many industrial firms and also between each other. This network was seen as a substantial barrier for the market for corporate control. However, with the strategic reorientation of the banks towards investment banking during the 1990 they regarded their position in industrial firms as a handicap and reduced their engagement. Deutsche Bank, for example, publicly announced that it planned to reduce its board positions and share holdings in industrial firms. In the network of cross holdings one can see that most of the banks and in particular the Deutsche Bank moved from being in the core to the edges of the decisively less dense network between 1996 and 2004. In contrast, the Allianz still seems to hold a core position, although it reduced its position overall. Nevertheless, Allianz always had a more passive role than the banks. By outsourcing its investment portfolio to a separate investment fund Allianz indicated it had a mainly financial interest in their investments [Höpner and Krempel (2006)].<sup>12</sup> The abolition of the corporate capital gains tax in 2002 gave a strong impetus to the dissolution of the network. It allowed financial institutions to uncover their large hidden reserves without paying taxes on the proceeds [Rünger (2012)].

The dissolution of the cross-shareholding network removed an important barrier to the market for corporate control. Apart from their position in the German company network, banks had further possibilities to influence the outcomes of takeover attempts. Due to their seats on supervisory boards and their ability to exert influence through their proxy voting power, they can either support or hamper management in fending off hostile

<sup>12</sup>Anecdotal evidence of the most of financial interest of Allianz in at least some of its larger stock positions is given by Fichtner (2009), who discusses the case of Heidelberger Druck, which came under pressure of the activist hedge fund Centaurus to start a share buy-back programme. Allianz remained rather passive and sold part of its shares later with a handsome profit.

takeover bids. In sum, until the early 1990s at least banks were willing to use their powers to undermine hostile takeover attempts. However, the orientation towards investment banking led them to be rather supportive of hostile takeovers. The dilemma banks faced was well illustrated by the takeovers of Krupp/Hoesch in 1991 and Krupp/Thyssen in 1997. In both cases the Deutsche Bank supported the takeover attempts by Krupp while it had strong relations to the respective takeover targets. This was widely criticised by the public and led the banks to reduce their monitoring role and to direct their focus on investment banking mainly [Höpner and Jackson (2006)]. Deutsche Bank made its support of a takeover friendly environment in Germany very clear through the following quote of its management board chair Klaus Breuer in 1997 during the Krupp/Thyssen takeover battle: "I very much hope that a first large case will set an example within our financial culture"<sup>13</sup>. Jackson and Höpner (2006) saw the decisive test case and proof that a market for corporate control had developed in the Mannesmann/Vodafone takeover in Germany. Banks did not play any defensive role for Mannesmann. Politicians did not actively intervene in the deal. In sum, the case showed that hostile takeovers are possible in Germany.

As explained above, this development inclines managers to pursue shareholder value friendly policies, which in turn leads to a distributional change in favour of shareholders and at the expense of workers. While the market for corporate control can mainly explain changes in listed stock companies also non-listed and non-stock corporations may be affected. As seen above, private equity funds target non-stock corporations and therefore, exert a similar pressure on those companies. Additionally, it can be argued that many of Germany's smaller firms are suppliers of the big industrial listed companies. With those under pressure to maximise shareholder value they may use their market power to forward this pressure to their suppliers.

Altogether, we can see there are relevant mechanisms that originated in the financial sector and contribute to the spread of shareholder value. German financial institutions retreated from the German company network as strategic investors. This left room for more financially interested investors, which put pressure on the management to follow shareholder value oriented strategies. The increased activity of new forms of institutional investors like activist hedge funds and private equity firms took this pressure to a new qualitative level. Also, the dissolution of the German company network combined with some legal changes, more firms are exposed to the market for corporate control. This puts management under additional pressure to keep share prices high in order to prevent hostile takeovers. As shown by de Jong (1997) an increase in shareholder value has distributional consequences. Therefore, it can be argued that the described changes in the financial sector have led to an increased emphasis on promoting shareholder value, which in turn has led to increasing inequality. However, how much of the increase in inequality can be explained by shareholder value orientation is hard to quantify. Looking at the hourly wage developments of different sectors in the economy as presented in Table 2 above suggests concluding that it does not seem to be the most relevant factor. One can see that average nominal wage growth during the 2000s was decisively lower than in the 1990s. This is true for all sectors, and not only the ones that are most likely to be affected by the changes in the financial sectors as discussed above.

<sup>13</sup>Spiegel 13/1997: 94.

One would assume that the tendencies towards shareholder value are strongest in big listed companies. Those should be overrepresented in the industrial sector, while companies in the service sector should be rather small and non-listed. Still the industrial and the financial sector had the highest wage increases in the 2000s.

Additionally, Höpner (2003) showed the degree of shareholder value orientation for big German companies and found the following descending sectoral order: chemicals and pharmaceuticals, utilities, automobile, plant and mechanical engineering, trading and construction. Also, here we can find that the sectors that are mostly following shareholder value are not the ones with the lowest wage increases. Hence, while shareholder value orientation surely has contributed towards the general trend, it does not seem to be the root cause. Looking at the regulatory reform and the changes in the behaviour and rhetoric in the reports of DAX 30 firms, Bradley and Sundaram (2003) dated the occurrence and the spread of shareholder value largely in the 1990s. For the period after 2000 there may still be substantial effects, also due to the occurrence of new institutional investors, but the overall trend does rather seem to be caused by other factors, e.g. the labour market reforms at the beginning of the 2000s.

## 5. CONCLUSION

The large non-profit oriented part of the banking sector is a unique and remarkable feature of the German financial system. The high reliance on banks instead of markets to finance the German system was traditionally described as a bank based system, where Bundesbank, government and the banks themselves were interested in the preservation of the existing order. Only when the big banks' business model as house banks of the large German industrial firms eroded those actors defected and pushed for a more market based system, to support their new focus on investment banking. This was supported by the Bundesbank and the German government, which introduced a range of changes to the relevant laws and regulations in the 1990s and early 2000s. Most importantly, the environment was made more transparent and attractive to foreign investors. Additionally, the regulatory structure was adapted for the development of a market for corporate control. Likewise, tax laws were adapted allowing corporations to reduce their cross-shareholdings without paying taxes on the capital gains. This facilitated the already ongoing disintegration of the German company network, where the big financial institutions in particular—the former core of the network—retreated due to their new investment banking focus.

Examining the direct influence of the financial sector on inequality, I could not find similar trends as in some of the Anglo-Saxon countries. The data that was examined did not suggest huge increases in bankers' wages, nor in the profit share of that sector. The financial sector followed the overall trend of enormous increases in CEO pay; however, that trend was not unique to the financial sector, even though, the Deutsche Bank, with the highest payments up to the crisis, could have served as a lead example for other large companies. Nevertheless, further research on the wage distribution in the sector and regarding non-CEO leading staff of the banks would be interesting to get a better idea of the general trends within the financial sector.

Next the relation between the financial and the non-financial sector was examined. Looking at the ownership structure of the non-financial corporate sector in Germany, it

was found that the replacement of strategic, relatively stable investors by largely financially interested investors has given rise to an increased focus on financial goals and the application of shareholder value oriented strategies by the management boards. Additionally, the reduction of strategic investors has allowed new forms of institutional investors to become important shareholders. Having that position, they actively try to change management strategies towards the (short-term) benefit of shareholders partially at the expense of other stakeholders.

The change from largely strategic stable shareholders (together with the legal changes enacted in the 1990s and early 2000s) has given rise to a market for corporate control, which increases the pressure of management to follow shareholder value strategies to keep share prices high and not being targeted by hostile takeover attempts.

This focus of management on shareholder value has also distributional effects. Giving priority to profitability and shareholder value instead of pursuing growth and a compromise among stakeholders may have led to increases in the profit share. Given the unequal distribution of wealth in Germany, this also can help to explain the more unequal personal income distribution. However, at least for the big companies the turn towards shareholder value had already started in the 1990s. While it surely has contributed towards the increasing inequality in the 2000s, the uniform decline of wage growth in all sectors lead to the conclusion that the changes in the financial structure and the corresponding changes in corporate governance are not the main explanation of the increased inequality observed in the 2000s.

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**Comments**

Your paper examines the relationship between changes in the financial sector and the increasing inequality in Germany over the last two decades. Apparently, the article is a good dissection of the national accounts and some financial sector indicators. But, I have a firm belief that a researcher would have to start by asking whether there is clear increase in income inequality and then see if it occurs around the time of a visible change in financial system arrangements. Without the former, there is nothing to study. Without the latter, one should probably be looking elsewhere. This creates a motivation to analyse the relationship between financial sector and income inequality in the context of Germany. Unfortunately, your paper could not motivate as a researchers. More clearly, the underline theatrical linkages between financial sector development and income inequality lacks in your paper.

Then you claimed that the large non-profit oriented part of the banking sector is a unique and remarkable feature of the German financial system. I believe this is not true. Look at the banking system of China. China also has four Large state owned banks and doing the non-banking activities. For example, they are loaning purely for the social objective like poverty reduction, enhancing of the literacy rate and balla balla. But they are contributing in the economic growth and the reducing the income inequality through their non- profit making and inefficient banking system. I suggest, as a young researcher, you must read about the Chinese financial system as well. You will get some new insights from their financial arrangements.

You took a stance that the higher employees' compensation in the financial sector is contributing in Income inequality of Germany. On the contrary your article give a feel that the employees compensations in financial are merely high. So, there is a mismatch between claims and your evidences in the paper.

Then you claimed that the wage compensations in the financial sectors are lower than the financial sector in US. If the financial sector is growing in Germany, I need your comment here, and then the employees' compensation will be much higher than the present scenario. Are you expecting more Income inequality? If yes, then you must give some guide line to your policy makers

I really must appreciate your work. Because you, as a young researcher, have done a lot to understand the data. This is really lacking in young researchers, specially in my country. Whah they usually do, they get some indices and put them in a software like STATA , Eviews or rats and get some favourable sign and size of the parameters. Indeed, this will not help them to be a influential researcher.

**Abdul Jalil**

Quaid-i-Azam University,  
Islamabad.

## Cluster-Based MSE Development: The Role of *Kaizen* Training

TETSUSHI SONOBE and KEIJIRO OTSUKA

### I. INTRODUCTION

It has been increasingly recognized that entrepreneurship holds the key to industrial development in developing countries [World Bank (2012)]. Indeed, a significant number of studies find that productivity and profitability vary greatly across enterprises even in the same industry in the same country, and that a large part of the variation can be accounted for by the difference in management practices<sup>1</sup>Identifying and supporting high-potential entrepreneurs may be the key to the success of industrial development.

Entrepreneurship is the capacity to introduce new ideas into practice and to manage enterprise operations efficiently. Innovation here does not necessarily mean scientific discovery or engineering invention but the Schumpeterian creation of a new combination of production resources and new ideas to increase profits. In the context of developing economies, innovation includes borrowing technology or learning from abroad. The first introduction of products and production processes from developed countries into a developing country and the first adoption of management practices that may be common in developed countries but are novel in developing countries are considered to be innovations.

Despite its importance, we know little about the entrepreneurship of business owners and managers in developing countries.<sup>2</sup> Why are firms there less able to innovate and manage than their counterparts in developed countries? How can their entrepreneurship be nurtured? The purpose of this paper is to explore these questions by reviewing our case studies of industrial clusters in Asia and sub-Saharan Africa (SSA). These studies include randomized controlled trials (RCTs) of management training for micro and small enterprises (MSEs). While RCTs of management or business training

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<sup>1</sup>See, for example, Bloom and van Reenen (2007, 2010), Bloom, Eifert, *et al.* (2011), Bloom, Mahajan, *et al.* (2010), Bruhn, Karlan, and Schoar (2010), and Syverson (2011).

<sup>2</sup>In this paper, we refer to owners or other ultimate decision makers of enterprises as business owners and managers to avoid confusion between entrepreneurs and entrepreneurship. The term entrepreneur is used to denote owners and managers with varying entrepreneurial skills.

are not new, a major feature of our training programmes is to teach basics of production management called *Kaizen* as well as basics of financial management and marketing which are usually taught in other programmes. *Kaizen* is based on industrial engineering developed in the US, assimilated and modified into a bottom-up approach to management in Japan, and imported by the US automobile industry under the name of Lean Manufacturing, which does not emphasises bottom-up flows of information as much as *Kaizen*.

We highlight cluster-based industrial development because low-income countries should have a comparative advantage in labour-intensive manufacturing industries, which are characterised by the dominance of MSEs located in industrial clusters.<sup>3</sup> In other words, we are interested in cultivating entrepreneurship that will foster cluster-based MSE development since such development will be conducive to reducing poverty and income equality and crucial for inclusive growth.<sup>4</sup> In Asia and Latin America, there are a large number of industrial clusters.<sup>5</sup> Clusters are not uncommon in SSA.

Altenburg and Meyer-Stamer (1999) find that a number of industrial clusters in Latin America are “survival clusters” producing generally low-quality products and selling them predominantly to domestic markets. Yoshino (2011) finds that most industrial clusters in SSA are also survival clusters, where firms are barely breaking even. Why do these firms fail to innovate? Possibly because of unfavourable business environments: such as bad governance, poor infrastructure, and inadequate financing. Or, they may not possess much entrepreneurship. The former is important but, we believe the latter is crucial. There are cases in which clusters have successfully grown despite unfavourable business climates. This paper explores how that happens. We begin by asking how business owners and managers who are not entrepreneurs dare to start their businesses.

To answer this question, Section II describes how cluster-based MSEs in various industries developed in different countries in Asia and Africa. We find that many owners and managers come to feel keenly their lack of managerial and innovative capacities, as their clusters become survival clusters. Section III begins by discussing the possible reasons why they cannot improve these skills and what the government can do to support training, awareness campaigns, and other efforts to nurture entrepreneurship. We then review the results of management training experiments, including our own, to see whether entrepreneurship can be taught and how management training programmes can be improved in future. Section IV contains concluding remarks.

## II. MANAGERIAL AND INNOVATIVE CAPACITIES OF MSEs

In this section, we use the results of our observational studies to discuss why managerial and innovative capacities are not important initially but assume importance later in the process of industrial development.

<sup>3</sup>We define an industrial cluster simply as the localization of firms producing similar and related products (e.g., final products and parts).

<sup>4</sup>Our approach is consistent with the theoretical proposition of Rodriguez-Clare (2007) that the best industrial policy entails the direct promotion of industrial clusters in the sector in which the country has a comparative advantage.

<sup>5</sup>As reported by Huang and Bocchi (2008), Long and Zhang (2011), and Sonobe and Otsuka (2006).

Our arguments in this paper are based mainly on our 19 case studies of cluster-based industrial development in Asia and Africa, which are listed in Table 1. Of these case studies, 8 cases (cases 6, 8, 10, 14, 15, 16, 17, and 19) involved experiments, of which 5 experiments (cases 6, 10, 14, 16, and 19) were randomized controlled trials. Discussion of the results of these experiments is deferred to the next section.

Table 1

*Origin of Development of Selected Industrial Clusters in Asia and Africa*

Location	Main Product	Initial Firm Type and Initial Product	No. of Firms in Cluster	Entrepreneur's Schooling Years
1 Bingo, Japan			200	10.6
2 Hamamatsu, Japan	Working clothes	Farm households (traditional clothes)		
3 Taichung, Taiwan, China	Motorcycles	Small- and medium-scale (woodwork)	150	Na
4 Zhili, Zhejiang, China	Machine tool	Small- and medium-scale (simple machinery)	100	13.0
			5000 (incl. subcons)	
5 Wenzhou, Zhejiang, China	Baby clothes	Farm households (hand-made silk products)		7.5
		Farm households (repair parts for electrical fittings)	200	10.6
6 Bac Ninh, Vietnam	Electrical fittings			
7 Sargodha, Pakistan	Rolled steel bars	Farm households (agricultural implements )	133	6.7
8 Addis Ababa, Ethiopia	Electric fittings	Small- and medium-scale (electrical fittings)	1200	9.4
9 Nairobi, Kenya	Garment	Tailors (tailored suits)	700	10.1
10 Kumasi, Ghana	Garment	Tailors (tailored dresses)	640	8.6
11 Northern Taiwan, China	Metalwork	Small- and medium-scale (car repair)	500	11.0
12 Chongqing, China	Printed circuit board	FDIs (printed circuit boards)	60	13.2
		Small- and medium-scale and FDIs (motorcycle)	50	15.1
13 Three cities in Jiangsu, China	Motorcycles			
	Printed circuit board	SOEs and TVREs (printed circuit boards)	200	12.1
14 Hatay, Vietnam	Knitwear	Cooperative (knitwear for SOEs)	160	7.9
15 Addis Ababa, Ethiopia	Leather shoes	Migrant artisans (leather shoes)	1000	9.2
16 Addis Ababa, Ethiopia	Metalwork	Migrant artisans (metal work)	130	10.8
17 Nairobi, Kenya	Metalwork	FDIs and SOEs (metalwork)	150	11.0
18 Dhaka, Bangladesh	Garment	Training in Korea (garment)	4100	15.0
19 Dar es Salaam, Tanzania	Garment	UNIDO training (garment)	700	10.7

*Notes:* FDIs, SOEs, and TVREs stand for foreign direct investments, state-owned enterprises, and township-village-run enterprises, respectively. *Sources:* Cases 1, 2, 3, 4, 5, 11, 12, and 13 are from Sonobe and Otsuka (2006). Cases 6, 7, 8, 9, 14, 15, 16, and 17 are from Sonobe and Otsuka (2011). Case 10 is from Iddrisu, *et al.* (2012) and Mano, *et al.* (2012). Cases 16 and 19 are from Sonobe, Suzuki, and Otsuka (2011). Case 18 is from Mottaleb and Sonobe (2012).

*Selection of the Cases*

We conducted the 19 case studies over nearly 15 years without a long-run study plan specifying which industrial clusters should be studied based on random selection from a list of clusters. This is because there was and is no such a list. The number of clusters is unknown, especially in SSA. It is likely that SSA has many more clusters and entrepreneurs than governments and researchers recognise. Most would be survival clusters.<sup>6</sup> The 19 clusters that we studied are not representative of industrial clusters in

<sup>6</sup>We have found that the number of business people operating in our study sites in SSA has not been captured by statistical and tax authorities, and that few clusters in SSA were known to researchers.

Asia and Africa, and they are more likely to be focused on dynamically growing rather than survival clusters. Nonetheless, they cover a variety of MSE clusters in Asia and Africa.

All these clusters have been voluntarily and spontaneously formed by private firms without much assistance from the government, including the four cases in China. Thus, the China case studies are comparable to the others. The studies of four industrial clusters in Japan and Taiwan, China are also comparable because they were developed before these countries became highly industrialised.

The clusters in the first group (i.e., cases 1 to 10) were initiated by pioneering businesses that produced imitations of imported goods without any help from the government or foreign firms. The development of the second group of clusters (cases 11 to 17) was based on foreign technologies brought in by foreign direct investments (FDIs), state-owned firms (SOEs), or foreign artisans who migrated from Southern Europe and ran home-based businesses.<sup>7</sup> In the third group (cases 18 and 19), the clusters came into existence thanks to training programmes provided by foreign firms and international organisations. Consistent with the Heckscher-Ohlin theorem, the initial products of these clusters, as shown in the parentheses in the last column, tended to be labor-intensive items. This tendency is clearer in the first group than in the second and third groups (cases 18 and 19).

Indeed in the first group, new industries emerged as main products or activities shifted to take advantage of existing institutions, infrastructures, and technologies. In Kumasi, Ghana (case 10), for example, metalworking firms, such as lathe turners, welders, and casting foundries, are clustered where thousands of car repair garages are concentrated. These garages need a lot of metal processing services and also provide an abundant supply of scrap metal from disabled cars that cannot be repaired. The metalworking firms provide repair services but also manufacture a variety of metal products, such as corn mill machines, wheelbarrows, and cash safes. Among tailors in Addis Ababa and Nairobi (cases 8 and 9), those who made money and won the buyers' trust expanded their businesses from tailoring into the factory or workshop production of ready-made garments. In cases 1, 4, 5, 7, 13, and 15, a number of owners and managers started as traders and then diversified their businesses into manufacturing. Such former traders tend to be high-performers, which may reflect the importance of management and marketing skills to manufacturing firms in developing countries.

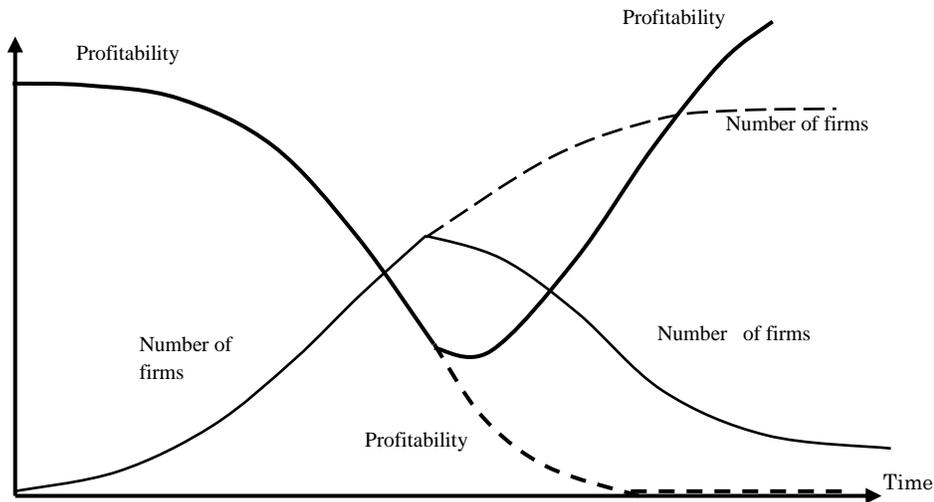
### ***Why Business Owners and Managers who are not Entrepreneurial Set up Firms***

New indigenous industries in developing countries begin with the imitation of imported products. In cases 1 to 10 in Table 1, an industry pioneer exerted great efforts to find new production methods, sources of materials, and marketing channels for imperfect imitations of imported products. Once these difficulties were overcome, the pioneer made sizable profits, despite the low quality of his or her products, because poor domestic consumers created a high demand for cheap substitutes of imported products and because competitors were few. This profit attracted a swarm of imitators to the industry. Many were

<sup>7</sup>Although printed circuit boards (PCBs) are core devices for electronics items and IT equipment, the PCBs produced in the clusters listed in Table 1 in their early days were technologically simple and produced without using expensive machinery.

spin-offs, i.e., the former employees of the pioneer, who produced the same low-quality products by using the same low-quality inputs and sold their products on the same local markets as the pioneer. In this way, an industrial cluster was formed, as illustrated in Figure 1. Industries that began with technology brought by FDIs, SOEs, and international organisations followed almost the same path (cases 11 to 17 and 19).

**Fig. 1. An Illustration of Development Patterns of Industrial Clusters in Terms of Changing Profitability and the Number of Firms.**



Earning high profits for the time being, owners and managers in the early phase are not particularly interested in introducing new products or new production processes. Moreover, they are rarely capable of innovation. The pioneers are imitators, even though they are innovative in starting new business activities by imitating. Other firms in the cluster are imitators of imitators and even less likely to possess innovative capacity. Interestingly, setting up a firm in the cluster becomes increasingly easy over time for such entrepreneurs in the early phase of cluster development. As the cluster expands in terms of the number of firms and hence their output, an increasing number of traders buying products and supplying materials come to the cluster, which makes production and transactions in the cluster more convenient. Some firms specialise in the production of parts. In other words, the division of labour between assemblers and part-suppliers and between manufacturers and traders increases with the market size [Ruan and Zhang (2009)]. The problem of imperfect contract enforcement and asymmetric information is reduced in the industrial cluster by the “community mechanism” an environment where people know each other and spread information regarding unscrupulous behaviour, as in rural communities [Hayami (2009); Arif and Sonobe (2012)].<sup>8</sup>

<sup>8</sup>Hayami (2009) argues that the community mechanism is effective not only for the enforcement of contract-based transactions but also for the management of local commons and the provision of local public goods in rural communities. In this paper, however, we focus on the enforcement of contract-based transactions.

The number of firms and the total output in the cluster increase over time, but productivity and product quality are hardly improved. This phase of cluster development may be termed the “quantity expansion” phase. In clusters in their quantity expansion phase, even casual observers can see that very poorly managed firms are not forced to exit. Possible reasons include the low-level of competition within the cluster, the high demand for low-quality products, and the availability of low-wage labour. Thus, spontaneously formed and quantitatively expanded industrial clusters abound in firms with very limited managerial and innovative capacities. Since such firms make positive profits, more of the same kinds of firms are attracted to the cluster. They, however, will face difficulty in the next phase.

### ***Increasing Importance of Managerial and Innovative Capacities***

As the cluster expands quantitatively, the product price and profitability will eventually decline because increased output is supplied to the limited domestic market for the cluster’s low-quality product. This process, illustrated by Figure 1, took place in the subsequent quantity expansion phase of industrial development in all cases except for case 18 listed in Table 1. As the profitability declines, the entry of new firms slows down and eventually ceases.

Declining profitability will induce business owners and managers to seek more profitable products [Aghion, *et al.* (2005)], which should be of higher quality and differentiated from the inferior products of other firms. Such endeavour, however, do not necessarily bear fruit. While a firm may successfully improve product quality by using high-quality materials and parts and by employing skilled workers, consumers may not immediately perceive the improved quality and the new product may fail to command a high price in market. As Akerlof (1970) points out, branding and quality guarantees would be effective countermeasures to this problem, but they may be known by only a few owners and managers, if any, in industrial clusters. Moreover, since brands may be stolen, branding may have to be supplemented with the use of exclusive sales agencies and other distribution methods [Sonobe, Hu, and Otsuka (2004)]. Since the improved products contain differentiated parts and components, and since such intermediate goods embody new ideas, it is also important to establish trust-based, long-term subcontracting relationships with parts suppliers. In addition, to enter the high-quality segment of the market, product quality must be strictly controlled. If these reforms are successfully implemented, production can be expanded profitably.

As the firm size is enlarged accordingly, the management of cash flows, inventory, and labour will assume greater importance. Good management is not an easy task for owners and managers in the cluster, as they have operated only small organisations and may be unaware of how to improve management. In this sense, they are not likely to be efficient managers. They now need to study management or hire competent managers or probably both.

The restoration of high profitability involves these multidimensional improvements in production and management. If one dimension of the improvements is missing, other improvements may not produce positive results. For example, even a firm that has successfully launched a popular product may suffer from losses if its supply chain is inadequate. Moreover, even a firm making profits may go into bankruptcy if its

cash management is poor. If a firm's attempt to improve production and management miscarries, the news will spread quickly in the cluster, and others may recoil from any new attempt at similar improvements. This will lead the cluster to a long-run stalemate in which profitability is so low that existing firms struggle for survival and there are no new entrants (see the dotted curves in Figure 1). Most industrial clusters in SSA have been trapped in this equilibrium. A possible exception is the leather shoes industry (case 15) in Addis Ababa, which seems to be going through multidimensional improvements in production and management by incorporating production and management knowledge from Italy.

Many clusters in Asia, including cases 1 to 5 and 11 to 14, succeeded in multidimensional improvements and followed a development path leading to the dramatic growth of the industry with a smaller number of much larger firms, as illustrated by the solid curves in Figure 1. Such a dynamic development phase may be termed the "quality-improvement" phase, in which managerial human capital plays a decisive role. The growth of the industry in this phase entails creative destruction. An increasing number of firms attempt to imitate the multidimensional improvements in the cluster, and some of them further improve production and management practices. Those firms undertaking continual improvements in production and management will grow, whereas firms that fail to keep pace will be forced to exit the industry or will be merged with growing firms. While the number of firms in the cluster will decrease as the result, the total production value and employment of the cluster will continue to grow, and the products will be sold in larger markets, including export markets.

Continual improvements in production and management will be achieved by learning from outside of the cluster, especially from abroad. More concretely, innovative entrepreneurs acquire new knowledge of technology and management by visiting foreign countries frequently to participate in trade fairs and training programmes. They also send workers abroad for training, and invite in foreign experts. They may also be able to learn from foreign firms operating within their countries. Entrepreneurs in Asia have been keen on learning from the successful experiences of advanced firms in neighbouring countries. Taiwan and Korea learned from Japan, while China learned from Taiwan and Korea as well as from Japan. At present, South Asian countries are learning from China, among other countries. In SSA, only a few owners and managers seem to clearly recognise the importance of learning from abroad.<sup>9</sup>

### ***Employment Size of Industrial Clusters***

To illustrate how significant industrial clusters are in terms of job creation and how they differ in size, with and without successful multi-dimensional improvements in production and management, Table 2 shows the number of manufacturing jobs and the total number of jobs (including those in garages in case 10 and subcontractors in case 14). It also shows the gender and schooling composition of workers in the selected industrial clusters. Because we often failed to collect the relevant job data in case studies conducted earlier, we focus on recently surveyed industrial clusters. Except for cases 10, 14, 15, and 18, the

<sup>9</sup>Some enterprise managers in East African countries, however, are learning from other countries by employing technicians and managerial advisers from Asia and by visiting European countries.

clusters listed in this table are in the final stage of the quantity expansion phase, and their total employment size ranges from 600 to thirteen thousand and has been relatively stable for the last several years. The metalwork cluster in Ghana (case 10) was expanding in terms of the number of enterprises at the time of our baseline survey in 2003. However according to the results of our follow-up surveys it probably has been in the final stage of the quantity expansion phase since 2005. The number of jobs is significantly higher in the knitwear cluster in Vietnam (case 14) and leather shoe cluster in Ethiopia (case 15), which have entered the quality improvement phase by newly introducing multidimensional improvements [Sonobe and Otsuka (2011)].

Table 2  
*The Number of Jobs, Monthly Wages, and Sex and Schooling Compositions  
of Workers in Selected Industrial Clusters*

No. <sup>1</sup>	Cluster	Year	No. of Manufacturing Jobs(1000)	Total No. of Jobs (1000) <sup>2</sup>	Monthly Wage(US\$) <sup>3</sup>	% of Women	% of High School Education and above
6	Rolled steel, Vietnam	2010	3.3	n.a.	161	5	0
7	Elec. fittings, Pakistan	2008	13.2	n.a.	105	10	18
8	Garment, Ethiopia	2007	7.2	n.a.	36-45 <sup>4</sup>	59	17 <sup>5</sup>
10	Metalwork, Ghana	2003	6.7	99.2 <sup>6</sup>	32	0	25
14	Knitwear, Vietnam	2010	3.2	20-30 <sup>7</sup>	59	70	25
15	Leather shoes, Ethiopia	2008	22.2 <sup>5</sup>	n.a.	35-53 <sup>4</sup>	23	15 <sup>8</sup>
16	Metalwork, Ethiopia	2009	9.1	n.a.	63-88 <sup>4</sup>	9	44 <sup>8</sup>
17	Metalwork, Kenya	2008	1.2	1.7	117-208 <sup>9</sup>	0	43
18	Garment, Bangladesh	2004	2,100 <sup>9</sup>	n.a.	61-97 <sup>11</sup>	40	50
19	Garment, Tanzania	2010	0.6	n.a.	57	83 <sup>12</sup>	11

Notes:

1. The numbers are the same as in Tables 1 and 2.
2. Including related jobs in the cluster (e.g., car repairing in the metal work cluster).
3. Converted to US dollars by the prevailing exchange rate.
4. The lower number refers to female wage and the higher one to male wage.
5. The number refers to 2009.
6. Including 80 thousand jobs generated by about 8 thousand garages.
7. Including more than 5,000 subcontractors in nearby villages.
8. Including those who have completed vocational training.
9. The lower number refers to casual worker wage and the higher one to regular worker wage.
10. The data include the employment in the country as a whole including the Greater Dhaka and Chittagong.
11. The lower number refers to casual worker wage and the higher one to regular worker wage.
12. Proportion of female owners, not workers.

### III. TRYING TO MAKE MANAGEMENT TRAINING MORE EFFECTIVE

In recent years, an increasing number of randomized controlled experiments have been carried out to test the effectiveness of management training and consulting services provided to MSEs in various parts of the developing world.<sup>10</sup> A common finding obtained by these studies, including our own randomised experiments (cases 6, 10, 14, 16, and 19) and as non-randomized ones (cases 8, 15, and 17), is that the owners and managers of

<sup>10</sup>See, for example, Karlan and Valdivia (2011), Drexler, Fischer, and Schoar (2010), Bruhn, Karlan, and Schoar (2010), Bjorvatn and Tungodden (2010), and Mano, *et al.* (2012).

MSEs had very limited management knowledge before receiving management training or consulting service. While the training contents were rather rudimentary in many of these experiments, many participants in the training programmes adopted the management practices taught in their programme. This indicates they had not been aware of those management practices before.

### ***Reasons for and Countermeasures to Low Awareness***

Most likely, the majority of the MSEs in the samples of these studies operate in survival clusters, and they know they need something new in order to increase profitability. Why then are these owners and managers ignorant of even basic management practices? There are two possible explanations. One attributes this ignorance to market failures. One market failure occurs because owners and managers do not know who possesses the knowledge they want to acquire, and when they do know, they are not able to verify whether or not the person has passed that knowledge to them. Moreover, once the seller shares his or her knowledge, the buyers may quickly grasp and become unwilling to pay for it. Because of this asymmetric information problem, the transaction of knowledge is difficult unless the seller has established a good reputation. The second type of relevant market failure arises from the difficulty in keeping the purchased knowledge secret. If imitation or spillover is expected to be widespread, businesses will be reluctant to pay, preferring to get a free ride.

The second explanation may be down to ignorance. MSE owners and managers may value of learning as well as overestimating their own abilities.<sup>11</sup> Many owners and managers in our study sites maintain their management is better than average. When asked how they know what the average is, they simply smile. Moreover, some owners and managers may have a tendency to put off paying for expensive activities such as learning and investing.<sup>12</sup>

The asymmetric information problem may be mitigated if management-training programmes are provided by organisations with good reputations, such as governmental orienteer national organisations, foreign aid agencies, well-known companies and NGOs. The gap between the social and private benefits of owners and managers' acquiring management skills may be bridged by government's support for management training or the provision of financial incentives to either owners or managers who learn management skills or to organisations that train them. Public awareness campaigns may help address ignorance about the value of management skills. Owners and managers who tend to procrastinate may be nudged into action if microfinance or some other favorable treatment is linked with participation in a training programme.<sup>13</sup> Implementing these programmes to assist MSEs is unlikely to lead to serious corruption, compared with infrastructure projects [Shleifer and Vishny (1993)].

<sup>11</sup>In the panel of Forbes 500 CEOs, Malmendier and Tate (2005) find that overconfident CEOs over estimate investment returns.

<sup>12</sup>There is growing literature on procrastination [e.g., O'Donoghue and Rabin (1999)]. A number of randomized controlled trials have confirmed the existence of procrastination.

<sup>13</sup>There are already a number of management or business training programmes linked with microfinance provision, including the training programmes discussed by Karlan and Valdivia (2011) and Bjorvatn and Tungodden (2010).

### ***Estimating the Benefits of Management Training***

The above arguments about countermeasures are based on the premise that it is possible to design and implement a management-training programme with social benefits exceeding costs. There has, so far, been little empirical evidence that clearly supports this premise because the social benefits of management training programmes are not easy to estimate even if sample owners and managers are randomly assigned to control and treatment groups. Few studies have attempted cost-benefit analyses of management training. Many papers on management experiments do not even mention costs.

There are probably two major difficulties in measuring or estimating the social benefits of management training.<sup>14</sup> One arises from the possible external effects of the training. The social benefit is the sum of private benefits to the participants and those to non-participants, minus any harmful effects, if any. Non-participants may benefit from the training programme through knowledge spillovers. However, if participants increase sales revenues by taking customers from non-participants, someone will lose. Few attempts have been made to measure or estimate these positive and negative externalities, with Calderon, *et al.* (2012) being an exception.

The second major difficulty in estimating the effects of training is that no one knows how long they take to become fully effective or how long they last. Existing studies measure how training programmes change participants' knowledge levels, their adoption of management practices taught in the programme, their longevity or survival in the market, and their accounting-based indicators of business performance, such as revenues, value added, and profits. Most of the studies find that the training effects on the participants' level of management skills and adoption of useful management practices are positive and statistically significant. Mano, *et al.* (2012) find that management training improves a participant business's longevity significantly. However, the training effects on accounting-based performance indicators are significant in only a small number of studies. Presumably, this is partly because business performance is affected by a multitude of factors beyond the participants' control, and partly because the training effect on business performance takes a longer time to make its full impact. It is likely this effect was measured too early in most studies.

### ***Tentative Results of Cost-Benefit Analysis***

Since 2007 and in collaboration with the World Bank and the Japan International Cooperation Agency (JICA), we have been conducting pilot projects in eight clusters where management training programmes are provided for small businesses free of charge. Cases 6, 10, 14, 16, and 19 can be regarded as randomized controlled experiments because owners and managers were assigned to treatment and control groups at random. Three cases (8, 15, and 17) are not randomized controlled experiments.

In each cluster, local business consultants provided management training in local languages in a classroom setting. An interpreter accompanied any international consultants. In the clusters in Vietnam (cases 6 and 14), Ethiopia (case 16), and Tanzania (case 19), we also offered on-site training several months after the classroom training was

<sup>14</sup> For a more comprehensive and rigorous discussion of the technical problems of the management experiments, see an excellent literature survey by McKenzie and Woodruff (2012).

completed. In the on-site training programme, instructors visited participants' firms to teach them how to adopt useful management practices. They later visited the firms again to check if the assimilation was going well and to give further advice. The assignment to the on-site training was random and independent of the random assignment to the classroom training.

To measure management practices, we use a simpler version of the management score developed by Bloom and Van Reenen (2007, 2010) for medium-sized firms in developed and emerging economies. Our version is suitable to MSEs in low-income countries. More than half of the elements of our management score are based on visual inspection by our enumerators. They base the remainder on the interviews with the owners or managers of the firm. In each experiment, we observed the management score and the accounting-based performance indicators of each owner or manager in the treatment group and the control group before and after the training programme. In cases 6, 14, 16, and 19, we also observed management scores between the classroom training and the on-site training (Survey 2). Another round of surveys has been conducted very recently in one study site and is planned in the others.

In our randomized experiments, we randomly invited a number of owners and managers to take part in a training programme. It was up to them to decide whether or not to attend. Since some did not, we estimated the local average treatment effects (LATE). The estimated LATE on the participants was positive and highly significant for the management score in all the randomized experiments that we conducted (cases 6, 10, 14, 16, and 19). As mentioned earlier, the LATE on firm survival is also positive and significant in case 10, even though it could not be estimated in the other cases because the incidence of exit was negligibly low. Since owners and managers may not be fully aware of the value of management skills, it is interesting to examine how training affects the willingness to pay (WTP) for management training. We asked our sample owners and managers about their willingness to pay about 400 US dollars before and after four of our experiments (cases 6, 14, 16 and 19). In three cases, the WTP for the participants increased sizably after the training. In two of these three cases, the WTP also increased for non-participants in the control group. These WTP results suggest that many owners and managers were unaware of the value of training before taking part, and that the vast majority of training participants attach high value after taking part. In addition, some non-participants also become willing to pay, based solely on what they hear about the programme.

The LATEs on the participants' accounting-based performance indicators, however, are not statistically significant in case 16. This is most likely because the follow-up survey was conducted too soon, only two months after the on-site training was completed and five months after the classroom training. In cases 6 and 14, a number of MSEs had not collected receivables from their customers in the short period before the follow-up survey, so accounting-based performance data are not available until the next round of survey.

In case 10, where the follow-up survey was conducted a year after the classroom training programme, the estimated LATE on annual value added is 13,890 US dollars and is marginally significant. This indicates that participation in the classroom training for three weeks increased a participant firm's value added by 13,890 dollars on average

relative to the non-participant firms' value added for the single year immediately after the training programme. The training effect may persist for several years, and the estimate of the effect may be diluted by the improved performance of non-participants due to knowledge spillovers. Thus, the estimated LATE of 13,890 dollars is likely to underestimate the social benefit of the training. The cost of the training per participant is 740 dollars. For the experiment in this study site, we did not hire international consultants, and the venue was provided by a nearby vocational school free of charge. The cost per participant in this study site was relatively low. It could have been even lower if the same training had been rolled out for a large number of participants because some costs, such as preparing teaching material are fixed.

In case 19, the follow-up survey was conducted just three months after the on-site training had been completed. Since almost all the invited owners and managers participated in the training in this site, we estimated the average treatment effect on the participants. It is estimated that the classroom training increased the annual value added of firms taking part by 4,181 US dollars. On-site training increased that by 4,038 dollars on average relative to non-participants.<sup>15</sup> The classroom training cost per invited firm was 2,905 US dollars, which includes the fee for an international consultant from Japan and banquet hall rental paid to in one of the largest hotels in Dar es Salaam. The on-site training cost per participating firm was 2,043 dollars, which again includes the fee for an international consultant from Japan. Despite cost being over-estimated and benefits under-estimated, it is remarkable and encouraging that the estimated effect tends to exceed the cost.

### ***Issues for Future Research***

It may be interesting to note that training effects depend on the education level of the training participant, as our studies in Ghana and Ethiopia, Bjorvatn and Tungodden (2010), and some other studies attest. For example, educated owners and managers tend to benefit more from training in record keeping practices probably because record keeping requires math skills. Berge, *et al.* (2011) measure preference variables and argue that female owners and managers perform less well because they are more risk-averse and less willing to compete than their male counterparts. In our sample of garment producers in Tanzania (case 19), female owners and managers comprise the majority, and many of them operate businesses not to make a living but to have disposable income that they can spend as they wish, according to our unstructured interviews with them. Yet, we find no evidence for underperformance of female owners and managers in terms of business performance. In terms of management skills, they were somewhat superior to their male counterparts because many of them had started their businesses after receiving garment business training provided by some organisations exclusively for females. In our experimental training programme, male owners and managers participated and benefited from the training a little more than female participants. This could be a catch-up rather than the gender difference in the effect of training.

More generally, there are those training participants who can apply new ideas to their businesses successfully, and those who cannot acquire useful knowledge. Indeed

<sup>15</sup>Note that the effect of the on-site training would be more difficult to be realised by the time of the follow-up survey because the on-site training was implemented after the classroom training.

different effects in terms of education have already been reported by several studies, including Mano, *et al.* (2012). To the extent that these different effects are more a rule than exception, the cost-benefit analysis of the training would need to take them into account. We will come back to this point shortly after the discussion of spillovers below.

Knowledge spillovers are a vexing problem for researchers who want to estimate training effects, but they are socially beneficial. To design better training programmes, we should pay more attention and devote more efforts to explore what type of knowledge is easy or difficult to spread, what the major channels of spillovers are, and how fast and how accurately knowledge is conveyed through spillovers. The data generated by our experiments in Ethiopia and Tanzania suggests that knowledge spills over not only from participants to non-participants but also from participants to participants. Also, participants benefit from talking about the training contents to others. In other words, you can better yourself by observing others and the best way to learn something is to teach it. To the extent that these tentative results are robust, it is useful to increase opportunities for participants to discuss management and to visit each other's firms, for example, by encouraging them to organise alumni associations.

The methodology featuring randomised controlled trials and the estimation of the average treatment effect on the treated (ATT) has been extensively used in medical studies of the effects of medicines. Spillovers are not a major concern in such studies. By contrast, the effect of teaching knowledge and skills is likely to be accompanied by spillovers. If management training generates considerable external effects, it may not necessarily be a good idea to estimate ATT or LATE in order to grasp the training impacts. If training contents spill over widely, we should focus on analysing what types of owners and managers assimilate training contents better and disseminate them to a greater number of others. If training contents do not spill over widely, but the success story of participants spurs many others to actively try to acquire useful knowledge and skills, it is desirable to concentrate the limited training resources on nurturing promising owners and managers and developing success stories or role models. In either case, it is meaningless to be obsessed by the idea of estimating the impact on average and to evaluate training programmes through the estimated impact on average.

To design better training programmes, what to teach and how to teach are critical issues to be explored. These issues have not received due attention in existing studies of management training. A major exception is the study by Drexler, Fischer, and Schoar (2010), which compares different ways of teaching bookkeeping. Traditionally, Japanese businessmen, business consultants, and aid workers are fond of teaching the Japanese style of production and quality management, *Kaizen*. It is "a common-sense, low-cost approach to management" according to Imai (1997). It is now adopted by a number of large firms in the developed and emerging economies, often under the name of lean management. Business development service (BDS) providers who received, say, the ILO's entrepreneurship and business management training must have heard of *Kaizen*, but they do not allocate much time to it when they serve as instructors in training programmes. However, in our experience of hiring them as instructors in our pilot projects, they are excellent at teaching entrepreneurship, business strategy, marketing, and record keeping. The tentative results of our training experiments indicate that training participants appreciate both *Kaizen*-type training and BDS-type training. Therefore we have designed our programmes to include both.

While the discussion in this section has focused on management training, we believe that training programmes for MSE owners and managers in developing countries should include innovation as a major subject. As we saw in the previous section, it is vital for these owners and managers to succeed in product quality improvement, branding, improvements in marketing, strengthening relationships with suppliers, and improvements in management of labour, inventory, and finance. Moreover, since a number of clusters in developed and emerging economies have achieved these multidimensional improvements in production and management, a number of them should be able to share their experiences with owners and managers in survival clusters in the developing world, especially in SSA. Thus, these issues should be incorporated in training programmes to cultivate both the innovative and managerial capacities of owners and managers.

If MSE owners and managers are likely to benefit from learning diverse subjects, should all subjects be taught in the same way. Given the heterogeneity of owners and managers, the question arises also as to whether to include them all in the same class. According to our tentative results classroom training and on-site training have similar effects in BDS-type training but differ in *Kaizen*-type training. It is difficult for training participants to understand how to apply the knowledge of *Kaizen* without looking at concrete examples. So for *Kaizen*-on-site training and visiting other participants' workshops seem to be more effective. Another related finding is that while the effect of on-site training on the adoption of *Kaizen*-type practices does not depend on the participant's education level, the effect of classroom training on the adoption of BDS-type practices does. These preliminary results warrant further studies on how to efficiently teach management to MSE owners and managers in developing countries.

#### IV. CONCLUSIONS

The pace of industrial development is largely determined by the dissemination and adoption of new technologies and good management practices. The market for management consulting and training services, however, is likely to fail. This is partly because knowledge spillovers create a gap between the social and private benefits of acquiring managerial capacity, and partly because many owners and managers are not aware of the importance of management knowledge. In this paper we argue that to help MSEs in developing countries prosper management training should be supported by government and foreign aid. In Taiwan, the Industrial Technology Research Institute has facilitated importing foreign technologies and disseminating them by means of adaptive research and training [Hong and Gee (1993)]. It is hoped that Sub-Saharan Africa will have such effective institutions in charge of adaptive research and training toward improvements in production and management in the not-too-distant future.

Although this paper focuses on cultivating managerial and innovative capacities, financial development and infrastructure development are as important. Management training can have an additional impact if it is linked with finance and infrastructure development. High-performing firms require finances not only to invest in capital goods but also to move from their original industrial clusters to more spacious and better-equipped industrial zones. If a training programme is provided before offering low-interest credits, it is relatively easy to distinguish innovative, promising entrepreneurs. It

is desirable to link management training programmes with the provision of credit and space in the industrial zone. This way firms with improved managerial and innovative capacities and, hence, higher ability to repay loans, will be more likely to receive loans and relocate their production bases with expanded scale of operations.

Much remains to be studied about the design of management training programmes for owners and managers, public awareness campaigns, trainers' training systems, trainers' quality assurance systems, and the overall strategy of dissemination and adoption. In this paper we argue, based on our case studies, that management training programmes are likely to have significant impact. They should facilitate learning from the experience of multidimensional improvements in production and management and cultivate innovative capacities. Considerably many more empirical studies are warranted.

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*Comments*

Thank you, Dr Sonobe for a really fruitful presentation. It is really an honour for me to be a discussant on the work of Dr Sonobe. But, unfortunately, I did not have your paper for a detailed discussion. However, I went through the abstract of your paper and come up with some brief comments and questions.

Dr Sonobe your presentation tries to put many things together. For example, the cluster-based industries, Kaizen Management and MSE growth. Surely your presentation/paper is a coherent explanation of title and subtitles. However, I have just few comments and question for more understanding the subject.

- (1) The Clusters must be expected to display the negativities of asymmetric knowledge. How do you think how the clusters may work in this situations?
- (2) I just wonder how the concept of KAIZEN management is different than Lean Manufacturing. In my understanding, lean manufacturing also reduces costs, lead times, and inventory requirements, ensures greater productivity, and brings about overall efficiency. Similarly, what is differences between 5s approach and Six sigma approach.
- (3) The KAIZEN management has a constant focus on improvement becomes an obsession and causes stress in the workforce. How do you think about the stress management in your KAIZEN management model?
- (4) No Margins for Error.
- (5) There is no margin of error in KAIZEN management arrangements. Apparently, it requires a favourable external climate. For instance is not possible in places with unreliable energy supply, inadequate transportation infrastructure, and or poor work culture in the society. Similarly, in KAIZEN management arrangements.
- (6) Is management training enough? Surely, Technology is also important, Credit/finance is also important, Infrastructure is also important
- (7) The KAIZEN arrangement over-focus on elimination of waste, and it overrides other concerns. For example, it ignores other crucial parameters such as employee wellness, and corporate social responsibility. Please comment.
- (8) KAIZEN is more a culture than a method, and there is no standard KAIZEN production model.

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## **Marginality as a Root Cause of Urban Poverty: A Case Study of Punjab**

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### **I. INTRODUCTION**

Historically poverty as a concept was considered to be a key factor to design social policy. The social development normally is concerned with socio-economic empowerment of the poor of the concerned society. It is always been a key issue for developing as well as developed countries, however the nature and treatment of issue varies. The treatment of poverty is different from society to society. In advanced countries, an individual who is unable to actively participate in society or has weak social network, environment, health and education etc. is considered to be poor. Financial empowerment is also considered to be important in these countries but it takes into account with other dimensions of poverty [Lyberak and Tinios (2005)]. However, in developing countries, policy focus is still on uni-dimensional definition of poverty where a single dimension either consumption or income is a strong factor that affects the standard of living of an individual [Wagle (2005)]. Though the multidimensional poverty concept is also getting attractiveness in these countries with a perception that an individual's status in one dimension cannot represent his status in another dimension but still there remains dearth of policy-making. Another important transformation in the literature on poverty is seen in terms of identification of nexus of marginality, social exclusion and poverty [Ruth, *et al.* (2007); Zoran, *et al.* (2006); Whelan and Bartrand (2005)].

In developed countries, marginality is being treated as phenomena related with poverty and social exclusion. Separate surveys were conducted to see the root cause of the problem, in Canada, Canadian Institute of health sciences introduced marginality index as a policy measure. In developing countries, unfortunately very limited literature is available in the area of marginality and social exclusion. However in India, due to caste inequalities, this issue is getting great attention of the researchers [World Bank (2011); Thorat and Nidhi (2010); Thorat, *et al.* (2009); Mitra (2004)]. Marginality is broadly defined as a state

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situated at the margin, this could lead toward social exclusion and hence poverty. On the other hand the term “social exclusion” is a vibrant, multidimensional process driven by unequal power relationships. This exclusion can affect individual, household, group, community and countries across four dimensions i.e. economic, political, social and cultural and make certain objects more vulnerable which leads them to high incidence of poverty [Jennie, *et al.* (2008)]. In this respect, the study of poverty dynamics could benefit from engaging with, and incorporating, models or detailed conceptions of multidimensional social exclusion among the marginalised population.

The state of poverty among this marginalised class may be different from the rest of the population. This marginalised class may face exclusion in socio-economic and cultural participation in the society which deprives them from education, health, networking etc. However, the determinants of poverty may be the same but the effect of these determinants could be different. A number of literature is also available which theoretically and conceptually establishes dimensions and characteristics of marginalisation, addressing processes of restricted participation of this marginalised class in social, economic, political or cultural life of common society. Poverty and social exclusion as two descriptions of severe social inequality have often been mixed up, and hypothesis about their interrelation and characteristics have hardly been tested empirically. Is poverty the first stage on the way out of society, or are there considerable differences between the risks of becoming poor or socially excluded? To this end, this study proposes the conceptualisation and operationalisation of social exclusion tendencies and incidence of poverty in the identified marginalised class. The empirical analysis employs Poisson regression analysis to see the determinants of multidimensional poverty among the identified marginalised group.

Organisation of paper is as follows: Section I is introduction. Section II presents literature review. Theoretical framework is discussed in Section III. Section IV throws light on methodology. Empirical model, estimation techniques and explanation of variables is there in Section V of the paper which is followed by discussion of results in Section VI. Section VII concludes the paper.

## II. LITERATURE REVIEW

The rapid rural-urban migration, structural changes in developing economies and globalisation is enhancing the issue of urban poverty and is creating serious problems in the management of urban areas of developing countries, Pakistan being one of them. One of the evident causes of poverty and inequality in the urban areas is marginality [Susan, *et al.* (2001); WDR (2001); Oxfam GB Urban Programme (2009)]. Poverty is not a uni-dimensional concept and is not the name of material deprivation but is a set or an outcome of interlocking factors such as physical weakness, socio-economic isolation, vulnerability and powerlessness [Philip (2008)]. This poverty type may be same or different within certain socially excluded groups and is strongly dependent upon the clan network of households existing in a marginalised group. Unfortunately these factors leading to poverty have received less attention of the researchers in Pakistan, mostly research on the issue of poverty in Pakistan explores levels, trends and dynamics but not much attention is given to the issue of vulnerability to multidimensional poverty of the marginalised livelihood of this country.

A person is normally considered deprived due to deficit consumption but there are other factors that contribute significantly to make one feel deprived including the shortfall of living needs. The living standards are highly affected by insecurity and powerlessness of future shortfalls. Calvo (2008) therefore considered this vulnerability to multidimensional poverty as a form of hardship that is defined in both conceptual and empirical way. He extended his own index that he developed in 2005 and used bi-dimensional measures of consumption and leisure. His findings suggest that these two dimensions are negatively correlated in both rural and urban cases. This vulnerability is different from poverty much attention is needed to differentiate between vulnerability and poverty.

Vulnerability is related with poverty but it is not necessary that all poor are vulnerable or all vulnerable are poor. Angemi (2011) supported this view in his study with the help of household level analysis within poverty framework. He pointed out that the characteristic of vulnerability is consistent with the characteristics of poor so by this he found that poverty and vulnerability both are related with each other. However, an important point of his analysis was that all poor are not vulnerable while some proportions of non-poor are vulnerable. In the same lines Susan and Takashi (2002) employed two period panel data set of the North-West Frontier Province, Pakistan and proved that the sample household was subject to a high risk of income poverty. Results also revealed the households are more vulnerable to consumption poverty and are affected by the shock of outside employment as compared to self-employed households. An important outcome from this analysis concludes that the age, having less land and irregular sources of income strongly affect the extent of vulnerability among households. Diego (2011) is of the view that the dynamics of risk and uncertainties are helpful to understand the nature of poverty. By applying the pooled GLS method on the national data sets of Uganda, he discovered that along with a sharp reduction in poverty, the vulnerability to poverty in Uganda has also declined, however, the issue of marginalisation existed due to geographical segregation. The results revealed that the central region experienced reduction in incidence of vulnerability while the rural areas, where 90 percent of population is living under extreme poverty conditions, the incidence of vulnerability has increased. Supporting the findings of Diego (2011), a worldly accepted truth is that this high incidence of vulnerability to poverty is mostly dominant in socially excluded and marginalised group.

Early research also support the idea of this social exclusion, In industrialised countries, the evolution of one parent family defines a new pattern of poverty and marginalisation. This marginalisation exists not only in labour market of these countries but also exists in the provision of public housing [Hilary (1989)]. On the other hand, David, *et al.* (2000) tried to develop a baseline for understanding the nature of poverty and social exclusion. They used poverty in terms of deprivation from goods, services and social activities. They are of the view that this way of measuring deprivation satisfied both absolute and relative poverty terms. The analysis shows the there is an increase in the multiple deprivation and poverty in Britain during the survey period. By identifying these issues in family-cycle approach, Dewilde (2003) tried to develop a framework of analysis of poverty and social exclusion. As per his views, a life course perspective conceptualises the traditional approaches and combines their best element into the

analysis of social exclusion hence poverty. He used three sociological perspectives on the life course i.e. the traditional North-American life course perspective by Elder (1974), the Continental institutional approach and “political economy of the life course”. With the help of these three approaches, he proposed a new framework to analyse poverty and social exclusion relationship over the life course, both theoretically and empirically.

These circumstances of poverty are strongly related with level of social exclusion and parental social class. The factors that provide the poverty prospects at childhood age due to parental social class are strongly associated with current lacking of basic infrastructure [Aya (2009)]. This was also proved by Christopher, *et al.* (2013) with the help of a comparative analysis between four important factors i.e. social exclusion, parental status, childhood economic status and state of current poverty. With the help of EU-SILC module, they figured out how the welfare regimes mediate the impact of parental social class and childhood economic circumstances on poverty. Findings showed that by applying social class plan, intergenerational factors have least impact on income poverty. The other objective of the analysis was to get knowledge about the impact of parents’ class and childhood economic circumstances on income poverty and it was discovered that the impact of parent social class on income poverty is weak for social democratic countries and strong for liberal countries, however social class has high impact on vulnerability. In case of income poverty the impact of vulnerability is high in relation to both parent’s social class and childhood economic circumstances. Economic vulnerability has also high impact on welfare regimes which experienced difficult economic circumstances in childhood.

Franz, *et al.* (2011) has provided conceptual and analytical framework in order to explore the root cause of poverty. They were of the view that there is need to highlight poverty with respect to marginality. They found marginality to be the root cause of extreme poverty. According to them, marginality is an involuntary position and is a condition of an individual or group that is at the brink of social, economic and ecological systems. Such marginality prevents affected communities to utilise resources, assets and service and all other factors, that become the cause of poverty. They define poverty as a matter of absolute deficiencies as perceived by the poor. They look poverty as a relative, subjective, dynamic and systematic mechanism and concluded marginality as a pattern of causal complexes in a societal and spatial dimension.

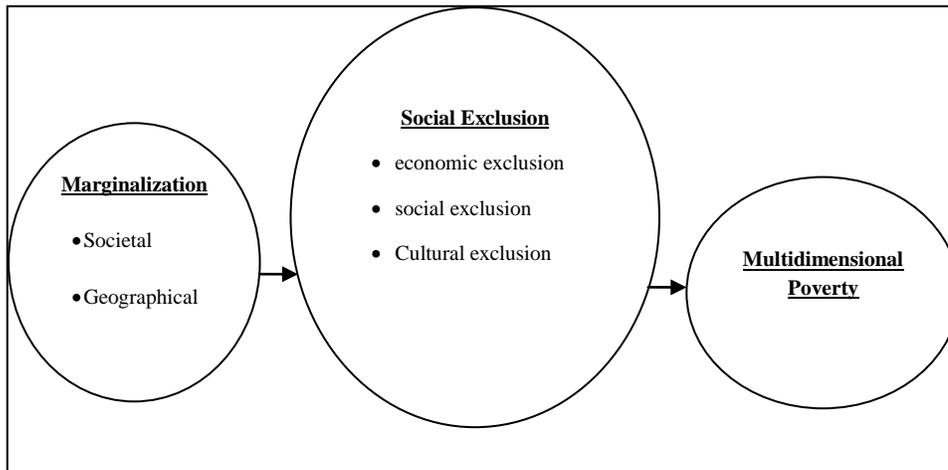
Nayar (2007) is of the view that poverty and social exclusion that are significant socio-economic variables and are generally ignored while estimating ill-health effects. Social exclusion mainly refers to the inability of a society to realise its full potential while keeping all groups and individuals within reach. The relationship between caste and health indicator shows that poverty is a complicated issue that requires to be addressed with a multi-dimensional facet.

Literature no doubt covers issues of poverty, marginality and social exclusion on very broad way. Valuable input was given by different authors to explore issues of poverty among marginalised class. But there is a lack of literature available in identification of marginal and socially excluded population from poverty and social status dataset. Researchers made effort by conducting survey of marginalised group but that was not at province or national level, however the importance of defining socially excluded class at national level is vibrant. Therefore this study identifies marginal population from existing dataset and analyses extent of their multidimensional poverty in Punjab.

### III. THEORETICAL FRAMEWORK

Poverty is a long term debate and developing countries are targeting to be free of poverty by 2015, the millennium development goals directly and indirectly target poverty eradication and aims for a good standard of living for the livelihood of the society. To eradicate extreme poverty and to make people out of extreme hunger requires a good educational infrastructure; reduced child mortality, improved maternal health and gender equality and enhanced women empowerment [United Nation (2007)]. Progress towards reducing poverty is slower which addresses policy gaps in achieving the target. Policies overlook the depth in the issues of poverty and take poverty at general level, but the population who is actually excluded from rest is ignored, that population is living below poverty line and marginalised in participating socio-economic activities with rest of the population of the region. Unfortunately pro-poor growth ignores this important aspect of poverty. The facts shows progress is slower in developing world where globalisation is seen in form of higher rural-urban migration but on other side, the economic and social side is still deprived and fails to meet the challenges of this higher rate of rural-urban migration. This causes an increase in the burden of city management and also an increase in the size of the excluded area within the city or periphery of the city. Such population is marginalised while living in the slums and *katchiabadies* of urban area and face a lack of opportunities to acquire skills and access to labour market. This marginalised population then becomes socially and ethnically excluded from the rest of the society and has less access to educational, health and other urban services.

**Fig. 1.**



This marginalisation defines boundaries between groups living in a society, some groups are economically excluded and to some extent social inclusion prevail in such group, but on the other hand some are demographically and economically excluded, in a society of developed as well as developing countries, therefore marginalisation can be considered as a process in which a community or individual lives at margin and gradually become economically, culturally, socially and politically excluded from rest of population [Zahra and Tasneem (2014)]. There are some deprived groups who are

excluded in all dimensions of exclusion and spent deprived and vulnerable life even being part of that society. Thus marginality leads to social exclusion in long run and this social exclusion is blamed to be primarily responsible for social conflict due to its inability to transform itself since it is strongly connected to the systems of oppression and domination.

Usually poverty links with material lacks, it has theoretical as well as strategic importance, but the increasing understanding is that poverty is not just a name of material lacks, but also associated with restricted access to resources that can make an individual or household well off. UN has defined poverty through the “capability approach” and “the human rights approach”. These inter-related themes provide an enriched understanding of poverty and we can define poverty as:

“A human condition characterised by the sustained or chronic deprivation of the resources, capabilities, choices, security and power necessary for the enjoyment of an adequate standard of living and other civil, cultural, economic, social and political rights”.<sup>1</sup>

In continuation of defining poverty, Oxfam (2009) extends this definition into four dimensions, these dimension includes social exclusion, relative and income poverty as well as relative poverty status. Poverty can be defined as:

“Poverty can’t be comprehensively defined by a single approach; it needs to cover the aspects of not having enough to either live on or to build from and being excluded either from wealth or from the power to change for betterment, these sums up to four areas.”<sup>2</sup>

Thus poverty cannot be restricted to income and expenditure but it is the name of deprivation of the resources that makes an individual better off in his social, economic, cultural and political life. Oxfam (2009) also explains social exclusion as the fourth dimension of poverty. Exclusion causes poverty, this relation may be causal and may make people vulnerable and then poor, this marginality emerges due to certain groups’ representation from ethnic minority, deprived class, deprived gender and due to lack of participation in social life, restricted access toward living facilities etc. that causes vulnerability amongst these groups and in turn poverty in the long run.

This marginality has two way relationships with poverty, it enforces people to be poor or poverty enforces people to be marginalised. Individual or settlements being excluded from the dimension of development and progress move towards extreme poverty. The people that are affected by poverty and exclusion are considered to be the marginalised poor [ZEF (2011)].

Poverty is ex post phenomenon of social exclusion, it is caused by marginality or vice versa. A vulnerable household can be in and out of poverty over time depending on the future income prospects, expenditure stream, and accessibility to social services. A marginalised household can be poor or non-poor. A marginalised household considers being poor or more sensitive to shocks if that household has:

- (i) Low level of human capital, knowledge and access to skill improvement.

<sup>1</sup>UN (2007) quoted in Oxfam (2009).

<sup>2</sup>Oxfam (2009).

- (ii) Suffers from physical or psychological disabilities and poor access to health facilities.
- (iii) Poor infrastructure and have less capacity to improve it.
- (iv) Few productive and financial assets and has limited access to credit market.
- (v) Poor social networking and excluded from normal lives of society.
- (vi) Poor access to job market opportunity.

Therefore:

A marginalised household is considered to be poor if it has a limited access to the living needs, has limited or restricted access to social, economic and political life of its society due to residential, societal, spatial, environmental deprivations etc. and has poor capacity to ensure good standard of living for its members.

#### IV. METHODOLOGY

The geographical focus of this paper is the Punjab province of Pakistan, which is an economic hub of the country. The dynamic nature of agriculture and industrial production along with having major population share of the country makes it more important than other areas or provinces. However, Punjab has witnessed major urbanisation in the past few decades and has achieved improved growth rate but that has not proved to be beneficial for the entire population and certain segments of urban areas remain in extreme poverty.

Numbers of studies are available that cover issues of poverty in Punjab as well as in Pakistan but advanced level analysis on poverty is rare in literature. Primary data from the combined round of PIHS was used by Siddiqui (2007) whereas Siddiqui (2009) used PSLM 2004-05 survey. Sikander (2009) used the data from Multiple Indicator Cluster Survey (MICS)-2003-04 to analyse the determinants of poverty in Punjab. Malik (1996) used self-collected data on a rural locality called “Wanda” (District Bhakkar, Punjab). His results were based on a sample size of 100 and however were not nationally representative for inference about the determinants of poverty. The analysis of marginalisation and poverty in this study is based on two waves of data from Multiple Indicator Cluster Survey (MICS) conducted in 2007-08 and 2011-2012. In 2007-08, 91,280 households participated in the data collection process out of which 59456 were rural and 31824 were urban. Of this sample 594,851 individual from urban and rural areas were covered with a wide range of socio-economic issues on living condition, economic situation, health and education, housing etc. In data set collected in 2011-12, 3102048 household were covered, in which 3488 was urban and 3788 are rural, and this data set also covered more than 90 indicators from different socio-economic perspective. The unit of observation for the analysis of this study is the individual resides in the urban areas of Punjab, Pakistan.

This paper is primarily concerned with the measurement of poverty among marginalised people of Punjab with immediate focus on whether these people are living in extreme poverty or out of poverty. The definition behind is that poverty is a relative concern that can be explained with economic and social wellbeing, capability and social inclusion. Whereas marginalised and socially excluded concept is another important dimension of the study which has been extracted from Zahra and Tasneem (2014). The

flow of empirical analysis is based upon marginalised population as this study is concerned with the measurement of poverty among marginalised people. Marginalised and socially excluded population in urban areas of all cities of Punjab are extracted with the help of an index developed in Zahra and Tasneem (2014) along with the dimensions and indicators of marginality given below in Tables 1 and 2.

Table 1  
*Dimension and Indicators of Marginality in Punjab*

Dimension	Indicators
Residential Instability	People living alone, people who are not in youth (aged 16+), average number of persons per room, dwelling that are apartment and small building, population of divorces/widowed, people living on rent, people without access to electricity and gas
Material Deprivation	People aged 20 and above without secondary school, people receiving transfer payments, unemployed population (aged 15+, population in low income quintile, type of housing, unpaid family worker)
Dependency	Dependency ratio, female population, population aged 65+, population (aged 15+) economically inactive.
Ethnicity	Language, Religion

Reproduced from Zahra and Tasneem (2014), Marginality and Social Exclusion in Urban Punjab: A Spatial Analysis, Working Paper, GC University, Lahore.

Table 2  
*Dimension and Indicators of Exclusion in Urban Punjab*

Economic Exclusion	Employment (unemployed or discouraged employment), Population at poverty risk, Material deprivation of housing, housing congestion lack of washing machine, freezer and oven, lack of computer and internet accessibility, lack of access of bank account, overcrowding
Exclusion from Social Services	Low educational achievement (basic schooling) and early school leavers, No access to water and sanitation facility, Household with young children not in school, Cannot read or write, Poor general health, Poor physical health, Disable child quality
Cultural Exclusion	low neighbourhood, membership of community centre etc. little social support

Reproduced from Zahra and Tasneem (2014), Marginality and Social Exclusion in Urban Punjab: A Spatial Analysis, Working Paper, GC University, Lahore.

Multidimensional poverty has been evaluated in extracted population sample.

## V. EMPIRICAL MODELING, ESTIMATION PROCEDURE AND EXPLANATION OF VARIABLES

Literature provides different techniques e.g., Ramya, *et al.* (2014) and Labar and Bresson (2011) estimated multidimensional poverty index based on Alkair Foster Measure, whereas Mahlberg and Obersteiner (2001), Sikander and Mudassar (2008) and Merz and Rathjen (2011) used logit regression to see multidimensional poverty. Wagle (2005) contributed in literature by introducing index based estimation of multidimensional poverty and used structural equation modeling. Literature support a wide range of methodologies which used structural as well as simultaneous equation modeling. Attention has now been diverting to analyse the impact of different deprivation on extent of multidimensional poverty. The extent of multidimensional poverty can be seen with the help of number of areas in which a specific household or individual is deprived [Alkair and Foster (2011); Jhon, *et al.* (2013)].

Dimensions in which household or individual are deprived is measured as count data (number of dimension in which each individual is deprived) and are assessed with Poisson regression, a useful technique for count data modeling. It is one of the most robust model for discrete data modeling with an assumption that the dependent variable (number of dimensions in which individual is poor) is distributed as Poisson and its logarithm is a linear function if there are independent variables. Wang and Famoya (1997) used this technique for the modeling of household fertility decision, Femoya, *et al.* (2004) made an application of this model on accidental data, John, *et al.* (2013) use this to assess multidimensional poverty in Nigeria.

Poisson regression captures discrete and non-negative nature of data, the second advantage of Poisson regression is that it allows inference to be drawn on the probability of occurrence [Winkelmann and Zimmermann (1995)]. Another important feature of Poisson regression is that dependent variable is modeled as a deterministic function of independent or explanatory variables, therefore randomness is fundamental and not because of other factors.

The dependent variable in the model is the number of dimension in which an individual is poor with non-negative numbers. An individual's deprivation in different dimension is based on different socio-economic and demographic characteristics, the expected value of dependent variable ( $y$ ) on a set of explanatory variables ( $x$ ) can be written as:

$$E(y/x) = e^{(x'\beta)}$$

Where

$Y$  = dependent variable

$x$  = set of explanatory variables such as health, education, assets, social wellbeing, environmental wellbeing, economic inclusion etc.

$e$  = base of natural logarithm

$x'$  = transpose of  $x$

$\beta$  = the vector of parameters.

The above equation shows that  $E(y/x)$  is greater than zero, therefore an individual deprived in number of dimensions conditional on  $x$  is the Poisson distributed with a probability of:

$$P(Y = y/x) = \frac{e^{-e(x'\beta)} e^{(x'\beta)y}}{y}$$

Where  $y = 1, 2, 3 \dots 8$

The maximum likelihood poisson multidimensional poverty equation can be:

$$L(\beta) = \sum (y_i x_i \beta - e^{x_i \beta})$$

$X$ 's in above equation are the set of independent socio-economic variables which describe individual's characteristics. The full model therefore can be written as:

$$\delta_i = e^{\beta_0 + \sum_{j=1}^k \beta_j x_j}$$

Where

$\delta_i$  = the expected number of dimension in which individual is poor

$e$  = the base of natural logarithm

$\beta_0$  = the intercept

$\beta_j$ 's = coefficient of regression

$x_j$ 's = explanatory variables

The study takes "a number of dimension in which an individual is deprived" as dependent variable. To calculate the number of dimension in which an individual can be poor, Alkair Foster (2010) methodology has been used that helps to measure dimensions of poverty. Furthermore Ataguba, *et al.* (2013) also used the same technique to find dimensions in which an individual can be poor. Taseer and Zaman (2013) used this technique to show time series breakdown in multidimensional poverty in Pakistan. This methodology uses dual cut-offs to find dimensions adjusted measure of poverty and is better than other methodologies as it satisfying assumptions of monotonicity and decomposability. To identify and measure multidimensional poverty, head-counts and dimension adjusted head count ratios are used. The dimension adjusted head count  $M_0$  can be calculated as:

$$M_0 = H_0 \times A$$

Where  $H_0$  is the proportion of people who are deprived in certain dimension and  $A$  is the mean share of deprivation among the poor,  $M_0$  is used as a dependent variable in the model. Internationally eleven dimensions has been selected to measure multidimensional poverty among household or individuals but in case of MICS dataset, it is only useful to calculate seven dimensions. These include economic, housing, air quality, health, education, water and sanitation, assets. Detailed composition of these dimensions is given below in Table 3.

The contribution of human capital to poverty alleviation is proved by previous literature. The development of human capital leads to an increase in standard of living at household level. Communities with more low-skilled workers in general are more likely to experience high rates of poverty. The *educational attainment* as a measure of quality of human capital is important, High educational attainment may imply a greater set of employment opportunities that could decrease poverty [Cameron (2000); Chaudhary, *et al.* (2009)]. The availability of education facilities serve as a main indicator of remains

Table 3

*Dimensions and Indicators used for Dependent Variables*

Dimensions	Indicators
Living Standard	Housing type (floor, roof and walls material), dwelling type, rooms congestion, electricity,
Environment	Type of Fuel, open dumps nearby, solid waste disposal, kitchen for cooking
Assets	TV, Refrigerator, AC, Vehicle (car, Motor Cycle), Oven, Washing Machine, Room cooler
Education	Education of HHH, education attainment (primary)
Health	Vaccination, Disable HH member
Livelihood	Employment type, other source of income
Water and Sanitation	Proper means of water, proper mean of sewerage, toilet facility, HH use boiled/filtered water for drinking purposes

poor. If the household have an accessibility of school then there is a greater chance to get rid from poverty. Theory shows a fundamental impact of health on households, it is considered that the accessibility to health services directly influence the productivity of individual household [McDonough, *et al.* (2009); Zhong (2009)]. Another indicator of housing standards is access to electricity. The housing indicators also affect the standard of living of households. Employment is considered as an important factor to affect poverty. The occupational affiliation of the head of household is found to be an important determinant of poverty. The empirical results suggested that the industry specific employment is necessary for reducing poverty (increased per capita consumption and ultimately per capita food consumption) [Sikander (2009)]. The employment trend is defined by *participation rate* which is the ratio of the number of workers to the number of adults in a household. The participation rate is expected to be negatively correlated to poverty. *Household income* is an important determinant of household expenditure since it serves as a budget constraints to the amount that can be spent within a period, there is also bound to be a correlation between income and poverty level of a household, if all other things being equal. The household income is also important to define the poor and non-poor households for further analysis. In economic perspective, to judge the standard of living of households, the *household Property and Assets* which contains the land, livestock and other accessories of life also plays a role to determine the poverty level among households.

As this paper is more concerned with relative poverty related with socio-economic inclusion, capability etc., therefore this study also uses some indices based on socio-economic characteristics of individual and household from where s/he belongs, developed by Wagle (2005). Since integration of different theories would develop a realistic picture of poverty, this study uses different dimension of poverty as explanatory variable i.e. economic inclusion, social wellbeing, capabilities and environmental

wellbeing. The index of economic inclusion is developed with the help of different variables that affect an individual in his economic life. Theories suggest a strong link between employment type, access to finance and occupation with standard of living [Athinkson (1999); Wagle (2005)]. The employment in executive and professional fields, employment in other fields, income, wealth and employment of HHH's partner are some of indicators that are important for economic inclusion of a person. Theory suggests that social wellbeing can be measured by housing condition, electricity, access to safe drinking water, access to secure housing tenure, type of toilet facility, type of cooking fuel and type of assets etc. The index of social wellbeing helps to predict the contribution of this index in the poverty status of households. The approach to measure capabilities of household to earn and to make its standard of living better proves to be important for poverty analysis. Previous literature support that educational achievement, health status, gender related discrimination within households, household head health and access to health facilities as indicators of capability. [Sen (1992); UNDP (2000); Wagle (2005); Alkair (2007)]. Finally, the index of environmental wellbeing also plays an important role in determining the level of poverty among urban household, this index includes such indicators that directly affect the health of household. The access of safe water, proper sanitation and solid waste disposal facilities can be considered as some of the important aspects of environmental conditions. All indices are calculated with the help of principle component analysis.

## VI. MARGINAL POPULATION IN VARIOUS POVERTY BANDS

The estimation of poverty line is very helpful to define various bands of poverty such as extremely poor, ultra poor, non-poor etc. [*Economic Survey of Pakistan* (2007)]. Population which consumes less than 50 percent income of poverty line are categorised as extremely poor, whereas population which lies between income groups (more than 25 percent of poverty line income) is considered as non-poor.

Table 4

*Marginal Population in Various Poverty Bands*

		2007-08	2011-12
		Income based Poverty Line (\$1.5 per Day)	Food Consumption based Poverty (Rs 1668) <sup>3</sup>
Extremely Poor	> 50%	40.8	94
Ultra Poor	50% <X>75%	30.0	4.1
Poor	75% <X>100%	11.0	1.2
Vulnerable	100% <X>125%	5.8	0.3
Non-poor	125% <X	6.8	0.4

<sup>3</sup>Planning Commission of Pakistan (2011).

Around 70 percent of total population lives within extremely poor and ultra-poor and only 6.8 percent of marginal class live out of poverty in 2007 while in 2011 the poverty line is based on expenditure approach, where 94 percent population appears to live in extreme poverty.

## VII. RESULTS AND DISCUSSION

The results from poisson regression analysis is presented in Tables 5 and 6, the study use four models (two for each data set) to prove hypothesis. Theory suggest a chain of marginality, social exclusion and poverty, therefore model 1 of each dataset shows results that includes marginality as an explanatory variable, while model 2 contains all other variable of model one and use social exclusion index as an independent variable to prove the theoretical link.

We found that coefficient has correct signs as defined in theory with some minor contradictions. Results provided in Table 5 show that income has a negative impact on the proportion of dimension in which household can be poor and increase in income level will reduce poverty threats by .02 percent ( $e^{0.0002}=1.00$ ), keeping all other variables constant. The coefficient is significant at 1 percent. This also proves the importance of multidimensional poverty that income has a contributory role if defining a person poor but does not have a unique role. While occupation of an individual also plays a negative impact on the possibility to be poor and can draw him out from poverty, individual who has good mean of earning than an individual with no or odd job has lesser threat of poverty by 13 percent ( $e^{0.0013}=$  ) at 1 percent level of significance.

As far as the education of individual is concerned, compared to those individuals who are illiterate, people having incomplete primary education, threat of poverty is lower by 23 percent ( $e^{0.2381} = 1.269$ ), compared to not being literate, people having primary education is found to be at minimal threat of poverty by 25 percent ( $e^{0.2549} = 1.290$ ) again assuming all other variables to be constant. For those persons, who have matric and higher education have a lesser threat to be poor by 29 percent ( $e^{0.2926} = 1.339$ ).

As far as housing condition is concerned, the variables reported those individual who have poor housing condition, the result shows a positive relationship of both variables, compared to people living in better housing, the threat to be poor for those individual living in poor housing increased by 11 percent( $e^{0.1103} = 1.116$ ). The coefficient of housing is significant at 1 percent.

An individual who has good amount of assets is also better off as compared to individual with no assets; the possibility to be poor for that individual is lower by 21 percent ( $e^{0.2198} = 1.245$ ) while holding all other variable constant. Capability to be better off has also strongly affect the status of poverty of an individual, a person with good capabilities has a 31 percent ( $e^{0.3152}$  ) less chances to be in multidimensional poverty than a person with no capabilities. Economic inclusion also lower the risk of poverty, an individual who has greater inclusion in economic activities has 55 percent ( $e^{0.5578} = 1.746$ ) chances of deprivation in different dimension that a person with no economic inclusion. Similar with social wellbeing, person with greater social and civic services has less chances of deprivation than a person with no social and civic services. The coefficient is significant at 1 percent level. Model 2 has almost same results with the same nature of relationship.

Table 5

*Poisson Regression Output (2007-08)***Dependent Variable: Poverty Counts**

	Model 1		Model 2	
	Coefficient	Standard Error	Coefficient	Standard Error
Income	-.000261***	0.000157	-.000259***	.000157
Poor Health	.00362	.01121	.001378	.011224
No Education (reference)				
Pre-primary	-.238136***	.019691	-.22552***	.01975
Primary	-.254944***	.008643	-.23253***	.009776
Middle	-.26673***	.0107994	-.237417***	.012318
Matric	-.292634***	.022817	-.25584***	.023737
Higher	-.292006***	.0278123	-.25359***	.028669
Madrasa	-.316337***	.0978124	-.28196***	.098035
Poor Housing Condition	.11037***	.00729	.11064***	.00729
Occupation	-.00135***	.000102	-.00130	.000104
Assets	-.21986**	.09553	-.19139**	.095745
Capability	-.315201***	.035955	-.26964***	.036493
Environment Wellbeing	.26406***	.03086	.26964***	.03087
Social Wellbeing	-.71456***	.096468	-.724314***	.096684
Economic Wellbeing	-.55788***	.072224	-.632038***	.070282
Marginality Index	-.03103**	.007036	-	-
Social Exclusion Index	-	-	.02941	.00722
Log Likelihood		-50127.518		-50129
Pseudo R2		.0239		.0239
LR $\chi^2$ (12)		2457.01		2454.04
Prob> $\chi^2$		0.0000		0.0000

Table 6

*Poisson Regression Output (2011-12)***Dependent Variable: Poverty Counts**

	Model 1		Model 2	
	Coefficient	Standard Error	Coefficient	Standard Error
Food Exp	-.00035**	.000151	.000346**	.000513
Poor Health	.28101***	.050004	.26754***	.04996
No Education (reference)				
Pre-primary	.241633***	.05386	.244616***	.053865
Primary	.225908***	.00840	.231517***	.008779
Middle	-.03337**	.01031	-.03517**	.011005
Matric	-.045371***	.00970	-.028226**	.010339
Higher	-.04938***	.00677	-.028919**	.01123
Poor Housing Condition	.04979**	.016667	.03649**	.01650
Occupation	.000184	.000239	.000205	.000239
Assets	-2.3437***	.161364	-2.4809***	.16043
Capability	-.173256**	.069413	-.151884**	.06940
Social Wellbeing	3.6445***	.12478	3.7985***	.12019
Economic Inclusion	-.163873***	.022886	-.10671***	.01974
Marginality Index	.035296***	.006772	-	-
Social Exclusion Index	-	-	.01079**	.00513
Log Likelihood		-58456		-58468.287
Pseudo R2		.019		.0189
LR $\chi^2$ (12)		2275.35		2252.63
Prob> $\chi^2$		0.0000		0.0000

Results of Poisson regression of 2011-12 data wave presented in table 6 had only expenditure data while income aspect of household has been ignored. Therefore the above table has two variables missing due to non-availability of data, one is income of an individual and the other is environmental wellbeing while one variable is additional i.e. expenditures. According to results, expenditure has negatively affected the risk to be in poverty, increase in expenditure will decrease deprivation by .03 percent ( $e^{0.0003}=1.00$ ), keeping all other variable constant. The coefficient is significant at 5 percent. As far as the education of individual is concerned, compared to those individuals who are illiterate, people having incomplete primary education, threat of poverty increase by 24 percent ( $e^{0.2416} = 1.269$ ), compared to not being literate, people having middle level education is found to be at a minimal threat of poverty by 3 percent ( $e^{0.0333} = 1.034$ ) again assuming all other variables constant. For those persons, who have matric and higher education have a lesser threat to be poor by 5 percent ( $e^{0.0497} = 1.051$ ). As far as the housing condition is concerned, the variable reported those individual who have poor housing condition, the results show a positive relationship of both variable, compared to people living in better housing, the threat to be poor for those individual living in poor housing is increased by 5 percent ( $e^{0.0497} = 1.051$ ). The coefficient of housing is significant at 5 percent. Capability to be better off has also strongly affect the status of poverty of an individual, a person with good capabilities has a 17 percent ( $e^{0.1732} = 1.189$ ) less chances to be in multidimensional poverty than a person with no capabilities. Economic inclusion also lower the risk of poverty, an individual who has greater inclusion in economic activities has 16 percent ( $e^{0.1638} = 1.178$ ) chances of deprivation in a different dimension that a person with no economic inclusion. Similarly with marginality index and social exclusion index, person with higher marginality and social exclusion has high threat to be poor in different dimensions than a person who is not at marginal position and not socially excluded. Model 2 of this wave also shows similar results with the same nature of relationship.

The results showing almost significant relationship with relationship with poverty perceived in theory expect some of variable which shows opposite results. Above results shows a picture of poverty during two time period i.e. 2007-08 and 2011-12 respectively. Increase in income and expenditure makes an individual better off and reduce chances to be in poverty. An individual with high income and good nutrition can access living facilities well and can be more productive than a person with less food consumption [Headey (2008)]. Results also show a negative and significant impact of income and expenditure on deprivation and poverty in both waves. Wealth of an individual also includes type and number of assets which an individual has, therefore the state of poverty strongly depends upon the asset ownership of an individual or household [Moser (1998, 2006)]. Results show a negative, strong and significant relationship of assets ownership on risk of multidimensional poverty, a person with good assets has lower chances to be poor in different dimension than a person with no assets. Same relationship is proved by Meck and Lansley (1985) and Milton (2003), where lack of assets make a person more poor. Liverpool and Alex (2010) shows a positive impact of asset building on consumption expenditure.

Another important determinant of poverty is education which is proved by results from both waves. To make a detail analysis, we split education into different levels and

compare risk to be poor with illiteracy. Higher education lower chances of poverty, Haroon (2009) shows a positive impact of education on expenditures of household, Dewilde (2004) proves that with increase in educational attainment, the risk of poverty has been reduced, he tested this theory both on uni-dimensional and multidimensional poverty risk, results also reflect theoretical base, first wave supports the attainment in education lower the chances for household to be poor, all results are significant at 1 percent level, while second wave (2011-12) shows a positive relation of education attainment till primary level with poverty risk for an individual, while education attainment (above primary and onward) will lower risk of poverty significantly. Jhon, *et al.* (2013) also found a positive impact of primary education attainment on multidimensional poverty counts; similarly Dewilde (2004) also found greater proportion of population with higher education within poverty. Narayan, *et al.* (2000) and Meck and Lansley (1985) also highlights assets, income and education as important determinants of poverty.

Alkire (2008) gives high importance to housing condition as it plays very important role in defining multidimensional poverty. If a person living in poor housing, his chances of living in poverty is greater, poor housing will reduce chances of having good living facilities, relax life style and productive socio-economic contribution [Taseer and Zaman (2013)]. Results support theory and prove a significant impact of poor housing on chances to remain in poverty. As far as health of an individual is concerned, in case of first wave, results are insignificant and positive toward risk of poverty, while second wave shows highly significant and positive relationship of poor health of a person.

Sen (1992) approach of capability was defined as a transformed area of poverty research, later OPHI measure by Alkier and Foster (2008) also focused on this dimension. She gave due importance to capabilities in definition of multidimensional poverty measurement. Results show a negative relationship between capabilities risk of poverty. The improvement in capability will reduce the chances of poverty. Wagle (2005) also proves a negative relation between poverty and capability improvement. Similarly, the index of environment wellbeing has a negative impact on poverty and environmental up-gradation ensures betterment in standard of living of an individual. There is a significant contribution of environment hazards in urban poverty, degradation of renewable resources i.e. fresh water and poor mean of waste management lead toward poor standard of living [Satterthwait (2003)]. The index of social wellbeing also shows expected relation and negatively affects the risk of poverty; an individual who is socially empowered has fewer chances to be captured in the trap of poverty then a socially deprived person.

The relationship between marginality and poverty shows different results in two waves, during 2007-08, relationships show a negative relationship, here one thing which should be considered while explaining this relationship is that the marginality index is in form of least to most marginal, the increase in value of marginality index shows high marginalisation of specific individual, therefore if we assume marginality leads to poverty then the expected relationship between dependent variable and marginality index is positive which exist in 2001-12 data results. According to Franz, *et al.* (2011), it is not necessary that a marginalised person is poor or a poor is marginalised, however both are interlinked, therefore results support the theory presented by Franz, *et al.* (2011). In

2007-08, a negative relationship between marginality index and poverty counts is reported, however in the second wave relationship is positive and increase in marginality would cause an increase in poverty counts. According to [Sen (2000)], the concept of social exclusion is considered to be the root cause of poverty. The composition of social exclusion index is similar to the composition of marginality index, higher value shows higher exclusion or vice versa. Both data results show a positive and significant relationship between social exclusion and poverty counts. An increase in social exclusion would cause ultimate poverty in different dimension of socially excluded person.

## **VII. CONCLUSION**

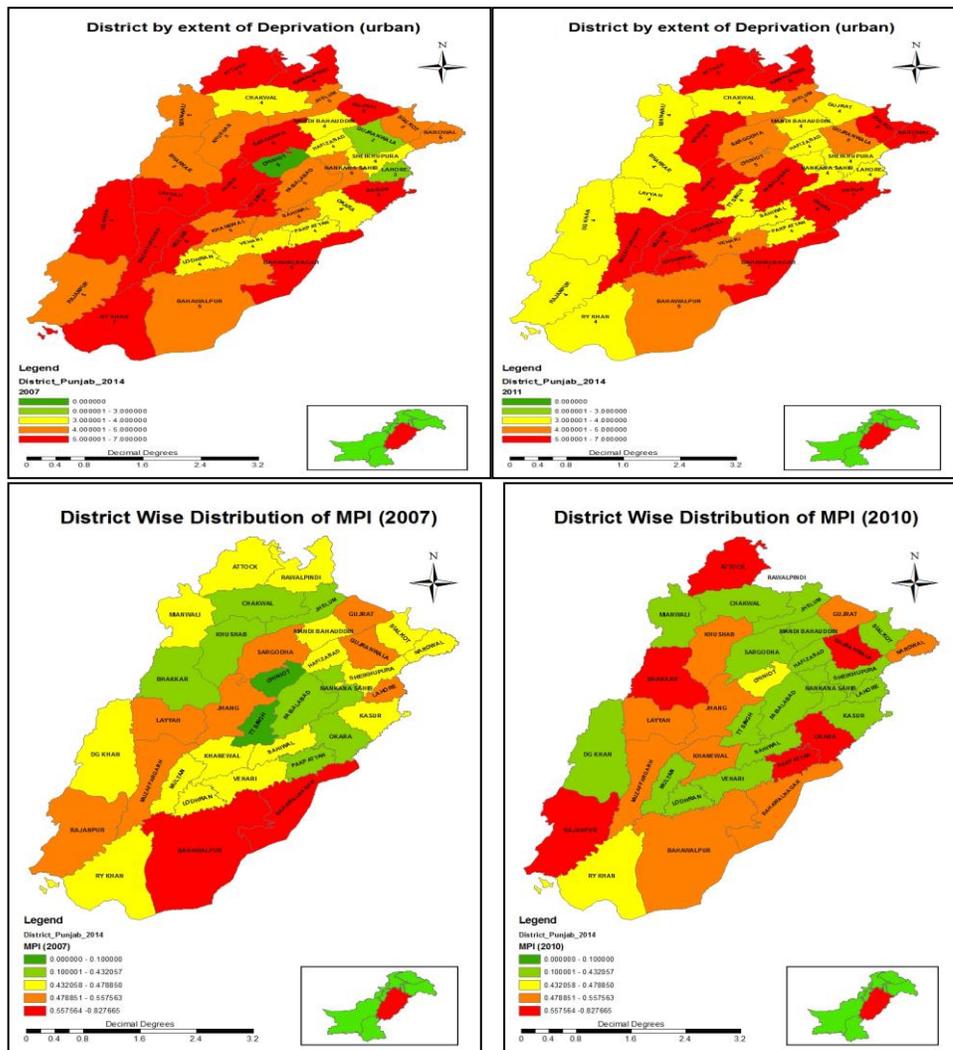
The study is an attempt to analyse the determinants of poverty among marginalised population of urban Punjab. For this purpose, two waves of Multiple Indicator Cluster survey (MICS) of the year 2007-08 and 2011-12 has been used. Among a sample set of more than two hundred thousand, around 96000 were reported as marginalised based on marginality index, and 33,629 were drawn as socially excluded from marginal group, rest of the population is considered as marginal but not socially excluded.

Results verify hypothesis and show that marginality is a root cause of extreme poverty. As far as multidimensional poverty of this marginal class is concerned, the population with no education or low level of education is highly poor in multidimensional way, the extent of economic inclusion, social betterment, capability improvement also positively affect an individual and his poverty count is reduced with the betterment of above mentioned indicators. Overall results confirm the research question that marginality cause poverty.

On the determinants side, the income support programs cannot break the vicious circle of poverty until and unless policies focus is toward the determinants of poverty. Along with education, health and housing, the role of capabilities and environment, exclusion and marginality cannot be ignored. There is a strong link of these variables with poverty. Therefore a need to focus on these determinants is important and providing income, skills, education and other related factors should be the focus of any policy decision. Marginality and social exclusion may be a new concept for poverty reduction policy-making, but we can't deny this fact that in Pakistan, the focus of poverty reduction strategies is on curative measures, not on preventive measures. Therefore those factors which exclude a household or individual from community is not at target of policy makers.

Countries are going to treat marginal communities separately to make specific policies for their benefits but in Pakistan still there is dearth of literature and no dataset exist which could cover issues of marginal community specifically. A need to study marginal class and their problem through survey and research is strongly needed. Moreover, a new diverted focus of policy should be on the treatment of poverty among disadvantaged class. The separate survey to target marginalised communities if not possible then at least inclusion of this dimension in some national and provincial level data set can fulfil the purpose. These people have different nature of issues in their social, economic and cultural lives which are related with socioeconomic service delivery mechanism together with infrastructure provision.

## APPENDIX



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### Comments

- The paper aims to provide a district level analysis which focus on micro level poverty analysis of the marginalised people of Punjab with focus on whether these people are living in extreme poverty or out of poverty. Paper also find out the determinants of MPI by using Poisson regression The study has defined the marginality as a state situated at the margin, this could lead toward social exclusion hence poverty or a marginal person can be out of poverty. Please rephrase the definition of marginality because it is missing the social-economic aspects.
- I not found much difference between theoretical framework and literature review. Author has given a uni-directional framework moving from marginalisation—social exclusion—MPI. I think it is not unidirectional. Current deprivation can also transmit social exclusion in future and especially look at the socially excluded people, they are transferring their current deprivations into their children by making them potential future social excluded people. You also mentioned similar statement at pp. 8 that marginality has casual relation with poverty.
- At pp. 9 author give powerful statement that “urban areas of Punjab remain in extreme poverty”. I think its cannot be justified. Though there are pukets of rural poverty with a lot of regional variation but you can find comparatively less urban poverty differential even north, central and south. You have skipped three studies which have applied the small geographical technique on two micro data-sets to compare poverty levels across more than one hundred districts of Pakistan. Jamal (2007) and Cheema (2010) utilised the HIES 2004-05 and PSLM 2004-05 for the district level poverty comparison while Ali (2011) has applied this technique on the 2007-08 HIES 2007-08 and 2007-08 MICS (Punjab) to predict poverty at district and tehsil levels for Punjab.
- On pp. 9-10 please correct the sample information of MICS 2011-12. 102,545 were conducted. The study has taken the concept of marginalised and socially excluded from Zahra and Tasneem (2014). I not found the study in reference list so unable to know how concept has been measured. Though annexure 1 and 2 has explained the marginality and exclusion but definition is not clear. i.e. in marginality people living along not in youth (16+) but youth is also comprises of 16+, second how you tackle the students as your unit of analysis is individual but I don't know what age is in unit of analysis, then majority of the characteristics coming from hh, so it should be defined at hh level. Then almost the variables in marginality and social exclusion are same i.e. economically inactive/unemployed in marginal and employment in social exclusion, education vs literacy or low educational attainment, electricity/gas/rented home vs freezer/oven/computer, average number of persons per room vs housing

congestion. Same are the indicators of MPI so if you put all the three annexure tables together, you cannot find any major difference. Then if you see annexure Table 3, you are taking majority of indicators at hh level so why then analysis at individual level. The study has taken 7 dimensions and a lot of indicators (though definition is not given of indicators.) need to check multicollinearity, and robustness.

- At pp. 12 author stated that the study takes “number of dimension in which an individual is deprived” as dependent variable.
- In Table 4.1, there is need to explain poverty line i.e. author reported 1668 for 2011 but it is not. Second how poverty is estimated from MICS data, including technique and poverty line. Third you cannot compare income based vs consumption base and you can find a lot of difference in Table 4.1.
- I am concerned on the theoretic building of poisson regression model. Because majority of your variables are either facing multicollinary or they also exist in the estimation of dependent variable. (what you do if income is 0 as explanatory variable. Education is itself determinant of income (Table 4.2). Occupation and income, assets and income and then social, economic well-being and marginally also capture the same.
- In Table 4.3 food expenditure is itself determined by MPI. It’s totally wrong
- In annexure GIS mapping, deprivation is 0 or high in Gujrat, Rawalpindi, Attock is unable to understand, the range is also questionable. All these numbers make the whole paper ambiguous.

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## Food Consumption Patterns and Implications for Poverty Reduction in Pakistan

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### INTRODUCTION

The global food crisis of mid-2000s resulted in a several-fold increase in the prices of essential food items. Resultantly, the incidence of food insecurity, hunger, and poverty has increased in many developing countries [Ivanic and Martin (2008); Harttgen and Klasen (2012); De Hoyos and Medvedev (2009); World Bank (2010); Regmi and Seale (2010); Andreyeva, *et al.* (2010)]. Pakistan is also hit hard by this crisis. Prices of several food items increased by more than a 100 percent since 2006-07. Consequently, nearly half of the population is currently unable to meet its minimum (subsistence) caloric requirements for healthy and productive living [Malik, *et al.* (2014)]. A large proportion of household expenditure is spent on food (on average about 48 percent in 2010) and thus very little is left for the other expenditures necessary for human welfare, such as, health and education. Moreover, dietary diversity is extremely limited. Nearly 70 percent of food expenditure is on cereals, dairy, sweeteners, and fats. Wheat is the major source of calories, providing about half of the total daily calories [Malik, *et al.* (2014)]. However, the price of wheat increased by 125 percent between 2005-6 and 2010-11. Existing analyses indicate that these price shocks entail significant additional expenditures to maintain their pre-crisis consumption levels [Haq, *et al.* (2008); Friedman, Hong, and Xiaohui (2011)]. There is thus overwhelming evidence that rising food prices and the decline in real wages have serious implications for poverty, food security, and nutrition through food consumption patterns in the country.

In Pakistan, several studies have examined the effect of price change on consumption patterns during the last four decades [Siddiqui (1982); Burney and Khan (1991); Malik and Sarwar (1993); Burki (1997); Farooq, *et al.* (1999); Shamim and Ahmad (2007); Haq, *et al.* (2008, 2011)]. However, the analysis in these studies is based mostly on the data collected before the food price hike (i.e., before 2008). Some post-

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price-crisis studies, for example, Haq (2008, 2011) and Friedman, Hong and Xiaohui (2011), provide useful information on the impact of food price crisis on the welfare of Pakistan's population. However, these studies are limited in several ways by the assumptions underlying their analysis. For example, they assume similar consumption patterns across different household expenditure groups and across different regions of the country; and, thus fail to highlight the differential impact if any of the food price hike on the consumption patterns of poor and non-poor households located in different regions of the country. A fuller understanding of the consumer response to rising prices based on disaggregated analysis is essential for the policymakers to design effective and pro-poor food policy in the current scenario.

The main objective of this paper is to examine the extent of the impact of more recent price changes on consumer behaviour at a disaggregated level and highlight the policy implications for poverty, food security, and nutrition in Pakistan. For this purpose, using the data of the most recent publicly available and nationally representative Household Integrated Economic Survey (HIES) 2010-11, we estimate the Linear Approximate Almost Ideal Demand System (LA-AIDS) for ten food groups: wheat and wheat flour; rice including all kinds of rice consumed; other cereals; pulses; fruits and vegetables; milk and milk products including desi ghee and butter; meat (beef, mutton, fish and poultry); edible oil; sugar and other sweetener; and other food items (tea, condiments and spices, etc.). We divide households into two groups: poor and non-poor, and differentiate for rural and urban areas.

This paper is divided into five sections. Methodology and data are described in Section 2. A descriptive analysis of food consumption patterns is presented in Section 3. Section 4 presents a discussion of the results of LA-AIDS model and estimated elasticities. Implications of food consumption patterns for poverty reduction are presented in Section 5. Conclusions and policy recommendations are given in the final section.

## 2. METHODOLOGY AND DATA

### 2.1. Methodology

To estimate the income and price elasticities of ten food items, we use the Linear Approximate Almost Ideal Demand System (LA-AIDS) proposed by Deaton and Muellbauer (1980a, 1980b). This demand system derives budget share equation from the specification of Price Independent Generalised Logarithmic (PIGLOG) cost function introduced by Muellbauer (1976). The model has budget shares as dependent variables and logarithm of prices and real expenditure/income as regressors. The LA-AIDS model satisfies the desirable properties of a demand theory. The LA-AIDS demand equation in budget share form is:

$$w_i = \alpha_i + \sum_{j=1}^n \gamma_{ij} + \ln(p_j) + \beta_i \ln\left(\frac{x}{P}\right) + e_i \quad \dots \quad \dots \quad \dots \quad \dots \quad (1)$$

In Equation (1),  $n$  is the number of goods,  $w_i$  is the budget share of good  $i$ ,  $p_j$  is the price of good  $j$ ,  $x$  is expenditure,  $P$  is a price index approximated by the Stone price index ( $\ln(P) = \sum_j w_j \ln(p_j)$ ) and  $\alpha_i$ ,  $\gamma_{ij}$ , and  $\beta_i$  are parameters. Separability is imposed at the food level, implying that consumers modify their optimal food consumption bundle when relative prices of individual food items change, given an

optimal allocation of expenditure on food. Due to separability, the marginal rate of substitution between any food items is independent of the changes in the non-food items. To account for the household characteristics, Equation (1) is augmented with household specific socio-economic, demographic, provincial, and regional (briefly socio-economic) characteristics using the following relationship proposed by Pollak and Wales (1981).

$$\alpha_i = \alpha_i^* + \sum_j \delta_{ij} z_j \quad \dots \quad (2)$$

where  $z_j$  is a matrix of socio-economic variables and  $\delta_{ij}$  is the vector of parameters. Substituting Equation (2) in the Equation (1) yields:

$$w_i = \alpha_i^* + \sum_{j=1}^n \gamma_{ij} + \ln(p_j) + \beta_i \ln\left(\frac{x}{p}\right) + \sum_{j=1}^n \delta_{ij} z_j + e_i \quad \dots \quad \dots \quad (3)$$

Equation (3) is estimated for ten food items mentioned above for whole Pakistan. The theoretical restrictions on the demand function are imposed during estimation. These restriction include the following:

Adding-up:

$$\sum_i^n \alpha_i^* = 1, \quad \sum_i^n \gamma_{ij} = 0, \quad \sum_i^n \beta_i = 0 \quad \forall \text{ all } i \quad \dots \quad \dots \quad \dots \quad (4)$$

Homogeneity:

$$\sum_i^n \gamma_{ij} = 0, \quad \forall j \quad \dots \quad (5)$$

Symmetry:

$$\gamma_{ij} = \gamma_{ji} \quad \dots \quad (6)$$

Using Equation (3), uncompensated and compensated, expenditure elasticities can be derived. The uncompensated price elasticity for good  $i$  with respect to good  $j$  is  $e_{ij} = \frac{\gamma_{ij} - \beta_i}{w_i} - \delta_{ij}$ . Compensated price elasticity for good  $i$  with respect to good  $j$  is  $e_{ij} = \frac{\gamma_{ij}}{w_i} + w_j - \delta_{ij}$ , Where  $\delta_{ij}$  is the Kronecker delta and it equals one for own price and zero for cross-price elasticities. The expenditure elasticity ( $E_i$ ) is  $E_i = 1 + \frac{\beta_i}{w_i}$ .

The seemingly unrelated regression estimation method of Zellner (1963) is employed to estimate the system of equations. The statistical significance of the estimated elasticities is derived using the delta method. Imposing the property of additivity of the expenditure function makes the variance and covariance matrix singular and one of the equations needs to be omitted to estimate the LA-AIDS. The expenditure equation for “other food” is omitted and the coefficients for the omitted equation are derived using the theoretical conditions imposed on the estimation process. However, the coefficients estimated using LA-AIDS are invariant to the omitted equation.

**2.2. Data**

The data used in this study is derived from the nationally representative Household Integrated Economic Survey (HIES) 2010-11 (the most recent data

available). HIES 2010-11 covers 16,341 households selected from the urban and rural areas of all four provinces of Pakistan. A two-stage stratified random sample design was adopted to select the households. In the first stage, 1,180 primary sampling units (enumeration blocks) were selected in the urban and rural areas of all four Pakistan provinces. In the second stage, the sample of 16,341 households was randomly selected from these primary sampling units. Using a random systematic sampling scheme with a random start, either 16 or 12 households were selected from each primary sampling unit [Pakistan (2011)]. The HIES collects detailed information on the quantity and value of consumption of various food items. This information enables us to examine the budget share of different food items to estimate the LA-AIDS system. In addition, HIES collects data on various household and individual characteristics that allows the estimation of LA-AIDS demand system by controlling for various factors other than prices and income.

### 3. CONSUMPTION PATTERNS OF FOOD

In this section we examine the underlying food budget shares, calories consumption and the cost of calories across poor and non-poor households by urban or rural households. We classify households who fall in the lowest two per capita expenditure quintiles.<sup>1</sup>

#### 3.1. Food Budget Shares

Food accounts for 54 percent of total expenditure; 46 percent in urban areas and 58 percent in rural areas. Of total expenditure, non-poor spend about 51 percent and poor 57 percent on food. On average Rs 1695 per adult equivalent per month are spent on food; Rs 1137 by the poor and Rs 2070 by the non-poor. Cereals and dairy products are important food items in the diet of Pakistani households; constitute nearly 46 percent of total food expenditure. Wheat is the most important cereal, accounts for 22 percent of the food expenditures for the poor; 20 percent in urban areas and 22.9 percent in rural areas. Whereas, non-poor households spend 14.5 percent of food expenditure on wheat; 11.9 percent in urban areas and 15.9 percent in rural areas. Relative to wheat, rice accounts for only one fourth of wheat's expenditure share. Other cereals make up less than half a percentage of the food expenditures across the board (Table 1).

The share of expenditures on dairy products is higher than the share for cereals. Similar trends are observed for urban and rural areas. Poor spend more on wheat and non-poor on dairy products. Most of the dairy products are consumed in the form of milk and ghee. The other important categories but with much lower shares are fruits and vegetables, oils, and sugar. These food groups account for 13 percent, 10.8 percent, and 10.5 percent, respectively of food expenditures. Pulses make up about 3 percent of the total food expenditures.

<sup>1</sup>The average calories consumption for households, which fall in these two lowest quintiles is 2260 per capita, which is lower than the nationally accepted poverty line consumption of 2350 per ae per day.

Table 1

*Budget Shares by Food Groups; by Urban and Rural and Poverty Status*

Food Group	Urban			Rural			Pakistan		
	Overall	Non-Poor	Poor	Overall	Non-Poor	Poor	Overall	Non-Poor	Poor
Share of Food Expenditure in Total Expenditure (%)	46.5	42.5	52.4	57.6	56.1	60	53.8	51.4	57.4
Share in Food Expenditure (%)									
Wheat	15.2	11.9	20.1	18.7	15.9	22.9	17.5	14.5	22.0
Rice	3.8	3.6	4.0	3.8	3.8	3.7	3.8	3.7	3.8
Other Cereals	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4
Pulses	2.9	2.8	3.2	2.9	2.9	3.0	2.9	2.8	3.0
Fruits/Vegetables	13.3	13.5	13.0	12.9	13.1	12.7	13.0	13.2	12.8
Dairy	24.3	26.3	21.3	24.3	26.9	20.4	24.3	26.7	20.7
Meats	12.1	14.6	8.5	8.4	9.8	6.4	9.7	11.4	7.1
Oils	10.5	9.5	11.9	11.0	10.2	12.1	10.8	10.0	12.1
Sugars	9.7	9.4	10.1	11.0	10.6	11.6	10.5	10.2	11.1
Other	7.8	7.9	7.7	6.6	6.5	6.8	7.0	7.0	7.1

Source: HIES 2010-11.

### 3.2. Calorie Consumption

The HIES provides information on the consumed quantities of various food items. The consumption aggregate includes not only actual purchases but also self-produced and consumed items, consumption of items that were received as gifts, plus items provided in place of monetary compensation. Using the Food Composition Tables for Pakistan (2001), we converted these quantities into calories. The average calorie consumption is reported in Table 2. This table shows that wheat provides bulk of calories. Nearly 52 percent of the calories come from wheat for poor households. This proportion is higher in rural areas than that in urban areas. The second largest source of calories for the poor is cooking oil/fats followed by dairy products and sugars. The expenditure and calorie intake patterns signify an unhealthy diet patterns of the people of Pakistan.

Table 2

*Calorie Shares of Food Items (%) by Urban, Rural and Poverty Status (2010-11)*

Food Groups	Urban			Rural			Pakistan		
	Overall	Non-Poor	Poor	Overall	Non-Poor	Poor	Overall	Non-Poor	Poor
Total Calories Per Adult Equivalent Per Day	2,086	2,289	1,782	2,351	2,664	1,882	2,260	2,535	1,848
% Share in Total Calories									
Wheat	42.6	38.2	49.2	48.6	45.4	53.3	46.5	43.0	51.9
Rice	6.0	6.0	6.1	5.3	5.4	5.2	5.6	5.6	5.5
Other Cereals	0.5	0.5	0.3	0.7	0.8	0.6	0.6	0.7	0.5
Pulses	2.6	2.7	2.5	2.2	2.3	2.0	2.3	2.4	2.2
Fruits/Vegetables	5.0	5.3	4.5	4.2	4.4	4.0	4.5	4.7	4.2
Dairy	13.4	15.7	10.0	13.0	15.1	10.0	13.2	15.3	10.0
Meats	3.5	4.4	2.1	2.0	2.5	1.4	2.5	3.1	1.6
Oils	15.3	15.7	14.7	13.1	13.2	13.0	13.9	14.1	13.6
Sugars	9.7	9.8	9.6	10.1	10.2	10.0	10.0	10.1	9.8
Other	1.4	1.6	0.9	0.6	0.7	0.5	0.9	1.0	0.7

Source: Computed from HIES (2010-11).

Despite calorie-dense diet, the overall per adult equivalent per day calorie intake (2260) is less than the officially recommended minimum per day intake of 2350 calories. The average calorie intake for the poor (1848) is significantly lower than the recommended intake of calories. The calorie intake of urban poor is lower than the rural poor. The data reported in Table 2 shows that the poor households, irrespective of the place of residence, are not able to obtain 2150 calories per day.

### 3.3. Cost of Calories

The evidence indicates that the Pakistani diet is not calorie efficient in terms of expenditures. The cost per calorie varies significantly across rural urban areas and poverty status. Using the average food expenditure per adult equivalent per day and calories per adult equivalent per day, we computed the average cost of 100 calorie. In view of the importance of wheat, we also computed the cost of 100 calories derived from wheat. Results are presented in Table 3. This table shows that non-poor spend more to obtain 100 calories both in urban as well as rural areas. Overall a household spends Rs 2.52 to obtain 100 calories. However, looking at the cost of calories from wheat (last column), one can note that poor are paying a higher amount to get 100 calories from wheat than the non-poor. Calories, especially from wheat that is the major source of calories, can become more expensive if prices of wheat continue to rise.

Table 3

*Calories Consumed and the Cost of Calories (kcal/rupee)*

Region or Population Group	Population % of Total	Total Calories (Daily per A.E)	Food Expenditure (Daily per A.E.) (Rs)	100 Calories Cost Overall Food (Rs)	Expenditure on Wheat (per Adult Equivalent) (Rs)	Calories from Wheat (Daily per A.E.)	100 Calories Cost Wheat (Rs)
Rural Poor	31.2	1,882	36.77	1.95	8.15	1,006.9	0.81
Rural Non-Poor	35.6	2,664	67.00	2.52	7.73	1,207.6	0.64
Urban Poor	15.8	1,782	40.06	2.25	9.20	881.3	1.04
Urban Non-Poor	17.5	2,289	74.82	3.27	7.25	871.7	0.83
	100.00						
National	(130.12)	2,260	56.96	2.52	7.28	1,041.1	0.70

Source: Authors calculations based on HIES 2010-11.

Note: Figure in parenthesis is total estimated population in millions from HIES (2010-11) data.

## 4. ESTIMATED DEMAND ELASTICITIES

In this section we present estimates from the Linear Approximate Almost Ideal Demand System LA-AIDS model for the 2010-11 data discussed above. Per capita demand elasticities are estimated by controlling for various socioeconomic variables including poverty status of a household, regional and provincial differences, and seasonality effects. Food items are categorised into ten groups: wheat and wheat flour; rice including all kinds of rice consumed; other cereals; pulses; fruits and vegetables; milk and milk products including desi ghee and butter; meat (beef, mutton, fish and poultry); edible oil; sugar and other sweetener; and other food items (tea, condiments and spices, etc.).

The HIES does not collect information on prices of food items for each household. However, it collects data on the quantity consumed and total expenditure on food items in detail. This enables us to calculate the unit value of consumed food items for each household. These unit values are used as proxy of prices<sup>2</sup> in our estimation. In addition to prices and household per capita food expenditure, several socioeconomic variables are included in the model: three binary variables indicating three levels of education (primary, middle, and high) of the household head; binary variables representing employment of the household head (self-employed, farmer, employee); three dummies representing the quarter when data were collected; dummies representing the provinces of Punjab, Sind and Khyber Pakhtunkhwa (KPK), urban/rural areas and poverty status. The HIES survey is conducted over four quarters of the year. This enables us to test explicitly for differences in consumption across seasons.

#### 4.1. Estimated LA-AIDS Model

The descriptive statistics show this variation in the prices of food items across region (rural/urban) and poverty status. These are presented in Annexure Table 1. Prices are higher in urban areas than that in rural areas and non-poor households pay more as compared to poor households. The socio-economic variables indicate that household residing in urban areas are better than the rural households and non-poor households are better than the poor households in terms of education. A majority of households is engaged in wage employment and this proportion is not very different across rural/urban area or poverty status. A higher percentage of the rural population is poor (48 percent) as compared to urban areas (25 percent).

Most of the estimated coefficients from the model are significant at least at the 95 percent level of significance. The estimated equations for the ten food items are presented in Annexure Table 2. Significant differences in consumption patterns are observed between urban and rural areas, among provinces, and across poverty status. For example, urban households spend less on wheat, rice, other cereals, pulses, edible oil, and sugar and more on fruits and vegetables, dairy and meat than the rural households. The expenditure share of wheat is lower and rice is higher in all provinces as compared to Baluchistan (the reference province). The expenditure on pulses, fruits and vegetables, meat and sugar is significantly higher and the consumption of dairy is significantly lower in Baluchistan as compared to other provinces. The results indicate that household where head is educated up to the primary level consume more rice, other cereals and edible oils. The consumption of dairy products and meat significantly increases and that of edible oil and sugar decreases as education improves. Results show a significant decline in wheat consumption as education improves. Farm households spend significantly more on rice and other cereals and dairy as compared to non-farm households. However, no significant difference in the consumption of wheat between farm and non-farm households is observed. This table shows significant differences for poor and non-poor households. For example, comparing with non-poor households, poor households spend more on cereals, dairy, and sugar and less on meat, fruits and vegetables.

<sup>2</sup>Since all items are not consumed by all households the problem of missing prices arises. In order to keep these missing observations in the analysis, we followed Cox and Wohlgenant (1986) and replaced the missing prices with the average price of an item prevailing in the primary sampling unit (PSU).

These results confirm a priori expectations. There are significant seasonality effects. For example, wheat consumption is higher in quarter 4 (April-June), the period after wheat harvest. However, the seasonality effect in wheat consumption appears insignificant. Rice consumption is higher in quarter 3 (January-March), the period after rice harvest. Meat consumption is found to be statistically significantly higher in quarter 2 (October-December). Eid-ul-Adha, was celebrated in the second quarter in November in 2011. The consumption of fruits and vegetables is higher in the first quarter (July-September). These are the months when a variety of fruits and vegetables become available in the market.

#### 4.2. Expenditure Elasticities

Based on these estimates from the LA-AIDS model, we computed expenditure elasticities by rural and urban areas, and poverty status (see Table 4). Overall the expenditure elasticities are positive and significant suggesting that all goods are normal. The elasticities are greater than one for dairy and close to unity for rice, and sugar suggesting that these food items are most responsive to expenditure changes or luxuries. Similar patterns are observed for rural and urban areas. The elasticities of wheat and pulses appear slightly more elastic for rural areas as compared with urban areas. This indicates that a small change in expenditure affects the demand of these two items more in the rural areas.

Table 4

#### *Expenditure Elasticities of Demand (2010-11)*

Food Groups	Rural Areas			Urban Areas			Pakistan		
	Poor	Non-poor	Overall	Poor	Non-poor	Overall	Poor	Non-poor	Overall
Wheat	0.835	0.754	0.792	0.915	0.668	0.736	0.849	0.715	0.770
Rice	0.882	0.758	0.832	1.237	0.938	1.026	0.945	0.829	0.913
Other Cereals	0.129	1.227	0.791	0.252	1.134	1.024	0.072	1.259	0.890
Pulses	0.829	0.719	0.755	0.740	0.650	0.651	0.814	0.677	0.713
Fruits/Vegetables	0.879	0.882	0.877	1.019	0.947	0.959	0.907	0.909	0.910
Dairy	1.919	1.696	1.798	1.638	1.449	1.494	1.871	1.607	1.696
Meat	0.665	0.791	0.732	0.738	1.015	0.985	0.677	0.892	0.823
Cooking Oil	0.616	0.563	0.588	0.582	0.672	0.648	0.612	0.604	0.606
Sugars	0.840	0.863	0.863	0.967	1.072	1.063	0.865	0.956	0.939
Other	0.717	0.696	0.704	0.678	0.789	0.759	0.713	0.730	0.718

Source: HIES 2010-11.

Note: All results significant at 99 percent confidence level.

\* calculated using weighted Expenditure shares.

Comparing poor and non-poor households, Table 4 shows that poor households are more responsive to any changes in expenditures in both urban as well as rural areas. However, comparing the poor households across urban and rural areas, the results in Table 5 show that the urban poor are more responsive to expenditure changes than the rural poor for all food items except for pulses and meats. Any change in the expenditure of these two food items changes their demand more for urban poor. For non-poor households of urban areas, the expenditure elasticity of rice, meat, dairy products, fruits and vegetables, and sugar falls in the range of 0.938 to 1.449. This indicates that the

demand of these items changes more with a change in expenditure. Similar pattern, with a slightly lower value of the elasticities, is observed for rural non-poor. These results clearly show that a rise in income results in increasing the demand for expensive food items for poor as well as non-poor households both in urban and rural areas.

### 4.3. Own and Cross Price Elasticities

Own and cross price elasticities represent consumers' response to price change. To examine the welfare effect of price change, we computed uncompensated as well as compensated price elasticities. The uncompensated elasticity of demand represents changes in the quantity demanded as a result of changes in prices, capturing both substitution and income effect, whereas, compensated elasticity of demand describes only the substitution effect as a result of price change, keeping the level of utility constant. The demand for most of the commodities (except 'other cereals' in rural areas) is price inelastic (Table 5). These elasticities are statistically significant and have the expected signs. Compensated price elasticities are less than the uncompensated elasticities, which indicates that all the goods are normal. These elasticities show the responsiveness to prices and determine the consumption patterns of poor and non-poor households in the rural and urban areas of Pakistan.

Table 5

*Own Uncompensated and Compensated Price Elasticities of Demand (2010-11)*

Food Group	Rural areas			Urban areas			Pakistan		
	Poor	Non-poor	Overall	Poor	Non-poor	Overall	Poor	Non-poor	Overall
<b>Uncompensated Elasticities</b>									
Wheat	-0.350	-0.348	-0.360	-0.357	-0.200	-0.242	-0.352	-0.281	-0.317
Rice	-0.478	-0.383	-0.433	-0.902	-0.568	-0.684	-0.551	-0.450	-0.510
Other Cereals	-1.523	-1.817	-1.679	-0.530	-0.303	-0.333	-1.529	-1.336	-1.408
Pulses	-0.271	-0.332	-0.301	-0.465	-0.280	-0.327	-0.307	-0.291	-0.291
Fruits/ Vegetables	-0.595	-0.437	-0.506	-0.580	-0.421	-0.451	-0.591	-0.438	-0.495
Dairy	-0.947	-0.665	-0.761	-0.848	-0.840	-0.834	-0.920	-0.713	-0.769
Meats	-0.366	-0.148	-0.233	-0.553	-0.194	-0.239	-0.408	-0.190	-0.257
Cooking oil	-0.173	-0.271	-0.226	-0.096	-0.257	-0.209	-0.162	-0.244	-0.210
Sugars	-0.875	-0.451	-0.721	-0.881	-0.452	-0.604	-0.874	-0.441	-0.674
Other	-0.410	-0.396	-0.403	-0.605	-0.304	-0.390	-0.452	-0.365	-0.405
<b>Compensated Elasticities</b>									
Wheat	-0.165	-0.227	-0.209	-0.155	-0.107	-0.123	-0.163	-0.173	-0.179
Rice	-0.440	-0.353	-0.399	-0.851	-0.533	-0.645	-0.511	-0.419	-0.473
Other Cereals	-1.522	-1.811	-1.676	-0.529	-0.299	-0.330	-1.528	-1.331	-1.404
Pulses	-0.246	-0.311	-0.279	-0.441	-0.262	-0.308	-0.282	-0.272	-0.270
Fruits/ Vegetables	-0.484	-0.321	-0.393	-0.448	-0.291	-0.321	-0.476	-0.315	-0.376
Dairy	-0.581	-0.242	-0.364	-0.550	-0.500	-0.506	-0.567	-0.324	-0.396
Meats	-0.316	-0.062	-0.165	-0.495	-0.056	-0.121	-0.356	-0.081	-0.172
Cooking oil	-0.101	-0.213	-0.162	-0.025	-0.189	-0.140	-0.090	-0.183	-0.145
Sugars	-0.773	-0.356	-0.621	-0.769	-0.340	-0.490	-0.770	-0.339	-0.568
Other	-0.361	-0.350	-0.355	-0.555	-0.242	-0.331	-0.402	-0.313	-0.354

Source: Authors estimates using HIES 2010-11.

Note: All results significant at 99 percent confidence level.

A perusal of Table 5 shows some interesting findings. For example, the demand for most of the commodities (except 'other cereals') is price inelastic, ranging from  $-0.21$  (cooking oil) to  $-0.77$  (dairy). Cooking oil appeared least responsive to price change, both in rural as well urban areas irrespective of the poverty status. However, the absolute value of elasticity is the lowest for the urban poor. Poor and non-poor households respond in similar manner to the price change of dairy products in urban areas. The own price elasticity of 'other cereals' is greater than one indicates high responsiveness to price changes. However, rural-urban disaggregation shows 'other cereals' are inelastic for urban households and highly elastic for rural households. The price elasticity of rice in urban areas, especially for poor appeared relatively high. Wheat and other cereals are less price responsive for urban non-poor households. Although poor and non-poor households respond differently for the change in prices of fruits and vegetables, and sugar within rural or urban areas, the response behaviour of rural poor and urban poor, and rural non-poor and urban non-poor is similar. A considerable difference between uncompensated and compensated elasticities of wheat ( $-0.317$  and  $-0.178$ ) and dairy ( $-0.769$  and  $-0.396$ ) for all households irrespective of the place of residence and poverty status is observed. This indicates that maintaining the same utility level after a price change reduces the price responsiveness of these two food items.

Cross price elasticities indicate the effect of a price change in one commodity on the demand for another commodity. The estimated uncompensated and compensated cross price elasticities for rural areas, urban areas and overall Pakistan are reported in Tables 6, 7, and 8, respectively. Uncompensated elasticities indicate that most of the food items are complements of each other (negative cross price elasticities). However, if household expenditures are adjusted (compensated) to keep them at the old utility level, most of the food items become substitutes. This means that when price increases are offset by equivalent income increases to maintain the original utility level, households make substitution. The number of substitutes is higher in rural areas as compared to urban areas.

The low and insignificant value of the cross price elasticity of wheat and rice suggests that the consumption of wheat and rice are largely independent of price changes of either commodity which may illustrate the strong individual household preference for wheat and rice in Pakistan. A positive and significant cross price elasticity of wheat with other cereals indicates that households substitute other cereals in case of an increase in wheat price, or vice-versa. This result is consistent with the findings of Farooq, *et al.* (1999), Haq, *et al.* (2011). The importance of dairy and its products can be observed through the complementarity between dairy products and all other food items. An increase in the price of other food items reduces the demand for dairy and its products. However, an adjustment in expenditure to offset the price increase of other food items allows substitution for dairy products. This situation holds in both urban and rural areas. Our results confirm the importance of wheat and dairy products for the households in Pakistan irrespective of the place of residence. Other cereals including rice appear to be the weak substitutes of wheat.

Table 6

*Cross Uncompensated and Compensated Price Elasticities for Rural Pakistan (N=9,496)*

Food Groups	Wheat	Rice	Other Cereals	Pulses	Fruits and Vegetables	Dairy	Meat	Oils	Sugars	Others
<b>Uncompensated Elasticities</b>										
Wheat	-0.360	-0.138	0.571	-0.047	-0.240	-0.325	-0.207	0.006	-0.071	-0.092
Rice	0.008	-0.433	-0.596	-0.074	-0.010	-0.160	-0.008	-0.034	0.027	-0.007
Other Cereals	0.053	-0.060	-1.679	0.042	0.034	-0.176	-0.001	0.054	0.024	0.025
Pulses	0.031	-0.051	0.223	-0.301	0.005	-0.177	-0.021	-0.016	-0.011	-0.006
Fruits & Vegetables	-0.133	-0.074	0.525	-0.041	-0.506	-0.205	-0.004	-0.093	0.046	-0.061
Dairy	-0.132	0.096	-0.010	0.000	-0.033	-0.761	-0.116	-0.152	-0.103	-0.093
Meat	-0.073	-0.067	-0.518	-0.137	-0.005	-0.235	-0.233	-0.073	0.002	-0.091
Cooking Oil	0.018	-0.201	0.213	-0.219	-0.101	-0.273	-0.114	-0.226	-0.036	-0.068
Sugar	-0.013	0.038	0.206	-0.099	0.043	-0.239	0.007	-0.010	-0.721	-0.004
Others	-0.002	-0.040	0.076	-0.052	-0.029	-0.210	-0.054	-0.007	0.003	-0.403
<b>Compensated Elasticities</b>										
Wheat	-0.209	0.046	0.761	0.136	-0.065	0.042	-0.041	0.152	0.104	0.079
Rice	0.010	-0.399	-0.556	-0.040	0.015	0.058	0.008	-0.038	0.052	0.014
Other Cereals	0.018	-0.062	-1.676	0.039	0.023	0.004	-0.021	0.013	0.013	0.009
Pulses	0.021	-0.029	0.251	-0.279	0.018	0.028	-0.016	-0.031	0.003	0.004
Fruits & Vegetables	-0.044	0.048	0.653	0.081	-0.393	0.100	0.100	-0.009	0.159	0.048
Dairy	0.048	0.309	0.209	0.213	0.172	-0.364	0.079	0.023	0.101	0.107
Meat	-0.020	0.019	-0.426	-0.052	0.071	0.033	-0.165	-0.026	0.078	-0.018
Cooking Oil	0.087	-0.100	0.320	-0.117	-0.008	0.012	-0.030	-0.162	0.057	0.021
Sugar	0.063	0.147	0.322	0.010	0.143	0.054	0.098	0.061	-0.621	0.092
Others	0.026	0.020	0.143	0.008	0.023	0.033	-0.011	0.015	0.054	-0.355

Source: Authors estimates using HIES 2010-11.

Table 7

*Cross Uncompensated and Compensated Price Elasticities for Urban Pakistan (N = 6,209)*

Food Groups	Wheat	Rice	Other Cereals	Pulses	Fruits and Vegetables	Dairy	Meat	Oils	Sugars	Others
<b>Uncompensated Elasticities</b>										
Wheat	-0.242	-0.175	-0.884	-0.048	-0.189	-0.229	-0.239	0.015	-0.080	-0.137
Rice	0.002	-0.684	0.409	-0.045	-0.053	-0.131	0.002	0.051	0.068	0.000
Other Cereals	0.025	0.035	-0.333	-0.007	0.017	-0.107	-0.006	0.008	0.001	0.035
Pulses	0.032	-0.044	-0.149	-0.327	-0.019	-0.101	-0.050	0.014	-0.052	0.014
Fruits & Vegetables	-0.120	-0.210	0.480	-0.101	-0.451	-0.126	-0.047	-0.133	-0.011	-0.098
Dairy	-0.120	-0.130	0.110	0.063	-0.023	-0.834	-0.016	-0.108	-0.121	0.047
Meat	-0.136	-0.001	-0.296	-0.201	-0.038	-0.118	-0.239	-0.173	-0.106	-0.165
Cooking oil	0.028	0.036	-0.923	-0.076	-0.128	-0.179	-0.185	-0.209	-0.108	-0.069
Sugar	-0.006	0.209	0.238	-0.153	0.002	-0.165	-0.087	-0.065	-0.604	-0.050
Others	-0.035	-0.046	0.346	-0.003	-0.064	-0.096	-0.114	-0.025	-0.053	-0.390
<b>Compensated Elasticities</b>										
Wheat	-0.123	-0.012	-0.722	0.104	-0.032	0.042	-0.079	0.140	0.089	0.007
Rice	-0.003	-0.645	0.447	-0.017	-0.020	0.016	0.038	0.051	0.112	0.020
Other Cereals	-0.015	0.039	-0.330	-0.014	0.015	0.005	-0.005	-0.026	0.011	0.020
Pulses	0.019	-0.013	-0.119	-0.308	0.005	0.037	-0.022	0.006	-0.015	0.024
Fruits & Vegetables	-0.027	-0.073	0.616	0.025	-0.321	0.118	0.087	-0.035	0.131	0.019
Dairy	0.057	0.091	0.330	0.273	0.192	-0.506	0.202	0.075	0.105	0.248
Meat	-0.058	0.120	-0.176	-0.091	0.077	0.110	-0.121	-0.091	0.020	-0.064
Cooking oil	0.092	0.144	-0.816	0.020	-0.027	0.036	-0.081	-0.140	0.005	0.019
Sugar	0.059	0.317	0.346	-0.056	0.104	0.051	0.018	0.005	-0.490	0.039
Others	-0.001	0.033	0.424	0.064	0.008	0.090	-0.038	0.015	0.031	-0.331

Source: Authors estimates using HIES 2010-11.

Table 8  
*Cross Uncompensated and Compensated Price Elasticities for  
 Overall Pakistan (N = 15,705)*

Food Groups	Wheat	Rice	Other Cereals	Pulses	Fruits and Vegetables	Dairy	Meat	Oils	Sugars	Others
<b>Uncompensated Elasticities</b>										
Wheat	-0.317	-0.137	0.085	-0.051	-0.222	-0.293	-0.215	0.008	-0.074	-0.105
Rice	0.010	-0.510	-0.460	-0.076	-0.020	-0.154	0.002	-0.009	0.043	-0.006
Other Cereals	0.043	-0.044	-1.408	0.032	0.030	-0.151	-0.001	0.038	0.017	0.036
Pulses	0.032	-0.058	0.169	-0.291	-0.008	-0.150	-0.029	-0.006	-0.028	0.005
Fruits & Vegetables	-0.131	-0.101	0.578	-0.081	-0.495	-0.180	-0.015	-0.108	0.034	-0.075
Dairy	-0.131	-0.001	0.126	0.031	-0.034	-0.769	-0.069	-0.143	-0.128	-0.047
Meat	-0.093	-0.038	-0.501	-0.158	-0.014	-0.195	-0.257	-0.107	-0.034	-0.111
Cooking Oil	0.021	-0.137	-0.117	-0.168	-0.111	-0.244	-0.137	-0.210	-0.064	-0.060
Sugar	-0.010	0.107	0.269	-0.125	0.035	-0.222	-0.026	-0.031	-0.674	-0.030
Others	-0.011	-0.047	0.263	-0.028	-0.042	-0.174	-0.070	-0.009	-0.024	-0.405
<b>Compensated Elasticities</b>										
Wheat	-0.179	0.039	0.264	0.120	-0.055	0.039	-0.054	0.145	0.098	0.054
Rice	0.009	-0.473	-0.421	-0.044	0.008	0.039	0.024	-0.012	0.076	0.014
Other Cereals	0.006	-0.043	-1.404	0.028	0.022	0.006	-0.016	0.000	0.014	0.020
Pulses	0.020	-0.032	0.198	-0.270	0.009	0.032	-0.018	-0.019	-0.005	0.014
Fruits & Vegetables	-0.040	0.027	0.709	0.042	-0.376	0.104	0.099	-0.018	0.159	0.036
Dairy	0.048	0.216	0.346	0.243	0.175	-0.396	0.133	0.035	0.086	0.153
Meat	-0.031	0.062	-0.398	-0.063	0.078	0.062	-0.172	-0.045	0.063	-0.028
Cooking Oil	0.087	-0.032	-0.010	-0.069	-0.015	0.017	-0.047	-0.145	0.037	0.028
Sugar	0.062	0.216	0.381	-0.021	0.136	0.044	0.068	0.039	-0.568	0.062
Others	0.019	0.021	0.334	0.035	0.017	0.051	-0.016	0.020	0.041	-0.354

Source: Authors estimates using HIES 2010-11.

## 5. FOOD CONSUMPTION PATTERNS AND IMPLICATIONS FOR POVERTY REDUCTION

Results presented in Tables 4–8 reinforce the importance of wheat for all households irrespective of their place of residence and poverty status. The average availability of wheat has fluctuated around 10 kg per capita per month since 2001-02 while the per capita consumption has remained lower not only than the per capita availability but also than the recommended quantity of 10 kg per capita per month [Pakistan (2011b)]. The overall gap between total availability and consumption has been increasing over time<sup>3</sup> (see Table 9). The price of wheat has an important impact on the welfare of the people. Available data show that an increase in the price of wheat resulted in significantly reducing the purchasing power of skilled and unskilled labour. Despite an increase in the nominal daily wages, the purchasing power of skilled and unskilled labour has declined by 34 and 32 percent respectively. An increasing trend in wheat prices and resultant decline in the purchasing power and reduction in wheat consumption has serious implications for food security, nutritional status, and poverty.

<sup>3</sup>A smaller value of gap in 2010-11 is driven by decline in the per capita availability of wheat.

Table 9

*Per Capita Availability, Consumption, and Price of Wheat*

	Wheat Availability and Consumption (kg/month)			Price (Rs/kg)	Daily Wage in Lahore (Rs/day)		Wheat Flour Quantity can be Bought with Daily Wage in Lahore (kg)	
	Availability	Consumption	Gap		Skilled Labour	Unskilled Labour	Skilled Labour	Unskilled Labour
2001-02	9.6	8.9	0.7	10.1	298	182	30.8	18.8
2004-05	10.0	8.2	1.8	13.3	331	210	24.9	15.8
2005-06	10.6	8.1	2.5	13.1	369	230	28.3	17.6
2007-08	11.3	7.8	3.5	18.1	450	300	24.9	16.6
2010-11	10.0	7.9	2.1	30.3	600	375	20.4	12.8

Source: For wheat availability: Government of Pakistan (2011a), *Agriculture Statistics of Pakistan*.

For consumption: HIES (Various Issues).

For wheat prices and daily wages: Government of Pakistan (2014), *Economic Survey 2013-14*.

As discussed earlier that wheat is the most important food item in the diet of Pakistani households, provides bulk of calories (almost 48 percent). Its demand is very inelastic and preferences are very strong. An increase in the price of wheat may result in substitution with health and education that may worsen the already low human development indicators and may have adverse effect on already high levels of poverty in the country. This has serious implications not only for the money metric measures of poverty but also for other human development indicators, especially for the nutritional status.

As discussed in Section 3, Pakistani diet is dense in calories and macronutrients and deficient in micronutrient. Available national data show that the outcomes of micronutrient deficiency are noticeable amongst women and children. Nearly half of the women of child-bearing age are suffering from anemia, 43 percent in vitamin A deficiency, 48 percent in zinc deficiency, and 69 percent in vitamin D deficiency [Pakistan (2010-11)]. A malnourished woman is at higher risk of giving birth to an anemic or an underweight child (less than 2.5 kg). Such children have five times the risk of death in the first year and a high risk of growth failure during childhood and low birth weight may result in greater chronic diseases as an adult. As a result of high levels of malnutrition among women of child-bearing age, a large number of children under five years of age suffer from the vitamin A deficiency (54 percent), zinc deficiency (39 percent), and iron deficiency (62 percent). In addition, the prevalence of protein-energy malnutrition (PEM) is not only high but has also increased over time. In 2011 nearly 44 percent children were estimated to be stunted, 15 percent were wasted, and 32 percent were underweight. These proportions were 32.5 percent stunted, 11.2 percent wasted and 42.3 percent underweight in 2001. About 15 percent of Pakistan's population consists of children under five years of age. The human and economic potential in Pakistan is at risk due to high levels of malnutrition.

As discussed earlier, the high incidence of malnutrition amongst children has adverse effects on their intellectual development and consequently, their health and productivity in later life. A reduction in the purchasing power of the wage earners can further aggravate the situation. If the issues of limited dietary diversity, persistently rising prices of food, and increasing incidence of malnutrition are not addressed through

appropriate policy measures, the already alarming situation is likely to get worse. Addressing this alarming situation requires urgent development and implementation of appropriate policies and, more importantly, awareness building about the gravity of the situation.

## **6. CONCLUSIONS AND POLICY IMPLICATIONS**

The analysis presented in this paper highlights several critical aspects of the situation. The diet of most of the Pakistani households comprises of energy-dense food, such as, cereals, dairy, fats, and sugars. A large proportion of households consume less than the recommended amount of calories: The calorie intake of urban poor is lower than the rural poor. Despite varying consumption patterns across rural and urban areas and for poor and non-poor households, demand for dairy, wheat, and cooking oil is similar for poor and non-poor across rural-urban areas.

A considerable difference between uncompensated and compensated elasticities of wheat ( $-0.317$  and  $-0.178$ ) and dairy ( $-0.769$  and  $-0.396$ ) for all households irrespective of the place of residence and poverty indicates that maintaining the same utility level after a price change reduces the price responsiveness of these two food items. Often this substitution means foregoing other critical consumption required to maintain a balanced diet.

Rising prices of wheat adversely affect calorie consumption and hence poverty status. An increase in the price of wheat may not reduce its consumption but may result in a decline in the expenditure on other non-food items, such as, education and health. An increase in wheat price may be helpful for the wheat growers who are net sellers. However, all net buyers of wheat suffer. It is therefore important to evaluate the effect of increasing wheat prices in a broader framework. A reduction in the purchasing power as a result of increase in the prices of essential food items has adverse effects on food security and prevalence of malnutrition in Pakistan. If the issues of limited dietary diversity, persistently rising prices of food, and issue of food security are not urgently addressed through appropriate policy measures, the situation will get worse. Addressing this alarming situation requires appropriate policies and, more importantly, awareness building about the gravity of the situation.

Annexure Table 1

*Descriptive Statistics of Dependent and Explanatory Variables*

	Pakistan		Rural areas		Urban areas		Poor		Non-poor	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
<b>Prices (Rs/kg)</b>										
Wheat	28.36	4.41	27.52	4.39	29.99	3.97	28.04	3.99	28.58	4.65
Rice	62.07	47.58	61.77	55.18	62.64	27.64	57.20	44.34	65.31	49.35
Other cereals	74.33	49.28	69.82	46.52	83.04	53.16	71.47	47.07	76.23	50.62
Pulses	105.11	28.16	103.92	31.18	107.39	21.01	101.92	27.25	107.23	28.56
Fruits and vegetables	38.09	13.50	36.99	13.15	40.21	13.91	34.27	11.14	40.64	14.30
Dairy products	51.25	37.46	49.00	37.27	55.58	37.44	47.26	32.97	53.91	39.95
Meats	185.23	78.29	182.62	78.38	190.23	77.88	177.12	60.72	190.63	87.67
Cooking oil	151.26	22.31	151.66	22.46	150.49	22.01	149.83	20.92	152.21	23.15
Sugar and sweeteners	103.57	956.75	108.73	1049.13	93.67	748.12	131.09	1439.39	85.22	378.70
Other food items	162.33	49.22	156.93	46.90	172.70	51.85	147.75	41.52	172.06	51.50
<b>Socioeconomic variables</b>										
Dummy (primary=1)	0.16	0.37	0.17	0.38	0.14	0.35	0.19	0.39	0.14	0.35
Dummy (secondary=1)	0.27	0.44	0.24	0.43	0.33	0.47	0.21	0.41	0.31	0.46
Dummy (high=1)	0.13	0.34	0.07	0.26	0.25	0.43	0.04	0.19	0.20	0.40
Dummy (farm =1)	0.17	0.38	0.25	0.44	0.02	0.13	0.17	0.38	0.17	0.38
Dummy (employee=1)	0.46	0.50	0.41	0.49	0.57	0.50	0.51	0.50	0.43	0.50
Dummy (self-employed=1)	0.15	0.35	0.12	0.32	0.21	0.40	0.13	0.34	0.16	0.36
Dummy (poor=1)	0.40	0.49	0.48	0.50	0.25	0.43				
Dummy (urban=1)	0.34	0.47					0.21	0.41	0.43	0.50
Dummy (Punjab=1)	0.59	0.49	0.62	0.49	0.55	0.50	0.59	0.49	0.60	0.49
Dummy (Sindh=1)	0.24	0.42	0.17	0.38	0.36	0.48	0.22	0.42	0.24	0.43
Dummy (KPK=1)	0.12	0.33	0.16	0.36	0.06	0.24	0.13	0.34	0.12	0.32
Dummy (Balochistan=1)	0.05	0.21	0.06	0.23	0.03	0.17	0.05	0.23	0.04	0.20

Annexure Table 2

## Parameter Estimates of LA/AIDS Model for Pakistan 2010-11

	Wheat	Rice	Other Cereals	Pulses	Fruits and Vegetables	Dairy	Meat	Oil	Sugar	Others
Wheat price	0.1149*** (0.0028)	-0.0056*** (0.0012)	0.0003 (0.0005)	-0.0017** (0.0007)	-0.0308*** (0.0013)	-0.0308*** (0.0016)	-0.0241*** (0.0014)	-0.0037** (0.0016)	-0.0091*** (0.0014)	-0.0094*** (0.0010)
Rice price	-0.0056*** (0.0012)	0.0194*** (0.0009)	-0.0019*** (0.0003)	-0.0025*** (0.0004)	-0.0042*** (0.0008)	-0.0002 (0.0009)	-0.0017** (0.0008)	-0.0056*** (0.0008)	0.0041*** (0.0008)	-0.0020*** (0.0006)
Other cereal price	0.0003 (0.0005)	-0.0019*** (0.0003)	-0.0017*** (0.0002)	0.0007*** (0.0002)	0.0024*** (0.0003)	0.0005 (0.0003)	-0.0020*** (0.0003)	-0.0005 (0.0005)	0.0011*** (0.0003)	0.0011*** (0.0003)
Pulses price	-0.0017** (0.0007)	-0.0025*** (0.0004)	0.0007*** (0.0002)	0.0205*** (0.0005)	-0.0026*** (0.0004)	0.0007 (0.0004)	-0.0049*** (0.0004)	-0.0052*** (0.0008)	-0.0039*** (0.0004)	-0.0011*** (0.0004)
Fruit & vegetable price	-0.0308*** (0.0013)	-0.0042*** (0.0008)	0.0024*** (0.0003)	-0.0026*** (0.0004)	0.0649*** (0.0012)	-0.0060*** (0.0011)	-0.0034*** (0.0009)	-0.0162*** (0.0009)	0.0031*** (0.0009)	-0.0071*** (0.0006)
Dairy price	-0.0308*** (0.0016)	-0.0002 (0.0009)	0.0005 (0.0003)	0.0007 (0.0004)	-0.0060*** (0.0011)	0.0846*** (0.0026)	-0.0091*** (0.0014)	-0.0200*** (0.0009)	-0.0152*** (0.0012)	-0.0046*** (0.0007)
Meat price	-0.0241*** (0.0014)	-0.0017** (0.0008)	-0.0020*** (0.0003)	-0.0049*** (0.0004)	-0.0034*** (0.0009)	-0.0091*** (0.0014)	0.0750*** (0.0016)	-0.0161*** (0.0016)	-0.0046*** (0.0010)	-0.0091*** (0.0006)
Cooking oil price	-0.0037** (0.0016)	-0.0056*** (0.0008)	-0.0005 (0.0005)	-0.0052*** (0.0008)	-0.0162*** (0.0009)	-0.0200*** (0.0009)	-0.0161*** (0.0009)	0.0806*** (0.0021)	-0.0080*** (0.0009)	-0.0055*** (0.0008)
Sugar price	-0.0091*** (0.0014)	0.0041*** (0.0008)	0.0011*** (0.0003)	-0.0039*** (0.0004)	0.0031*** (0.0009)	-0.0152*** (0.0012)	-0.0046*** (0.0010)	-0.0080*** (0.0010)	0.0360*** (0.0013)	-0.0034*** (0.0007)
Other price	-0.0094*** (0.0010)	-0.0020*** (0.0006)	0.0011*** (0.0003)	-0.0011*** (0.0004)	-0.0071*** (0.0006)	-0.0046*** (0.0007)	-0.0091*** (0.0006)	-0.0055*** (0.0008)	-0.0034*** (0.0007)	0.0412*** (0.0007)
Food expenditure	-0.0413*** (0.0018)	-0.0035*** (0.0010)	-0.0004 (0.0003)	-0.0084*** (0.0004)	-0.0119*** (0.0012)	0.1534*** (0.0026)	-0.0184*** (0.0018)	-0.0425*** (0.0010)	-0.0069*** (0.0013)	-0.0202*** (0.0007)
Primary	-0.0067*** (0.0014)	0.0029*** (0.0008)	0.0005** (0.0003)	-0.0003 (0.0004)	0.0019** (0.0010)	-0.0004 (0.0021)	0.0015 (0.0014)	0.0014* (0.0008)	-0.0010 (0.0011)	0.0003 (0.0006)
Secondary	-0.0159*** (0.0012)	0.0009 (0.0007)	0.0001 (0.0002)	0.0005 (0.0003)	0.0007 (0.0008)	0.0047*** (0.0018)	0.0138*** (0.0012)	-0.0015** (0.0007)	-0.0024*** (0.0009)	-0.0010* (0.0005)
High	-0.0272*** (0.0016)	0.0025*** (0.0009)	0.0009*** (0.0003)	-0.0033*** (0.0004)	-0.0021* (0.0011)	0.0027 (0.0025)	0.0324*** (0.0016)	-0.0045*** (0.0009)	-0.0002 (0.0012)	-0.0012* (0.0007)
Farm household	-0.0014 (0.0016)	0.0068*** (0.0009)	0.0018*** (0.0003)	-0.0040*** (0.0004)	-0.0114*** (0.0011)	0.0389*** (0.0024)	-0.0074*** (0.0016)	-0.0088*** (0.0009)	-0.0089*** (0.0012)	-0.0055*** (0.0007)
Employee	0.0037*** (0.0013)	-0.0015** (0.0007)	0.0001 (0.0002)	-0.0002 (0.0003)	0.0013 (0.0009)	-0.0036* (0.0019)	-0.0030** (0.0013)	-0.0008 (0.0007)	0.0032*** (0.0010)	0.0008 (0.0005)

Continued—

Appendix Table 2—(Continued)

Self-employed	0.0004 (0.0016)	0.0040*** (0.0009)	0.0001 (0.0003)	-0.0019*** (0.0004)	0.0032*** (0.0011)	-0.0051** (0.0024)	0.0003 (0.0016)	0.0008 (0.0009)	-0.0007 (0.0012)	-0.0010 (0.0007)
Poor	0.0386*** (0.0013)	0.0019** (0.0007)	-0.0003 (0.0002)	-0.0029*** (0.0003)	-0.0048*** (0.0009)	0.0189*** (0.0019)	-0.0424*** (0.0013)	-0.0050*** (0.0007)	0.0025** (0.0010)	-0.0064*** (0.0006)
Urban	-0.0151*** (0.0012)	-0.0031*** (0.0007)	-0.0000 (0.0002)	-0.0002 (0.0003)	0.0026*** (0.0008)	0.0022 (0.0018)	0.0168*** (0.0012)	-0.0010 (0.0007)	-0.0084*** (0.0009)	0.0060*** (0.0005)
Quarter 2 (Oct-Dec)	0.0041*** (0.0013)	-0.0015* (0.0008)	-0.0004 (0.0003)	-0.0009*** (0.0003)	-0.0083*** (0.0009)	0.0014 (0.0020)	0.0155*** (0.0013)	-0.0000 (0.0007)	-0.0080*** (0.0010)	-0.0019*** (0.0006)
Quarter 3 (Jan-March)	0.0021 (0.0015)	0.0020** (0.0008)	-0.0011*** (0.0003)	-0.0027*** (0.0004)	-0.0039*** (0.0011)	0.0107*** (0.0021)	0.0021 (0.0014)	0.0060*** (0.0009)	-0.0141*** (0.0011)	-0.0012* (0.0006)
Quarter 4 (April-June)	0.0026* (0.0016)	0.0004 (0.0009)	-0.0004 (0.0003)	-0.0026*** (0.0005)	-0.0125*** (0.0012)	0.0246*** (0.0021)	-0.0087*** (0.0015)	0.0070*** (0.0010)	-0.0077*** (0.0012)	-0.0026*** (0.0007)
Punjab	-0.0294*** (0.0025)	0.0040*** (0.0014)	-0.0006 (0.0005)	-0.0068*** (0.0006)	-0.0233*** (0.0017)	0.1636*** (0.0037)	-0.0594*** (0.0025)	-0.0014 (0.0014)	-0.0395*** (0.0019)	-0.0071*** (0.0011)
Sindh	-0.0621*** (0.0026)	0.0355*** (0.0015)	0.0006 (0.0005)	-0.0084*** (0.0007)	-0.0365*** (0.0018)	0.1419*** (0.0038)	-0.0351*** (0.0026)	-0.0050*** (0.0014)	-0.0380*** (0.0019)	0.0071*** (0.0011)
KPK	-0.0153*** (0.0027)	0.0056*** (0.0015)	0.0066*** (0.0005)	-0.0010 (0.0007)	-0.0153*** (0.0019)	0.0901*** (0.0040)	-0.0522*** (0.0027)	0.0039*** (0.0015)	-0.0186*** (0.0020)	-0.0038*** (0.0011)
Constant	0.4340*** (0.0072)	0.0383*** (0.0039)	0.0076*** (0.0014)	0.0633*** (0.0019)	0.2315*** (0.0049)	-0.3556*** (0.0097)	0.1297*** (0.0069)	0.1777*** (0.0042)	0.1703*** (0.0052)	0.1031*** (0.0030)
Observations	15,705	15,705	15,705	15,705	15,705	15,705	15,705	15,705	15,705	15,705
R-squared	0.422	0.130	0.072	0.137	0.278	0.390	0.331	0.409	0.138	

Standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.

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### Comments

- The study has investigated the food consumption patterns, and has estimated the income and price elasticities by using Linear Approximate Almost Ideal Demand System (LA-AIDS) by controlling the poverty status, seasonality regional and provincial differences while estimating the demand patterns.
- The results are very interesting that purchasing power in terms of wheat purchase for both the skilled and unskilled labour has declined by taking the case study of Lahore.
- The paper is well-written and has detailed the objectives in a very comprehensive and fabulous way. I just have some comments;
- The paper has drawn important analysis of per capita food availability that though the average per capita calorie intake increased from 2078 to 2450 during 1949-2012 period but half of the population is still unable to meet its caloric intake so access and food inequity is still an issue for majority of population. You also have converted the quantities into calories as given in Table 2 My first question (though it may not be relevant to the authors finding), did official poverty line (need base approach) is not capturing this deprivation and should we need to re-base it?
- In Table 1 you have given food budget shared by food groups. What you find the major change in consumption pattern if you link it with previous studies as you mentioned [Siddiqui (1982); Burney and Khan (1991); Malik and Sarwar (1993); Burki (1997); Farooq, *et al.* (1999); Shamim and Ahmad (2007); Haq, *et al.* (2008, 2011)].
- You estimated average calories intake 2260 (2535 for non-poor and 1848 for poor) for 2010 as given in table 2 but in introduction you mentioned 2450 in 2012 as reported by GoP. So what you comment on it.
- In annexure 1, you have reported 40 percent poverty so I think you have not followed the official so how you come to this number.
- The author found interesting results in Table 3 both encouraging and discouraging that poor in both rural and urban get calories at low cost than non-poor however, wheat is expensive for poor in both rural and urban which around 50 percent caloric share and around 20 percent budget share. So what the items then poor is getting at low price?

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# Can We Solve the Issue of Poverty Without Solving the Issue of Conventional Economic Paradigm: A Critical Review

ANWAR SHAH and KARIM KHAN

## 1. INTRODUCTION

The primary focus of economics is to allocate resources in order to achieve the well-being of humans. Wellbeing has many dimensions, ranging from the level of mere subsistence to the equality of opportunities to accumulate, and to safeguard life and wealth. Poverty, thus, is one of the parameters for measuring the welfare of society in general. Given this importance, the Millennium Development Goals aim at halving the world poverty by 2015. Many organisations in the world set poverty eradication as one of their key objectives. Likewise, poverty reduction has got a central place in the international politics. Accordingly, each country including Pakistan has launched programmes for the alleviation of this great menace. The election manifesto of all the mainstream political parties in Pakistan includes poverty alleviation as one of their main goals. Additionally, poverty alleviation is one of the major subjects of talks in electronic media and in the editorials of newspapers, both at the national and at the international level. Nevertheless, poverty is still a major problem of humanity across the globe.

There are four different understandings of poverty in the existing literature, i.e. the monetary approach, the capabilities approach, the approach of social exclusion, and the participatory approach [Laderchi, *et al.* (2003)]. However, in practice, the monetary approach mostly retains its global dominance in both the descriptions and analysis. Under this approach, poverty is defined as “a state or condition in which a person or community lacks the financial resources and essentials to enjoy a minimum standard of life and well-being that is considered acceptable in society” [*Pakistan Economic Survey* (2014)]. Likewise, according to the World Bank (1990), poverty is basically the “inability to attain the minimal standard of living and having insufficient money to purchase the basic necessities of life such as food, clothing, housing, elementary education etc.” Alternatively, the poor people are those who do not have sufficient income or consumption to put themselves above some minimum threshold of wellbeing in the society.

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Given the global prevalence of this menace, there is considerable amount of resources kept aside in the budgets of most of the developing countries for eradicating it. Besides the domestic resources, the international donor agencies like the World Bank, the International Monetary Fund (IMF), the Asian Development Bank, the United Nations and its various subsidiaries etc. spend enough resources for its eradication.<sup>1</sup> Most of these agencies work almost in all of the developing countries in the world. In Pakistan, besides the above organisations, many governmental and non-governmental organisations work in this field. For instance, the organisations like the Benazir Income Support Programme (BISP), the Pakistan Poverty Alleviation Fund (PPAF), Pakistan Baitul Mall (PBM), AKHuwat, Khusli Bank Pakistan (KBP), Al-khidmat Foundation, Edhi foundation, National Rural Support Programme (NRSP) etc. are actively working for the eradication of poverty. In addition to the field work, a number of academic and research seminars/conferences are conducted on the issue of poverty in the world as well as in Pakistan.<sup>2</sup> Such seminars or conferences have three purposes. First, they are aimed at creating the awareness regarding poverty. Second, they identify its various dimensions. Third, they provide academic inputs to the policy practitioners and donor agencies about how to target the identified dimensions of poverty.

Given the set of activities, one may expect that poverty in the world as well as in Pakistan might have dropped to a negligible level. However, this is not the case as is indicated by the recent trends in poverty across the globe. For instance, the current situation of income-based poverty in the world shows that there are 1.2 billion poor people in 104 developing countries [*Human Development Report* (2014)]. This figure is based on the definition of \$1.25 a day. In terms of multidimensional poverty headcount, there are 1.5 billion poor in 91 developing countries. The Multidimensional Poverty Index (MPI) measures deprivations in the three dimensions i.e. health, education and living standards. Although, the world poverty is declining overall; however, almost 800 million people are still at risk of falling back into poverty if any setback occurred. There are many people in the world who face either structural vulnerabilities or life-cycle vulnerabilities. This is in spite of the fact that over the past three decades, the extent of global poverty has been declining consistently. For instance, the percentage of people living in the extreme poverty in 2013 is less than half of what it was in 1990 [UNDP (2013)].

Likewise poverty, the income inequality in the world shows that 40 percent of the world's population lives on less than \$2 a day. Their share in the global income accounts for just 5 percent. Another indicator shows that the 85 richest people in the world have the same wealth as the 3.5 billion poorest people. The share of the richest 20 percent people is three-quarters of the world income. According to the *Human Development Report* (HDR) (2014), the income inequality in developing countries rises by 11 percent from 1990 to 2010. The whole region of sub-Saharan Africa has been left behind: it will

<sup>1</sup>For instance, the main subsidiaries of the United Nations that are working in the field of poverty and human development are the United Nations Educational Scientific and Cultural Organisation (UNESCO), the United Nations Development Program (UNDP), the United Nations International Children's Emergency Fund (UNICEF), International Labour Organisation etc.

<sup>2</sup>For instance, the research and development agencies such as Pakistan Institute of Development Economics (PIDE), Sustainable Development Policy Institute (SDPI), Innovative Development Strategies (IDS) etc. regularly organise conferences on the issue of poverty

account for almost one-third of the world poverty in 2015 as compared to its status of one-fifth in 1990 [*Human Development Report* (2007)]. In a recent keynote address to the policy forum on income inequality of Organisation for Economic Cooperation and Development (OECD), Richard Freeman (2011), professor of economics at Harvard University, noted that “*the triumph of globalisation and the market capitalism has improved the living standards for billions while concentrating billions among the few. It has lowered inequality worldwide but raised the inequality within most countries*”.

The situation of poverty in Pakistan is not very different from the other developing countries in the world. In Pakistan, every third person is living below the poverty line [Naveed and Ali (2012)]. Naveed and Ali (2012) measure poverty on the basis of five dimensions, i.e. education, health, water supply and sanitation, household assets/amenities, and satisfaction from service delivery. In a province-wise comparison, the same study shows that 52 percent of the total population in Baluchistan is living below the poverty line. This is in spite of the fact that Baluchistan is considered as the land of minerals. In the same way, 33 percent of the Sindh’s population is living below the poverty line, followed by the Khyber Pakhtunkhwa (KPK) which is having 32 percent of its population living below the poverty line. In Punjab, the percentage of poor people is lower as compared to those of the other provinces, i.e. 19 percent of its population lives below the poverty line. Similarly, the Human Development Report (2013) ranks Pakistan as 146th in 187 countries in terms of human development, i.e. its Human Development Index (HDI) is 0.515. Likewise, Pakistan’s Inequality Adjusted Human Development Index (IAHDI), the Multi-Dimensional Poverty Index (MDI) and the Gender Inequality Index (GII) are 0.356, 0.264 and 0.567, respectively. These indices show that there is threatening level of inequality combined with the existence of non-income dimensions of poverty in Pakistan [United Nations Development Programme (UNDP) (2013)]. Besides, the gap between the poor and the rich is increasing day by day. For instance, the Gini coefficient in Pakistan shows an increase of about 17 percent from 1987-88 to 2004-05, i.e. its value increases from 0.35 in 1987-88 to 0.41 in 2004-05.

Here a question arises that why the conventional economics fails to achieve the single objective of human wellbeing as was farsighted by the earlier philosophers like Adam Smith. The purpose of this paper is to discuss the answer of this question. In this study, we conjecture that there exists a flaw in the philosophy of conventional economics, i.e. the conventional economics does not incorporate all the dimensions of human behaviour. This inconsistency is probably the root cause of the global poverty and income inequality. Until, this inconsistency is removed, probably, we would not be able to see an endless solution to these global issues. The economists and policy practitioners set the goals of eradicating poverty and inequality from the globe, which is fundamentally, a normative aspect; however, the strategy they adopt for the solution of these issues is derived mainly from the philosophy of invisible hand, which is inherently a positive aspect. Due to this inconsistent approach, the world is facing continuous problems of poverty and income inequality. Rest of the paper is organised into four sections. Section 2 sheds lights on the conventional approach for the eradication of poverty. In Section 3, we discuss the inconsistency in the conventional approach regarding the solution of poverty. Section 4 offers how to make the strategy of poverty reduction in line with the social objectives while Section 5 concludes the paper.

## 2. CONVENTIONAL APPROACH FOR THE ERADICATION OF POVERTY

The focus of the conventional approach is to eradicate poverty by the structural transformation of the traditional third world agriculture-based economies into the modern industries-based capitalist economies. In this regard, poverty has not always been the prime concern; rather, the primary concern remains on the accumulation of capital and wealth. The reason is that the conventional theory is firmly moulded in the structure of Adam Smith's (1776) Theory of Invisible Hands. Alternatively, in this structure, the individuals are allowed to maximise their private gains. Invisible hands will help the poor though helping the poor will not be the objective of those involved in the maximisation of their private gains. This presumption has played a vital role in diverting the economists' and other policy practitioners' attention primarily towards the wealth-generation regardless of its distribution among the various segments of the society.

As far as the wealth distribution is concerned; the mainstream theory is of the view that there exist trade-off between equality and economic growth. It is assumed that the Marginal Propensity to Save (MPS) of poor is lower than the MPS of the rich. This, in other words, implies that inequality is a precondition for higher savings, higher investments and higher economic growth. This is based on the presumption that higher savings though combined with the initial unequal distribution of income leads to higher investment which, in turn, increases the demand for labour in the next stage of growth process, leading to higher wages and higher share of labour in the economy. This hypothesis is summarised in the famous Kuznets Curve which proclaims that poverty and inequality could be resolved over time through the "Trickle-Down Effect". Under this traditional approach, the solution of poverty requires the implementation of the three D's namely Deregulation, Decentralisation and Denationalisation [Ghayur and Burki (1992)]. It is hypothesised that such policies will result in higher economic growth and will lead to lower poverty without any intervention in markets. Besides, the advocates of this approach recommend the elimination of general or non-targeted subsidies as such subsidies are considered as leading to price distortions which have negative implications for economic performance. In return, the "social safety net" and "paying cash subsidies" is introduced to compensate the negative welfare effects of those who are suffered from higher prices during the adjustment period.

Once the conventional approach could not give the desired outcomes; the proponents devised a series of poverty-reducing strategies, including the basic needs strategies in the 1970s. However, according to Comia, *et al.* (1987), such policies were again faded away in the 1980s when the stabilisation and adjustment policies took place. For instance, the Structural Adjustment Programme (SAP), and the other market-oriented policies such as liberalisation were the main focus of the era. Most of these policies were in the framework of the famous "Washington Consensus" which was based on the conventional approach that pro-growth policies will reduce poverty at the global and national levels [Dini and Lippit (2009)]. However, the occurrence of mass poverty in African, South Asian, and Latin American countries shows that the policies of liberalisation era did not work. The estimated data, based on United Nations Development Programme (UNDP) database, shows that inequality in the distribution of world wealth has increased dramatically from 1960 to 1994. For instance, the share of

industrial countries has increased from 77.3 percent in 1960 to 81.4 percent in 1994. Alternatively, the share of developing countries has decreased from 22.7 percent in 1960 to 18.6 percent in 1994.

Thus, the poor economic performance combined with the sharp rise in poverty in many countries in the 1980s led to the renewed interests in the reduction of poverty. In particular, the adverse results, particularly in African countries were so huge that the international financial institutions like the International Monetary Fund (IMF), the World Bank and the others were forced to pose the idea of social safety nets [Stewart (1995)]. In this regard, the UNICEF's "Adjustment with a Human Face" in 1987, the UNDP's first "Human Development Report" in 1990, and the World Bank's "World Development Report" on poverty in 1990 made poverty reduction as a central agenda of the international development. For instance, in the early 1990s, the World Bank president, Lewis Preston declared that "poverty is the benchmark against which we must be judged" [Dini and Lippit (2009)]. Along with this change, the emphasis also shifted from income growth to unemployment, income distribution and the basic needs.

According to the basic need approach; development is the enhancement of human freedom by ensuring the opportunities to lead a freer-life [Streeten (1995)]. In the same way, Sen (2001) asserts that people cannot be free if they do not have the resources to do what they like to do. In other words, the core of basic needs is to favour the creation of conditions in which people have the real opportunities of living the kind of lives they would like to lead, and to focus, particularly, on peoples' capabilities to choose the lives they have reason to value [Sen (2001)]. Thus, the focus has to be on the freedom generated by commodities, rather than on the types and usefulness of commodities. Alternatively, according to the social judgment approach, adequate nutrition, safe water, better medical services, better basic schooling, decent shelter and continuing employment are all considered as parameters on which the success of society could be measured. Since the provision of these goods cannot be ensured by the market forces; therefore, the basic needs approach attribute primary role to the institutions of state to redistribute resources towards the deprived segments of society. Wolfensohn (2000) is of the view that "a balanced and holistic understanding of the causes and effects of poverty can lead to reforms that promote inclusion, economic growth that reaches the poor, and social development—these are key to sustainable peace ... our job will be to help the countries harness the trends ... to promote growth, poverty reduction and social harmony" (pp. 7–8).

### **3. INCONSISTENCY IN THE CONVENTIONAL APPROACH**

The main focus in the conventional approach remains on growth; however, over the time, it focused on the different dimensions of growth. As stated earlier, the principle argument in the conventional approach is that the mass structural poverty would be eradicated by the capitalist-induced growth; however, the poverty management exercises like the compensation and resettlement, the social protection and social risk management etc., is assumed to supplement, support and harmonise this process of growth. Most of these poverty management exercises are seemingly contradictory even including those of the World Bank. This is justified by the fact that first they consider that poverty is structurally determined by the backward institutions. In order to eradicate poverty, such

institutions should be transformed in order to make them in line with the forces of free market. Onwards, they emphasise the need for the benevolent handholding of the poor through the social protection mesas the poor in the world has come out as a negative externality of the strategy of free market forces. This, in other words, implies that the capitalist approach of growth first makes the people poor; and then suggests how to provide relief to them.

Thus, the growth based on the theory of invisible hand could not be a solution of poverty. For example, Harris-White (2006) argues that the poverty cannot be eradicated in capitalism. On the contrary, poverty is constantly being created and re-created under the institutions of capitalism. Capitalism is a mode of production in which capital in the form of money and credit, physical machinery, stocks of goods and labour—is privately owned. Production is for sale, labour is for sale; and sale is mediated through money. The owner of the means of production, often operating through specialised managerial labour, controls the hiring, firing and working conditions of labour, the choice of technology, the commodities produced, and the exchange of the output. This owner has access to the credit from the specialised financial institutions, even though he may challenge their control. An employer's control over the capital takes place in the context of competition for market shares. However, it is widely believed that the objective of profit maximisation forces the capitalist to adopt new techniques leading to unemployment. For instance, Burkett (1991) is of the view that politicians, the mainstream media, and the orthodox social science have all been telling us that capitalism is the only viable option for solving the world's problems. Yet, the global capitalist system is itself entering the third decade of a profound structural crisis, the costs of which have been borne largely by the exploited and oppressed peoples of the underdeveloped world. Burkett (1991) further states that the World Bank's assertion that the free-market policies are consistent with the effective anti-poverty programmes does not confront the class structures and the global capitalist interests bound up with the reproduction of mass poverty in the third world.

The inconsistency in the approach of conventional economics can be judged from an old report on human development, i.e. UNDP (1998). According to this report the global spending on luxuries were sufficiently enough to educate all and to provide them with the basic health services. This fact is shown in Table 1. As is visible from the table, only the spending on cigarettes in Europe would have been enough to educate all and to provide the basic health facilities to them. For instance, the spending on cigarettes in Europe is \$50 billion while the need for the global basic services was only \$40 billion. If the preferences of individuals incorporate the regards for others; then the luxuries like cosmetics, perfumes, ice-creams etc. could easily be given off for the welfare of the vulnerable class of the society.

Given the above discussion, it is understandable that there remains fundamental flaw in the approach for tackling the issue of poverty. Due to this reason, poverty has come out one of the serious issues in the world. The above thesis also shows that the lasting solution of poverty is not in what the conventional approach presents. Hence, a question arises that what the solution, then, is? The following section provides a brief answer of this question.

Table 1

*Global Priorities and the World Need of the Basic Social Services*

Global Priority	Billions U.S. Dollars	The Cost of Achieving Universal Access to Basic Social Services in all the Developing Countries	Billions U.S. Dollars
Cosmetics in the United States	8	Basic Education for all	6
Ice Cream in Europe	11	Water and Sanitation for all	9
Perfumes in Europe and the United States	12	Reproductive Health for all Women	12
Pet Foods in Europe and the United States	17	Basic Health and Nutrition	13
Business Entertainment in Japan	35		
Cigarettes in Europe	50		
Alcoholic Drinks in Europe	105		
Narcotics Drugs in the World	400		
Military Spending in the World	780		
<b>Total</b>	<b>1418</b>	<b>Total</b>	<b>40</b>

#### 4. MAKING THE STRATEGY IN LINE WITH SOCIAL OBJECTIVES

Poverty alleviation itself is a normative goal. Therefore, the strategy to alleviate poverty should be, accordingly, normative. Alternatively, poverty could not be only achieved with a positive strategy. The current strategies in the path don't judge the individual behaviour on the basis of whether it is leading us to our desired goal or not? We can resemble the current situation of the world economies with a school where the objective is to have a result with the highest number of students with "A" grade. However, the administration of the school allows every student to schedule their time and activities the way they wish. If the students use their freedom for non-academic activities; then it is less likely that the school would achieve its desired goal. For instance, if, instead of study, the students allocate more time to activities such as playing games, surfing internet etc., then it is less likely that they would achieve A grade. Thus, in order to achieve the desired objective, the administration of the school needs to judge the behaviour of students on the basis of the objective set for the school. In the same way, we have a normative target of poverty alleviation; but the conventional approach positively allows every individual to allocate their resources the way they desire. Alternatively, the freedom and the maximisation of self-interest are protected in this system.

Besides, the freedom regarding the allocation of resources is not subject to moral or any other societal constraint. It only assumes that the phenomena of free market forces where all individuals pursue their private interests will lead to the alleviation of poverty. As stated earlier, this assumption is very unrealistic and the current trends in the poverty

of the world contradict this assumption. According to the orthodox approach, individuals are myopic and are only motivated by their personal interests. In other words, they are unable to match the desirability of their private demands with what is required for the overall welfare of society. Hence, they need some scale for judging the matching of their private demands with the interests of society. For example, it is common in our day-to-day life that we pass moral judgment on the demand of family members for having an excursion trip to Europe if their brothers or sisters are starving to death as it contradicts with the interests of the family. Likewise, we need to pass moral judgment on the behaviours of individuals if they don't fall in line with the interests of a global family. If this world is like a village; then, it not possible to say that let the people enjoy their lives while most of them are facing the abject level of poverty. Thus, a village with such inconsistent philosophy for its dwellers can never see the dawn of a day with poverty eliminated.

The true solution of poverty is a paradigm shift where the freedom of individual is judged on the basis of its consistency with the moral objectives set for the society as a whole. We need to reconsider the philosophy of market economies which is based on the theory of invisible hands. Alternatively, the academicians and policy practitioners need to promote a world where the freedom of individuals is ensured in line with the moral objectives set for the society. Moudoodi (2010), while redefining the thoughts of an eminent Muslim Scholar *Shahwiullah*, mention that the fundamental difference between the needs of human beings and animals is that humans not only want the satisfaction of their needs; but they also seek the grace in it. The level of seeking grace in the demand is so heterogeneous that sometimes it exceeds the level of optimality. Human beings are unable to clearly know and understand this level of optimality. For example, one can drink water in any glass, but taking grace or pleasure from drinking may lead to having it in the golden glass. Likewise, the need of human beings is to conceal their bodies from the vicissitude of weather and other environmental effects; however, the satisfaction of this need could be done by attiring simple dress. In contrast, wearing fashionable dress, fancy clown, golden cuffs are just the personification of this grace. This, in other words, implies that intervention from the outside is required to curb the level of pleasure that crosses the level of optimality. In this regard, a fundamental requirement is that an individual has to judge his behaviour on the basis of some ethical constraints. For instance, he has to give up pursuing his self-interest if it clashes with the interests of society [for related discussion, see also, Chapra (1991); Keynes (1926); Zaman (2012)].

To work against one's self-interest for the sake of protecting the social interests requires a very strong motivation. This motivation is not possible without incorporating the sense of accountably in individuals. For instance, telling them that any action of theirs' which is against the interests of society, they will be held responsible. This does not necessarily means that such motivation may come just from the public authority as it is impossible for public authority to monitor individuals all the time. In other words, some inherent forces must exist permanently in individuals in order to prevent them from hurting the social interests. For instance, one such force is the internal conscience of individuals. However, the limitation of internal consciousness is that it sometimes becomes weaker in preventing the individuals from hurting others. Hence, the only solution is the fear of punishment in the life here after for any wrong-doing in this world.

This idea, however, is not new in economics; and even Smith (1872) is of the view that fear of God may results in coinciding the private interests with the interests of society by providing moral sacredness to actions. Here we quote a very famous statement of Adam Smith:

*“When the general rules which determine the merit and demerit of actions, come thus to be regarded as the laws of an all-powerful Being, who watches over our conduct and, who, in a life to come, will reward the observance, and punish the breach of them: they necessarily acquire a new sacredness from this consideration”*(Smith, 1872: Part III, Chapter V).

The concept of punishment and reward in the life hereafter exist almost in all religions. We need to strengthen this belief further so that whenever a clash between the private and social interests arises, one must stop there without any coercive force of the government. Rather, an individual should fear the bad consequences of any wrong act in the life hereafter. So the belief of life hereafter is inevitable for the optimal allocation of resources as far as the social welfare is concerned. Without a strong belief in the life hereafter, it is almost impossible to stop individuals from maximising the selfish gains at the cost of social cost. If this is not the case; then, we will remain counting poverty for another 100 years, but we will never eradicate it. Alternatively, defining the preferences of economic agents just on the basis of self-interest is not a complete description of the human behaviour; rather morality should be given a role in specifying both the preferences and the constraints of individuals. Hence, the promotion of morality-based behaviour is the only solution of the current poverty in the World.

## 5. CONCLUSION

The current economic system which is based on the Adam Smith’s theory of invisible hands has side effects in the form of poverty and income inequality. The theory of invisible hands is based on the ideology of individual freedom. Alternatively, it does not give any role to institutions in specifying the preferences of individuals. For instance, according to the conventional ideology, the individuals are free from any moral, religious or social obligations in satisfying their demands. Thus, accompanied by the assumptions of perfect knowledge and selfishness-based rationality, economic agents are characterised by preferences which are self-regarding, exogenous, and stable. Given this structure, the ultimate purpose of individuals is to maximise their material gains. Since the beginning of formal economic thought, this ideology has been dominant and persistent. However, it has not been able to produce the outcomes which Adam Smith had foreseen at the time of developing the basics of this theory. In other words, the outcomes of the mainstream economic thought have been controversial as far as the welfare of society is concerned. For instance, it is concentrating the resources in the hands of few; and the issues like poverty or inequality are the production of this ideology. Still, there are no successful instruments with this ideology in order to eradicate these crucial issues.

In the current framework, there have been persistent attempts being made in order to reduce the issue of poverty. So far, however, there are no considerable achievements in this regard. Still, the 85 richest people in the world have the same wealth as the 3.5 billion poorest people. In Pakistan, every third person is living below the official poverty

line. A significant fraction of the population almost in all of the provinces of Pakistan has no access to the basic services. The gap between the rich and poor is widening day by day. While the theoretical and empirical literature on poverty and poverty reduction is huge; however, the real impact of such work appears to be insignificant. In this study, we argue that the fundamental problem lies in the approaches for solving poverty. For instance, all of the current approaches while considering poverty as a negative externality try to internalise its effects. In other words, these approaches don't try to fix the real root of this problem. The root cause of poverty is the philosophy of self-interest. Thus, until we do not address the morality-free selfishness and freedom, the elimination of poverty is unlikely. For instance, the new approaches to the reduction of poverty should incorporate in their agenda the role of morality in curbing the selfishness. Besides the informal institutions, there should be some central authority which could look at the moral obligations of individuals in the society. Our analysis suggests a complete shift in the paradigm of economics for tackling the issue of poverty. We conjecture that without such shift, we cannot see the dawn of a poor-free global village for another 100 years.

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### *Comments*

- The paper asserts that paradigm of conventional economics is based on the invisible hand theory of Adam Smith. Under free market forces, individual maximise private interest (utility/profit). Helping poor is not incorporated in the objectives of economic agents. Hence, poverty and income inequality come out as negative externalities of this paradigm. This paper suggests that until the problem in the roots of conventional economics is not solved, just working on to fix the negative externalities may not solve the issue of poverty.
- Author raise question on organisations that why poverty in the world and Pakistan not dropped as in 104 developing countries 1.2 billion people had an income of \$1.25 or less a day and in 91 developing countries 1.5 billion are MPI. And 800 million are at risk to be fall into poverty.
- Sir I agree to you that theoretic foundations of conventional approaches might lead to rising inequality. Under trickledown effect, you have explained three D's namely deregulation, decentralisation and denationalisation that they will reduce the poverty and growth. So now it depends on the country how it implement this D and what is state re-distribution policy, i.e. decentralisation in Pakistan not reap benefit while in China and some other countries remained successful. West is spending a lot on re-distribution along with progressive tax structure while our tax structure is regressive. Yesterday we have discussion that safety net is unable to eradicate poverty so that's why importance of inclusive growth is now stressed by majority of the literature that the benefits of growth will reach to all the segments of society.
- Poverty is a mental and psychological phenomena as well, therefore there is no consensus on the definition of poverty. I am just your student in experimental economics, if you conduct experiment from both extreme poor and upper middle class. Let say a poor have income of Rs 12000 and upper middle have around 50,000. Both will say that we are hardly surviving. Poor will say I need 2, 3 more while upper middle say that I need 20 more.
- With due apologise, poverty and inequality depends on priorities and needs as you mentioned in table 1 rather than capitalism. So if you apply the definition of developing countries in west i.e. dollar a day or 2350 calories or social inclusion, despite of capitalism, they have less poverty, deprivation and a well-defined social protection system. China is an example that during communist period (1948-78) they have more poverty than Africa, but 1978 to onward, they move toward capitalism and globalisation and not only reduce poverty in percentage but also in numbers. China did successful land reforms late 70s but our 3 land reforms fail.
- There is too much debate on poverty but our policies lack that how to include the poor and what he/she need. We have mainly focused on targeted safety nets

but we are unable to build their asset creation (soft and physical). In our developing countries including Pakistan, the market is not complete so the invisible hand is not working properly. The issue is that our growth is not inclusive (see 60s decade and 2006-10) with macro instability as well. Economic benefits are also skewed to our ruling class. We are not reaping the benefits from demographic transition because our institutions and governance system is not benefiting the poor and we are unable to absorb our youth so they are facing vulnerable employment and under-employment. Despite of all resources, we are not utilising our potential momentum, including growth, tax collection, etc.

- We are investing only 2.5 percent of GDP on human capital and our educational system is not producing the right quality skilled labour as per our need. Our graduates are searching jobs because they don't have entrepreneurial skills while our employer is unable to create jobs. Our educational institutes and our labour policies are not at same line. Due to lack of social health protection, 98 percent of population especially the poor and informal worker purchase health facility from their pocket so they are vulnerable to health and other shocks. The World Bank report of "Doing Business" shows that doing business in Pakistan is quite difficult, Pakistan was at 66th rank/175 and now we fall to 128/189. We have huge disparities across the regions and lack of infrastructure. We have to borrow from outside because we have only 13 percent saving so cannot invest. Being lack of R & D, our agricultural productivity is stagnant over the last 30 years, and in absence of crop insurance and weak market structure, our farmer is dependent on *artis*.

At end I agree you that to stop individual from working against his self-interest for the sake of social interest require a very strong motivation. This belief of day-of-judgment must be strong enough so that whenever a clash between private and social interest arise, he must stop there without any coercive force of government. I think if individually we get this level of spirit, all the issues would resolved if we forgo our interest on societal interest.

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## **Measuring Multidimensional Poverty and Inequality in Pakistan**

MAQBOOL H. SIAL, ASMA NOREEN and REHMAT ULLAH AWAN

### **1. INTRODUCTION**

The key development objective of Pakistan, since its existence, has been to reduce poverty, inequality and to improve the condition of its people. While this goal seems very important in itself yet is also necessary for the eradication of other social, political and economic problems. The objective to eradicate poverty has remained same but methodology to analysing this has changed. It can be said that failure of most of the poverty strategies is due to lack of clear choice of poverty definition. A sound development policy including poverty alleviation hinges upon accurate and well-defined measurements of multidimensional socio-economic characteristics which reflect the ground realities confronting the poor and down trodden rather than using some abstract/income based criteria for poverty measurement. Conventionally welfare has generally been measured using income or expenditures criteria. Similarly, in Pakistan poverty has been measured mostly in uni-dimension, income or expenditures variables. However, recent literature on poverty has pointed out some drawbacks in measuring uni-dimensional poverty in terms of money. It is argued that uni-dimensional poverty measures are insufficient to understand the wellbeing of individuals. Poverty is a multidimensional concept rather than a uni-dimensional. Uni-dimensional poverty is unable to capture a true picture of poverty because poverty is more than income deprivation.

Multidimensional wellbeing is not a new concept. Sen (1976) is among the pioneers to conceptualise the wellbeing in an alternate and direct way using the concept of capability and functioning. Income is rather an indirect approach to evaluate individual welfare since it is required to purchase basic needs for example food, shelter, clothing, etc., assuming a well-functioning market. Consequently, it is true to say that to acquire certain goods and services income is needed. So, poverty is not the state of deprivation of certain level of income, that is, one dollar per day or two dollars per day but poverty is a state of multiple deprivations that poor faces. This multiplicity of dimensions leads to a broad definition of poverty. Income data is not correctly available and also there are difficulties in adjusting data for prices and inflation. Multidimensional poverty does not fluctuate due to inflation. So, this is a relatively stable measure. Indicators reflect a relatively long term accumulation of welfare.

Many studies in 1990s have put a great emphasis on the relationship between economic growth, inequality and poverty. Inequality is also a multidimensional phenomenon. Only income or consumption inequality does not give true snapshot of inequality. It has considered that the combination of economic growth and inequality reduction policies are the key determinants of poverty reduction. Eradication of poverty is one of the most important objectives of all countries but the question arise, how to tackle this ambiguous problem? Although measuring MPI is a difficult task but due to the importance of MPI some developed and developing like Mexico, Colombia, Philippines, China, Brazil, Bhutan, Malaysia, Indonesia, Chile etc. have adopted multi-dimensional poverty estimation. Many researchers have investigated MPI for different countries like Metha and Shah (2003) in India, Justino (2005) in Brazil, Batana (2008) in Sub-Saharan countries, and Alkire and Santos (2010) in America. Computation of Multidimensional inequality is an exigent exercise as many variables contribute in it. Multidimensional inequality has been investigated in different countries like Justino (2005) examined multidimensional poverty in Brazil, Decancq, *et al.* (2009) in several countries, Aristei (2011) in Italy, Decancq and Lugo (2012) in Russia and Rohde and Guest (2013) in US.

In Pakistan, for alleviation of poverty, different social programs like Benazir Income Support Program (BISP) and Wasila-e-Rozgar scheme etc., have been introduced. Implementation of Poverty Reduction Strategy Papers (PRSP) approach and pledge to achieve Millennium Development Goals (MDGs) by Government of Pakistan reveal the importance of and need of poverty reduction. All poverty reduction strategies and social safety nets require the accurate analysis of poverty estimates to reach the primal objective of these programs. For achieving eight Millennium Development Goals, it is necessary to gauge the multidimensionality of poverty and inequality.

Main objective of this study is to measure multidimensional poverty and multidimensional inequality in Pakistan. Rest of the study is organised as Section 2 illustrates data and methodology. Results, conclusion and policy recommendations are discussed in Section 3.

## 2. DATA AND METHODOLOGY

This study employs Household Integrated Economic Survey (HIES) (2005-06 and 2010-11) for analysis of Multidimensional Poverty and Inequality in Pakistan. The study follows Alkire and Foster (2007) methodology for measuring Multidimensional poverty and Gini index for Inequality. It is easy to compute and interpret, intuitive and fulfils many desirable axioms. This is also called Adjusted Headcount Ratio ( $M_0$ ).  $M_0$  is applicable when any one of dimensions is ordinal, numerical values have no meaning, for example, qualitative in nature. Alkire and Foster Methodology (AFM) does not assume that data is continuous. Brief and simple steps involved in computation of MPI in mathematical as well as non-mathematical form are given below:

Step one is choice of unit of analysis. Unit of analysis may be household, individual, community, district or country. Choice of unit of analysis depends on research question. Second step is choice of dimensions. Dimension may be selected due to public consensus, empirical evidence or convenience due to data availability. Choosing indicator for each dimension is third step. For more accuracy and parsimony, it is necessary to use few reasonable indicators. Fourth step is to apply poverty lines for each indicator and convert achievement matrix into deprivational matrix. Replace individual's achievement with 0 or

one. Intuitively Equation 1 shows that if achievement of  $n^{\text{th}}$  household in dimension  $D$  is less than dimensional cut-off  $z_d$  then that household is declared as poor and vice versa.

$$g_{nd}^0 = \begin{cases} 1 & \text{if } Q_{nd} < z_d \\ 0 & \text{if } Q_{nd} > z_d \end{cases} \quad \dots \quad (1)$$

Next step is to count the number of deprivations for each individual and get one column vector. For simplicity, equal weights are assumed to apply. Then set second cut off for identification,  $k$  is applied. If the number of deprived dimension is smaller than  $k$  then the household is non-poor and vice versa according to identification function. Identification function  $\rho_k$  is defined in Equation 2.

$$\rho_k = (Q_n, z) = 1, \text{ if } S_n \geq k \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (2)$$

Now a censor matrix is defined, having zeros and ones for non-poor and poor households respectively. As AF methodology is concerned, MPI is calculated by the product of two components. First component of MPI is Multidimensional Headcount Ratio and second is Average Intensity of Poverty. So calculate headcount ratio (H) by dividing the number of poor by total population. Mathematically  $\mathbb{H} = \mathbb{h}(Q; z)$  is defined in Equation 3.

$$\mathbb{H} = \mathbb{q}/N \quad \dots \quad (3)$$

where

$N$ = Total population  
 $\mathbb{q} = \mathbb{q}(Q; z) = \sum_{n=1}^N \rho_k(Q_n, z)$  in set of  $z_k = \{n : \rho_k(Q_n, z) = 1\}$

Average intensity (A) is ratio of sum of deprivation of each individual to total number of poor. It gives the fraction of dimensions in which average household experienced multidimensional poverty. MPI is simple product of the average share of deprivation with raw headcount ratio, which is given in Equation 4.

$$\mathcal{M}^0 = A \times \mathbb{H} \quad \dots \quad (4)$$

MPI measures can also be decomposed by dimensions as given in Equation 5.

$$\text{Dimensional Contribution} = \mu(\mathcal{G}_d^{\alpha(k)}) / \mathcal{M}(Q; z) \quad \dots \quad \dots \quad (5)$$

**2.1. Dimensions, Weights and Cut-offs**

For accurate measurement, selection of appropriate dimensions is as important as accurate data. It is an important and most challenging task. But for this, there is no hard and fast rule. According to Sen, appropriate dimensions are those which have importance for individuals and society, and have importance regarding policy making. Based upon data availability regarding MDGs, this study has selected four dimensions, Education, Health, Expenditures and Living Standard, with ten indicators. Eight out of ten indicators are related to MDGs.

MPI can be measured at individual or household level through AF methodology, but if we select individual as a unit of analysis there might be a problem of data availability. In Micro survey expenditures, detail is present only on household level so it is most appropriate to analyse poverty on household level. In this study unit of analysis is household level. All four dimensions are equally weighted, equal to one fourth or 25 percent. Moreover, all indicators in all the dimensions are also equally weighted.

### **2.1.1. Education**

Education enables an individual, hence a nation to adopt new technology and technological changes. Income also depends on complete years of schooling. If a child is not attending school, it lessens the chances of increase in future income of a household. That's why education is the second goal of MDGs.<sup>1</sup> So it is essential to dissect education poor areas and take some measures. In line with MDG two, this study has used five years of education and school enrolment of schooling children as indicators of education. Current education level shows level of knowledge of a household because any one of educated member has positive externalities on other members of the household [Basu and Foster (1998)]. So the household is referred as deprived if no member has completed five years of education. The current enrolment status of all school going age members shows an increase in present and future abilities. The household is declared as poor if any school going age child is not enrolled in school.

### **2.1.2. Health**

Health like education is also a key variable of development. A person with good health can earn enough income to meet the basic necessities of his household. That's why MDGs put greater emphases on health. Three out of eight MDGs are in one or other way related to health. This study, based on data availability, has included immunisation against measles and postnatal care as indicators of health which are directly linked to fourth and fifth goal of MDGs respectively. Household is declared as deprived in immunisation if no child is immunised against measles. In Postnatal care Household is referred as deprived if mother of a family never goes for postnatal check-up.

### **2.1.3. Expenditures**

As multidimensional poverty emphasises on other dimensions of poverty, it does not mean to ignore monetary dimension. Monetary dimension is as important as others because income provides power to purchase other basic necessities. Many empirical studies excluded income/expenditures due to lack of data on income and expenditures. However, PSLM survey has data on all dimensions. There are three possible choices for material wellbeing income, asset ownership and expenditures. People do not report their true income level. They report low income level than actual may be due to fear of theft or income tax. Furthermore, income of agriculture and self-employed is difficult to estimate. Second indicator, asset ownership is supposed to be a good measure because it is free of these issues but the choice of a set of assets is highly crucial and questionable. Expenditure data is relatively credible than income data. So this study has used expenditure data as a proxy of monetary wellbeing.

<sup>1</sup>To attain universal primary education by 2015.

### 2.1.4. Living Standard

A single variable is not able to measure living standard. Due to limitation of data this study has selected only five indicators for living standard; access to safe drinking water, electricity, gas, sanitation and crowding per room. These indicators directly or indirectly are included in MDGs.

Life is impossible in the absence of water. But contaminated and grimy water grounds many diseases like diarrhoea and hepatitis leading to many deaths in Pakistan. Safe drinking water is related to seventh MDG. A household is deprived in water dimension if the household has no access to drinking water or more than 30 minutes consume to reach the source of safe drinking water.

Access to improved sanitation is a vital need for dignity and health of people. Sanitation is directly related to hygienic problems. For safety of health access to improved sanitation is essential. It is also related to seventh. A household is declared as poor if the household does not have an improved toilet.

Electricity is an important indicator of living standard. Electronic devices can be used with electricity and these electronic products enhance productivity and leisure. A household is deprived in this dimension if it has no electricity connection.

Gas is also indirectly related to MDGs; Bio mass fuel causes environmental degradation. So indirectly gas provides environmental sustainability and is also linked with 7th MDG. A household is pronounced as poor if it has no gas connection.

Crowding symbolises the number of persons who share a room for sleeping. More persons sharing one room indicate the shortage of facilities hence a low living standard. Indirectly this indicator is related to MDG five. A household is deprived if more than three persons are sharing one room for sleeping.

## 2.2. Multidimensional Inequality

Fisher (1956) is one of the pioneers of Multidimensional Inequality, who have given the idea of Multidimensional matrix. Kolm (1977), Atkinson and Bourguignon (1982), Walzer (1983), Gajdos and Weymark (2005) and Decancq and Lugo (2011) have proposed Multidimensional Inequality indices. Decancq and Lugo (2012) aggregate in reverse direction, first aggregate across dimensions and then across individuals, this technique takes into account correlation between dimensions. So, this study has employed Decancq and Lugo Multidimensional methodology for measuring Multidimensional Gini coefficient.

For measuring Multidimensional inequality Gini coefficient distributional matrix can be compared with social welfare function. Distributional matrix is similar as achievement matrix in MPI. Social welfare function can be constructed by double aggregation. First aggregated across dimensions to get individual welfare function and then aggregated across individuals for social welfare function. Same or different weights can be assigned to each dimension. Weights reflect the relative importance of a dimension. Weights must be assigned in such a way that the sum of all weights must be equal to one, mathematically  $\sum_{d=1}^D \mathcal{W}_d = 1$ .

Social wellbeing function can be written as:

$$\mathcal{W}_{n \times d} = \sum_{n=1}^N \left[ \left( \frac{r^n}{n} \right)^\delta - \left( \frac{r^n}{n} \right)^{\delta-1} \right] \left[ \sum_{d=1}^D \mathcal{W}_d (Q_d^n)^\beta \right]^{1/\beta} \quad \dots \quad \dots \quad (6)$$

Where  $\delta > 0$ ,  $\mathcal{W}_d > 0$ ,  $\sum_{d=1}^D \mathcal{W}_d = 1$

$\mathcal{W}_d$  = weights assigned to each dimension  
 $r^n$  = rank of individual n on the basis of S  
 $\delta$  = inequality inversion parameter  
 $\beta$  = substitution parameter

$$S = \left[ \sum_{d=1}^D \mathcal{W}_d (Q_d^n)^\beta \right]^{1/\beta} \dots \dots \dots \dots \dots \dots \dots \quad (7)$$

So  $\beta$  mirrors the degree of substitutability among the dimensions of wellbeing. Specifically,  $\beta$  is related to the elasticity of the substitution  $\sigma$  between the dimensions, and equals  $1-1/\sigma$ .  $\beta=1$ , represents perfect substitutability between the dimensions of wellbeing and  $\beta = -\infty$ , denotes dimensions are perfect complementary; at the extreme, individuals are judged by their worst outcomes.

Multidimensional Gini index can be defined as the fraction of an aggregated amount of dimensions of a distributional matrix by aggregated amount of dimensions if dimensions are equally distributed. It is analogous to Uni-dimensional Gini index which is also ratio of aggregated gap of income to the equally distributed income. So Multidimensional Gini is defined as below:

$$I(Q) = 1 - \frac{\sum_{n=1}^N \left[ \left( \frac{r^n}{n} \right)^\delta - \left( \frac{r^n}{n} \right)^\delta \right] \left[ \sum_{d=1}^D \mathcal{W}_d (Q_d^n)^\beta \right]^{1/\beta}}{\left[ \sum_{d=1}^D \mathcal{W}_d (Q_d^n)^\beta \right]^{1/\beta}} \dots \dots \dots \quad (8)$$

The value of Gini co-efficient lies between zero and one ( $0 < \text{Gini} < 1$ ). Gini co-efficient equal to zero shows a perfectly equal distribution of income (every person has the same level of income) while equal to one shows a perfectly unequal distribution of income (some persons have more income and some have less income).

Choice of different dimensions for multidimensional inequality is a crucial task and can be chosen with various justifications. Following dimensions are used for Multidimensional Inequality: Monetary wellbeing (consumption expenditures), Educational achievement and Health. This study has utilised maximum years of education attained by any member of a household as a proxy of educational wellbeing.

There are many proxies for Health like BMI, stunting and wasting for children, but these are not monotonically increasing function of health. Alternate to this, health risk index, proposed by Seth (2010), is a better measure of health quality. This index captures the risk of health of a household. The higher the value of health index mirrors the better quality of health. Health risk index combines three sub-indicators. The first indicator, safe drinking water  $I_w=1$  if a household has access to safe drinking water and  $I_w=0$ , otherwise. The second indicator is access to improved toilet,  $I_t=1$  if a household has access to improved sanitation and  $I_t=0$ , otherwise. Last indicator, crowding  $I_c=Mn/Rn$ , where  $Mn$  is number of members and  $Rn$  is number of rooms. It is difficult to decide normatively which indicator has more importance for health risk index so equal weights have applied. Health risk index for N household is defined in Equation 9.

$$\text{H.R.I} = \frac{1}{3} I_w + \frac{1}{3} I_t + \frac{1}{3} I_c \dots \dots \dots \dots \dots \dots \dots \quad (9)$$

This equation shows simple Health Risk Index with equal weights and ordinal data. As these dimensions have only value judgment and all researchers may not agree upon any weighting scheme, so equal weights is a better option.

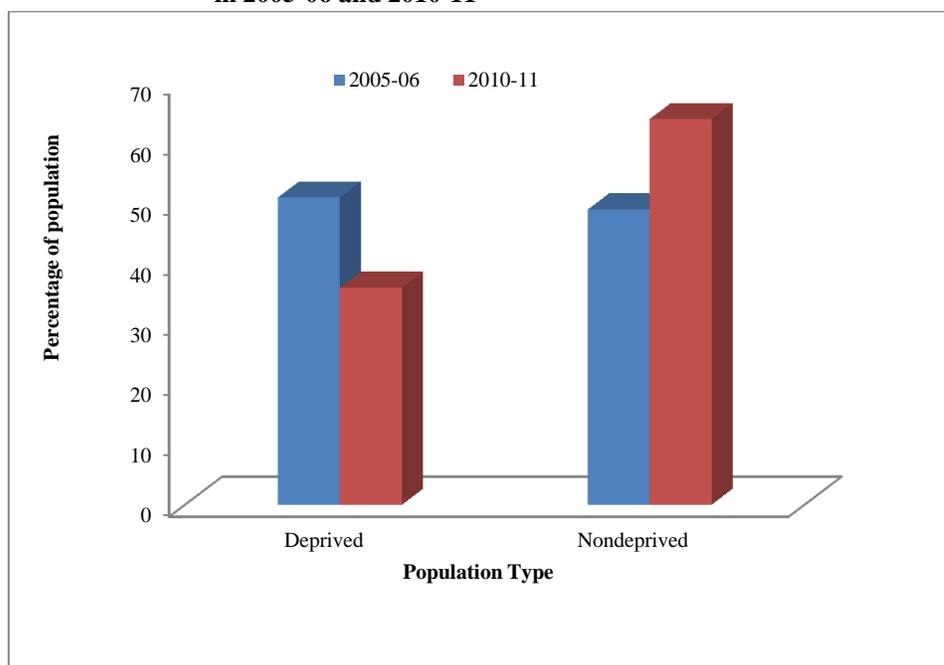
### 3. RESULTS AND DISCUSSION

#### 3.1. Results of Multidimensional Poverty

Income or expenditures are not the only determinant of poverty, many factors other than income/expenditures also contribute in poverty like poor health, lack of education, poor housing and low living standard. Poverty is something beyond income deprivation. This study has estimated MPI at National level.

This study applied Alkire and Foster (2007) methodology by using four dimensions; health, education, expenditures and living standard for measuring multidimensional poverty. Figure 1 shows the percentage of multidimensional deprived people by using ten indicators under the umbrella of four dimensions and by using equal weights. In 2005-06, 51 percent people were multidimensional deprived where as 49 percent people were multidimensional non-deprived.

**Fig. 1. Percentage of Multidimensional Deprived Population in 2005-06 and 2010-11**

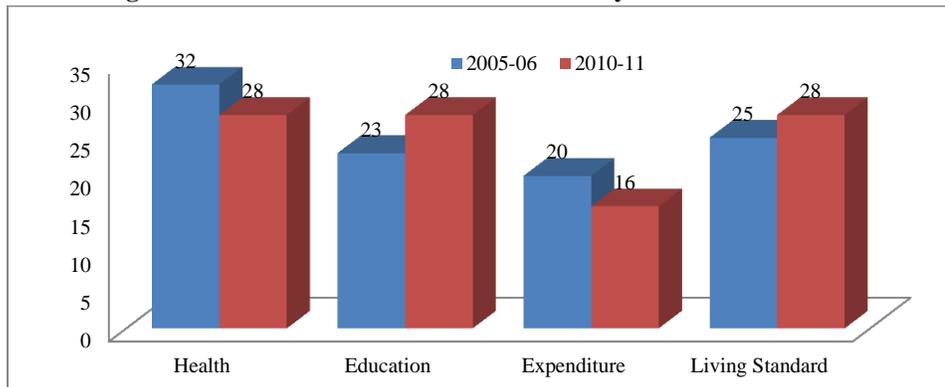


Source: Author's own calculations.

In 2010-11 multidimensional deprived population was 35.86 percent while the rest were non-deprived. Multidimensional poverty has declined by 15 percent during 2005-06 to 2010-11.

### 3.2. Dimensional Share to overall MPI

**Fig. 2. Dimensional Share to National Poverty 2005-06 and 2010-11**

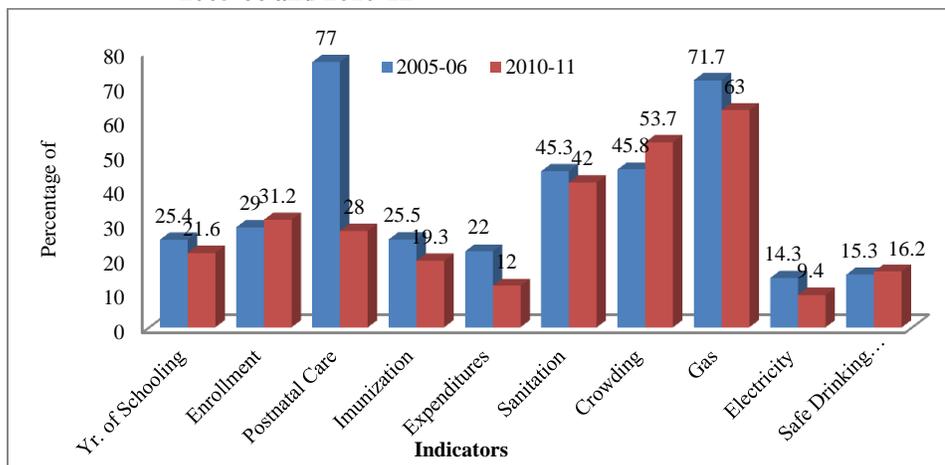


Source: Author's own calculations.

From Figure 2, it is clear that education contributes 23 percent in 2005-06 and 28 percent in 2010-11 to overall poverty, Health contributes 32 percent and 28 percent in 2005-06 and 2010-11 respectively while living Standard contribution is 25 percent and 28 percentage respectively. Expenditure share to overall poverty is 20 percent and 16 percent in 2005-06 and 2010-11. Contribution of education and living standard has increased over time. The reason for increase in share to poverty was due to over population, decline in quality of water and increase in education inequality. Thus these findings conclude that to curb multidimensional deprivation, resources must be allocated according to the percentage of the share of each dimension in overall poverty.

Dimensional contribution can be more zoomed by considering percentage deprivation in each indicator. Figure 3 gives a more detailed picture of multidimensional poverty through percentage of deprived population in each indicator.

**Fig. 3. Percentage of Household Deprived in each Indicator during 2005-06 and 2010-11**



Source: Author's own calculations.

Above diagram illustrates that during 2005-06 and 2010-11, about 77 percent and 28 percent households are deprived in post natal care, 25.5 percent and 19.3 percent households in immunisation against measles, 71.7 percent and 63 percent households have not a gas connection respectively. It is also depicted that the households have small houses as compared to their family, i.e. 45.8 percent and 53.7 percent households share a room more than three persons in 2005-06 and 2010-11. Congestion may cause many diseases which spread through respiration. In 2005-06 and 2010-11, 45.3 percent and 42 percent of households had no access to an improved toilet. In Pakistan, in 2005-06 and 2010-11, 15.3 percent and 16.2 percent households had no access to safe drinking water or it may consume 30 minutes to reach at the source of drinking. 14.3 percent and 9.4 percent households have no electricity connection as a lightning source while 22 percent of the population was living below Poverty line (BPL) in 2005-06 and 2010-11.

Table 1

*Adjusted Headcount Ratio at Different Cut Offs in 2005-06 and 2010-11*

K	2005-06			2010-11		
	H	A	$M_o = H \times A$	H	A	$M_o = H \times A$
1	91.86	40.08	36.82	60.02	36.55	25.23
2	72.07	46.81	33.74	54.40	42.07	22.89
3	51.06	55.55	28.36	35.86	50.56	18.13
4	36.85	62.71	23.11	22.60	58.66	13.26
5	27.53	68.52	18.86	15.37	64.53	9.92
6	16.86	76.62	12.92	8.60	73.09	6.29
7	10.60	83.65	8.87	3.84	80.71	3.10
8	05.58	89.06	4.97	.16	88.16	1.41
9	1.64	96.64	1.58	.10	96.46	.10
10	0	0	0	0	0	0

Source: Author's own calculations.

According to Union approach adjusted headcount ratio is 36.83 percent and 25.23 percent whereas Intersection approach shows zero percent headcount ratio in 2005-06 and 2010-11. Regarding Dual Cut off approach, poverty cut off "K" must be lie between two approaches. At "K=2" headcount ratio is 33.74 percent and 22.89 percent. As "K" increases headcount ratio decreases such as at k equal to three, four, five, six, seven and eight headcount ratio is 28.36 percent, 23.11 percent, 18.86 percent, 12.92 percent, 8.87 percent, 4.97 percent and 1.58 percent respectively in 2005-06. In 2010-11 for k equal to three, four, five, six, seven and eight headcount ratio is 18.13 percent, 13.26 percent, 9.92 percent, 6.29 percent, 3.10 percent, 1.41 percent and 0.1 percent respectively. The estimates of headcount ratio illustrate that multidimensional poverty has declined at all cut offs during 2005-06 to 2010-11.

### 3.3. Results of Inequality in Pakistan

This study analysed inequality in wellbeing in Pakistan for 2005-06 and 2010-11. Data used in this section have been also drawn from PSLM conducted by Pakistan Bureau of Statistics. In addition to consumption expenditure, facts of health and

education have also been incorporated. Equivalent per adult expenditures, proposed by Planning Commission of Pakistan, are used. In analysis, maximum years of education of any of the family member and Health Risk Index are included.

For computation of Gini coefficient, this research used four fundamental decisions about: standardisation of each indicator, the degree of substitution (value of  $\beta$ ), weights and inequality aversion parameter (value of  $\delta$ ). Each outcome was divided with its respective mean for standardisation, the value of  $\beta$  was restricted to zero because of ratio-scale invariance property. Cobb–Douglas function was used and Value of parameter infers value judgment about indicators and it is difficult to say which indicator is most important in human welfare so equal weights are employed in analysis.<sup>2</sup>

Standard Gini coefficient possessed the value of  $\delta$  equal to 2. This study computed Gini Coefficient for two values of delta one value was equal to 2 and other was 5 which represent the higher weight for bottom distribution. Higher the value of delta, higher weights will be given to bottom distribution. Results are given below;

Table 2  
*Gini Coefficient in 2005-06 and 2010-11*

Gini Coefficient	Delta=2		Delta=5	
	2005-06	2010-11	2005-06	2010-11
Expenditure	.32	.29	.5	.45
Health Risk Index	.19	.21	.34	.38
Max. Education	.34	.33	.69	.68
Multidimensional	.35	.34	.61	.61
Welfare Index	.64	.65	.38	.39

Source: Author's own calculations.

Table 2 illustrates consumption inequality in different wellbeing dimensions in Pakistan in 2005-06 and 2010-11. Value of Gini-coefficient ranges from 0 to 1 where zero means perfect equality and 1 means perfect inequality. Gini index shows the percentage of inequality prevailing in a country. The table portrayed that consumption expenditure inequality has declining trend from 0.32 to 0.29 for delta equal to two and more severe when value of  $\delta=5$  but inequality has decreased for both values of delta. Health risk inequality has increased from 0.19 to 0.21 for delta equal to 2 and also increased from 0.34 to 0.38 for delta equal to 5. Education inequality declined for delta equal to 2 and remained same when value of delta is 5. Multidimensional inequality showed slightly decline in dispersion when delta is 2 but showed no significant reduction in dispersion for delta equal to 5. Welfare index showed welfare has only 1 percent reduction for both values of delta and welfare has declined about 26 percent with the increase in value of delta from 2 to 5.

Upshot, results showed that multidimensional poverty also declined from 51 percent to 36 percent. The dimensional breakdown of MPI showed that Immunisation, postnatal care, Enrolment and Equivalent per adult expenditures comprise 66 percent of whole poverty in 2005-06, while in 2010-11 these four dimensions contribute 62 percent

<sup>2</sup>HDI also used equal weights.

in overall poverty. From 2005-06, Consumption inequality has declined about by 3 percent while Multidimensional inequality has declined only by 1 percent.

### 3.4. Policy Recommendations

The results of present study give some suggestions about policies for development. Policy for curbing poverty should be dimension specific. Education and health contribute 62 percent to overall poverty. Government should invest in health and education to provide more facilities, to accelerate pace of poverty reduction, to redistribute and improve health and educational facilities. Access to water has declined; the proper mechanism must be taken for provision of water supply schemes and improvement in the drainage system. The study opens some future research avenues like to explore main causes of multidimensional poverty and inequality. Additionally multidimensional poverty and inequality should also be dissected at provincial and rural-urban levels.

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### *Comments*

- The paper has estimated the MPI and MGI.
- On page 1 author wrote, “Although measuring MPI is a difficult task but due to the importance of MPI developed and developing countries have adopted multi-dimensional poverty estimation”. Though 2014 global MPI report measure more than 100 countries but it not official, except few countries, Mexico, Colombia, Philippines, China, Brazil, Bhutan, Malaysia, Indonesia, Chile
- Why study is measuring MPI and MGI, whether you have some policy target and you mould MPI indicators as according to conventional MPI methodology, you will suggest policy then. For example, in Colombia country’s development plan has three pillars: employment, poverty reduction and security. The government plans to reduce multidimensional poverty by 13 percent– from 35 percent of the entire population in 2008 to 22 percent in 2014. They put more emphasis on education and labour indicators (long term employment, formal employment) to improve quality of education and to resolve the issues of decent work. In Mexico, MPI is the part of public policy in which government aim to pull the extreme poor out of poverty based on both MPI and uni-dimensional approach.
- The study has utilised Pakistan Social and Living Standard Measurement (PSLM) surveys (2005-06 and 2010-11). But you have reported the sample of HIES data (15453 and 16341) so you not using PLSM data. Though you can use if you not indicator from consumption and income side.
- The MPI and MGI results are highly sensitive to the choice of indicators. Author wrote 10 pages on theoretical modelling of MPI and MGI while there is no discussion of selection of dimensions, indicators, weights, cut-off which should be because all your results are based on it that how you estimated the MPI and MGI.
- In result section 4.1.1. The author has stated to use four dimensions; education, expenditure, living standard and health I have reservation on expenditure dimension because it is usually determined by the other 3 and our discussion with Alkaire in April, she suggest not to use expenditure.
- But again there is no discussion on indicators before explaining the results. Indicators should be representative, sustainable, and less collinear to each other
- The results are very alarming in Figures 1 and 2, it should that MPI is 51 percent in 2005 and only 12 percent in 2010. Two reservations. Firstly we Pakistan not perform well health, education, expenditure and living standard indicators. Second we have estimated MPI with Alkaire.

<b>k-value</b>	<b>2004/05</b>	<b>2006/07</b>	<b>2008/09</b>	<b>2010/11</b>
17	0.284	0.272	0.261	0.230
23	0.264	0.252	0.240	0.208
28	0.240	0.229	0.217	0.185
33	0.219	0.208	0.197	0.166
34	0.211	0.200	0.188	0.157
40	0.179	0.169	0.158	0.129
50	0.122	0.117	0.108	0.085
52	0.105	0.102	0.094	0.072
62	0.057	0.057	0.050	0.037
75	0.016	0.017	0.014	0.010

- In Figures 3 and 4, author has mentioned the change in MPI within the dimensions. I think there should also be explain the reasons.
- In Figure 5 author has mentioned the indicators. It should be very earlier because whole your exercise is based on this analysis. But still we don't know that what the definition of indicators is. Some indicators look not representative, covering whole population (gas, enrolment, or not sustainable).
- Finally your Table 1 and Table 2 is totally contradict to Figure 1 (51 percent) and Figure 2 (12 percent).
- You have too summarised the discussion on MGI. Your take 11 pages to discuss MPI results while there is only 1 page on MGI. Again there is methodological gap that how you calculated as you mention health risk index, welfare index etc. but I don't know how you estimate these variables.
- Finally there is no conclusion or policy recommendation.

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## **Determinants of Household Poverty: Empirical Evidence from Pakistan**

M. TARIQ MAJEED and M. NAUMAN MALIK

### **1. INTRODUCTION**

The Millennium Development Goals (MDGs) aim at halving the percentage of world population in 1990 with income less than US \$ 1 a day and halving the share of people who suffer from hunger by 2015. Being a developing nation, poverty reduction should be our foremost obligation. An appreciable decline has occurred recently, headcount decreased from 34.46 percent in 2000-01 to 23.94 in 2004-05 [Pakistan (2006-07)]. However, seeing only the statistics and the trends in poverty we can just observe that what happened to poverty in different periods and also the decomposition of poverty in different years gives us a more appropriate picture of the incidence of poverty. This knowledge is useful because it informs us whether poverty is increasing or decreasing overtime. However, this information does not provide us the details of the causes of poverty. For instance, is poverty high due to low education attainment or large family size or due to any other reason? Here is a need of research about the determinants of poverty that are positively or negatively linked with the poverty status. This is the area where research can be most useful because firstly we have to understand the main determinants of poverty before designing the most efficient policy to reduce poverty in the country.

A logistic regression technique has been used to evaluate the determinants of poverty in Pakistan. An important determinant of household poverty is education of the head of the household. In the Millennium Development Goals (MDGs), originated from the United Nations (UN) summit 1999, and the Poverty Reduction Strategy Paper (PRSP), promoted by the World Bank and the IMF, education is considered as a weapon against poverty. Therefore the idea that education is a determinant of poverty has occupied much attention in the recent years. Since 1960s when Shultz (1961) and Becker (1962) emphasised upon the attainment of education and skills for human development, education's role in the economic growth and development became prominent and its importance in poverty reduction increased manifold. We have to seek out such vital channels (both qualitatively and quantitatively) between education and poverty reduction that will help us in policy formulations for poverty reduction and educational expansion.

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Along with educational deprivation we will also analyse some other personal and household characteristics. In this regard experience, age, gender and employment status of the head of the household are important. In most of developing countries gender discrimination is widely prevalent. Females have less educational and earning opportunities as compared to males. That's why female/male headed households can be an important determinant of poverty. Region (urban/rural) as a determinant of poverty is important in developing countries where usually agriculture sector is dominant. Moreover, the rise of industrialisation coupled with migration problems persuades us to consider the region in poverty determinants. We will also extend the location variable to cover the different provinces of a country. Moreover, household size and remittance receiving status of household will also be explored.

The main objective of this study is to determine the effect of different educational levels upon the probability of being poor of households (considering the expenditure side) in Pakistan. Similarly, some other personal characteristics such as gender, age, experience and employment status of the head of the household and some household characteristics such as the household size, remittance receiving status, regional and provincial location will also be analysed.

The study is structured as follows: Section 2 provides review of the literature on determinants of poverty. Section 3 is related with the data and methodology details while Section 4 includes the description of regression technique and construction of variables. Section 5 provides descriptive analysis of poverty assessment. Section 6 includes the logistic estimations and interpretation of the results and finally, Section 7 concludes with some recommendations.

## 2. REVIEW OF LITERATURE

After the contribution of Mincer (1958) in finding the role of education in wage earnings, Schultz (1961) and Becker (1962) both viewed investment in education attainment and in skill enhancement as the necessary component of human capital accumulation. As human capital formulation is necessary for poverty reduction that's why education becomes the vital and prominent factor in reducing poverty both at income level and also at other social and capability levels.

Coulombe and McKay (1996) used multivariate analysis to analyse the determinants of poverty in Mauritania based on household survey data for 1990. They estimated a multinomial logit model for the probability of being poor depending on household specific economic and demographic explanatory variables. The authors found that low education, living in a rural area and a high burden of dependence significantly increase the probability of being poor of the household.

Gundlach, *et al.* (2001) did a study on 102 countries using the quality adjusted broader measure of human capital, which depends upon the social returns of educational levels and an index of quality. The findings show that the income of the poor (lowest quintile) increases with the rising quality-adjusted human capital. They estimate that a 10 percent increase in the stock of quality adjusted human capital per worker increases the average income of the poor by 3.2 percent.

Tilak (2002) has conducted a comprehensive analysis of the approaches of development and well-being with respect to the education's reflections upon poverty. He points out that the inverse relationship between education and human poverty is well

recognised in many prominent approaches of development such as the human capital approach, the basic needs approach, the human development approach and the capability approach. The author argues that at micro level incidence of poverty is greatest among the illiterate households and tends to decline at higher levels of education in developing countries. Moreover, (at macro level) the decline in poverty is possible through higher level of education of the population. He also notes that a mutually reinforcing relation persists between education poverty (lack of education) and income poverty because income deprivation resists persons from attaining education and absence of education causes low-income level. Tilak vehemently mentions the direct linear relationship between education and earnings. This relation is well recognised universally i.e. with the rise of education earnings also rise considerably.

Okojie (2002) further goes in to the details of educational levels that affect the household's income poverty and the human poverty using household data of 1980, 1985, 1992 and 1996 for Nigeria. In the poverty model, the logistic regression was used and it was found that all levels of education (primary, secondary and tertiary) are significant in reducing the probability of being poor of the households. The results show that male-headed households are less likely to be poor than female-headed households. In the welfare model, the mean per capita expenditure was used as dependent variable and educational variables found to be significant in increasing the per capita expenditure of the household.

Bundervoet (2006) conducts a study upon the household data of 1998-99 of Burundi. The results show that the incidence of poverty (headcount measure), poverty gap and poverty severity are worse for the female headed families as compared to male headed families, however, the worse off element decreases as the head's educational achievement increases. The binary logistic regression results show the poverty status of household using explanatory variables of household and community characteristics. At rural level higher educational level of the head of the household significantly reduces the likelihood of being poor. A literate mother in the household reduces the probability of being poor. The probability of poor rises up to the age of 42 of the head and then declines. The possible reason could be the accumulation of assets for old age.

Zuluaga (2007) conducts a study on the 31,745 households of Colombia to find the monetary and the non-monetary effects of education upon income poverty and human poverty, respectively. The results show that an additional year of schooling of the head of the household increases total income of the household by the amount of 14.1 percent. Female-headed household is more likely to have less income as compared to male-headed but a rise in income quintile (towards non-poor) diminishes such disadvantage. Residents of rural areas are significantly poorer than those in urban areas. The interesting finding is this that the effect of education is not same in affecting all income quintiles. The return of education is bigger for the lowest quintile and decreases as the quintile increases. This shows that people from the lowest quintiles benefit more from the skills through formal education. In other words poor persons benefit more from the education attainment. For the non-monetary effects of education upon human poverty the author considers housing and health. The results show that education improves health through modifying the behaviour and decisions of persons with respect to health. Housing conditions also improve with the increasing educational level because education improves its decisions and behaviour regarding housing and it can avail credit facility in a better way.

Abuka, *et al.* (2007) estimate the determinants of poverty in the case of Uganda using logistic regression technique and the data from *Uganda National Household Survey (UNHS)*. The results showed that an increase in the schooling of household heads not only has a positive impact on the productivity and earnings but also enhances the productivity of other members of the household. The household size and being in rural areas significantly increase the likelihood of being poor.

A further analysis of educational levels by Tilak (2007) has shown noteworthy results. He argued that it would be wrong to say that for growth, development and poverty reduction we should wait for the universalising of primary education rather we should work on the post-primary education because it has the same role as primary education. Primary education is the threshold of human capital but secondary and higher education, and investment in science and technology gives rise to acceleration and sustenance in economic growth and development. The coefficient of correlation in India suggests that illiteracy, literacy and primary education are positively related with the poverty ratios. While, on the other hand middle, secondary and higher education levels are negatively related with poverty.

The above mentioned studies consider education as a vital weapon against poverty but Dollar and Kraay (2002) argue that education doesn't have any substantial or measurable effect on the income of the poor except its effect upon the overall average growth. They conduct a macro level study based upon the data of 137 countries for the years 1950-99. They reported that income of poor raises one for one with average income (growth) but the primary education attainment has a very limited impact upon the income of the poor. They conclude that economic growth is a prominent factor in eliminating poverty and primary education completion is not so much important.

The similar conclusion was proposed by Tilak (2007) in studying the correlation coefficients between the poverty ratios of 1999-00 and percentage of population having different educational levels in 1995-96 in India. The results show that illiteracy, literacy and primary education are positively related with the poverty. Hence it casts doubt upon the role of primary education in poverty reduction.

Majeed (2010) shows the poverty reducing effect of human capital in the case of Pakistan using the data over the period 1970-2004. In a recent study, Majeed (2012) finds mixed evidence for the relationship of poverty and human capital using a sample of sixty five developing countries over the period 1970-2008.

Through analysing different studies we can see that it is necessary that we must know the determinants of poverty for an effective poverty reduction strategy. Rather than focusing on macro level and cross country analyses we have to go for the micro level research for the proper evaluation of the poverty determinants. Dealing with micro level data we are engaging in the ground realities and micro circumstances of any particular country. Micro level data approach is very much relevant for the poor developing countries whose main problems are widely prevalent at grass root levels while macro data based studies do not represent the effects of those problems in their data with aggregates or averages.

### 3. METHODOLOGY

This study evaluates the personal and household characteristics as determinants of poverty in Pakistan. We show that how the occurrence of any particular event will affect

the likelihood of the household being poor. For instance, in what proportion the acquisition of primary education will increase or decrease the likelihood of being poor with respect to 'no education'.

Education is the most important factor regarding poverty reduction. The attainment of education enhances the earning potential of individuals and consequently, the increased earnings help reduce the poverty. There are also non-pecuniary effects of education that are effective in other dimensions of poverty such as deprivation in decision making abilities, and awareness about the surrounding. Hence it is expected that education is negatively linked with the poverty status and higher levels of education are more effective in poverty reduction.

Experience can be taken as the improvement in expertise and skill enhancement, which have positive implications for poverty elimination. The 'feminisation of poverty' means women are much more deprived and facing severe hardships in pulling themselves out of poverty as compared to men therefore it is expected that being female-headed household will increase the likelihood of the household being poor. The age of the head of the household is going to be seen in non-linear relation. Generally, in the working age of the head of the household when one can accumulate human capital there are more chances to be non-poor as compared to the old age. However, in the opposite case it is said that until the old age (or after retirement) one can accumulate enough resources or assets to be non-poor in old age as compared to the working middle age.

A large portion of population in Pakistan is directly or indirectly linked with our traditional agriculture sector hence its important to find out that whether the agriculture employment status as compared to non-agriculture employment status of the household head is effective in reducing household poverty or not. Population is a resource but its huge size and high growth rate in developing countries appeared to be a problem due to low level of human capital. Hence usually family size is positively related with the poverty status of the household.

Remittance, whether domestic or foreign, is a source of income for the household and reduces household poverty. It is a widely prevalent idea that in Pakistan the incidence and severity of poverty is high in rural areas as compared to urban areas hence to verify such statement we have to see whether the rural location of the household is associated with being poor or not. In the same way we can analyse the provincial location of the household as well.

Having been provision of theoretical consistent arguments, we have developed this model with choice variables comprising of the personal characteristics of the head of the household and household characteristics. In this regard, education, experience, gender, age and employment status of the household head are considered as personal characteristics of the household while household size, provincial location, regional location and remittance receiving status are considered as the household characteristics.

$$POVERTY = f(EDU, GEN, AGE, EXP, EMP, HS, REM, REG, PRO)$$

Dichotomous dependent variable:  $Poor = 1, Non-poor = 0$

**Explanatory Variables: Personal Characteristics of the Household Head**

▪ **Education (EDU)**

Primary Education

Primary = 1, Otherwise = 0

Middle Education

Secondary = 1, Otherwise = 0

<i>Matric Education</i>	<i>Matric = 1, Otherwise = 0</i>
<i>Intermediate Education</i>	<i>Intermediate = 1, Otherwise = 0</i>
<i>Bachelors Education</i>	<i>Bachelors = 1, Otherwise = 0</i>
<i>Professional Education</i>	<i>Masters or above education=1, Otherwise=0</i>
<i>No Education</i>	<i>Reference Category</i>
▪ <i>Gender (GEN)</i>	<i>Male = 1, Female = 0</i>
▪ <i>Employment Status (EMP)</i>	<i>Agriculture = 1, Not agriculture = 0</i>
▪ <i>Experience (EXP)</i>	<i>Age-School starting age-Years of schooling</i>
▪ <i>AGE</i>	<i>Age, Age<sup>2</sup> (Square of Age)</i>
<b><i>Household Characteristics</i></b>	
▪ <i>Region (REG)</i>	<i>Urban = 1, Rural = 0</i>
▪ <i>Remittances (REM)</i>	<i>Remittance = 1, Not = 0</i>
▪ <i>Household Size (HS)</i>	<i>Number of individuals in family</i>
▪ <i>Province (PRO)</i>	
<i>Punjab</i>	<i>Punjab = 1, Otherwise = 0</i>
<i>Sindh</i>	<i>Sindh = 1, Otherwise = 0</i>
<i>KPK</i>	<i>KPK = 1, Otherwise = 0</i>
<i>Balochistan</i>	<i>Reference Category</i>

#### 4. DATA, CONSTRUCTION OF VARIABLES AND ECONOMETRIC TECHNIQUE

The data for this study is taken from Household Income and Expenditure Survey (HIES) 2001-02 which is conducted by the Federal Bureau of Statistics (FBS) of Pakistan. It's the available gigantic and meaningful source of information of its kind that has the household level information in Pakistan. The selected data used for this study covers the four provinces of Pakistan (Punjab, Sindh, Balochistan and KPK).

The very first thing is to clarify the criteria through which we classify the households into poor and non-poor. In other words we can say that how we assign value of one (poor) or zero (non-poor) to the dependent dichotomous variable. For this task, there are different approaches such as the basic needs approach or the calorie-based approach; but here we use the method of quartile. We make four quartile of households depending upon the monthly per adult household expenditure. The lowest quartile (25 percent) will have the households with the lowest monthly per adult household expenditures. The households in the lowest quartile are considered poor and consequently dependent variable takes value one for them whereas each household in other three quartiles take the value zero. The household expenditure variable is the monthly per adult expenditure of the household considering all the food and non-food items. To calculate the adult equivalents we make use of the official calories chart (2003) with respect to age, provided by the Government of Pakistan.

Table 1

*Construction of Explanatory Variables*

Categories	Variables	Explanation
<b>Education</b>	Primary	1= primary, 0= otherwise

(Dummy)	Middle Matric (Matriculation) Inter (Intermediate) Ba (Bachelors) Prof (Professional) No education (reference category)	Similarly, we make other education variables.
<b>Age</b>	Age Age <sup>2</sup>	Age Square of age
<b>Experience</b>	Exp	EXP = Age - years of schooling - school starting age
<b>Household Size</b>	Mem	Number of family members
<b>Employment Status</b> (Dummy)	Agri Non-agri. status (reference category)	1=agriculture status, 0=otherwise.
<b>Remittances</b> (Dummy)	Rem Without remit. (reference category)	1=remittance receiver, 0=not receiver.
<b>Gender</b> (Dummy)	Male Female (reference category)	1=male, 0=not male (female).
<b>Province</b> (Dummy)	Punjab Sindh KPK Balochistan (reference category)	1=Punjabi, 0=not Punjabi Similarly, we construct the Sindh and KPK variables.
<b>Region</b> (Dummy)	Urban Rural (reference category)	1=Urban, 0=otherwise (rural).

Considering the explanatory variables of our model the personal characteristic variables will be used for the head of the household. The educational variables are dummy variables and one of them will get the value one in response to the household head's highest educational attainment. It means the educational level of the household's head will either fall in primary, secondary, matriculation, intermediate, bachelors or professional (masters and above) category. Here 'no education' is used as reference category. Other variables include age, experience and employment status of the household's head. Here the employment status is characterised into two broad categories whether the status is related to the agriculture sector (owner cultivator, share cropper, contract cultivator, livestock) or non-agriculture sector (employer, self-employed, paid employee-reference category). The experience variable is attained through subtracting the years of schooling and school starting age from the age of a person. It is not the actual but the potential experience. The personal characteristics include male/female headed households where female headed will be the reference

category, household size\*, whether the household is remittance receiver or not where having no remittances is the reference category, regional variable with rural as the reference category and provincial location of the household with Balochistan as the reference category.

The dependency ratio also matters as a correlate of poverty, since our main focus has been to investigate the role of human capital for which we have introduced different categories. We followed a parsimonious approach in selecting other control variables and have chosen control variables which are closely related to poverty incidence.

This study takes the Logistic Regression Technique to identify some determinants of poverty in Pakistan at household level. The model is estimated using the information of the four provinces of Pakistan. The binary logistic regression is used to identify the effect of explanatory variables upon the probability of being poor of the household. The dependent variable is dichotomous in which the value 1 for the poor household and 0 for the non-poor household. The results will not be interpreted through the coefficients but we will use the odd ratios in logistic regression to see that the occurrence of any particular event will increase or decrease the probability being poor of household and with what proportion as compared to the reference category.

## 5. POVERTY ASSESSMENT: A DESCRIPTIVE ANALYSIS

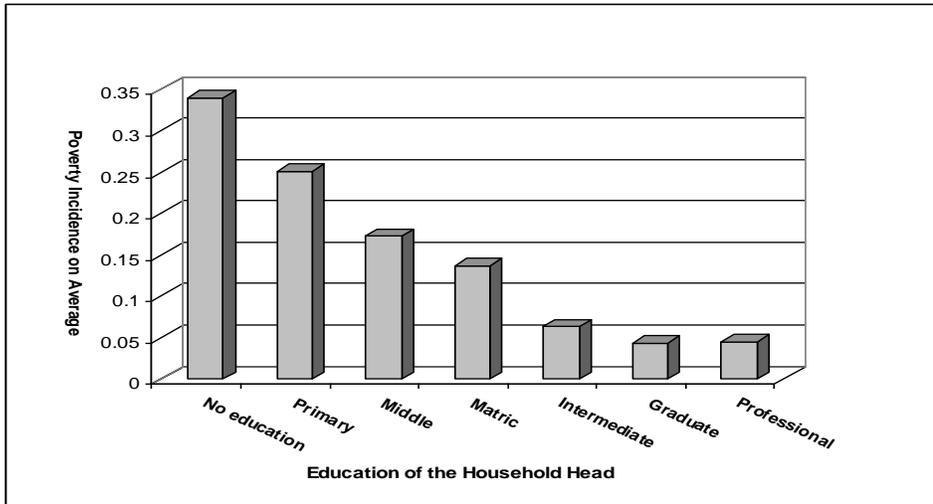
This study examines the personal characteristics and household characteristics as the determinants of poverty in Pakistan. Therefore it would be convenient to understand the results if we see the graphical representation of the poverty assessment in selected dimensions. The descriptive analysis is based upon the demonstration of average number of poor households in the particular dimensions. Hence the dimensions, which are going to be demonstrated, are the education, gender and regional location.

### 5.1. Poverty and Education

Investment in education is considered as the main source of human capital accumulation, which is the least developed sector of many developing countries including Pakistan. The acquisition of education helps an individual to overcome the multi-dimensional poverty prevalence and the education of the household head is also beneficial for other family members. Through education availability we can break the mutually reinforcing relationship between poverty and lack of education (education poverty). In Figure 1, we can see that as the educational level of the household head increases, on average the number of poor households declines. There is a consistent reduction in poverty from no education to the bachelor's level.

**Fig. 1. Education Dimension of Poverty**

\* Haughton and Khandker (2009) argue that household size is also an important correlate of poverty.

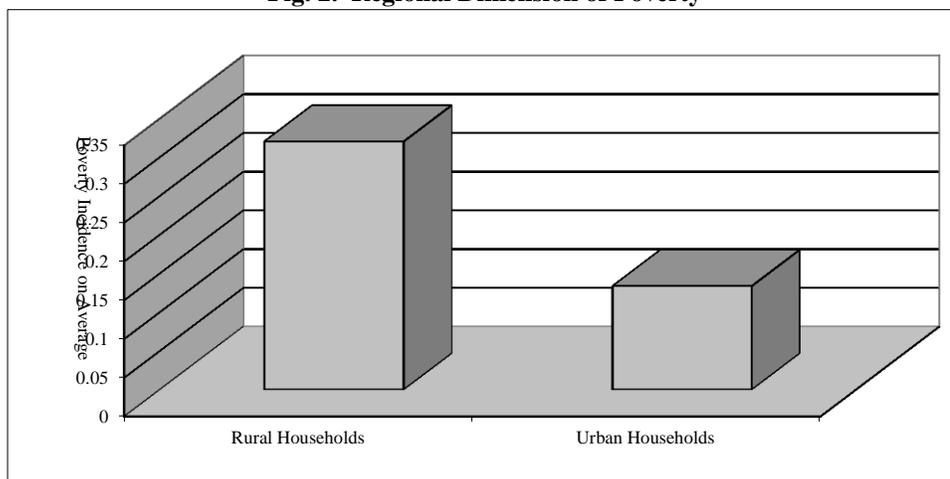


**5.2. Poverty and Regional Location**

Rural areas are much deprived as compared to the urban areas in Pakistan. One of the important reasons is the low productivity and consequently, the low incomes in the rural areas. Moreover, rural areas are much more vulnerable to natural calamities especially the floods and droughts. There is a huge gulf between the rural and urban areas in terms of facilities and opportunities that shows the biased government policies against rural areas. That’s why we observe the regional migration phenomenon especially for quality education and employment opportunities.

Incidence, depth and severity of poverty are high in rural areas as compared to urban areas in Pakistan [Jamal (2005)]. Our graphical demonstration of the data in Figure 2 shows that on average poor households are much more in rural areas as compared to urban areas.

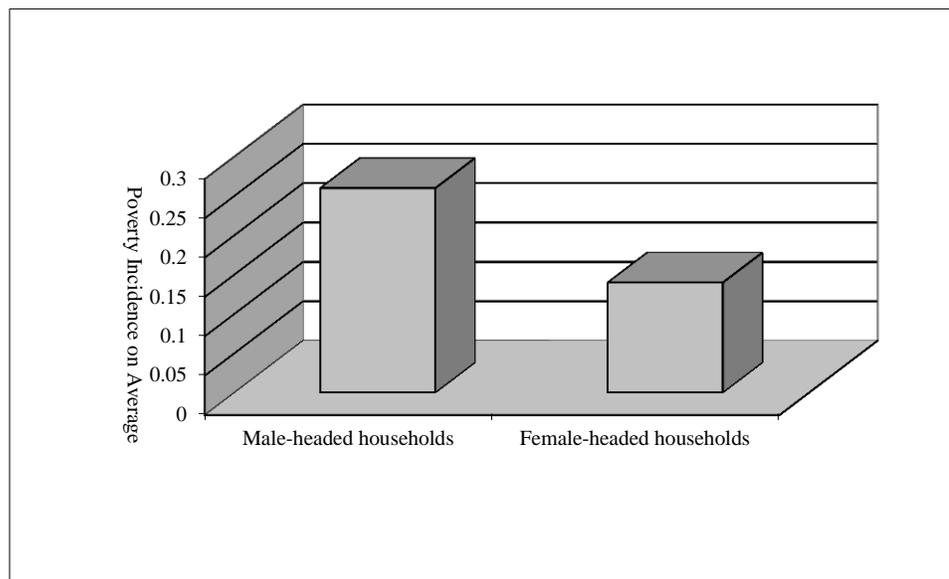
**Fig. 2. Regional Dimension of Poverty**



### 5.3. Poverty and Gender

It is generally perceived that our society is characterised with gender bias or gender discrimination. Women have unequal opportunities in education attainment and earnings as compared to men. Generally, female participation in society is low and it is observed that female-headed households face difficult circumstances to escape the poverty. The descriptive analysis in Figure 3 shows the surprising result that on average the poor female-headed households are small as compared to male-headed households. One reason behind this result could be the under-representation of female-headed households because there are cultural reasons to believe that many of the households that showed themselves male-headed are actually the female-headed households.

**Fig. 3. Gender Dimension of Poverty**



The graphical activity demonstrates the results about poverty incidence on average or aggregate basis. Cognizant of this descriptive analysis, now we are able to relate this information with our regression results to have a more vivid picture about the poverty determinants.

## 6. RESULTS

The logistic regression technique has been applied to evaluate the personal characteristics of the household's head and household characteristics as the determinants of household poverty in Pakistan. The personal characteristics include education, gender, age, employment status and experience. The household characteristics include regional location, provincial location, household size and remittances.

Table 2 reports the result for four provinces. The separate provincial and regional results are reported in the appendix. The Wald test is used to test the significance of coefficients and interpret the results using odd ratios. All the educational variables of the

household head are highly significant in reducing the probability being poor of the household. The primary, middle, matriculation, intermediate, bachelors and higher studies (professional category) education of the household head reduce the likelihood of the household being poor by 22 percent, 54 percent, 64 percent, 87 percent, 90 percent and 89 percent respectively as compared to the reference category of 'no education'.

It is noteworthy that the chances of escaping poverty of the household increase consistently as we increase the educational level of the household head. However, little improvement is observed beyond the attainment of intermediate education. All the educational variables in the separate provincial regressions provided in the appendix show that education is significantly and negatively related with the poverty status of the household except the primary education in Sindh, KPK and Balochistan. The same situation is with the middle and matric in Balochistan. However, all coefficients have negative signs as expected. Considering the separate regional regressions we observe that primary education of the head of the household is significant in reducing poverty in rural areas. In the rural areas primary education reduces the chances of poverty by 29 percent in comparison to the base category of no education. Moreover, all educational levels have shown that all levels are reducing the chances of poverty in greater proportion in urban areas as compared to the rural areas except the primary education.

Table 2

*Logistic Estimates of Poverty Determinants of Pakistan*

Variables	Coefficients	P-values	Odd Ratios
Age	.038	.000*	1.039
Age <sup>2</sup>	-.001	.000*	.999
Primary	-.243	.063***	.784
Middle	-.769	.000*	.463
Matric	-1.026	.000*	.358
Inter	-2.020	.000*	.133
Ba	-2.340	.000*	.096
Prof	-2.227	.000*	.108
Urban	-.906	.000*	.404
Male	.597	.000*	1.816
Punjab	.661	.000*	1.937
Sindh	.267	.000*	1.306
KPK	.647	.000*	1.909
Exp	-.009	.008***	.991
Mem	.196	.000*	1.216
Rem	-.554	.000*	.575
Agri	-.316	.000*	.729
Constant	-3.269	.000*	.038

\* denotes statistically significant at the 1 percent level.

\*\* denotes statistically significant at the 5 percent level.

\*\*\* denotes statistically significant at the 10 percent level.

If the employment status of the household head falls in the category of agriculture status (owner cultivator, share cropper, contract cultivator or livestock owner) then this reduces the probability of household being poor by 27 percent as compared to the base category of non-agriculture status. For age of the household head, we observed the positive sign for the variable age and the negative correlation is found between the poverty status of household and square of age. The age variable shows that as the age of the head increase by one year the chances of the household being poor will significantly increase by 3.9 percent. However the age-square variable shown negative sign which means in the older ages of the household head likelihood of the household being poor declines by 0.1 percent. Although the experience has a little effect but as the experience of the head of the household increases by one year then it reduces the chances of the household being poor by 0.9 percent.

The residence in urban areas was negatively associated with the poverty status. If the household is situated in the urban region then this reduces the likelihood of household being poor by 60 percent as compared to the reference category of rural areas. This result is significantly consistent in all separate provincial regressions given in the appendix. The male-headed household significantly increases the probability of that household to fall in poverty by 82 percent as compared to the female-headed household. The overall result's negative sign of the male-headed households also holds for the separate provincial and regional regressions. A household is more likely to be poor if it has a large number of members. If the family size increases by one person then it increases the probability of the household being poor by up to 22 percent. The same increase we observe for household size in the separate provincial and regional results. If the household is remittance receiver whether the remittances come from abroad or within the country then it decreases the probability of the household being poor by 43 percent than non-receiving households. In appendix the remittance effect in the separate urban and rural regressions reduces the chances of poor by 36 percent and 43 percent respectively. Considering the provincial location variables, being in Punjab, Sindh and KPK increases the chances of the household being poor by 94 percent, 31 percent and 91 percent respectively as compared with the base category of Balochistan. In appendix one additional determinant is evaluated considering the data of four provinces of Pakistan. The additional variable named as earners, which counts the number of earners per household that have any level of education. With the increase of one educated earner significantly reduces the probability of household being poor by 11 percent. However, almost all other results remain intact except the experience variable, which becomes insignificant.

## 7. CONCLUSION

The purpose of this study was to estimate the determinants of household poverty in Pakistan. The data used for this task is taken from the *Household Integrated Economic Survey (HIES 2001-02)* conducted by the Federal Bureau of Statistics. The determinants of poverty are explored using the logistic regression technique.

The main findings of our analysis can be concluded as follows: First, poverty is greatest among the less literate households and declines as education level increases—primary, middle, matriculation, intermediate, bachelors and higher studies. Therefore, educational attainment is a critical determinant of the incidence of poverty and should be

considered closely in implementing poverty alleviation programs. Second, the role of remittances appeared significant in reducing probability of being poor and this is more striking in rural areas. Third, the probability of being poor reduces in urban area implying that incidence and severity of poverty is more pronounced in rural areas.

Finally, the variables that are negatively related with the probability of being poor are: experience, age square and agriculture employment status. While the variables that are positively related with the probability of being poor are: household size, age of the household head, male-headed households and the provincial residence.

This analysis has certain limitations: First, it is a cross-sectional analysis using household survey data and it does not take into account time dynamics. Second, this study mainly focuses on the different levels of education and some selected control variables. Some control variables such as dependency ratio and training are missing. Future research can make a comparison of poverty determinants between different household surveys. In addition, research can be extended to incorporate more control variables. Similarly, a time series analysis can be conducted.

This analysis purposes following policy implications:

- There is a need to implement an appropriate policy measure in order to achieve the negative impact of education on poverty through increasing share of education expenditures at all levels.
- It is recommended that policy makers need to focus more on facilitating the remittances flows in rural areas through increasing financial access and reducing the costs associated with transfers of money.

**APPENDIX**

Table 3

*Separate Gender Level*

Gender	Explanatory Variables												
	Age	Age <sup>2</sup>	Primary	Middle	Matric	Inter	BA	Prof.	Urban	Exp.	Mem.	Rem.	Constant
<b>Male</b>													
Coefficient	.035	.000	-.299	-.727	-.980	-1.966	-2.387	-2.162	-.786	-.007	.181	-.329	-2.290
P-values	.000	.000	.087	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
Odd Ratios	1.036	1.000	.795	.484	.375	.140	.092	.115	.456	.993	1.199	.719	.101
<b>Female</b>													
Coefficient	.55	-.001	.146	-.133	-7.288	-7.203	-6.918	-7.194	-.850	-.028	.199	-.604	-2.228
P-values	.155	.075	.809	.841	.553	.709	.725	.780	.000	.156	.000	.002	.013
Odd Ratios	1.057	.999	1.157	.875	.001	.001	.001	.001	.427	.973	1.220	.546	.108

Table 4  
*Separate Provincial Level*

Province	Explanatory Variables														
	Age	Age <sup>2</sup>	Primary	Middle	Matric	Inter	BA	Prof.	Urban	Male	Exp.	Mem.	Rem.	Agri.	Constant
<b>Punjab</b>															
Coefficient	.040	-.001	-.328	-1.092	-1.556	-2.728	-2.526	-2.812	-.849	.865	-.005	.224	-.384	-.596	-2.931
P-values	.007	.000	.095	.000	.000	.000	.000	.000	.000	.000	.361	.000	.000	.000	.000
Odd Ratios	1.041	.999	.720	.336	.211	.065	.080	.060	.428	2.376	.995	1.251	.681	.551	.053
<b>Sindh</b>															
Coefficient	.007	.000	-.302	-.627	-.822	-1.594	-2.208	-2.459	-1.40	.238	-.007	.246	.150	-.051	-2.396
P-values	.692	.352	.225	.023	.001	.000	.000	.000	.000	.577	.300	.000	.722	.610	.000
Odd Ratios	1.007	1.000	.739	.534	.439	.203	.110	.085	.246	1.268	.993	1.279	1.161	.950	.091
<b>KPK</b>															
Coefficient	.73	-.001	-.246	-.432	-.725	-1.915	-1.963	-1.831	-.650	.350	-.013	.131	-.681	-.199	-3.066
P-values	.002	.000	.478	.187	.016	.000	.000	.001	.000	.053	.127	.000	.000	.095	.000
Odd Ratios	1.075	.999	.782	.649	.484	.147	.140	.160	.522	1.419	.987	1.140	.506	.820	.047
<b>Balochistan</b>															
Coefficient	.58	-.001	.166	.022	-.151	-1.137	-1.870	-1.384	-.778	.658	-.029	.171	-.370	-.255	-3.623
P-values	.030	.010	.683	.957	.642	.025	.001	.015	.000	.189	.010	.000	.286	.059	.000
Odd Ratios	1.060	.999	1.180	1.022	.859	.321	.154	.251	.459	1.932	.972	1.186	.690	.775	.027

Table 5  
*Separate Region Level*

Region	Explanatory Variables													
	Age	Age <sup>2</sup>	Primary	Middle	Matric	Inter	BA	Prof.	Urban	Exp.	Mem.	Rem.	Agri.	Constant
<b>Urban</b>														
Coefficient	.047	-.001	-.220	-.812	-1.107	-2.261	-2.555	-2.739	.528	-.009	.186	-.443		-2.679
P-values	.007	.000	.310	.000	.000	.000	.000	.000	.001	.113	.000	.000		.000
Odd Ratios	1.048	.999	.802	.444	.331	.104	.078	.065	1.696	.991	1.205	.642		.069
<b>Rural</b>														
Coefficient	.027	.000	-.340	-.647	-1.06	-2.211	-2.384	-1.763	.454	-.006	.186	-.552	-.288	-2.831
P-values	.019	.001	.037	.000	.000	.000	.000	.000	.001	.159	.000	.000	.000	.000
Odd Ratios	1.027	1.000	.712	.523	.345	.110	.092	.172	1.575	.994	1.204	.576	.750	.059

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### Comments

It is a nice effort to emphasise the importance of education in poverty but has serious issues which are to be addressed by the author. The issues are listed below:

- (i) Surprisingly the study presented in December 2015 is based on data of 2001-02. After 2001-02, five data sets of HIES are released by FBS and a lot research is carried out with new available data sets, then what is the significance of analysis based on 14 years old data.
- (ii) Employment status is taken as Agriculture and non-agriculture. This is industry rather than employment status. Moreover the study is based on rural as well as urban areas of Pakistan. As per HIES used in present study only 6.46 percent earners from urban areas are employed in agriculture. So this classification makes no sense for employed persons of urban areas.
- (iii) One of the explanatory variables is Household size. It is measured by household members. In poverty analysis absolute number is not important; it is rather age and gender composition which is important. Moreover in poverty analysis merely household size does not matter, it is dependency ratio that matters.
- (iv) The household belonging to lowest quintile are considered as poor. (it 5th quintile (not 4<sup>th</sup>) means lowest 20 percent households ). It means around 20 percent households are considered as poor, which is vague, as all studies reported that for 2001-02 around 35 percent population was below poverty line.
- (v) On page 13 “If employment status falls in agriculture then it reduces the probability of being poor by 27 percent as compare to base category of non-agriculture”.
- (vi) This result does not match with the published data of HIES for 2001-02. As per data average monthly income in Agriculture is 2062 and for non-agriculture it is 3303. Moreover it is less than all other industries. Almost same is true for all quintiles
- (vii) As per data 62.25 percent earners in rural areas belongs to agriculture that why poverty is more intensive in rural areas, On the other hand only 6.46 percent earners from urban areas are engaged in agriculture. What does these results indicates for urban people.
- (viii) Taking the variables of age and experience of head at the same time makes no sense, as experience is down scaling of age, i.e., age minus four or five. AND surprisingly both variables have different signs.
- (ix) Households are categorised in two groups as receivers of remittances or non-receivers. This is too broader classification, as volume of remittances do matter. Secondly the micro analysis of data shows that overwhelming majority of household belonging to top quintile are not receivers of remittances.
- (x) The results on one side show that education of head has negative impact on poverty, on the other side households with agriculture industry are better off. These findings are again contradicting as mostly educated people are engaged in non-agri industry.

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## Determinants of Urban Poverty: The Case of Medium Sized City in Pakistan

NASIR IQBAL and MASOOD SARWAR AWAN

### 1. INTRODUCTION

The process of urbanisation has dual impact on the development process of an economy. Initially, it encourages the workers to switch from low productive sector i.e. agriculture to high productive sectors like services and manufacturing [Becker, *et al.* (1994)]. Subsequently, it generates formidable problems for residents by depriving them of access to essential basic needs [Egziabher (2000)]. It is also observed that the poor try to urbanise faster as compared to the whole population [Ravallion (2007)] and this urbanisation process leads toward the emergence of urban poverty. Urban poverty is distinct from the rural poverty with respect to its incidence, economic, demographic and political aspects. The urban poverty can be controlled by developing the clear understanding of its nature, magnitude and intensity.

It is estimated that the urban population of Pakistan is 35 percent of the total population and its annual average growth rate is 3.4 percent (1990-2005) which is much higher as compared to South Asia's figure of 2.8 percent in the same period [World Bank (2007)]. Such expansion of urbanisation formulates a daunting task of peering at the issues of urban poverty. In Pakistan, the phenomenon of poverty is moving like a business cycle. It was high in 1960s and came down in 1980s, but again moved upward in 1990s before falling rapidly after 2000. Urban poverty fell from 22.7 percent in 2000-01 to 13.1 percent in 2005-06 [Pakistan (2008)]. This rapid fall of urban poverty is linked with strong economic growth, rise in per capita income, large inflow of remittances, and better economic and social policies of last government [Chaudhry, *et al.* (2006)]. Recently, high inflation eroded the gain made in poverty reduction by pushing people clustered close to the poverty line to the below the poverty line [Anwar (2008)].

Given the changing level of poverty and emergence of new forms of urban poverty, it is necessary to examine urban poverty especially at city level. City Level Poverty Assessment (CLPA) is tool for acquiring up-to-date information on a city's poverty and its social development. Poverty profile at city level will provide a snapshot about who is poor, where they live in the city, their access to services, their living standards and so forth, thereby contributing to the effective targeting of poverty by policy measures. Keeping this in view, the objective of this paper is to estimate the poverty level and its determinants at city level.

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The sample city, chosen in this study to analyse the urban poverty and its determinants is 'Sargodha' which is 10th largest city of Pakistan. The estimated population of the city was 0.57 million in 2007 where 0.464 million people resided in municipal jurisdiction and almost 0.106 million dwelt in cantonment area [Punjab (2007)]. Sargodha city is the central hub of the district's agriculture and industrial activities. The major crops of this area are wheat, rice, sugarcane and citrus. Moreover, the district has gained immense fame in citrus production especially the oranges (kinnows) of Sargodha which have earned worldwide praise in taste. Hosiery, Textiles, Chemicals and Soap are major manufactures of this area. Sargodha has grown at a very rapid rate and become a major urbanised area in Punjab. It is the industrial, commercial, financial and service centre of the country. In recent years, the urban infrastructure has become overburdened and the city has been subjected to considerable urban strife. Keeping the importance of the city in view, it becomes essential to conduct a detail study on poverty.

The rest of paper is organised as follow: review of literature is presented in Section 2 and socio-economic characteristics of the city followed by this section. Section 4 and 5 consists on methodology and poverty profile of the city respectively. Section 6 explains the determinants of the poverty and last section concludes the paper and tries to present some piece of policy recommendations.

## 2. REVIEW OF LITERATURE

Poverty is a multidimensional phenomenon. Generally, concept of absolute poverty is used to measure the poverty. Absolute poverty is based on defining minimum calorie intake for food need and minimum non-food allowance for human need required for physical functioning and daily activities and this approach requires assessment of a minimum amount necessary to meet each of these needs [Anwar (2006)]. For this purpose, the most prominent approach used in Pakistan is calorie-based approach [Naseem (1977); Irfan and Amjad (1984); Cheema and Malik (1984); Malik (1988)]. In this approach, the poverty line is set as the average food expenditure of those households who consume in the region of the minimum required calorific intake. Ercelawn (1990) used calorie consumption function to derive expected total expenditure of those households who consume minimum required calorific intake. This method derives expected expenditure for potential (2550) calorific intake [Sherazi (1993)]. Subsequently, this method was modified by adjusting for non-food expenditures [Jafari and Khattak (1995); Ali (1995); Amjad and Kemal (1997)]. These studies used 2550 calories per day per adult as the calorific cut-off point for estimation of absolute poverty. This calorie norm was recommended by Pakistan Planning Commission (1985) and supplemented by recommendations of FAO/WHO. The nutrition cell of Planning Commission, Government of Pakistan reduced the calorie cut-off point for Pakistan to 2150 calories per person per day per adult in 2002 but revised this threshold level to 2350 calories per adult equivalent per day in July 2002 [Anwar (2006)]. Recently, there are number of studies conducted in Pakistan by different institutions and authors to examine the true picture of poverty in Pakistan. These studies used 2350 calories per adult equivalent per day as threshold point by including food and non-food items for measuring absolute poverty [World Bank (2006); Anwar and Qureshi (2003); Anwar, *et al.* (2004); Anwar (2006); Jamal (2005); Jamal (2007) and Planning Commission and CRPRID (2006)].

Natural population growth, rural to urban migration and the reclassification of rural to urban areas works as deeper determinants of urban poverty. It is estimated that rural to urban migration and reclassification of areas are responsible of 40 to 50 percent of urban population growth [UN (2005)]. Role of informal sector could not be ignored in explaining the phenomenon of urban poverty. Informal sector absorbs a large part of gigantic population of developing countries. Hence informal sector, a dominant part of urban areas, assimilates a lot of workers which are constantly becoming the part of urban population due to rising urban population, rural-urban migration and reclassification of areas. Over the year, absorption of labour force in informal sector of the economy increases from 60.2 percent (1999-00) of the total labour force to 66.1 percent in 2006-07 in urban areas of Pakistan [Pakistan (2008)]. The poor section of the urban population can be divided into the 'working poor' category and 'unemployed poor' category whereas the informal sector is dominated by the working poor category but at the same time the destitution of unemployed cannot be ignored [Manda and Odhiambo (2003)].

Poverty dynamics are closely linked with demographic characteristics of the household especially family size, dependency ration, sex of the head of the household, age composition and literacy of the head of the household. Household size is prime demographic factor and it is generally positively related with the poverty status [Qureshi and Arif (2001); Chaudhry (2009)]. Large family size is likely to put extra burden on a household's assets and resource [McKay and Lawson (2002)]. Education of household head is the significant determinant of household poverty [Qureshi and Arif (2001)] and the literate head of household reduces the probability of being poor [Chaudhry (2009)]. Jamal (2005) showed that in urban areas dependency ratio is also positively related with the poverty status of the household.

Human capital acts as fundamental determinant in enhancing the income level and hence in poverty reduction. Pakistan has owned the poverty reduction strategy paper in which one of the main pillars of poverty reduction is human capital. Without human capital formulation, the goal of development or poverty elimination is inevitable. Human capital accumulation is largely based upon education and skills attainment. Nasir and Nazli (2000) found that monthly earnings of an individual worker increased by 7.3 percent with an additional year of schooling. Earnings will be increased by 37 percent with the attainment of ten years of schooling against no education. They also found that quality of schooling has significant effect upon earnings where quality is here defined as schooling at private schools. Hence education can increase the earnings potential of the poor. Thus investment in human capital of the poor in the form of additional schooling can make them productive. Siddiqui (2001) concluded that improvement in human capital formation can be important in increasing women's economic involvement and a reduction in gender based poverty. Jamal (2005) showed that in urban areas the education of the head of the household is negatively related with poverty. Haq (2005) found that poor persons of Pakistan have low level of human capital and education clearly reduces the probability of being poor because the role of education is important in the labour market as those with higher education are more likely to get employment and have higher wages. Wages and productivity in non-farm activities rise with education at an increasing rate as education rises [Kurosaki and Khan (2006)].

Provision of public services in the vicinity of the household is also critical in determining the status of the household. Haq (2005) found that the human poverty indicators, like housing, health, drinking water, sanitation facilities and garbage collection system, are in deplorable conditions in poor areas of city. Poor persons have low standard of housing, majority suffered from chronic diseases, mostly use the open well as a source of water, open drain system is prevalent in poor persons and almost no garbage collection system is present for the community. Arif and Iqbal (2009) found that access to electricity and provision of education facilities for girls and health facilities in the public sector play an important role in explaining the differences in poverty levels. Investing more in provision of education and health services is thus key to an increase in overall income of the population and hence to reduce the poverty.

These studies clearly depict the multidimensional nature of poverty and only knowledge about the absolute number is not sufficient to design the effective poverty reduction strategy. Rather than focusing on national and regional level poverty estimate, there is needed to conduct detail study at city level to acquire the true picture of poor people. To fulfil this gap in literature, this study explores these factors at medium sized city in Pakistan such as Sargodha.

### 3. SOCIO-ECONOMIC CHARACTERISTICS OF CITY

In this section the descriptive analysis of the socio-economic characteristics of Sargodha city is presented. This profile is based on survey conducted for this study.

#### Education

Education is an important component of human capital and it is very much effective in poverty reduction. Analysis shows that 14.2 percent individuals never attended educational institutions whereas 55 percent availed the education facility in past and 30.8 percent are presently enrolled in educational institutions. Regarding the absorption of educational institutions we have seen that out of the total students who were enrolled or presently studying 73.4 percent are students of government institutions and 25.2 percent are students of private institutions (Table 1). It shows that in city, public sector is still providing the educational facility to many students.

Table 1

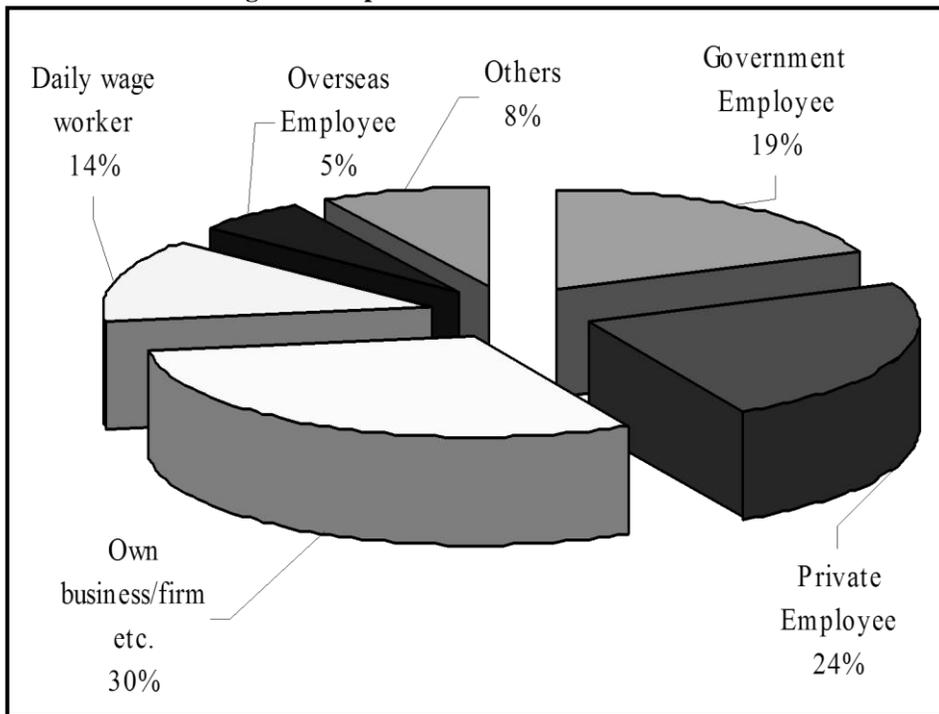
<i>Type of Education Facility Availed</i>	
Type	Percent
Government (Public)	73.4
Private	25.2
<i>Deeni Madaris</i>	0.6
NGO, Foundation	0.3
Elementary Educational School*	0.1
Others	0.4

*Source:* Computed from the survey of 'Assessment of Poverty in Sargodha City'. \* Major certificates and degrees of these schools include: PTC, CT, B.Ed and M.Ed.

**Occupational Status with Sectoral Composition**

The occupation status shows that 18.6 percent of total individuals are employed in government category. In this category people employed in government departments/institutions and semi-government institutions are included and 23.4 percent are working in private corporate sector. Analysis also indicate that the largest occupation is own business/firm category (30.5 percent). The workers who are getting salaries on daily wages are 13.7 percent and 5.2 percent are overseas Pakistanis. Those whose income is based on pension are only 1.8 percent. The individuals in house-job are 0.6 percent and 0.9 percent are searching jobs in labour market, while only 0.5 percent is not eligible to be employed (Figure 1).

**Fig. 1. Occupational Status of the Household**



Source: Computed from the survey of 'Assessment of Poverty in Sargodha City'.

Sectoral composition indicates that 5.1 percent people are working in agriculture sector, which is very low because sample only covers the city region of Sargodha. 2.2 percent fall in the category of mining and quarrying and 6.2 percent are working in manufacturing sector while 6.7 percent in construction related activities. Analysis also shows that 2.2 percent are involved in the distribution of services such as gas and electricity, 3.0 percent are engaged in storage and communication sector and 15.8 percent are in wholesale and retail trade. Persons in finance and insurance, ownership of dwellings and public administration and defense are 6.4 percent, 0.9 percent and 5.0 percent respectively. Social service is the second highest sector having 21.0 percent of working people (Table 2).

Table 2

*Sectoral Composition of Labour Force*

Sectors	Percent
Agriculture	5.1
Mining and Quarrying	2.2
Manufacturing	6.2
Construction	6.7
Electricity and Gas Distribution	2.2
Transport, Storage and Communication	3.0
Wholesale and Retail Trade	15.8
Finance and Insurance	6.4
Ownership of Dwellings	0.9
Public Administration and Defense	5.0
Social Services	21.0
Others	25.6

*Source:* Computed from the survey of 'Assessment of Poverty in Sargodha City'.

**Dwelling Types and Status**

Analysis shows that out of the total dwelling 93.6 percent houses are independent houses and only 0.9 percent is apartment or flat. This low figure is correct in the sense that in Sargodha city there is no such flat-culture and most of the people have independent houses. Result indicates that 5.5 percent dwell in a facility which is part of the large unit and 87.9 percent houses are occupied by the owners. Only 3.9 percent are in the category of owner occupied (self-hired). The houses on rent, subsidised rent and free of rent are 7.0 percent, 0.9 percent and 0.3 percent respectively. Most of the houses have three rooms (24.5 percent of the total houses). Houses with two rooms are 16.4 percent and residences with four and five rooms are 14.5 percent each (Table 3). It is seen that houses with one room and with above six rooms are in low proportion.

Table 3

*Presence of Number of Rooms in a House*

No. of Rooms	Percent	No. of Rooms	Percent
1	5.2	8	3.6
2	16.4	9	1.2
3	24.5	10	0.6
4	14.5	11	0.3
5	14.5	12	0.6
6	11.2	14	0.6
7	6.4	15	0.3

*Source:* Computed from the survey of 'Assessment of Poverty in Sargodha City'.

### Provision of Public Amenities

As the area of analysis is urban region therefore regarding the provision of basic infrastructure services such as electricity, gas, telephone and sewerage, it is expected that urban dwellers are enjoying better facilities. Result shows that almost 99.7 percent houses have electricity connections and only 0.3 percent is deprived of this service while 82.6 percent houses have gas connections and 17.4 percent are without it. Regarding land-line facility, it is noted that 58.2 percent houses have the land-line phone service against 41.8 percent who are without it. It is also a noticeable fact that recent boom in cellular mobile companies effected the monopoly of government land-line phone service. Water supply facility is availed by 85.8 percent of the total community and 95.1 percent houses have the sewerage system and only 4.9 percent are deprived of it (Table 4). It is observed that 89.1 percent houses connected with underground drains, 4.2 percent with just covered drains, 6.1 percent with open drains and 0.6 percent have no such system. 91.8 percent houses have flush connected to public sewerage, 5.2 percent houses have flush connected to pit and only 3.0 percent houses with flush connected to open drain.

Table 4

#### *Houses with Availability of Infrastructure (Percent)*

Services	With Service	Without Service
Electricity	99.7	0.3
Gas	82.6	17.4
Telephone	58.2	41.8
Water	85.8	14.2
Sewerage	95.1	4.9

*Source:* Computed from the survey of 'Assessment of Poverty in Sargodha City'.

For drinking water, 56.7 percent houses rely upon motorised pumping/tube-well, 27.6 percent use piped water in their houses, 11.8 percent use hand pump and only 3.9 percent use other sources of water for drinking purposes. It is also observed that 85.3 percent houses have water in tap for 24 hours. From this figure we cannot conclude that water facility of municipal administration is efficient because large number of houses depend upon motorised pumping to use under ground water. We have observe low figure for less than 24 hours and only 5.2 percent houses have less than one hour water available in their taps. Water charges are very negligible in country and also paid by very less proportion that use this facility. Only 33.6 percent of the total houses pay for water supply and 66.4 percent do not.

## 4. DATA AND METHODOLOGY

### Data Source and Data Collection Procedure

Poverty analysis is generally based upon primary data at household level. For this study, primary data are collected under the joint survey 'Assessment of Poverty in Sargodha City' by the Pakistan Institute of Development Economics (PIDE) Islamabad

and the University of Sargodha (UOS) Sargodha in May 2008. Sargodha city is mainly divided into 22 union councils. The information is taken through randomly selecting 11 union councils and then interviewed 30 households at random in each selected union council. For selecting union councils and household, we used the information provided by Federal Bureau of Statistics. This activity provides the detailed information of 330 households in the city on major components required for poverty estimation, including roster of the household, income of the household, expenditure of household on food items, fuel and utilities, housing, frequent non-food expenses and other non-food expenses like clothes, footwear, education, and health related expenses.<sup>1</sup> It also contains information on socio-economic indicator of the household.

### **Definition of Poverty Line**

Poverty estimates are measured by using three different poverty lines. First; official poverty line, estimated by the Planning Commission of Pakistan is used. By using the Pakistan Integrated Household Survey (PIHS) 1998-99 data, the Planning Commission estimated absolute poverty line as Rs 673.5 per month per adult equivalent. This poverty line is adjusted by consumer price index (CPI) to get the adjusted poverty line for 2008. The Commission has already adjusted the poverty line for the 2000-01, 2004-05 and 2005-06 periods using the Consumer Price Index (CPI). In 2004-05, the official poverty line was Rs 878.64 per month per adult equivalent and in 2005-06 the inflation adjusted official poverty line was Rs 944.5 per month per adult equivalent [Pakistan (2008)]. Adjusted official poverty line, for 2007-08, used in this study is Rs 1140 per month per adult equivalent. Anwar (2006) estimated poverty line by using latest PSLM data for 2004-05 and applying 2350 calories per adult equivalent per day as a cut-off point. Poverty line based new estimate was Rs 933 per month per adult equivalent for 2004-05. Adjusted poverty line is Rs 1211 per month per adult equivalent for 2007-08. This poverty line also validates the findings of World Bank (2006) about head count ratio in Pakistan. To make these two poverty lines compatible with urban areas, these lines were adjusted by rural urban food price differentials. The focus of this study is to investigate the poverty in urban area, so to strengthen the result and make them more suitable for urban area, this study also used urban specific poverty line to get clearer picture of the poverty. Qureshi and Arif used the Food Energy Intake (FEI) method to compute separate poverty lines for both rural and urban areas. The cost of food component of this basket was equal to the food poverty line determined by estimating the cost of food consistent with a calorie intake of 2550 per adult equivalent per day for rural areas and 2295 calories per adult equivalent for urban areas. They used 'Pakistan Socio-economic Survey' (PSES) 1998-99 data for estimation of urban poverty line. The estimated urban poverty line was Rs 874.1 per month per adult equivalent for 1998-99 [Qureshi and Arif (2001)]. The adjusted urban poverty line is Rs 1476 per month per adult equivalent<sup>2</sup> for 2007-08.

<sup>1</sup>Although sample size was small due to resource limitation, yet an utmost effort was made in sample selection process to make the sample highly representative by using expert opinion and guidance from Bureau of Statistics Sargodha.

<sup>2</sup>While adjusting household consumption expenditure in order to get per adult equivalent expenditure, this study has used an equivalent scale that gives a weight of 0.8 to individuals younger than 15 years and 1 for all other individuals.

### Measures of Poverty

By using these poverty lines based on the total expenditure necessary for an acceptable standard of living considering 2350 calories of the food items provided by the government of Pakistan, we estimate the three important indicator of poverty:

*Head Count Ratio:* This estimate of poverty is worked out by counting the persons below an exogenously defined cut-off level of consumption expenditure, known as the poverty line from the distribution of persons obtained from the consumer expenditure modules of survey of the PIDE/UOS. The ratio between the person below the poverty line and the total number of individual in the sample is called Head Count Ratio (HCR). Mathematically it is defined as:

$$HCR = \frac{H}{N}$$

*HCR* = Head Count Ratio

*H* = Number of person below the given poverty line

*N* = Total number of persons in the sample

*Poverty Gap:* This indicates the aggregate poverty depth of the poor relative to the poverty line. This is a good indication of the depth of poverty in that it depends on the distance of the poor below poverty line i.e., the average consumption gap between the actual expenditure of the poor and the poverty line. Potential for eliminating poverty by targeting transfer to the poor is another implication of this indicator [Ravallion (1992)]. Poverty gap also represents the total amount of income necessary to raise every one, who is below the poverty line up to that line. Estimating Procedure for this indicator as follow:

$$P = \frac{1}{n} \sum_{i=1}^n \left[ \frac{Z - Y_i}{Z} \right]$$

Where

*P* = Poverty Gap (Distance of the poor below the poverty line).

*Z* = Poverty line determining expenditure

*Y<sub>i</sub>* = Consumption Expenditure of the *i*th poor household

*Severity of Poverty:* It is Foster-Greer-Thorbecke *P<sub>2</sub>* measure representing severity of poverty. For this the poverty gaps of the poor are weighted by those poverty gaps in assessing aggregate poverty. This also shows variance in the poverty gap. It is estimated as:

$$P_2 = \frac{1}{n} \sum_{i=1}^n \left[ \frac{Z - Y_i}{Z} \right]^2$$

Where

*P<sub>2</sub>* = Severity of poverty

*Z* = Poverty line determining expenditure

*Y<sub>i</sub>* = Consumption Expenditure of the *i*th poor household.

## 5. POVERTY PROFILE OF THE MEDIUM SIZED CITY

### Extent, Gap and Severity of Poverty

To measure the extent of poverty i.e. poverty ratio or head count ratio, three different poverty lines are used. The result shows that the head count ratio in Sargodha city is 14.3 percent by using official poverty line, 15.9 percent by using poverty line given by Anwar (2006) and 21.0 percent by applying urban specific poverty line calculated by Qureshi and Arif (2001). Poverty gap and severity of poverty are aggregate measures of 'spread' of the poor below the poverty line i.e. they aggregate the distance of all poor individuals from the poverty line. Analysis shows that poverty gap is sufficiently large (4.4 percent) in 2008 as compared to the poverty gap (2.1 percent) measured in 2005-06 for urban area of Pakistan [Pakistan (2008)]. As the alleviation of poverty is the individual household phenomenon, the income distribution pattern and individual household poverty gap would lead towards the actual increase in income needed for the household to be out of the poverty trap. A lower value indicates that most of the poor are bunched around the poverty line. Higher value of poverty gap indicates bad condition of the poor. The severity of the poverty is shown by the squared of the poverty gap. So more the poverty gap, the more would be the severity of the poverty. Severity of the poverty for Sargodha city is 2.6 percent by using official poverty line, 2.8 percent by applying Anwar (2006) definition of poverty and 3.3 percent by using Qureshi and Arif (2001) estimated poverty line (Table 5).

Table 5

*Extent of Poverty, Poverty Gap and Severity of Poverty (Percent)*

Indicators	Poverty Line		
	Official	Anwar (2006)	Qureshi and Arif (2001)
Head Count Ratio	14.3	15.9	21.0
Poverty Gap	4.4	5.2	6.0
Severity of Poverty	2.6	2.8	3.3

*Source:* Computed from the survey of 'Assessment of Poverty in Sargodha City'.

### Poverty Dynamics in Sargodha City

#### *Poverty by Demographic Characteristics of Household*

Various characteristics of the household have direct or indirect bearings on the income generating activities or consumption pattern of the households. These economic aspects of the individual household determine the living standard of the household by which the poverty status has been measured. The first demographic characteristic is the age composition of the head of the household. Analysis indicates that poverty level reduces with the increase of age of the head of the household. Lowest incidence of poverty is found among the age group of 61 and above (Table 6). These households probably had some assets, more experience and relatively more earners, so less poverty in the household. The second demographic characteristic is family size. Household size is

positively related with the incidence of poverty. Large household were more likely to be poor than small household because larger households probably had more young children, that encounter financial burden due to high cost of living, education, health and other social as well as societal activities and vice versa. The incidence of poverty for the largest households (9 + members) were more than three times the incidence of poverty for the smallest group (1-4 members). This gave the direct implication of family size and incidence of poverty so family size is positively related with existence of poverty. Migration status also plays vital role in moving household out of poverty because migration provides better opportunities to get more and more resources. Incidence of poverty was lower among those heads of households who moved in the past to their current place of residence (Table 6).

Table 6

*Decomposition of Poverty by Demographic Characteristics (Percent)*

Household Characteristics	% Share	Poverty Line		
		Official	Anwar (2006)	Qureshi and Arif (2001)
<b>Age (Head of Household)</b>				
14-40	22.4	15.9	18.7	22.7
41-60	61.3	15.8	16.5	22.2
61 and above	16.3	6.9	10.1	13.8
<b>Sex (Head of the Household)</b>				
Male	93.5	14.2	15.6	20.0
Female	6.5	16.4	20.0	21.1
<b>Household Size</b>				
1-4 Members	9.8	7.1	7.1	8.5
5-6 Members	32.9	7.4	8.2	11.2
7-8 Members	28.4	14.5	17.1	20.7
9 and above Members	29.0	24.4	26.3	36.7
<b>Migration</b>				
Non-migrant	79.2	16.8	18.7	24.4
Migrant	20.8	4.9	4.9	8.2

Source: Computed from the survey of 'Assessment of Poverty in Sargodha City'.

**Poverty among Occupational Groups**

In order to have an idea about the living status of persons engaged in different occupations, the incidence of poverty has been calculated for major occupation groups. Results show that incidence of poverty is highest among the daily wage worker and lowest among the government employees (Table 7). This indicates that secure job and proper flow of income has direct implication for poverty status. People are more secure in government sector, so they are less poor, while people working on daily basis are not secure with their earnings. People with secure job have more capacity to absorb economic shocks.

Table 7

*Poverty among Occupational Group (Percent)*

Occupation	% Share	Poverty Line		
		Official	Anwar (2006)	Qureshi and Arif (2001)
Government Employees	18.9	3.3	3.4	5.7
Private Employees	23.8	11.0	11.0	13.6
Own Business/ Firms etc.	31.0	7.5	9.0	11.5
Daily Wage Workers	13.9	30.0	33.3	45.6
Overseas Employees	5.3	8.8	8.2	8.8
Pensioners	1.9	8.3	8.3	25.0
Others	5.2	20.9	20.9	20.9

Source: Computed from the survey of 'Assessment of Poverty in Sargodha City'.

**Poverty among Sectoral Groups**

Sectoral composition indicates that incidence of poverty is more likely in construction sector (Table 8). In urban areas, the informal sector particularly construction sector, most of labours work on daily wage basis. Informal sector create uncertainty and increase the chances of unemployment in the economy. In this sector, there is no proper flow of income for the household. This probably increase the chances that individual is most likely to be poor if works in this sector i.e., construction sector. Another important finding is that poverty in those household works in public sector is negligible, this indicate that public sector is more reliable to reduced poverty.

Table 8

*Poverty among Sectoral Group (Percent)*

Sectors	% Share	Poverty Line		
		Official	Anwar (2006)	Qureshi and Arif (2001)
Agriculture	5.1	9.1	9.1	9.1
Manufacturing	6.2	7.5	10.0	15.0
Construction	6.7	27.9	32.6	37.2
Electricity and Gas Distribution	2.2	7.1	7.1	7.1
Transport, Storage and Communication	3.0	15.8	15.8	21.0
Wholesale and Retail Trade	15.9	10.8	12.8	16.7
Finance and Insurance	6.4	0.0	0.0	2.4
Public Administration and Defense	5.0	0.0	0.0	3.1
Social Services	21.0	5.9	5.9	10.4
Other	34.0	18.7	19.2	23.1

Source: Computed from the survey of 'Assessment of Poverty in Sargodha City'.

### Poverty by Access to Amenities

Distributional implications of the household's indoor amenities affect not only the quality of life of the households but also have direct bearings on the economic activities of the labour force of the households. It is argued that households having access to amenities are likely to be less poor compared to those without such provisions. Table 9 shows that only very few household are without electricity (0.3 percent only). So electricity in term of poverty of the household did not contribute much because almost all household has the facility of electricity in their house. In city 82.6 percent of the sample household have gas connection while the remaining 17.4 percent were managing fuels by some alternative sources. The incidence of poverty was 14.2 percent among the households having gas connection and 14.9 percent in the households having no gas. So the poverty incidence was relatively higher in the households having no access to this utility when compared with households having gas connection in their vicinity.

Table 9

#### *Decomposition of Poverty across Availability of Amenities (Percent)*

Amenities	% Share	Poverty Line		
		Official	Anwar (2006)	Qureshi and Arif (2001)
<b>Electricity</b>				
Yes	99.7	14.3	15.9	21.0
No	0.3	0.0	0.0	0.0
<b>Gas</b>				
Yes	82.6	14.2	15.6	19.2
No	17.4	14.9	17.0	29.8
<b>Telephone</b>				
Yes	58.2	5.2	6.1	7.3
No	41.8	27.1	29.4	40.2
<b>Water Supply</b>				
Yes	85.8	2.9	4.2	8.5
No	14.2	18.9	20.5	26.0
<b>Sewerage</b>				
Yes	95.1	12.5	14.1	18.5
No	4.9	47.1	47.0	65.8

*Source:* Computed from the survey of 'Assessment of Poverty in Sargodha City'.

In case of telephone facility in the households, only 58.2 percent availing this facility and remaining 41.8 percent don not have this facility. The incidence of poverty was more in the household having no connections of telephone as compared with households having connection (Table 9). Moreover, the fast growing mobile phone industry has solved the communication problem and people prefer mobile connection rather than fixed-line connection. In case of piped water supply, 85.2 percent households availing this facility while only 14.8 percent deprived from it. Poverty level was high in those households where this facility is not available and less in those having this facility. Availability of sewerage facility has the similar pattern with poverty.

## 6. DETERMINANTS OF POVERTY

Poverty is a multi-dimensional phenomenon, so varieties of factor determine the nature and direction of poverty. These factors could be economic, social or political. Identification of these factors helps us to formulate policy to combat poverty. To measure the effect of these factors, binomial logistic regression model is used in which the dependent variable is dichotomous: 0 when a household is above and 1 when below the poverty line. Predictor variables are demographic, human capital and dwelling endowment. The results will not be interpreted through the coefficients but we will use the odd ratios in logistic regression to see that the occurrence of any particular event will increase or decrease the probability being poor of individual and with what proportion as compared to the reference category.

### Model Specification

Let's assume the general equation

$$Y_i = f(X_{1i}, X_{2i}, \dots, X_{ki}) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (1)$$

$Y_i$  is the dependent variable representing the Households' level of poverty and  $X_s$  are the various household level of education and experience. Let's suppose that the response variable  $y^*$  captures a true status of the household either as poor or non-poor so we can estimate the regression equation as follows

$$y_i^* = \sum_{j=0}^k X_{ij} \beta_j + \varepsilon_i \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (2)$$

$y^*$  is not observable and is a latent variable. We can observe  $Y_i$  as a dummy variable that takes the value 1 if  $y^* > 0$  and takes the value 0 otherwise.  $\beta$  is the vector of parameters and error terms are denoted with  $\varepsilon$ . The error terms entail the common assumption of zero mean and underlying distribution of the error terms is logistic. Let  $P_i$  denotes the probability that the  $i$ th household is below the poverty line. We assume that the  $P_i$  is a Bernoulli variable and its distribution depends on the vector of predictors  $X$ , so that

$$P_i(X) = \frac{e^{\alpha + \beta X}}{1 + e^{\alpha + \beta X}} \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (3)$$

$\beta$  is a row vector and  $\alpha$  is a scalar. The logistic function to be estimated is then written as

$$\ln \left[ \frac{P_i}{1 - P_i} \right] = \alpha + \sum \beta_j X_{ij} \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (4)$$

$$\ln \left[ \frac{P_i}{1 - P_i} \right] \text{ is the natural log of the odds in favour of the household falling below}$$

the poverty line whereas  $\beta_j$  is the measure of change in the logarithm of the odds ratio of the chance of the poor to non-poor household. Equation (4) is estimated by maximum likelihood method and the procedure does not require assumption of normality or homoskedasticity of error in predictor variables.  $X_i$  is the vector of independent variables. These variables include size of household size, electricity connection in the house, phone

connection in the house, gas connection in the house, water supply in the house, sewerage facility and education.

Generalised functional form of the model is as under:

$$P = a + b_1HHS + b_2Sew + b_3WS + b_4Tel + b_5Gas + b_6Prof + b_7Bach + b_8Inter + b_9Mat + b_{10}Midl + b_{11}Exp + e$$

$P$  = Poor Household [1= if poor, 0= otherwise].

$HHS$  = Household Size [in numbers].

$Sew$  = Sewerage Facility [1= Yes].

$WS$  = Water Supply Facility [1= Yes].

$Tel$  = Land Line Telephone Facility [1= Yes].

$Gas$  = Gas Connection [1= Yes].

$Prof$  = Professional [1= Yes].

$Bach$  = Bachelor [1= Yes].

$Inter$  = Intermediate [1= Yes].

$Mat$  = Matriculation [1= Yes].

$Middle$  = Middle [1= Yes].

$Exp$  = Experience [in years].

$e$  = Error Term.

Dependant variable is defined by using official poverty line. Eleven explanatory variables are used in this model. Human capital variables are dummy variables and defined in term of educational level and experience. One of them will get the value one in response to the individual's highest educational attainment. It means the educational level of the individual will either fall in middle, matriculation, intermediate, bachelors or professional (masters and above) category. Here 'primary education' is used as reference category. In past research, it is found that human capital variables are negatively related with the poverty level. Other variables include experience, public services utilised by the individuals and their family sizes. The experience variable is attained through subtracting the years of schooling and school starting age from the age of a person. It is not the actual but the potential experience. To make potential experience more meaningful we have included the individuals with age above 14 years. The services include the Gas, Land-line Telephone, Sewerage and Water Supply. All these services variables are dummy in nature if the individual is availing the particular facility the respective variable will get the value one otherwise zero. Household size variable is continuous. The household size is taken because it directly linked with the distribution of resources within the family members and is positively related with poverty level.

## Results and Discussions

It is observed that the attainment of middle, matriculation, intermediate, bachelors and professional (masters or above qualification) will decrease the likelihood of being poor by 38 percent, 70 percent, 79 percent, 92 percent and 96 percent respectively as compared to their reference category of primary education (Table 10). All the educational variables are negatively affecting the poverty status of individuals. Moreover, as we

increase the educational qualification of individuals their chances of being non-poor increases or we can say that the probability of being poor declines vigorously. If an individual succeeds in getting matriculation education after middle than actually the increment in the probability decline being poor will be of 30 percent (70 percent–40 percent). Also such inter-educational level comparison shows little improvement between bachelors and professional categories but improvement is visible. With the increment of one year in potential experience will reduce the likelihood of being poor by 0.02 percent, although it is a minor effect but expertise is effective in reducing poverty. Provisions of public services are altogether negatively related with the poverty status. The decline in the chances being poor with the availability of gas, telephone, water supply and sewerage is 28 percent, 87 percent, 66 percent and 67 percent respectively (Table 10).

Table 10

*Logistic Regression Model of Being Poor with Multiple Independent Variables*

Variables	Coefficient	Level of Significance	Odd Ratios
Experience	-0.011	0.01	0.98
<b>Education</b>			
Middle	-0.592	0.03	0.62
Matriculation	-1.231	0.00	0.30
Intermediate	-1.819	0.00	0.21
Bachelor	-2.608	0.00	0.08
Professional	-3.291	0.00	0.04
Gas	-0.351	0.07	0.72
Telephone	-2.252	0.00	0.13
Water Supply	-1.200	0.00	0.34
Sewerage	-1.192	0.00	0.33
Household Size	0.346	0.00	1.51
Constant	0.850	0.10	1.92

Source: Computed from the survey of 'Assessment of Poverty in Sargodha City'.

Family size is important because as we increase the family size the burden upon the pool of resources of any family will increase and practically we have lesser and lesser resources for the welfare of individuals. Large families are more prone to poverty. Therefore, we observe positive sign for the household size as expected so with the increase of one individual in family the rise in probability being poor of individual is 49 percent (Table 10). Provisions of public amenities are negatively related with status of the poor. All variable are significant and have expected sign. These results indicate that access to these facilities play an important role in explaining the difference in poverty levels.

## 7. CONCLUSION AND POLICY OPTIONS

Where poverty is concentrated, who is affected and to what extent, are relevant questions in poverty analysis. The analysis of poverty presented in this study uses the data from survey conducted in Sargodha city during May 2008. It is first time that this

type of analysis has been carried out in Sargodha. The survey was conducted for 330 households.

The analysis, based on official poverty line, shows that the head count ratio is 14.3 percent while this ratio increases to 15.9 percent by using latest poverty line given by Anwar (2006) and 21 percent by using urban specific poverty line. Poverty gap for Sargodha city is sufficiently high (4.4 percent) as compare to the aggregate poverty gap (2.1 percent) measured in 2005-06 for urban area. By using other two poverty lines, poverty gap become very large. Severity of the poverty for Sargodha city is 2.6 percent by using official poverty line and 2.8 and 3.3 percent by using Anwar (2006) and urban specific poverty lines respectively. Socio-economics analysis shows that education, family size, nature of occupation and public amenities play important role in poverty alleviation. Incidence of poverty is highest among the daily wage worker and lowest among the government employees. The results also show that education, experience and public services are negatively related with the poverty status of individuals. Moreover, results show that public services availability is also very essential for poverty reduction. It is actually beyond doubt that proper service utilisation symbolises the improved living standard of the people.

Following policy options can be used to reduce the urban poverty in general and particularly for Sargodha city: There is need to focus on the education of the poor because human capital plays vital role in breaking the vicious circle of poverty. Poverty incidence is positively related to family size. This highlights the importance of population policies. Problem of poverty in Pakistan cannot be solved without addressing the problem of rapid population growth. Government should devote more resources for provision of reproductive health services. Female education is another very powerful tool to contain population growth and at the same time improve human capital of the country. Public sector and private sector along with community participation should manage and create human capital in the shape of better technical education that will increase the productivity of the urban poor.

There is need to formulate programmes which help poor people to manage risk. Micro-insurance programmes, public works programmes, and food transfer programs may be mixed with other mechanisms to deliver effective risk management. There is need to develop programme which can prevent and respond to financial and natural shocks. There is need to increase local organisations' capacity which will help in promotion of community development which eventually enhance the control that poor people and their communities have over the services to which they are entitled. But strong monitoring mechanisms are suggested in this regard. There is also need to support poor people's social capital by assisting networks of poor people to engage with market and nonmarket institutions to strengthen their influence over policy.

Informal sector plays critical role in poverty alleviation. On one hand these is needed to enhance the productivity of participants of the informal sector through provision of microcredit, skills training and advisory services. Sargodha city is surrounded by very fertile citrus orchards and a network of citrus processing factories. Citrus research centres and vocational training for citrus processing workers can be used to enhance the productivity level of these workers that ultimately strengthen the economic well being of the masses of the city.

On the other hand, there is also needed to formalise the informal sector especially the construction sector. Steps should be taken to bring the informal sector into formal fold for better earnings. Less stringent rules and regulations for the formal sector can encourage informal sector enterprises to join the formal sector. Steps should also be taken by government to minimise the wage differentials between public and private sector by increasing minimum wage to reduce poverty.

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### **Comments**

This paper is an attempt on analysing poverty in Sarghoda city. Since the focus is only one city, therefore it can be more effective in understanding the dynamics of poverty in Sarghoda city. Following are few observations, which need to be addressed seriously:

- (i) Analysis on almost six years old data has a little significance in current scenario, when latest data is available.
- (ii) Sampling criteria is questionable as half of the union councils (11 out of 22) are dropped from the analysis and remaining half are given equal representation (30 households from each union council) irrespective of population proportion.
- (iii) The significance of using three different poverty lines is not given. Authors used three poverty lines (Official: 1140, Anwar: 1211 and Qureshi and Arif 1476). Why own poverty line is not estimated when data was also available.
- (iv) On page 12 Author write that Severity of Poverty index is the Foster-Greer-Thorbecke index, but  $P_0$ ,  $P_1$  and  $P_2$  all are special cases of FGT index
- (v) Authors took household size as one of the variable to analyse poverty. Mere use of household size ignores the number of earners in a household. The best option could be to take dependency ratio.
- (vi) In modelling the determinants of poverty relation with experience is not linear. Authors wrote “with the increment of one year in potential experience will reduce the likelihood of being poor is 0.02 percent” which is not true, the effect of initial years is usually less as compare to mid years. Therefore the square of experience should also be incorporated.
- (vii) In defining the categories of education the lowest (and reference) category is “primary education”. It seems to be that it is primary and below.
- (viii) Provision of public amenities (Gas, Electricity, Water Supply and Sewerage) is a bit confusing. As according to results (Table 10) the likelihood of being poor for households with gas connection is 28 percent less than households without gas connection. Should it not be user or not, rather than available or not. Then why electricity is dropped from the regression analysis.
- (ix) One of the policy implications (page. 21) is “There is need to formulate programs which help poor people to manage risk. From which result this policy is drawn? Similarly it is concluded that there is need to enhance the productivity of participants of informal sector through provision of microcredit etc. Again from which result this policy is recommended.

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## **Measurement of Living Standards Deprivation in Punjab Using AF Method (Periodical Comparison Approach)**

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### **I. INTRODUCTION**

In spite of taking and implementing various special measures by the government of Punjab and the Pakistan to alleviate poverty in Punjab, poverty is still there and has become a constraint in the way of economic progress and prosperity of the people of the Punjab-Pakistan. Poverty is pronounced deprivation in well-being. The conventional view links well-being primarily to command over commodities, so the poor are those who do not have enough income or consumption to put them above some adequate minimum threshold.

The broadest approach to well-being and hence poverty focuses on the capability of the individual to properly function in the society. The poor lack key capabilities, and may have inadequate income or education, and last but not the least living standards. How we measure poverty can importantly influence how we come to understand it, how we analyse it, and how we create policies to influence it. In recent years, the literature on multidimensional poverty measurement has blossomed in a number of different directions. The 1997 Human Development Report vividly introduced poverty as a multidimensional phenomenon, and the Millennium Declaration and Millennium Development Goals (MDGs) have highlighted multiple dimensions of poverty since 2000.

Salahuddin and Zaman (2012) in the article entitled “Multidimensional Poverty Measurement in Pakistan: Time Series Trends and Breakdown” applied Alkire-Foster Multidimensional (AFM) poverty measure given in 2007 for building time-series trends

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of poverty in Pakistan for the period 1998-2006. Their study results show that multidimensional poverty measures provide more elaborate and precise picture of poverty in Pakistan. The authors found that people of Pakistan were highly deprived in education and health.

Naveed and Tanweer-ul-Islam (2012) in their paper entitled “A New Methodological Framework for Measuring Poverty in Pakistan” presented a critical analysis of poverty measurement in Pakistan and argues for adopting a multidimensional methodological framework. Utilising AF methodology over the RECOUP Household Survey data (2006-07) the paper provides multidimensional poverty estimates at the aggregate, provincial and district level and identifies the major drivers of poverty. Their paper seems helpful in elaborating how policy makers can prioritise the development budget among districts and allocation within each district based upon the level and nature of deprivation. The authors found that consumption level as a single measure of poverty alone was a poor measure of poverty in Pakistan. In another paper entitled “Estimating Multidimensional Poverty and Identifying the Poor in Pakistan: An Alternative Approach” Naveed and Tanweer-ul-Islam (2012) critically examined the Poverty Scorecard, which was recently introduced by the Government of Pakistan for the identification of poor households under the Benazir Income Support Programme. By employing the AF measure to analyse household data from two provinces, Khyber Pakhtunkhwa and Punjab, their paper recommends an alternative method to estimate multidimensional poverty and identify poor households. This paper also investigates the relationship between household consumption and multidimensional poverty. This paper contrasts the results obtained by using a multidimensional measurement of poverty with those of the official poverty line. The limitations of the official poverty line were also identified and the role of household consumption in explaining deprivations was discussed in this paper.

Contemporary methods of measuring poverty and wellbeing commonly generate a statistic for the percentage of the population who are poor—a Head Count Index (H). A practical aim of Alkire and Foster (2007, 2011) was to construct poverty measurement methods that could be used with discrete and qualitative data. It includes identifying ‘who is poor’ by considering the range of deprivations they suffer, and aggregating that information to reflect societal poverty in a way that is robust and decomposable.

Pakistan, being the 6th highest populous and 9th largest (with respect to size of its labour force) country of the world, have a population of about 177 million in 2011. Punjab is the biggest province of Pakistan with a population of 96.55 million (55 percent of total Pakistan’s population) in 2011. The labour force participation rate remains low (32.98 percent) in Pakistan as compared to other countries of the world, reflecting the large chunk of children and old ages (67.2 percent) in the population. The civilian labor force in Pakistan is 58.41 million in 2011. The crude birth rate, death rate and infant mortality rate per 1000 persons has been found 27.5, 7.3 and 70.5 respectively, in 2011. The male (10 year and above) labour force participation rate is only 68.83 percent as against only 21.5 percent for female that remains very low in 2009-10. Some social, cultural and religious factors that prevent female workforce to participate in paid jobs are the main reasons for this low female participation rate. Agriculture sector is considered as back bone and the major sector

of the Punjab and Pakistan's economy accounting for 44.75 percent and 45.27 percent, respectively of the total employment. The official Labour Force Survey reported unemployment rate in Pakistan stood at 5.6 percent in 2009-10. Pakistan's literacy rate for male, female and both stood at 69.5 percent, 45.2 percent and 57.7 percent, respectively as against Punjab's literacy rate for male, female and both stood at 69.1 percent, 49.8 percent and 59.6 percent, and, respectively in 2009-10. The above literacy rate figures reveal that the overall Pakistan's literacy rate is determined by overall Punjab's literacy rate because of the size of literate population in Punjab. Education expenditure as a percentage of Gross National Product (GNP) remained around 2 percent throughout the history of Pakistan [Pakistan (2010-11)].

Considering the scope and subject matter of the study, the *key objective* of this study is to measure *Multidimensional Poverty Index (MPI)* for the considered periodical segments 2007 and 2011 in the province Punjab and, in turn, going deep into different areas, divisions and districts to have neck to neck evaluations of the poverty status in the Punjab province of Pakistan.

Since the MPI is founded upon *seven different indicators* of living standards so the overall results can also be decomposed to have the absolute and relative contribution of each indicator towards the overall MPI. Using this property of the MPI, we can go deep into each division and district with the intention to observe the poverty status with regard to MPI value of each indicator. The two period comparisons i.e., the years 2007 and 2011 will prove helpful to track the changes in poverty over time in different areas, divisions and districts of the Punjab. It will also prove helpful in auditory analysis of the allocated funds to specific regions worthwhile along with political regime of *military and democracy*.

Since the results of this study are bifurcated for geographical split-ups of the province, this study aids the policy makers in Punjab to eradicate poverty in the respective areas, regions, divisions and districts. This study has its own *significance* to every reader and specifically for government institutions because it also provides a picture of the poverty status and helps to monitor the disparities among different regions of the Punjab. The study is of a *unique nature* in the respect that it is perhaps the first study assessing *Living Standards Deprivation in Punjab using MICS data and AF Method*. This study would also be helpful for policy makers for enhancing the living standards of deprived segments of the society, especially the households. The finding of this study could offer a base for formulation of sound policies for deprived regions of the Punjab, exclusively to public and private organisations for the betterment of rural households through increased their living standards. This study may catch the interest of democracy lovers regarding living standards deprivation when compared to guided democracy of General Musharif as the MICS data for the period 2007 reflect the impact of policies of the government guided by General Musharif and the MICS data for the period 2011 depicts the impact of policies of the government guided by President Asif Ali Zardari.

This study is *delimited* to two period comparisons i.e., for the periods 2007 and 2011 because of the non-availability of MICS data for current periods i.e., after 2011. This study is also geographically *delimited* to Punjab province of Pakistan as the MICS data for other provinces is not available. Further, this study is delimited to only one

aspect of deprivation that is of the living standard deprivation as sound and reliable data on the other aspects of deprivations are not available in MICS data.

## II. REVIEW OF LITERATURE

Keeping in vision the different dimension of the study, the review of literature has been fulfilled. The Human Development Report, 1997 presented the most realistic approach by not only high lighting the poverty of income, but also on poverty from human development outlook- poverty as a contradiction of choices and opportunities to live comfortable lifespan.

Salzman (2003) terms in her paper “Centre for the Study of Living Standards” the methodological adoptions in the construction of composite, economic and social welfare indices. The author derived out with the result that “in current years a bulk of composite and social welfare indices have been developed, but the development is made inefficiently and methodologies are ignored”. This paper suggested a list of recommendations for best-practice methodologies founded upon the recent paper by Booyesen (2002) and the United National Development programme [e.g., Anand and Sen (1994)].

Jamal (2003) uses the Index of Multiple Deprivation (IMD) based upon the 1998 Population and Housing Census Pakistan data. This paper focuses the poverty alleviation concerns in Pakistan. It presents the practicable ways to deal income for poverty improvement in developing countries. Furthermore, the study discussed about identification of areas of concern, building up conclusions on local and sectorial main concerns, smooth the programs for poverty lessening in the targeted community and understanding the association between poverty and its foundation.

Ashraf and Usman (2012) presented a new measure of Multidimensional Poverty Index (MPI) for the province of Punjab using a method proposed by Alkire and Foster (2007, 2009). The authors estimated MPI by applying SPSS and MS-Excel on MICS data for the period 2007-08. This paper integrates many aspects of poverty related to the MDGs into a single measure. MPI also examines the most common deprivations related to different districts of Punjab. According to this study, the less multidimensional deprived districts were: Lahore, Multan, Rawalpindi, Sialkot, Jhelum, Gujranwala, Sahiwal and Faisalabad are included. The districts with moderate multidimensional deprivations according to MPI were: Attock, Mandi-Bahauddin, Mianwali, Gujrat, Chakwal, T.T. Singh, Vehari, Khushab, Nankana Sahib, Narowal, Bhakkar, Sargodha and Sheikhpura. The districts Hafizabad, Kasur, Okara, Lodhran, Pakpattan, Khanewal, Bahwalnagar, Jhang, Bahawalpur, Layyah, Rajanpur, R. Y. Khan, D. G. Khan and Muzaffargarh were the most deprived in all dimensions.

A compact among nations to end human poverty-HDR (2003), and the innovative century opened with an exceptional accentuation of commonality and fortitude to eradicate the poverty from the world. In 2000, UN Millennium Declaration was made in the “largest ever” meeting of the head of the States of committed countries – “Rich and Poor” for doing all that can be done in order to eliminate the poverty. The main apprehensions of this declaration are to promote human decorum, maintain social equality, impartiality and achieving peace and ecological sustainability by 2015 or earlier.

Originated from the Millennium Declarations, the MDGs are associated to perceive poverty in the multidimensional way. Insufficient income prevalence of hunger, gender inequality, deficient in education and living standards are addressed for the reflection of the poverty picture in the respective countries. This task was also accepted by Pakistan being the signatory and various steps were taken in this concern. MICS linked MDGs to have most of the data on the proposed indicators to track changes over time. Various rounds of provincially MICS are being conducted in Pakistan. In Punjab, MICS 2007 and 2011 is the second and third round of MICS in the series.

The Human Development Index (HDI) is one of the most extensively used measures of human development, developed and published by UNDP's first annual Human Development Report (HDR), 1990. The HDI is structured in the order of Amartya Sen's competency approach which emphasises the consequences of standards of living, health and education [Stanton (2007)]. Before HDI, many indices like GDP per capita, GNP per capita, life expectancy, literacy and enrolment are being used but none of these has not got much as gratitude as Mahbub ul Haq's HDI [HDR (1990)]. In spite of all its significance, HDI is being criticised for choice of variables, predetermined weighting methodology and redundancy. Another imperative apprehension regarding HDI is its equally weighting method. Ghaus, Pasha and Ghaus (1996) and Noorbakhsh (1998) have provided the other ways of giving weights to the dimension and variables.

Jamal (2009), constructed District Human Development Indices for the Punjab for the periods 2004 and 2008 by using HDI that integrates three dissimilar factors (a) a long and healthy life (life expectancy) (b) education as a combination of adult literacy and school enrolment and (c) a decent level of livings. The research utilises the district based MICS 2004 and 2007-08 data.

While constructing Punjab Indices of Multiple Deprivations for the periods 2003-04 and 2007-08, Jamal (2011) presented the income poverty results using MICS data. However the authors ignore the multidimensional aspect of poverty. These indices of multiple deprivations are intended to evaluate the poorest or socially excluded segment of the society.

Niazi and Khan (2011) in the paper "The Impact of Education on Multidimensional Poverty across the regions in Punjab" assessed the educational deprivation and estimated the incidence of multidimensional poverty in Punjab using AF Method. The study estimated the contribution of lack of education in the incidence of multidimensional poverty in urban and rural areas of province Punjab, Pakistan. The overall educational deprivation of the multidimensional poor segment during 1998-99 was found to be 60.8 percent, which significantly increased to 83.4 percent in 2001-02 but decreased as 72.4 percent in 2004-05 and again increased to 79.8 percent during 2005-06 along with little decline as 78.0 percent in 2007-08, whereas the incidence of multidimensional poverty during the same period was 48.6, 49.99, 40.80, 45.72 and 42.38 percent, respectively over the time. This study also found lowest educational deprivation as well as the incidence of multidimensional poverty in urban area as compared to the rural areas of the Punjab throughout the period under consideration.

On 14 July, 2010, UNDP and Oxford Poverty and Human Development Initiative (OPHI) presented a new index of measuring poverty level in a multidimensional way. Alkire and Santos (2010) presented a paper on this new Multidimensional Poverty Index (MPI) for 104 countries.

The Punjab provincial Reports of MICS, 2007 (vol-I) and MICS, 2011 (vol-I), are the outcome of continual efforts of Bureau of Statistics, Planning and Development Department, government of the Punjab to provide reliable data for monitoring the effectiveness of interventions to eradicate poverty in the province. The indicators of MDGs for education, health, water and sanitation and poverty are accessible in both reports to track the changes in poverty over time and areas of distressing concerns being highlighted.

Pakistan Economic Survey, 2010-11 reviews the development of Pakistan's economy over the years; the reported source uses the absolute poverty line method based upon the calorie method. The poverty line was used for cutoff at 1.25 \$ a day.

The above literature review indicates that poverty and its dimensions remained the interest of social scientists since 1990. A number of studies were also carried out in the recent past to assess the scope of poverty in Pakistan both at micro and sectorial levels, but very few studies have put emphasis on the fundamentals of poverty. Poverty is a sign of many disorders in the configuration of Nations, so, it is an effect of many causes. MPI is the very adequate alternative for the measure of acute, absolute and relative poverty. Instead of using direct income or consumption approaches, which have their own data constrains and are very probable to be influence with the annexation of random disturbance terms, due to fact that data on these variables is attached to the human verbal and behavioural outcomes and by nature these numerical facts and figures are tentional or intentional over reported or under reported at the sweet will of the plaintiffs.

The idea of using multiple variables for the identification of deprivation and in turns going for the poverty index measures through the filters of dual cutoff is justified in manifold reasons. Just having the sole identification process as most of the uni-dimensional measures does, may include the certain number of individuals who are deprived in particular indicator, but they may be at higher level of satisfaction in having the sagacity that they have achieved such glassy.

Measuring social problems in a truthful way is an essential element of modern and democratic governments and measuring it in a multidimensional way helps government to do better in terms of policy making as poverty is the multidimensional phenomenon and it must be tracked over time for changes in the multidimensional way. This study opens the new horizon and many innovations are in line to be considered by having the series of the MPI measures with regular time lags. In this connection the two different rounds of MICS are considered to have MPI measures and changes over time are tracked. This will reflect and provide the guide lines to design social polices strategically with desired objectives for public sectors. The results can serve as practical instruments for monitoring policies and are useful alerts for decision making at a short and long term time spans.

### III. DATA SOURCES, SAMPLING PROCEDURE AND METHODOLOGY

#### Data Sources

MICS (Multiple Indicator Cluster Survey) Punjab, 2007 and 2011 provide representative household survey estimates regarding more than 100 indicators *vis-a-vis* province, area of residence (major cities, other urban and rural), 9 divisions, 36 districts

and 150 tehsils/towns. It was one of the largest surveys in the history of Pakistan with a sample size of 102,545 households for MICS 2011 and 91280 for MICS 2007 with an exceptional response rate of 97 percent. The survey was planned, designed and implemented by Punjab Bureau of Statistics under the supervision of second author. The sample design of both MICS was provided by Pakistan Bureau of Statistics. Technical input was obtained from Regional Office for South Asia-UNICEF (ROSA) and Global Desk on MICS4. Fieldwork was carried out from July to December in both surveys for their respective rounds. Report and data of MICS Punjab, 2011 is also available at one of the UN web domain Child info.

### **Sample Design**

The sample has been selected in two stages. In urban areas, the first-stage selection unit is the Enumeration Block. In the rural areas, the first-stage selection unit is the Village. From each first-stage sample unit, a sample of households has been selected: 16 in the rural areas and 12 in the urban areas. The second stage units are selected with equal probability. This gives a sample that is more or less self-weighting within each selection stratum.

### **Multidimensional Poverty Index (MPI)**

The MPI measure is very smooth and robust and the advantage of using MPI is that it is sensitive to the changes as compared to simple Head Count Ratio (H), the H remains unbothered if a person who is censored as poor after the poverty cutoff becomes more deprived or less deprived, the H only changes when the person becomes non-poor or becomes poor. On the contrary, the MPI being the product of H and Average Intensity of Poverty (A) grasps the changes according to the deprivation rank of the censored poor.

The MPI can be used to imitate the clear depiction of the individuals, households or communities and even countries living in poverty. With the decomposition property of MPI it is also potential to perceive shallow into each of the dimension and bifurcating some certain geographical split-ups. Additionally, we can have the pattern of the poverty by taking array of poverty cutoffs to expedite the policy maker with poverty index rendering to different bands of poverty namely low, medium and high.

The AF Method generates Head Counts and also a unique class of poverty measures ( $M_\alpha$ ).  $M_0$  (for  $\alpha = 0$ ) is an adjusted Head Counts. This  $M_0$  reflects both the incidence (the percentage of the population who are poor) and intensity of poverty (the number of deprivations suffered by each household, A).  $M_0$  is calculated by multiplying the proportion of people who are poor by the percentage of dimensions in which they are deprived ( $M_0 = H \times A$ ).

For the measurement of the MPI, seven indicators from the Household Characteristics Module of MICS 2007 and 2011 are considered with the total weight evenly distributed among them. The reason for the inclusion of these indicators is that most of the data obtained in this module are the results of the observational and visual reports of the enumerators. So, the chances of false information are very low.

Table 1

*Weights and Deprivation Cutoff for Each Indicator*

Indicator	Relative Weight	Deprivation Cutoff
Access to Drinking Water	$\frac{1}{7}$	A household is consider <i>deprived</i> if it has unimproved source for “access to drinking water” (unprotected well, unprotected spring, pond, tanker-truck, cart, surface, other)
Source of Sanitation (Toilet Facility)	$\frac{1}{7}$	A household is consider <i>deprived</i> if it has unimproved source of “sanitation (toilet facility)”:(flush somewhere else, flush to unknown place, pit latrine without slab, composite toilet, bucket, no facility/bush/field, other).
Main Material of Floor	$\frac{1}{7}$	A household is considered <i>deprived</i> if it has unimproved “floor material” (earth/sand, dung plastered)
Main Material of Roof	$\frac{1}{7}$	A household is considered <i>deprived</i> if it has unimproved “roof material” (no roof, thatch/palm leaf, wood planks, metal, wood)
Main Material of Walls	$\frac{1}{7}$	A household is considered <i>deprived</i> if it has unimproved “walls material” (no wall, cane/palm/trunks, dirt, bamboo with mud, stone with mud, uncovered adobe, plywood, cardboard/crate, reused wood)
Cooking Fuel	$\frac{1}{7}$	A household is considered <i>deprived</i> if it uses unimproved “cooking fuel” (coal/lignite, charcoal, wood, straw/shrubs/grass, animal dung, animal dung, other)
Assets	$\frac{1}{7}$	A household is considered <i>deprived</i> if it has less than 50 percent assets of (motorbike ,computer, television, car/van/tractor/trolley, washing machine, air cooler/fan, motor/pump, bicycle, fridge/ air-condition)

To obtain the Achievement Matrix (X): which shows the achievement of each household in each of the seven indicators, for MICS 2011 of order (95238 X 7) and of order (91280 X 7) for MICS 2007, the responses for each indicator in the MICS: 2011 and 2007 Standards of Living Modules responses are re-coded according to the definition provided by UNICEF, Joint Monitoring Program (JMP) of improved and unimproved sources for each indicator. The definition for improved and unimproved sources for each indicator with their relative weights and deprivation cutoff are presented in Table 1. Equal weights to different living standard indicators are assigned in Table 1. Applying scientific methods to assign weights may mislead the preferences of the household to each living standard indicator as each indicator yield different importance to different households.

**Achievement Matrix (X)**

The X is the one which represents the outcome of the indicators for each household; it is of the order n x d, in this particular case of MICS 2011, the X will be of the form.

$$X(2011) = \begin{bmatrix} x_{11} & \dots & x_{17} \\ \vdots & \ddots & \vdots \\ x_{95238\ 1} & \dots & x_{95238\ 7} \end{bmatrix}$$

For MICS 2007, the X will be of the form.

$$X(2007) = \begin{bmatrix} x_{11} & \dots & x_{17} \\ \vdots & \ddots & \vdots \\ x_{91280\ 1} & \dots & x_{91280\ 7} \end{bmatrix}$$

**Deprivation Cutoff Vector and Matrix**

A vector  $Z_j = [\text{Improved, Improved, Improved, Improved, Improved, Improved, 50 percent of Assets}]$  for 7 deprivation cutoffs (one for each dimension) is used to determine whether a person is deprived. If the person’s achievement level in a given dimension “j” falls short of the respective deprivation cutoff  $Z_j$ , the person is said to be deprived in that dimension; if the person’s level is at least as great as the deprivation cutoff, the person is not deprived in that dimension.

According to the cited criteria the entries in the achievement matrices are substituted into dichotomy i.e.,  $go_{ij} = 1$ , if  $X_{ij} < Z_j$  (Deprived) and  $go_{ij} = 0$  if  $X_{ij} \geq Z_j$  (Non-Deprived). In this way the Deprivation Matrices  $g^o$ ’s are obtained for both of MICS 2011 and 2007.

$$g^o(2011) = \begin{bmatrix} go_{11} & \dots & go_{17} \\ \vdots & \ddots & \vdots \\ go_{95238\ 1} & \dots & go_{95238\ 7} \end{bmatrix}, \quad g^o(2007) = \begin{bmatrix} go_{11} & \dots & go_{17} \\ \vdots & \ddots & \vdots \\ go_{91280\ 1} & \dots & go_{91280\ 7} \end{bmatrix}$$

**Weighted Deprivation Matrix (WDM)**

The relative weights  $W = [\frac{1}{7}, \frac{1}{7}, \frac{1}{7}, \frac{1}{7}, \frac{1}{7}, \frac{1}{7}, \frac{1}{7}]$  of the indicators are applied to the deprivation matrices. Such that  $go_{ij} = W_j = \frac{1}{7}$ , if  $X_{ij} < Z_j$  (Deprived) and  $go_{ij} = 0$ , if  $X_{ij} \geq Z_j$  ( Non-Deprived) so that this study obtaineds the WDM as given below:

$$g^o(w)(2011) = \begin{bmatrix} go_{11} & \dots & go_{17} \\ \vdots & \ddots & \vdots \\ go_{95238\ 1} & \dots & go_{95238\ 7} \end{bmatrix}, \quad g^o(w)(2007) = \begin{bmatrix} go_{11} & \dots & go_{17} \\ \vdots & \ddots & \vdots \\ go_{91280\ 1} & \dots & go_{91280\ 7} \end{bmatrix}$$

### Deprivation Count Vector (DCV)

These vectors are the count or score of each person in all the indicators. It is the sum of weighted deprivations. *i.e.*,  $C_i = g_{i1} + g_{i2} + \dots + g_{i7}$ . The DCVs for MICS 2011 and 2007 are given below:

$$C(2011) = \begin{bmatrix} C_1 \\ C_2 \\ \vdots \\ C_{95238} \end{bmatrix}, \quad C(2007) = \begin{bmatrix} C_1 \\ C_2 \\ \vdots \\ C_{91280} \end{bmatrix}$$

### Poverty Cutoff

Given the poverty cutoff  $K$ , This study compares the deprivation count with the  $K$  cutoff and then censor the deprivation of those who were not identified as poor.

$$\text{If } \rho_k(x, Z) = 1, \text{ if } C_i \geq K$$

$$\text{If } \rho_k(x, Z) = 0, \text{ if } C_i < K$$

### Censored Weighted Deprivation Matrix

It is the key matrix over which we will perform the aggregation and find the set of AF measurements for  $M_o$  (MPI). Here  $g_{oij}(k) = W_j = \frac{1}{7}$ , if  $C_i \geq k$  ( Deprived and poor)  $g_{oij}(k) = 0$ , if  $C_i < k$  ( Deprived or not, but non-poor).

$$g^o(k)(2011) = \begin{bmatrix} g_{o11}(k) & \dots & g_{o17}(k) \\ \vdots & \ddots & \vdots \\ g_{o95238\ 1}(k) & \dots & g_{o95238\ 7}(k) \end{bmatrix}, \quad g^o(k)(2007) = \begin{bmatrix} g_{o11}(k) & \dots & g_{o17}(k) \\ \vdots & \ddots & \vdots \\ g_{o91280\ 1}(k) & \dots & g_{o91280\ 7}(k) \end{bmatrix}$$

### Censored Weighted Deprivation Count Vector

After the implementation of dual cutoffs, this vector counts the score of each person from the Censored Weighted Deprivation Matrix. Here  $C_i(k) = C_i$ , if  $C_i \geq k$  and  $C_i(k) = 0$ , if  $C_i < k$ .

$$C(k)(2011) = \begin{bmatrix} C_1(k) \\ C_2(k) \\ \vdots \\ C_{95238}(k) \end{bmatrix}, \quad C(k)(2007) = \begin{bmatrix} C_1(k) \\ C_2(k) \\ \vdots \\ C_{91280}(k) \end{bmatrix}$$

### Head Count Ratio of MD Poor

It is the proportion of people who have been identify as poor. It is called incidence of poverty, or poverty rate and is calculated as:

$$H(2011) = \frac{\sum_{i=1}^{95238} \rho_k(x, Z)}{95238} = \frac{q_{2011}}{95238}, \quad H(2007) = \frac{\sum_{i=1}^{91280} \rho_k(x, Z)}{91280} = \frac{q_{2007}}{91280}$$

### Intensity (Breadth) of MD Poverty

It is average proportion of deprivation in which the poor are deprived and is calculated as:

$$A(2011) = \frac{\sum_{i=1}^{95238} C_i(k)}{7q_{2011}}, \quad A(2007) = \frac{\sum_{i=1}^{91280} C_i(k)}{7q_{2007}}$$

### $M_0$ (MPI)

This is the final step for the calculation of MPI. It is the adjusted Head Counts and is the product of H and A, *i.e.*,  $M_0 = H \times A$

## IV. RESULTS AND THEIR INTERPRETATION

### Poverty Identification

With the poverty K-Cutoff, this study is considering the range of cutoffs to observe the pattern of each of the AF measurement. Table 2 shows the results for the periods 2011 and 2007 and corresponding graphical representation are shown in Figure 1 and Figure 2.

It is substantiation from Table 2 that the Head Count Ratio (H) is very high for both time periods, when we have established the poverty cutoff at 10 percent deprivations. As one move from 10 percent to 100 percent poverty cutoff, H keeps on decreasing, but still one got some percentage of multidimensional (MD) poor people even at 100 percent poverty cutoff.

The average intensity (A) has the increasing pattern, it is due to the fact that in the Censored Weighted Deprivation Matrix as the percentage of poverty cutoff increases the household with more deprivations are censored as poor, and the Average Intensity of the poverty is the average of the MD poor people. At the initial poverty cutoffs, the A is low and with the increase in poverty cutoff the percentage of A keeps on increasing and becomes 100 percent for both time periods.

Table 2

*H, A and  $M_0$  at Different K-Cutoffs for the Periods 2011 and 2007*

K- Cutoff (percent)	2011			2007		
	Head Count (H)	Average Intensity (A)	$M_0$ (MPI)	Head Count (H)	Average Intensity (A)	$M_0$ (MPI)
10	0.865	0.422	0.365	0.872	0.478	0.417
20	0.653	0.513	0.335	0.667	0.581	0.388
30	0.458	0.610	0.279	0.488	0.689	0.336
40	0.458	0.610	0.279	0.488	0.689	0.336
50	0.304	0.702	0.213	0.409	0.740	0.303
60	0.186	0.784	0.146	0.303	0.799	0.242
70	0.186	0.784	0.146	0.303	0.799	0.242
80	0.086	0.866	0.074	0.169	0.865	0.147
90	0.005	1.000	0.005	0.009	1.000	0.009
100	0.005	1.000	0.005	0.009	1.000	0.009

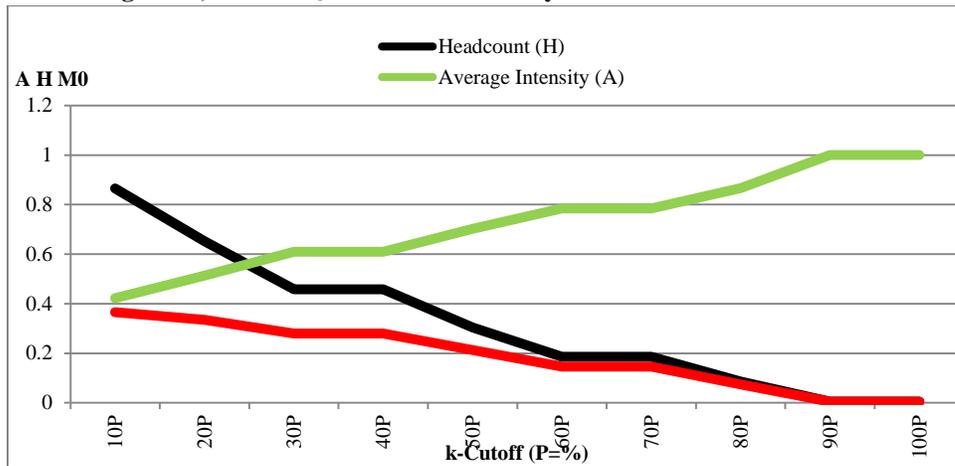
The  $M_0$  is the product of H and A and it is the percentage of people who are MD poor and facing deprivations at the same time, with the increase in the poverty cutoff, the value of  $M_0$  decreases, but even at 100 percent poverty cutoff, this study still got some percentage of the MD poor.

**Overall Comparison of  $M_0$  (2011) and  $M_0$  (2007)**

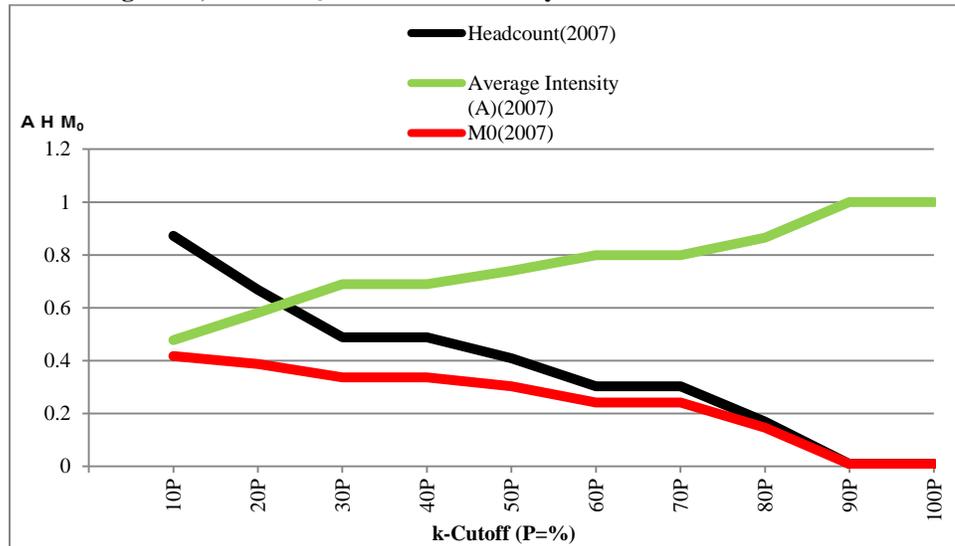
There is difference of approximately 6–10 percent in the value of  $M_0$  (2011) and  $M_0$  (2007) at each of the poverty cutoff level. The Figure 3 shows the prominent decrease in the poverty for the period 2011 as compared to the period 2007.

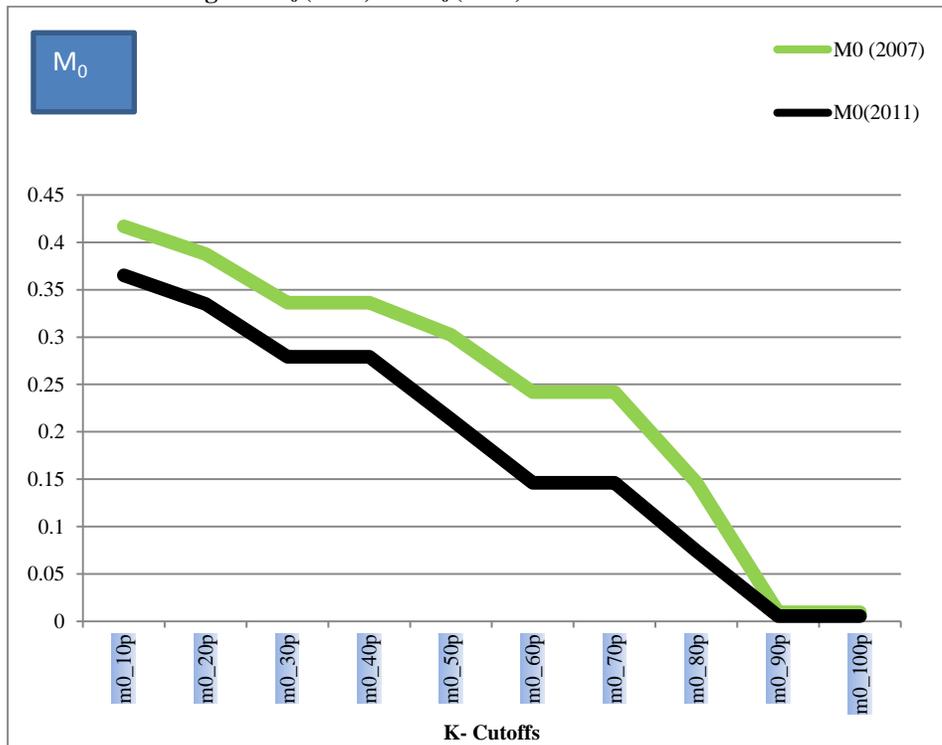
In conclusion, this study observed that each of the AF measure has shown decrease in poverty in 2011 as compared to 2007 at all cutoffs.

**Fig. 1. A, H and  $M_0$  at Different Poverty Cutoffs for the Period 2011**



**Fig. 2. A, H and  $M_0$  at Different Poverty Cutoffs for the Period 2007**



**Fig. 3.  $M_0$  (2011) vs.  $M_0$  (2007) at Different K-Cutoffs**

#### Poverty Identification (K-Cutoff at 33 percent)

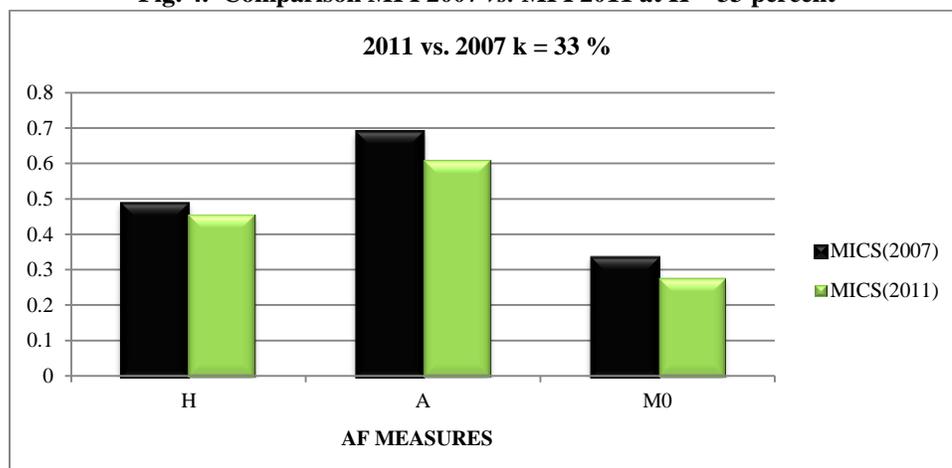
To converse about MPIs at a specific poverty cutoff, this study set the K-cutoff at 33 percent. Having AF measures at this cutoff this study will drill down into Regions/Divisions/Districts for independent MPIs and their contribution to the provincial MPI.

The poverty identification for poverty cutoff  $K=33$  percent for both the considered time periods are presented in the Table 3 and Figure 4. The overall results show a decrease in each of the measure for the year 2011 as compared to the year 2007. It is worthwhile to note that the H and the A have decreased by 3 percent and 7.9 percent, respectively whereas; the MPI ( $M_0$ ) has decreased to 5.7 percent. Here, the advantage of using AF method is that the H has shown just 3 percent (does not take into account the phenomena that poor become more deprived or less deprived), in contrast the  $M_0$  (MPI) reflect the real situation and has shown the decrease of 5.7 percent.

Table 3

*Comparing MPI 2007 vs. MPI 2011 at  $K = 33$  percent*

AF Measures	MICS 2007	MICS 2011	Increase/Decrease
H	0.488	0.458	-0.030
A	0.689	0.610	-0.079
$M_0$	0.336	0.279	-0.057

**Fig. 4. Comparison MPI 2007 vs. MPI 2011 at K = 33 percent**

### Interpretation of the Results at K-Cutoff 33 percent

#### (i) For the Period 2011

- The incidence of poverty  $H = 45.76$  percent indicating the percentage of the people who are multi-dimensionally poor.
- The Intensity of Poverty  $A = 61.01$  percent which shows that, on average, the poor people are facing 61.01 percent of the deprivations.
- The value of  $MPI = M_0(2011) = 0.279$  which is the product of  $H$  and  $A$ . It is percentage of those people which are multidimensional poor as well as they are deprived at the same time.

#### (ii) For the Period 2007

- The incidence of poverty  $H = 48.71$  percent indicating the percentage of the people who are multi-dimensionally poor.
- The Intensity of Poverty  $A = 68.94$  percent which shows that on average the poor people are facing 68.94 percent of the deprivations.
- The Value of  $MPI = M_0(2007) = 0.336$  which is the product of  $H$  and  $A$ . It is percentage of those people which are multidimensional as well as they are deprived at the same time.

The results for both time periods can be summed up that the overall Punjab has shown the decline in the poverty measured by MPI of 5.72 percent in 2011 as compared to 2007.

### Urban and Rural Bifurcation of $M_0$

The region-wise comparison of MPI results is presented in Table 4. In the region-wise comparison, the AF-measures have fallen in period 2011 for both the urban and rural regions. The decrease in the poverty is found to be 6 percent for the rural areas, whereas the urban areas have shown the fall of just 0.2 percent.

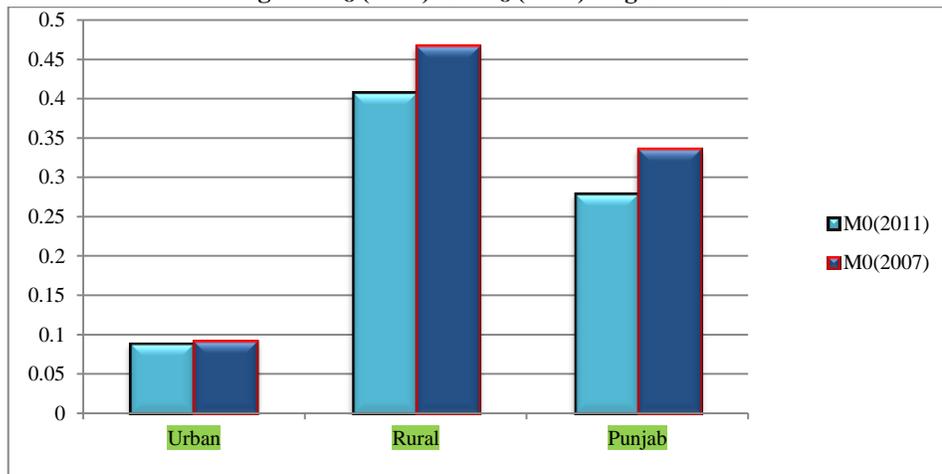
The region-wise comparison of the MPIs results for both of the time periods is also presented in Figure 5. The results in Figure 5 reveal the clear difference between the poverty status of urban and rural regions and highlight the disparities faced by the rural region of the Punjab.

In conclusion, the poverty in the rural areas of the Punjab for the period 2011 is found to be 31.8 percent more than that of the urban areas, whereas the poverty in the rural areas of the Punjab for the period 2007 was found to be 37.8 percent more than that of the urban areas. This also means that although the poverty has fallen in rural areas of the Punjab in 2011 as compared to 2007, yet the poverty gap between rural and urban regions of the Punjab is still evident.

Table 4

*Urban and Rural Bifurcation of MPI*

Region	2011			2007		
	H	A	M <sub>0</sub>	H	A	M <sub>0</sub>
Urban	0.173	0.517	0.089	0.153	0.600	0.092
Rural	0.650	0.627	0.407	0.667	0.700	0.467
Punjab	0.458	0.610	0.279	0.488	0.689	0.336

**Fig. 5. M<sub>0</sub>(2011) vs. M<sub>0</sub>(2007) Region-wise****Sorting by Divisions and Bands of Poverty**

The Punjab province comprises of nine divisions namely Bahawalpur, Rawalpindi, Gujranwala, Lahore, Multan, Faisalabad, Sahiwal, Sargodha, and D.G. Khan. The results for both time periods are ranked from lowest to the highest poverty level. On the basis of the poverty level the divisions are classified into the low (up to 20 percent), medium (21 percent to 35 percent) and high (above 35 percent) poverty bands in this study.

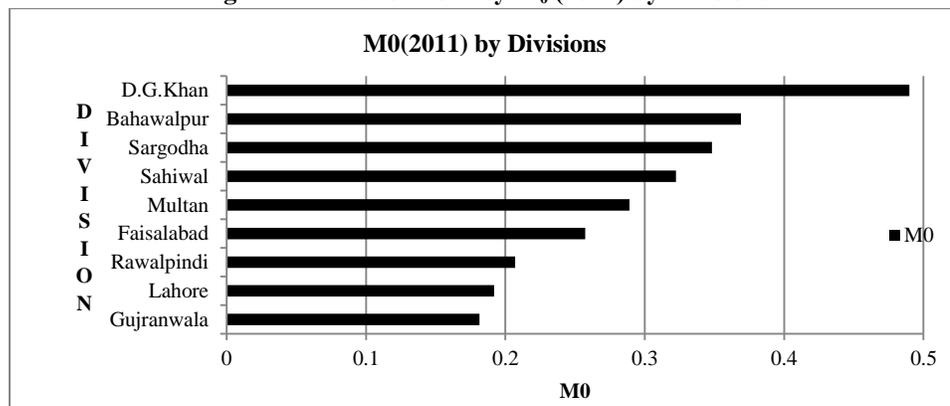
**(i) For the Period 2011**

The Table 5 presents MPI (2011) results for each division ordered from lowest to highest with the classification of poverty band for the period 2011. The D.G. Khan division has the highest MPI of 0.489 followed by Bahawalpur at 0.369, Sargodha at 0.348 and Sahiwal at 0.322. D.G. Khan and Bahawalpur divisions fall in the high poverty band. Faisalabad, Multan, Sahiwal, Sargodha are ranked under medium poverty band whereas, Gujranwala, Rawalpindi and Lahore having value of MPI up to 20 percent, categorised in the low poverty band. The graphical representations of divisional MPI results are also shown in Figure 6.

Table 5

*Sorting  $M_0$  (2011) by Divisions*

Division	$M_0$ (2011)	Bands of Poverty
Gujranwala	0.181399	Low poverty
Lahore	0.192033	
Rawalpindi	0.206952	
Faisalabad	0.257276	Medium poverty
Multan	0.28914	
Sahiwal	0.322424	
Sargodha	0.348195	
Bahawalpur	0.369109	High poverty
D.G. Khan	0.489913	

**Fig. 6. Ranked for Poverty  $M_0$  (2011) by Divisions****(ii) For the Period 2007**

The Table 6 presents the MPI (2007) results for each division ordered from lowest to highest with the classification of poverty band for the period 2007. The D.G. Khan division has the highest MPI of 0.5299 followed by Bahawalpur at 0.4782, Sahiwal at 0.4013 and Sargodha at 0.40. Multan, Sargodha, Sahiwal, Bahawalpur, and D.G. Khan Divisions ranked in the high poverty band. Lahore and Faisalabad are found under Medium poverty band, whereas Rawalpindi and Gujranwala divisions are found under

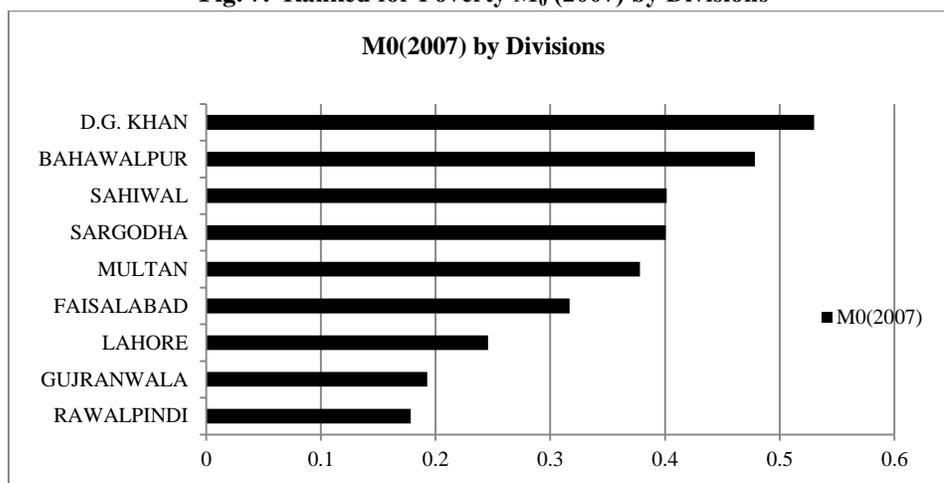
low poverty band. The graphical representations of divisional MPI (2007) results are also shown in Figure 7.

The above findings indicate that all the divisions of the Punjab Province are not at the similar situation with regard to the poverty status for periods 2011 and 2007. In 2011, D.G. Khan division is at least 30 percent poorer than Gujranwala, Lahore and Rawalpindi. Whereas, Bahawalpur and Sargodha divisions are round about 14 to 18 percent poorer than Gujranwala and Lahore similar prevalence of disparities among the division for the period 2007.

Table 6

*Sorting  $M_0$  (2007) by Divisions*

Division	$M_0$ (2007)	Bands of Poverty
Rawalpindi	0.178248	Low poverty
Gujranwala	0.192727	
Lahore	0.245671	
Faisalabad	0.316711	Medium poverty
Multan	0.378095	
Sargodha	0.40051	
Sahiwal	0.401381	High poverty
Bahawalpur	0.478288	
D.G. Khan	0.529922	

**Fig. 7. Ranked for Poverty  $M_0$  (2007) by Divisions****Division-wise Comparison of MPI**

The division wise comparisons of the MPI results are presented in Table 7. The results show decrease in poverty for all the divisions of the Punjab except Rawalpindi division. The highest decrease is of 11 percent in the Bahawalpur division followed by 9 percent in Multan, 8 percent in Sahiwal, 6 percent in Lahore, Sargodha and Faisalabad. The lowest decrease in poverty of just 4 percent and 1 percent is observed in D.G. Khan and Gujranwala, respectively.

Table 7

Division-wise Comparison of MPI 2007 vs. MPI 2011

Division	M0(2007)	M0(2011)	Increase/Decrease
Bahawalpur	0.478	0.369	-0.109
D.G. Khan	0.530	0.490	-0.040
Faisalabad	0.317	0.257	-0.059
Gujranwala	0.193	0.181	-0.011
Lahore	0.246	0.192	-0.054
Multan	0.378	0.289	-0.089
Rawalpindi	0.178	0.207	0.029
Sahiwal	0.401	0.322	-0.079
Sargodha	0.401	0.348	-0.052

Fig. 8. Division-wise Comparison of MPI 2007 vs. MPI 2011

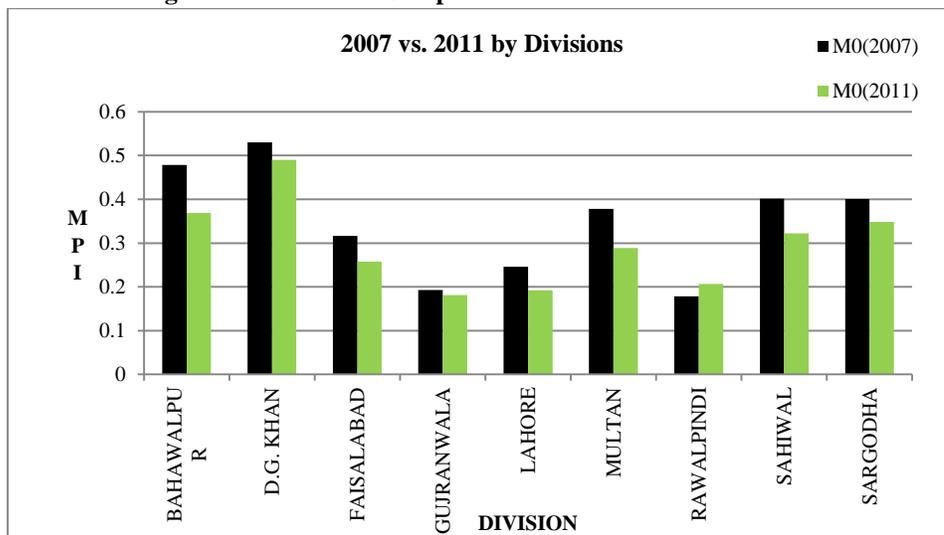
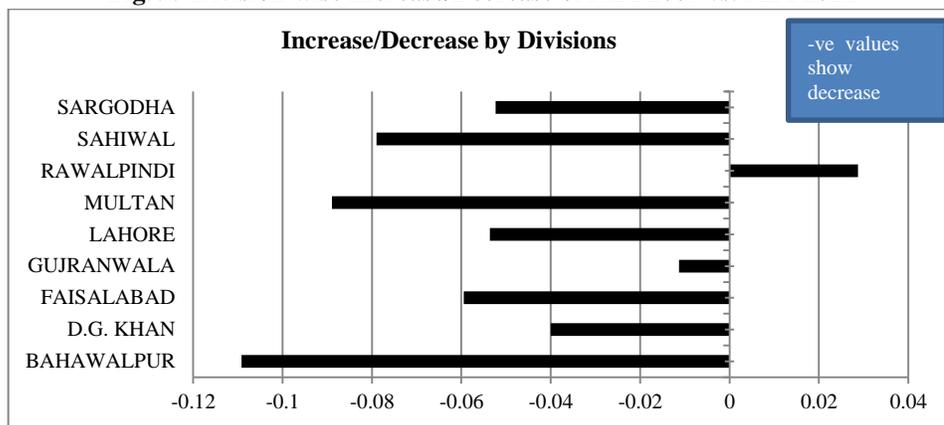


Fig. 9. Division-wise Increase/Decrease of MPI 2007 vs. MPI 2011



In conclusion, the corresponding decrease in the poverty has pushed some divisions out of their ranked band of poverty. Particularising for each, it is detected that Lahore division which was falling under the medium poverty band during 2007 has decreased the poverty and now, under the low poverty band for the year 2011. On the same lines Multan, Sahiwal and Sargodha divisions have revealed progress and are in medium band of poverty in 2011 as compared to 2007 when these were tumbling under high poverty band.

The graphical demonstration of comparisons is given in Figure 8, the corresponding increase or decrease in each division is given in Figure 9.

### District-wise Comparison of MPI

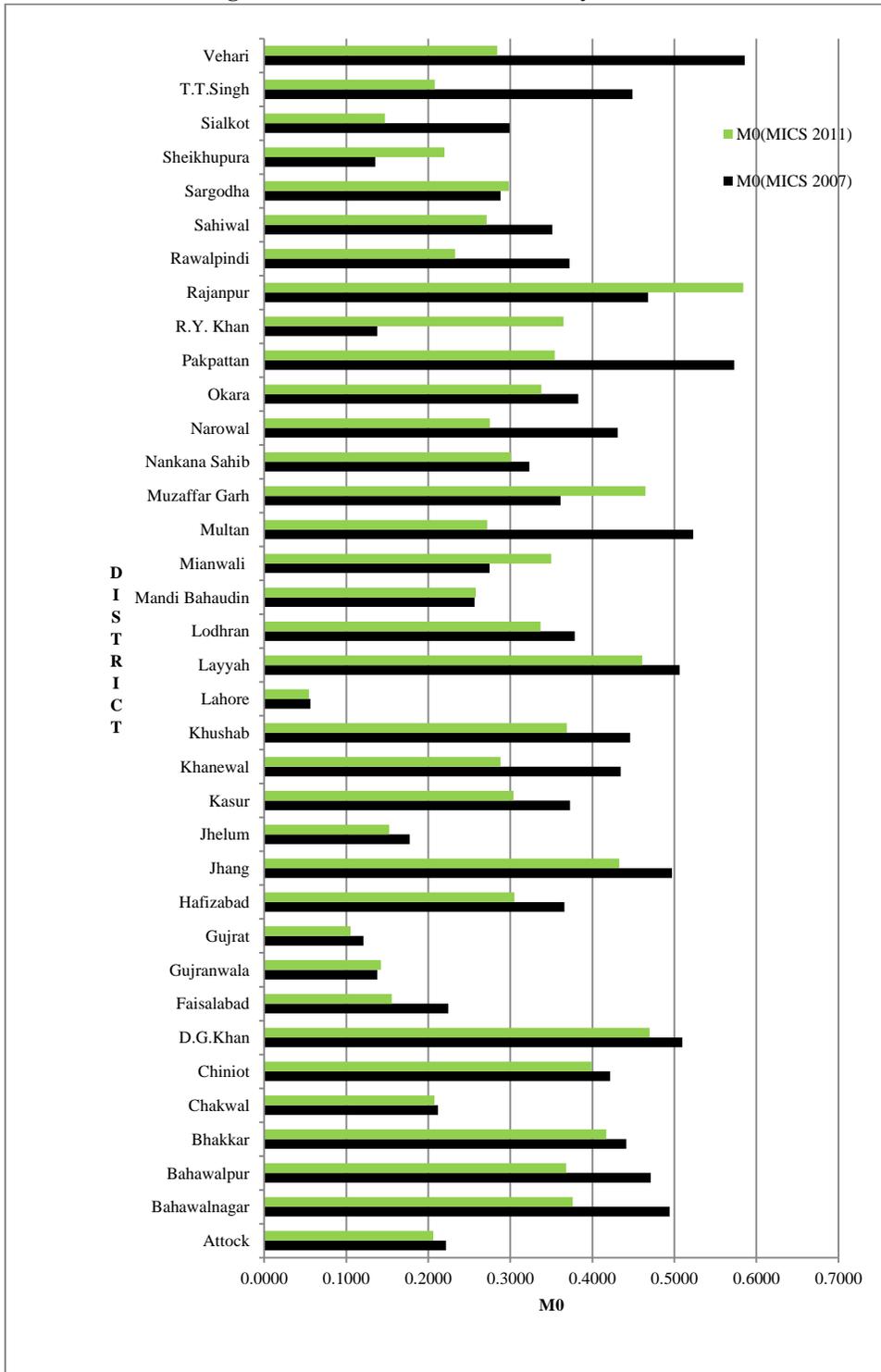
The side by side comparisons of district-wise results for MPI for the periods 2007 and 2011 are given in Table 8. Bold figures in Table 8 show the rise in the poverty. The decrease in poverty is shown in districts Vehari of 30 percent, Multan of 25 percent, T.T Singh of 24 percent, Pakpattan of 22 percent, Saikot of 15 percent, Narowal of 16 percent, Khanewal of 15 percent and Rawalpindi of 14 percent. The increase in the poverty has observed by 23 percent in R.Y.Khan, 12 percent in Rajanpur, 10 in percent Muzaffargarh, 8.5 percent in Sheikhpura, 7.5 percent in Mianwali and 1 percent in Sargodha. The district-wise comparisons of MPIs are shown in Figure 10, while increases/decreases in poverty are shown in Figure 11.

Table 8

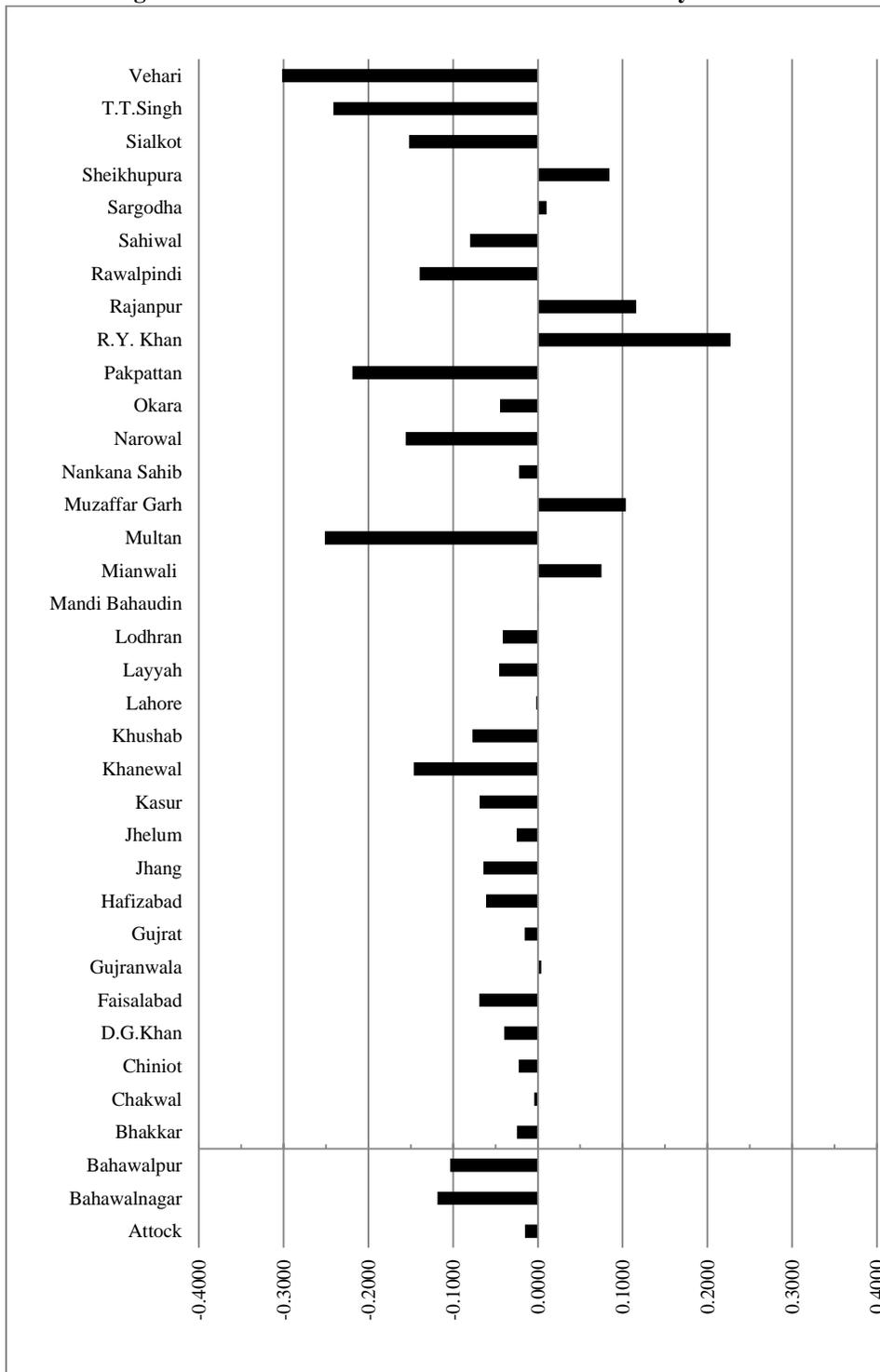
#### *MPIs 2007 vs. MPIs 2011 by Districts*

District	M0 (2007)	M0 (2011)	Inc/Dec	District	M0 (2007)	M0 (2011)	Inc/Dec
Attock	0.222	0.206	-0.015	Lodhran	0.379	0.337	-0.042
Bahawalnagar	0.494	0.376	-0.118	Mandi Bahaudin	0.257	0.258	<b>0.001</b>
Bahawalpur	0.471	0.368	-0.103	Mianwali	0.275	0.350	<b>0.075</b>
Bhakkar	0.442	0.417	-0.025	Multan	0.523	0.272	<b>-0.251</b>
Chakwal	0.212	0.208	-0.005	Muzaffar Garh	0.361	0.465	<b>0.104</b>
Chiniot	0.422	0.399	-0.023	Nankana Sahib	0.323	0.301	-0.022
D.G. Khan	0.510	0.470	-0.040	Narowal	0.431	0.275	-0.156
Faisalabad	0.225	0.155	-0.069	Okara	0.383	0.338	-0.045
Gujranwala	0.138	0.142	<b>0.004</b>	Pakpattan	0.573	0.354	-0.219
Gujrat	0.121	0.105	-0.016	R. Y. Khan	0.138	0.365	<b>0.227</b>
Hafizabad	0.366	0.305	-0.061	Rajanpur	0.468	0.584	<b>0.116</b>
Jhang	0.497	0.433	-0.064	Rawalpindi	0.372	0.233	-0.140
Jhelum	0.177	0.152	-0.025	Sahiwal	0.351	0.271	-0.080
Kasur	0.373	0.304	-0.069	Sargodha	0.288	0.298	<b>0.010</b>
Khanewal	0.435	0.288	-0.147	Sheikhpura	0.135	0.220	<b>0.085</b>
Khushab	0.446	0.369	-0.077	Sialkot	0.299	0.147	-0.152
Lahore	0.056	0.055	-0.002	T.T. Singh	0.449	0.208	<b>-0.241</b>
Layyah	0.507	0.461	-0.046	Vehari	0.586	0.284	<b>-0.302</b>

**Fig. 10. MPIs 2007 vs. MPIs 2011 by Districts**



**Fig. 11. MPIs 2007 vs. MPIs 2011 Increase/Decrease by Districts**



## V. CONCLUSION AND RECOMMENDATIONS

### Conclusion

The purpose of the study is to assess multidimensional poverty using Alkire and Foster (AF) method for the periods 2007 and 2011 in province Punjab-Pakistan, using primary data from Multiple Indicator Cluster Survey (MICS). The results are bifurcated for geographical split-ups of the Punjab to further explore over time status of poverty and monitor the disparities among different regions of the Punjab. The calculated figures of MPI (multidimensional poverty index) for the Punjab province at different k-cutoffs and detailed results for particular poverty cutoff of 33 percent indicated that the overall condition of Punjab province of Pakistan concerning to the deprivation in the economic barometers of living standards is at the moderate level of poverty. But the disparities and issues are evident when results are bifurcated area, division and district wise. The rural area of the Punjab has almost MPI at 0.40 in 2011 which means 40 percent of the rural population is MD poor and having deprivation in the living standards. Furthermore, the nine different divisions of the province are found to be have isolated thresholds of MPI. D.G. Khan, Bahawalpur and Sargodha divisions have been found to have the high values of MPI, whereas Gujranwala, Rawalpindi and Lahore divisions are having comparatively low values of MPI. Additionally, going shallow into district level results the circumstances get inferior and inferior. There are gigantic slits between different districts of the province Punjab. In Rajanpur, D.G. Khan, Muzaffargarh, Layyah, Jhang and Bhakkar more than 40 percent of the population is MD poor and having deprivations. There is dissimilarity ranging from 20 to 35 percent shown by the MPIs results of Gujranwala, Lahore, Gujrat, Faisalabad, and Jhelum districts when paralleled with the MPIs of Rajanpur, D.G. Khan, Muzaffargarh, Layyah, Jhang, and Bhakkar districts.

### Recommendations

On the basis of the results of individual time periods and chronological comparative findings of the study, the following suggestion and recommendation is being depicted.

- It is clear that all the regional split-ups of the Punjab province are not having similar standing, so the similar policies for all over the province will not prove its worth. To allocate the resources, there is dire need to focus on the different bands of poverty and allocation should be made accordingly, for instance D.G. Khan, Bhawalpur, Sargodha divisions need more care and attention as compared to Gujranwala, Lahore and Rawalpindi divisions.
- As we have identify the divisions which are under different bands of poverty, then utilising it as a base line we should carefully observed the status of the poverty in the particular district of the respective division to see which of the district should be focused first e.g., considering D.G. Khan division having  $M_0$  (2007) = 0.5299 and  $M_0$  (2011) = 0.4899, this division consists of four districts *i.e.*, D.G. Khan, Layyah, Muzaffargarh, and Rajanpur having MPI in the order at 0.50, 0.50, 0.36 and 0.46 for year 2007 and 0.47, 0.46, 0.46, 0.58 for year 2011, respectively. From this comparative analysis of the MPI it is perceived that the D.G. Khan and Layyah districts were having uppermost MPI value in 2007 and 2011. They have lessened their poverty level by 4 percent each. Whereas,

Muzaffargarh and Rajanpur districts were at 0.36 and 0.47, respectively in 2007 but in period 2011 they have flown up to 0.46 and 0.58, respectively. This deductive technique of identifying the poorer of the poor with the periodic check provides guide lines to introduce interventions in the right direction. As in the case of D.G. Khan Division, there is a dire need to focus Rajanpur and Muzaffargarh districts alarmingly.

- Consider Bahawalpur division having  $M_0(2007) = 0.48$  and  $M_0(2011) = 0.37$ , it shows 11 percent decline. This division consists of districts Bahawalnagar, Bahawalpur, R. Y. Khan, having MPI values at 0.49, 0.47 and 0.138 for 2007 and 0.38, 0.37 and 0.365 for 2011, respectively. Now it is evident that Bahawalpur and Bahawalnagar districts have shown decline in poverty whereas, the R.Y. Khan District has shown sharp rise in poverty. Here, policy makers need to focus R.Y. Khan at the first priority.
- Decomposition of the result by indicators may also helpful for having the particular direction for the allocation of resources.
- For the lovers of democracy, this paper may be used as evidence that even poor democratic regime *regarding living standards deprivations* is better in enhancing living standards in Punjab as compared to guided democracy guided by General Mushraf and especially of the dictatorship.

#### Future Avenues

- As MICS 2014 data collection and data entry process have not been yet completed and is in process. The findings of this study may be generalised using data of MICS 2007, 2011 and 2014 in the measurement of MPI.
- The sampling distribution of A and  $M_0$  can be classified and test of goodness of fits can be performed in order to detect the underlying distributions of each of the measures.
- Based upon the findings and evidence of the distributions, the statistical inference and predictions can be made.
- A robust analysis of the MPI class of measures can be done. For example, association among class of measures, Gap Analysis, Standard Error (Precision and Accuracy) etc.
- Scientific method of assigning weights to different indicators and dimensions may be used.
- Existing data sets does not allow us to include more and more indicators as the scopes of available data sets are either too narrow or too broad. In order to include further dimensions and indicators it is very necessary, to conduct a purpose based survey which includes all indicators and dimensions which are dynamic and internationally comparable in measuring MPI.

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**Comments**

This is a comprehensive research, based on huge data set. It covered all regions of Punjab and had a broader base as considered seven indicators of poverty. The paper is a good contribution literature on multidimensional poverty in Pakistan. Followings observations are noted in this paper:

- (i) Last line of page 02 “Punjab the biggest province of Pakistan, having the same poverty indicators as of Pakistan”. This statement seems to be wrong as many studies have reported that incidence of poverty is least in Punjab or authors should give evidence in favour of their statement.
- (ii) In Review of Literature many important studies that worked out MPI for Pakistan are not given such as, Salahuddin and Asad Zamad (PIDE, 2012), Arif (SDPI, 2012) and Niazi and AttaUllah (PU, 2012)
- (iii) What is rationale of considering these seven indicators (why education, Health, nutrition etc are not considered)
- (iv) What is rationale of giving same weight to each indicator, when they are not of equal importance. For instance access to drinking water is more important than Main material of roof.
- (v) An excellent District-wise comparison of MPI is give (Table 8), but reasons of differentials across districts and over time are not given
- (vi) Last point of recommendations “this paper may be used as evidence that the worst type of democracy is even better than guided democracy, especially of dictatorship”. This is a big claim merely on the basis of MPI, when key indicators education, health are not considered.

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## Educational Inequality in Rural and Urban Sindh

NOMAN SAEED and AMBREEN FATIMA

### 1. INTRODUCTION

Education is one of the important ingredients to measure the level of development of a society [UNDP (1990)]. Education not only contributes to improve the human capital of the society but also provide a civilised society (as economic agents are engaged in production, supplying labour, consuming good and services and participates in political decision making) and hence creates spillover effects and improves the welfare of the society without making anyone else worse off [Thomas, *et al.* (2001)]. It is the basic right of every member of the society to get equal access to education.

Education creates improvement in the human capital, which is regarded as an essential determinant of growth and subsequently it facilitate in reducing poverty. Government should give proper attention to promote education in the society given its importance in fostering growth and reducing poverty. But shortage of resources, inconsistent policies and deficiency in political will have made it difficult for developing countries to achieve desired education targets. It can be observed from the available literature that educational gaps between various groups exist within countries and distribution of education is skewed. A skewed distribution of education implies a large social welfare losses resulting from underutilisation of potential human capital [Thomas, *et al.* (2001)].

It can be observed from the existing literature that various indicators are used to measure different aspects of education for analyses. These indicators include literacy rate, enrolment ratios and education attainment. Afzal, *et al.* (2013) computed Net Enrolment Ratio (NER) by taking the ratio of the proportion of female net enrolments with male net enrolments in period  $t$ , separately for middle and secondary level to show gender disparity in education. Hamid, *et al.* (2013) used literacy rate and net enrolment rates to explain educational disparities across districts in Pakistan. Chaudhry and Rehman (2009) uses female to male literacy ratio, female to male enrolment ratio separately for primary and secondary age population to explain the gender inequality in education. Chaudhry (2007) used overall female to male literacy ratio of age 10 and above and female to male enrolment ratio for primary level to show the gender inequality in education. Jamal and

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Khan (2005) computed District Education Index (DEI) by taking weighted averages of enrolments rates in primary, secondary and tertiary and adult literacy rates and then used maximum-minimum ratio, Coefficient of Variation and Gini Index of DEI to show educational status separately for provinces, area (rural and urban) and gender (male and female). Sabir (2002) used gross enrolment ratios to explain gender disparities in education.

Standard Deviation of education indicators only measures the dispersion of educational inequality. To measure the relative distribution, Thomas, *et al.* (2000) proposed measurement of educational Gini index. Many of the researchers have computed the level of education attainment and the level of disparity using the educational Gini coefficient and examines educational gap within countries, regions, gender and castes and hence analyse the countries commitments of eliminating disparities in education.

For example Yang, *et al.* (2014) computed Gini index of education using data for the year 1996, 2000, 2004 and 2008 and concluded that there is remarkable progress in education attainment in China and effective decrease in education inequality during the period. Agarwal (2013) uses unit level information from household survey conducted by National Sample Survey Organisation (NSSO) for the period 1993, 1999, 2004 and 2009 and computed education inequality in major states of India and highlighted that there is marked disparity in educational attainment of the population in rural and urban areas and across the states. Kumba (2010) uses National Social Economic Survey data for the period 1999 to 2005 for the computation of Educational Gini coefficient and concluded that there is significant improvement in Gini Coefficient of Education in Indonesia. Tomul (2009) using the data of 1975 and 2000 Census and employing the direct method for calculating Gini concluded that the average years of schooling in Turkey and in all the regions has increased and inequality in education has decreased. Paranjape (2007) employee unit level information from household survey conducted by National Sample Survey Organisation (NSSO) for the year 1999-2000 and computed educational Gini index separately for regions, gender and caste for Maharashtra State of India and concluded that distribution of education is highly skewed particularly in rural region and among the socially backward sections. Educational inequality is higher in females than male in both rural and urban regions and the caste based inequality is sharper in rural areas. Thomas, *et al.* (2001) using data for 85 countries for the period 1960–90 computed inequality in education attainment by employing direct and indirect method of computing Gini Index for education and concluded that inequality in education in most of the countries declines over last three decades.

As part of global commitment at the World Education Forum [Dakar (2000)], Pakistan recognises that education is a fundamental right for all people, regardless of gender or age. Based on the commitment, Government of Pakistan, Development Agencies, Civil Society and Private Sector are now actively participating to provide basic education to all children, youth and adults. The National Education Policy of the Government of Pakistan therefore aims to ensure equal access to education opportunities to all the citizen of Pakistan [Pakistan (2009)].

To contribute for the achievement of overall target for Pakistan, the provincial Government of Sindh (GoS) prioritises the education sector and initiated Sindh Education Reform Programme (SERP) with the support of European Commission and the World

Bank. The Sindh Education Reform Program aimed at increasing school participation; reduction in gender and rural/urban disparities, improving schooling outcomes; increasing retention, completion and improvement of quality.

In order to implement the plan effectively and to reduce inequality and rural-urban disparity in education attainment, the policy makers need to have some benchmark. This paper aims at providing a measure which gives comprehensive picture of the degree of inequality in educational attainment within and across districts of Sindh using the methodology proposed by Thomas, *et al.* (2001). The paper will not only facilitate the policy maker to examine the changes in the inequality in major districts of Sindh during 2004-05 to 2010-11 but also assist them to formulate policies according to the shift in inequalities.

The paper is organised as follows: Section II describes the methodology. Section III discusses the data sources; Section IV presents the results. Section V explains the measure issues and concerns and analyses the factors affecting students' participation in school, while Section VI provides conclusions.

## 2. METHODOLOGY

### 2.1. Educational Attainment

Educational attainment is percentage distribution of population aged 15 and above according to the highest level of education attained or completed. The education attainment is compute to show the educational level of the population (of age 15 and above) and to show the stock of human capital within a country, in order to gauge needs and to ascertain policies for upgrading it. This indicator is used to reflect the structure and performance of the education system and its accumulated impact on human capital formation [UNESCO (2009)].

To observe the attainment rate in Sindh, we classify the individuals into seven educational levels that are: (1) illiterate and literate with non-formal schooling, (2) below primary (grade I-IV), (3) primary (V), (4) middle (VI-VIII), (5) secondary (IX-X), (6) higher secondary (XI-XII), and (7) graduation and above.<sup>1</sup>

### 2.2. Measurement of Educational Inequality

It can be realised from the existing literature that standard deviation of years of schooling has been used to measure absolute dispersion of distribution of education. The education Gini index is a relative measure of inequality in distribution of education. This indicator was developed by Thomas, Fan and Wang [Thomas, *et al.* (2000)] and is based on educational attainment. The education Gini index is analogous to income Gini which is a well known and most widely used measure of inequality. The measure associated with Lorenz curve is a graphical representation of inequality. The Gini coefficient has a natural geometric interpretation; it is equivalent to the ratio of the area between Lorenz curve and the 45<sup>0</sup> line of equality (egalitarian line) to the total area under the egalitarian line. The mathematical expression can be written as:

$$gini = \frac{1}{\mu} \sum_{i=2}^n \sum_{j=1}^{i-1} p_i |y_i - y_j| p_j \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (1)$$

<sup>1</sup>Diploma and Certificates that are below graduation level are added in higher secondary level.

Here, Gini = Gini index for Education and is equal to the average years of schooling for the concerned population;  $y_i$  and  $y_j$  are the years of schooling at different education attainment levels;  $p_i$  and  $p_j$  are the proportions of population with certain levels of education; and  $n$  is the number of levels in education attainment. The average years of schooling (AYS) is obtained as:

$$\mu = AYS = \sum_{i=1}^n p_i y_i$$

Similar to the conventional Gini index, the education Gini index ranges between the 0 (0 percent) and 1 (100 percent) whereas zero represents perfect equality and one represents perfect inequality. The higher the value of the index, the greater is the inequality. The index allows comparison across sub-groups of population and over time, and provides a complete picture on the educational development of a country or state in this case for districts of Sindh [Thomas, *et al.* (2001)].

Information on educational attainment levels for each social group for population aged fifteen and above is available separately by region and gender in PSLM. We have obtained the years of schooling at each of the seven education attainment levels using the following:

- (i) Illiterate  $y_1 = 0$
- (ii) Below Primary  $y_2 = y_1 + \frac{1}{2} C_p = 2.5$  approximately equal to 3
- (iii) Primary  $y_3 = y_1 + C_p = 5$
- (iv) Middle  $y_4 = y_3 + \frac{1}{2} C_s = 8$
- (v) Secondary  $y_5 = y_3 + C_s = 10$
- (vi) High secondary  $y_6 = y_5 + C_{HS} = 12$
- (vii) Graduation and above  $y_7 = y_6 + C_G = 16$

Where,

- $C_p$  = Cycle of Primary Education = 5 years
- $C_s$  = Cycle of Secondary Education = 5 years
- $C_{HS}$  = Cycle of High Secondary Education = 2 years
- $C_G$  = Cycle of Graduation and above = 4 years

### 3. DATA

This paper utilises unit level information from household surveys conducted by the Pakistan Bureau of Statistics (PBS), Government of Pakistan. The Pakistan Social and Living Measurement Survey (PSLM) are designed to provide Social and Economic indicators in the alternate year at provincial and district level. The surveys provide a wealth of information at the household and individual levels on household characteristics such as: household residence (rural or urban), religion, monthly household consumption expenditure; and demographic characteristics of individuals such as: age, education, marital status and sex. The survey also provides information on level of education attained by type of educational institution. The PSLM can classify information on educational attainment of an individual into Illiterate or not literate, literate with non-formal schooling, literate below primary, primary, middle, secondary, higher secondary, diploma/certificate holder, graduate, and postgraduate and above. The PSLM surveys are

now publishing district level surveys since 2004-05 [Pakistan (2004-05 to 2010-11)].<sup>2</sup> The analysis in the paper is conducted for the individuals aged 15 and above. Most studies on human capital generally consider this age group since this age group matches well with the labour force data [Barro and Lee (1996)].

#### 4. RESULTS AND DISCUSSION

##### 4.1. Educational Attainment Rate

Table 1 shows the proportion of population (aged 15 and above) by educational levels in years 2004-05, 2006-07, 2008-09 and 2010-11. Although it can be observed that the Sindh educational system showed a progress but it is clearly visible that 47.3 percent population is still illiterate and only 7.5 percent population are graduate and have higher degrees. Illiteracy decreases at a scant rate over the time. Among the literate population, primary and secondary constitute the major proportion in all the years. Primary education and Graduation and above showed a decrease in 2010-11 as compared to 2008-09 may be due to the increase in proportion in other levels of education. Substantial disparity can be observed in education attainments of rural and urban residents. It is noticeable that the proportion of illiterate population in the urban areas is half of that in rural areas in all the years.

Table 1

*Proportion of Population Across Educational Levels*

Sindh (Rural and Urban)	2004 - 05	2006 - 07	2008 - 09	2010 - 11
Illiterate	50.59	50.97	47.18	47.29
Below Primary	3.20	2.99	2.72	2.54
Primary	11.04	10.95	12.12	11.64
Middle	7.51	7.29	7.54	7.59
Secondary	13.47	13.51	14.49	15.40
Higher Secondary	5.68	5.75	6.32	8.05
Graduation and above	8.52	8.53	9.64	7.50
<b>Rural</b>				
Illiterate	65.49	66.59	59.97	61.20
Below Primary	3.41	3.55	3.04	2.88
Primary	12.14	11.90	13.74	13.12
Middle	4.62	4.64	5.63	5.50
Secondary	7.92	7.09	9.30	9.71
Higher Secondary	2.77	2.81	3.59	4.48
Graduation and above	3.65	3.42	4.73	3.11
<b>Urban</b>				
Illiterate	32.19	31.94	31.43	29.74
Below Primary	2.95	2.31	2.33	2.11
Primary	9.67	9.80	10.11	9.78
Middle	11.07	10.53	9.88	10.21
Secondary	20.31	21.33	20.88	22.57
Higher Secondary	9.27	9.35	9.69	12.56
Graduation and above	14.53	14.76	15.68	13.04

*Source:* Author's calculations from the unit record data of the 2005, 2007, 2009 and 2011 PSLM for individuals aged 15 and above.

The proportion of Primary (and Below Primary) education was 14 percent of the total population of rural and urban areas in 2005. This proportion remained almost the same over the time. The proportion of population having degree or higher than degree level of education is very low in rural areas. This may be because of the migration i.e.

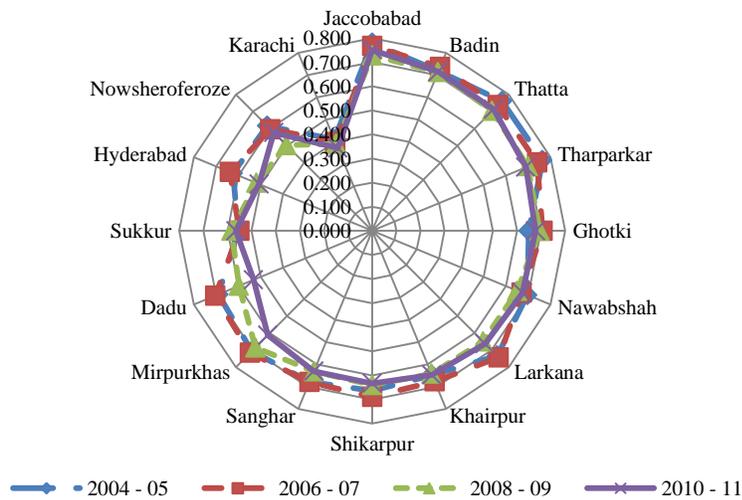
<sup>2</sup>Since district level information is available from 2004-05, the paper confined its analysis for the period 2004-05 to 2010-11.

people from the rural areas often migrate for better education or employment opportunities to urban areas, this also signals disparity in the distribution of educational infrastructure and resources.

#### 4.2. Educational Inequality

Table 2 shows the Gini index of education for major districts of Sindh. The Gini index at the provincial level was 62 percent in 2004-05, which decreased to 59 percent in 2008-09 and further to 58.5 percent in 2010-11. Nevertheless, the extent of educational inequality is very high. Among the major districts, Karachi has the lowest Gini Coefficient in all the years (See also Fig.1). Inequalities are high in most of the districts but Jacobabad has the highest extent of inequalities in Sindh followed by Badin and then Thatta.

**Fig. 1. Changes in Educational Inequality: Major Districts of Sindh.**



*Source:* Author's calculations from the unit record data of the 2005, 2007, 2009 and 2011 PSLM for individuals aged 15 and above.

*Note:* Educational inequality is measured by the Gini index of education. New districts were constituted in 2005-06 and the PSLM provides district wise information since 2004-05. Information for new district is available since PSLM 2008 that's why analysis of Major district exclude newly constituted districts.

The table clearly highlights inter-district disparity in the distribution of education attainment. The Gini index in Karachi is 37 percent while it is more than 50 percent in rest of the Sindh and reaches to more than 70 percent in Jacobabad, Badin and Thatta. The Gini index declines in most of the district over the time but it increases in Nausheroferoze, Nawabshah, Jacobabad, Thatta and Larkana while showed a marginal increase in District Badin and District Khairpur.

Table 2

*Gini Index of Education— Major Districts of Sindh*

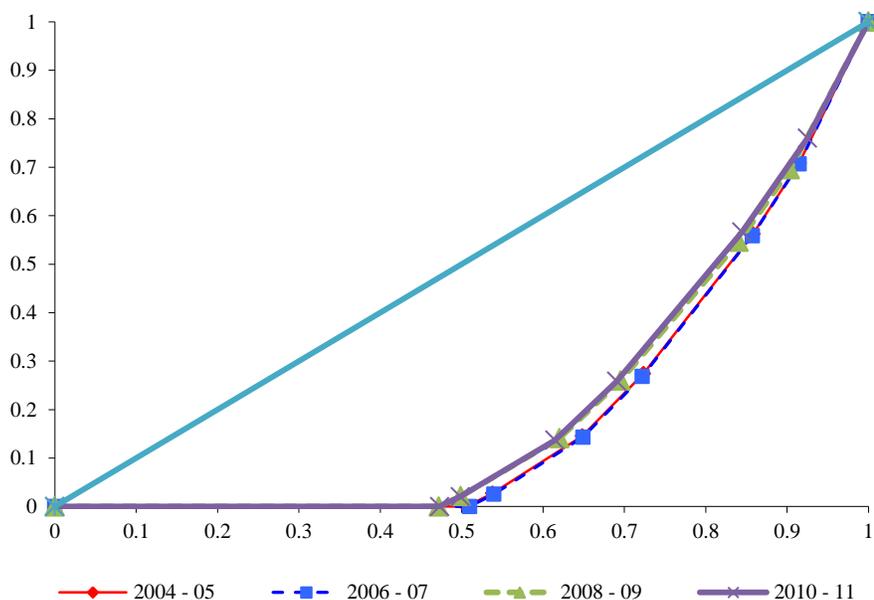
Sindh	Rural				Urban							
	2004 - 05	2006 - 07	2008 - 09	2010 - 11	2004 - 05	2006 - 07	2008 - 09	2010 - 11				
Badin	0.718	0.736	0.713	0.715	0.765	0.769	0.740	0.749	0.537	0.603	0.604	0.569
Dadu	0.690	0.705	0.598	0.533	0.716	0.742	0.601	0.549	0.566	0.538	0.583	0.437
Ghotki	0.649	0.707	0.695	0.677	0.672	0.748	0.718	0.723	0.588	0.585	0.621	0.517
Hyderabad	0.625	0.639	0.520	0.507	0.713	0.721	0.669	0.690	0.513	0.526	0.447	0.420
Jacobabad	0.780	0.766	0.728	0.751	0.830	0.818	0.791	0.808	0.627	0.622	0.558	0.586
Jamshoro	–	–	0.658	0.609	–	–	0.700	0.693	–	–	0.598	0.470
Karachi	0.411	0.399	0.391	0.372	0.721	0.662	0.616	0.611	0.380	0.370	0.364	0.346
Kashmore	–	–	0.725	0.698	–	–	0.799	0.783	–	–	0.548	0.489
Khairpur	0.648	0.677	0.642	0.647	0.672	0.712	0.667	0.672	0.560	0.548	0.548	0.554
Larkana	0.733	0.743	0.650	0.662	0.761	0.778	0.696	0.710	0.624	0.615	0.524	0.530
Maitari	–	–	0.669	0.639	–	–	0.712	0.693	–	–	0.562	0.507
Mirpurkhas	0.706	0.716	0.685	0.612	0.774	0.772	0.766	0.712	0.511	0.553	0.448	0.419
Nawabshah	0.696	0.671	0.651	0.675	0.763	0.753	0.692	0.726	0.560	0.521	0.548	0.558
Nowsheroferoze	0.616	0.596	0.503	0.576	0.661	0.625	0.500	0.624	0.489	0.514	0.508	0.442
Sanghar	0.678	0.679	0.631	0.631	0.714	0.727	0.669	0.649	0.542	0.520	0.495	0.559
Shahdadkot	–	–	0.715	0.704	–	–	0.724	0.717	–	–	0.658	0.623
Shikarpur	0.664	0.689	0.640	0.633	0.719	0.773	0.686	0.705	0.534	0.505	0.513	0.458
Sukkur	0.556	0.551	0.583	0.565	0.683	0.708	0.697	0.662	0.463	0.465	0.509	0.498
Tando Allah Yar	–	–	0.613	0.633	–	–	0.685	0.719	–	–	0.497	0.496
Tando Muda Khan	–	–	0.674	0.688	–	–	0.680	0.722	–	–	0.654	0.610
Tharparkar	0.764	0.740	0.699	0.690	0.816	0.803	0.736	0.731	0.569	0.505	0.555	0.490
Thatta	0.762	0.737	0.703	0.713	0.782	0.772	0.746	0.762	0.667	0.576	0.519	0.494
Umerkot	–	–	–	0.699	–	–	–	0.741	–	–	–	0.602
<b>Sindh</b>	<b>0.618</b>	<b>0.621</b>	<b>0.591</b>	<b>0.585</b>	<b>0.739</b>	<b>0.748</b>	<b>0.696</b>	<b>0.701</b>	<b>0.459</b>	<b>0.454</b>	<b>0.452</b>	<b>0.430</b>

Source: Author's calculations from the unit record data of the 2005, 2007, 2009 and 2011 PSLM for individuals aged 15 and above. As per the Census 1998 there were 16 districts in Sindh in the year 2005-06 new districts were constituted and the total reaches to 23 districts.

We now examine the educational inequality in rural and urban areas separately. The Gini index is higher in the rural areas compare to the urban areas. Mostly districts have Gini index more than 70 percent in rural areas. It can be clearly observe that the educational inequalities are decreasing in urban areas over the time (see Table 2). The improvement in the distribution (decrease in Gini index) is highest in the District Dadu (both for rural and urban regions). Mostly districts showed improvement in distribution in the urban areas except Nawabshah, Sanghar, Jacobabad and Khairpur where inequality marginally increases in 2010-11, while for rural areas, distribution showed that in major districts education inequality increases marginally in 2010-11.

Figure 2 shows the educational Lorenz curve. The figure shows an improvement in the distribution of education in Sindh over time.

**Fig. 2. Education Lorenz Curve, of Sindh: 2005, 2007, 2009 and 2011**



Source: Author's calculations from the unit record data of the 2005, 2007, 2009 and 2011 PSLM for individuals aged 15 and above.

## 5. MAJOR ISSUES AND CONCERNS<sup>3</sup>

This section will analyse some of the major factors that affect students' participation in schools. These issues are useful in explaining the rural–urban inequalities in general and also in explaining the extent of rural inequality in particular. Household's economic factors, school environment (including quality of human and physical

<sup>3</sup>The analysis is mostly based on the observations and experiences during the visits to districts and conducting different studies for the donor agencies (include European Union, the World Bank, JICA and Government of Sindh) by the author and from the review of several unpublished reports.

infrastructure), social and cultural factors are important factors influencing school participation rate [Tilak (2009)].

For rural areas, there is a limited access to educational institutions particularly at higher levels of education. School infrastructure in terms of classrooms, drinking water and toilets is poor. Many schools even do not have class rooms and students had to sit in an open area. Schools become non-functional during rains. Students often face poor access to information and technology in rural areas. However, in urban areas, there is accessibility of educational institutions; better infrastructure (both in terms of human and physical facilities) and good quality of education are some important incentives which motivate students to participate in schools.

The prevalence of cultural and traditional norms in rural areas also discourages participation of girls in education. Traditional customs in villages such as early child marriages are still persistent which affect participation in education. Lack of female teachers despite the growing demand for education is another issue in many districts. Many schools are functional with only one or two teachers mostly male.

## **6. CONCLUSION**

This paper examines the educational attainment rate and educational inequality in Sindh for the period of 2004-05 to 2010-11. About 47 percent of the population of the Sindh in age group 15 and above is illiterate and just 7.5 percent have obtained Graduation and higher degree. There is a clear disparity in educational attainments of the population in rural and urban areas, and across the districts in Sindh. Using the education Gini index, we have estimated inequality in educational attainment. Although, inequality declined between 2004-05 and 2010-11 but the extent of inequality remains high (above 58 percent in 2010-11). The Gini index is higher for rural areas as compare to the urban areas across districts indicating rural-urban disparity in education attainment.

Improved infrastructure facilities and good quality of education are vital to encourage the children in rural areas to get enrolled. In order to improve the education system of Sindh in general and rural areas in particular and to achieve the MDGs, strong coordination is also required between the Donor agencies and Government with the support of private sector.

## APPENDIX

### Average Years of Schooling

Sindh	Rural				Urban							
	2004 - 05	2006 - 07	2008 - 09	2010 - 11	2004 - 05	2006 - 07	2008 - 09	2010 - 11				
Badin	3.28	2.86	3.20	3.08	2.48	2.34	2.71	2.43	6.08	4.78	4.98	5.43
Dadu	3.34	3.31	4.84	5.23	2.91	2.76	4.77	4.87	5.24	5.60	5.13	7.03
Ghotki	4.01	3.26	3.42	3.67	3.63	2.56	3.00	3.06	4.98	5.12	4.62	5.78
Hyderabad	4.66	4.38	6.27	6.06	3.18	2.90	3.56	3.33	6.40	6.19	7.44	7.28
Jacobabad	2.52	2.58	3.18	2.81	1.85	1.90	2.18	2.00	4.51	4.41	5.68	5.03
Jamshoro	-	-	3.88	4.37	-	-	3.29	2.92	-	-	4.69	6.44
Karachi	7.61	7.84	8.03	8.05	2.66	3.38	3.67	3.91	8.07	8.28	8.47	8.47
Kashmore	-	-	3.29	3.73	-	-	2.29	2.64	-	-	5.59	6.35
Khairpur	4.14	3.91	4.40	4.12	3.86	3.33	3.99	3.74	5.18	5.93	5.91	5.53
Larkana	3.13	2.97	4.38	4.09	2.72	2.42	3.63	3.26	4.66	4.84	6.33	6.20
Maitari	-	-	3.84	4.15	-	-	3.19	3.38	-	-	5.35	5.92
Mirpurkhas	3.42	3.21	3.57	4.66	2.38	2.45	2.42	3.09	6.23	5.35	6.76	7.48
Nawabshah	3.55	3.75	3.90	3.57	2.50	2.68	3.22	2.82	5.53	5.63	5.44	5.20
Nowsheroferoze	4.58	4.86	6.25	5.22	3.92	4.40	6.33	4.56	6.41	6.13	6.06	7.05
Sanghar	3.61	3.79	4.24	4.02	3.01	3.16	3.67	3.77	5.71	5.84	6.20	4.97
Shahdadkot	-	-	3.21	3.42	-	-	3.09	3.21	-	-	3.91	4.65
Shikarpur	3.90	3.67	4.40	4.45	3.16	2.40	3.54	3.31	5.61	6.30	6.53	7.09
Sukkur	5.48	5.54	5.04	5.25	3.21	3.06	3.20	3.60	6.95	6.81	6.17	6.31
Tando Allah Yar	-	-	4.52	4.12	-	-	3.46	2.90	-	-	6.17	5.97
Tando Muda Khan	-	-	3.61	3.08	-	-	3.38	2.44	-	-	4.08	4.29
Tharparkar	2.70	3.07	3.50	3.38	1.95	2.21	2.96	2.73	5.38	6.22	5.54	6.27
Thatta	2.46	2.45	3.03	3.09	2.08	1.94	2.32	2.24	4.00	4.54	5.73	6.34
Umerkot	-	-	-	3.21	-	-	-	2.61	-	-	-	4.51
<b>Sindh</b>	<b>4.67</b>	<b>4.66</b>	<b>5.07</b>	<b>5.00</b>	<b>2.82</b>	<b>2.70</b>	<b>3.38</b>	<b>3.22</b>	<b>6.96</b>	<b>7.04</b>	<b>7.15</b>	<b>7.24</b>

Source: Author's calculations from the unit record data of the 2005, 2007, 2009 and 2011 PSLM for individuals aged 15 and above.

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# The Composite Impact of Institutional Quality and Inequality on Economic Growth

NEELUM NIGAR

## 1. INTRODUCTION

The relationship between institutions and economic growth has attracted significant attention in recent years with the dominant view being that institutional quality positively influences economic performance of a country. However, the impact of similar kind of institutions on economic growth varies across regions and countries. Various reasons including, Income inequality and ethnic fragmentation have been put forth as proximate cause of the weaker relationship between institutions and economic growth [Easterly, *et. al* (2006); Ann-Sofie (2007)]. However not enough literature is available on why the impact of similar set of institutions on growth varies across countries and regions. Given that inequality may weaken the impact of institutional quality on growth, this study seeks to examine the composite impact of institutional quality and inequality on growth in selected Asian economies.

Highly unequal societies may adversely influence the quality of institutions. Literature suggests variety of mechanisms through which this may happen. These include concentration of political power and social and ethnic fragmentation etc. Studies argue that if the political power is concentrated in society, then the few elites will shape institutions and policies to their own advantage—in such societies the government will make the kind of investment and offer the kind of services which favour the elite. It is also argued that the skewdness of the distribution of wealth contributes to political inequality which produces institutions that favour a small segment of the society [Olson (1993), Sonin (2003), Acemoglu (2003, 2005), Gradstein (2008)]. Engerman and Sokoloff relate institutional quality to inequality observed in factor endowments while Acemoglu relate this to colonialism. They argue that inclusive institutions were established in places where the European colonisers could settle themselves while extractive institutions were developed in countries/regions where the colonisers were to rule through minimal presence of their own.

The primary objective of the study is to examine how institutional quality influences economic growth, given inequality. While seeking an answer to this question the independent impact of institutional quality and inequality on growth will be also be gauged.

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The rest of the paper is organised as follows. Section 2 discusses the relevant literature review while the empirical model, data sources and the model specification are presented in Section 3. Section 4 describes the estimation results Section 5 concludes the study.

## 2. REVIEW OF RELATED LITERATURE

The debate over the importance of institutions in the growth process has been the focus of attention for some decades now. A variety of literature examines the growth process across nations in relation to many concepts ranging from inequality, trade, geography to institutions. Some of these works are reviewed below:

### 2.1. Inequality and Growth

The relationship between inequality and growth has been repeatedly challenged making it difficult to capture the exact relationship between growth and inequality. While Kuznets' inverted U-curve hints that inequality will rise as the economy grows in the early stage of development and falls when GDP per capita surpasses a certain level. However, it is argued that high inequality may lead to reduced economic growth, suggesting a negative relationship between inequality and growth [Alesina and Rodrik (1994); Persson and Tabellini (1994) and Clarke (1994)]. Explaining the negative relationship between growth and inequality Birdsall, *et al.* (1995) and World Bank (1993) point towards the fact that growth had been high in relatively egalitarian East Asia as compared to Africa and Latin America—the regions with high inequality. Perotti (1996) finds no evidence for the role of higher tax rates causing inequality but links the negative relationship between inequality and growth to the political instability and low human capital development more unequal societies. The negative inequality-growth relation has been challenged by many researchers who found zero, or a positive relationship between inequality and growth. [Forbes (2000); Barro (2000); Banerjee and Duflo (2003)]. These studies implicitly support the long held belief in economics about the positive association between inequality and growth. The underlying argument being that the rich with higher propensity to save will provide more capital for investment thereby positively influencing growth. However, given data constraints, especially regarding the data on inequality, these studies did not test the relationship for poor countries.

A large strand of literature is focused on the mechanisms that characterise the inequality-growth relationship. Apart from the redistributive mechanism identified in the work of Alesina and Rodrik (1994) and Persson and Tabellini (1994), institutional mechanism is a strong determinant of the negative relationship between inequality and growth [Easterly (2002); Olson (1993); Acemoglu (2003, 2005) and Sokoloff and Engerman (2000)]. Easterly (2002) has examined the impact of inequality; on institutions, openness and schooling and he finds negative effect of inequality on all three. Olson (1993) and Acemoglu (2003) confirm the negative relationship between inequality and growth by identifying how inequality and political instability lowers the growth process. Sokoloff and Engerman (2000) emphasise the role of few powerful elites in delaying the implementation of growth enhancing policies and conclude the inequality adversely affects economic development.

Yet another channel of inequality-growth relationship is of credit market imperfections. The credit market imperfections affect growth through influencing access to education. Galor-Zeira (1993) and Perotti (1996) argue that given credit market imperfections a borrower ends up paying more interest making it difficult for the poor to borrow. This constrains the access to education for the poor and the formation of human capital. Easterly (2007) also supports the view that inequality has an adverse effect on human capital formation and economic development. Easterly's cross country analysis suggests that inequality has been a barrier to schooling and economic prosperity.

## **2.2. Inequality and Institutions**

While the importance of institutions for development has widely been accepted, a significant body of literature confirms that institutional quality varies across countries. Several studies examine the impact of economic conditions on institutional quality. In particular, studies like Hoff and Stiglitz (2004), Sonin (2003), and Chong and Gradstein (2004) suggest that an egalitarian distribution of income is very important for establishing good institutions. Hoff and Stiglitz (2004) present a framework for institutional subversion; Sonin (2003) presents a dynamic model suggesting that low quality institutions are responsible for the adverse effect of inequality on growth as low-quality institutions are associated with wasteful redistribution towards the rich which affects the growth process negatively. Chong and Gradstein (2004) propose a mechanism which identifies that the intensity of rent seeking derived from a public asset—such as technological knowledge or a natural resource—is a source of low institutional quality. Using a panel vector Autoregressive approach and Granger causality test they find a bi-directional causal relationship between income inequality and institutions. Sonin (2003), using a theoretical model, shows that in the absence of democracy (political inequality and wealth inequality) the rich and the politically influential make the institutions work for their benefit through rent seeking activities. Such activities retard the development process due to waste of resources in rent seeking, resulting into lower growth and high inequality.

Engerman and Sokolof (2002) and also Sokoloff and Engerman (2000) look at this relationship in historical perspective. They argue that initial (historical) factor endowments are the main determinants of inequality developed under colonial regimes. Given high inequality the colonial regimes were able to establish extractive institutions in Latin America whereas they failed to do so in North America, where relative egalitarianism prevailed. The authors argue that high inequality in these colonies provided unbalanced economic opportunities which benefited the elite. In line with study of Engerman and Sokolof (2002), many social scientists and economists have successfully tested inequality's hypothesis. Easterly (2001) using middle class share as a proxy for inequality and commodity endowments as an instrument for inequality confirms a negative relationship between inequality-democracy. Erickson and Vollrath (2004) test the Engerman and Sokolof hypothesis using land inequality as a measure of inequality and they find no influence of land inequality on institutions. Quite contrary to the findings of Erickson and Vollrath (2004), Keefer and Knack (2002) test the impact of land and income inequality on property rights controlling for political regimes (democracies versus autocracies). They show that inequalities negatively affect institutions (property rights).

Some studies, such as Bardhan (2001), Hoff and Stiglitz (2001), and Busch and Muthoo (2010) link the persistence of inefficient institutions with bargaining power. Bardhan (2001), using a simple Nash bargaining model, demonstrates that a growth-enhancing institutional change may create would-be winners and would-be losers and argues that it is the would-be losers who would resist the change. They further argue that the change being resisted is potentially Pareto improvement. Similarly, Busch and Muthoo (2010) study the issue in a two player's model in which the players have options to negotiate over an efficiency-enhancing institutional change. The model assumes that the players have perfect and complete information. They show that if this change is implemented then how the players' respective bargaining power would be altered, resulting into a change in the players' incentive to support or not to support the institutional change. Both the studies conclude that greater degree of inequality in the players' bargaining powers leads to the persistence of inefficient institutions. Similarly in one of his pioneering works Acemoglu (2002) argues that the conflict over redistribution policies is a key factor determining the persistence of inefficient institutions.

### **2.3. Institutions and Growth**

The link between institutions and growth has been widely debated to explain the cross country variation in the development path. Since the first studies that used institutions as explanatory variables of growth in cross-country regressions [e.g., Barro (1991)], large number of works have used variety of datasets that provide 'institutional variables' to be added to the usual explanatory variables in cross-sectional growth regressions. e.g. International Country Risk Guide (ICRG), Business Environment Risk Intelligence (BERI), the Polity database, the Freedom House index, etc. [Knack and Keefer (1995); Mauro (1995); Clague, *et al.* (1997) and Hall and Jones (1999)].

In a cross-country analysis, Knack and Keefer (1995) investigates the impact of property rights on economic growth using institutional indicators. These institutional indicators include quality of bureaucracy, property rights, and the political stability of a country compiled by country risk evaluators to potential foreign investors. They find a statistically significant positive relationship between institutions and economic growth. Similarly, Mauro (1995) and Easterly (1999) show that corruption affects the growth process negatively. The two popular studies which have examined the role of institutions on economic growth are Hall and Jones (1999) and Acemoglu, *et al.* (2001). The former focuses on social infrastructure and the later emphasises the risk of expropriation that current and potential investors face. Given the endogeneity between institutions and growth, both the studies use instrumental variables to examine the relationship between institutions and growth. Hall and Jones (1999) examine the hypothesis that the difference in cross-country economic performance is based on variations in inputs (physical capital and human capital). Their results show that the large amount of variation in the level of the Solow residual across countries cannot fully explain the differences in physical capital and educational attainment. They conclude that the differences in capital accumulation, productivity and therefore output per worker across countries are determined by differences in institutions and government policies, which they call social infrastructure. Acemoglu, *et al.* (2001) argue that European colonisers established good institutions in countries where the disease environment allowed them to settle, while they established extractive institutions in countries where they could not settle themselves.

Rodrik, *et al.* (2002) investigates the impact of institutions, geography and trade in affecting the variations in income levels around the world. Their results show that the quality of institutions succeed in explaining the variation—once institutions are controlled for, trade does not directly affect economic growth, while geography weakly affects it. Trade and other geographical indicators have negative relationship with growth. Rodrik, *et al.* (2002) finds a bi-directional relationship between institutional quality and trade. This suggests that trade can indirectly affect the growth process by improving institutional quality. They also examine the impact of geography on economic growth and their results confirm the findings of Easterly and Levine (2002) that geography has a significant effect on institutions, this could be, e.g. through the disease environment.

The literature, discussed in this study provides a one link phenomenon in which either inequality has been linked to growth or to institutions, or institutions have been linked to growth and vice versa.

Only a selected number of papers which study the determinants of institutions and the influence of these institutions on growth. Olson (1993), Acemoglu (2003), and (2005) discuss the political determinants of development in which they argue that political inequality affects economic institutions which in turn affect the growth process. In historical perspective Sokoloff and Engerman (2000) links the development pattern of the New World's colonies to the initial level of inequality which, they argue, has resulted into the subversion of institutional quality in Africa and Latin America. The authors conclude that economic inequality in the age of colonisation adversely affects suffrage, schooling, banking and other institutions and continues to affect growth to this very day. Social and cultural dynamics of a country also play an important role in establishing efficient and much effective institutions. In line with this argument Ann-Sofie Isaksson (2007) and Easterly, *et al.* (2006) find that measures of social cohesion (or social division) such as income inequality and ethnic fractionalisation endogenously determine institutional quality which in turn causally determines growth. Gradstein (2008) emphasises on the role of political and economic inequality over formal institutions in the growth process. However, Mark Gradstein does not empirically test this relationship argued. The present study seeks to fill this gap.

### 3. EMPIRICAL MODEL

Based on the literature reviewed above the behavioural relationship between income inequality, institutional quality and economic growth can be empirically formulated as follows

$$Y_{it} = \beta_0 + \beta_1 Inst_{it} + \beta_2 Ineq_{it} + \beta_3 Inst_{it} \cdot Ineq_{it} + \beta_4 X_{it} + u_{i,t} \quad \dots \quad \dots \quad \dots \quad (1)$$

$Y_{it}$  is the annual per capita growth rate of GDP,  $Inst_{it}$  is institutional quality,  $Ineq_{it}$  is inequality,  $Inst_{it} \times Ineq_{it}$  is the interaction term allowing the institutional parameter to vary along inequality,  $X_{it}$  is a vector of control variables including inflation, trade openness, change in capital taken as investment and population growth, whereas  $u_{it}$  is the random error term.

The main focus in Equation 1 is on  $\beta_3$  which is the parameter for the interaction of institutional quality and inequality. Interaction models are generally used to capture the

effect of one variable over the other through the mediating mechanism. For example Ann-Sofie (2007) investigates the impact of institutional quality on economic performance in socially segmented countries. To account for the role of social division on economic performance, the author employs a nonlinear model that captures the interaction between institutional quality and social division by using the term ‘Gini times social division’. The study finds that though high institutional quality positively influences economic growth independently but this relationship is adversely affected in countries with high degree of social divisions. Similarly, Savoia and Easaw (2007) use the interaction of economic institutions and political equality (i.e. democracy) to gauge their combined influence on income inequality. They find that the impact of economic institutions on income inequality is influenced by the level of political equality.

### 3.1. Data Description and Sources

We use panel data for nine low and lower-middle income countries.<sup>1</sup> The selection of nine countries within the low and lower middle income countries is owed to data constraints—the data on income inequality (Gini coefficient) for sufficient period to allow econometric analysis (1984-2010) is available only for these 9 countries, within the category of low and middle income countries.

The studies on inequality often use the data on inequality developed by Denniger and Squire (1996, 1998). The Denniger and Squire data set has been criticised on various counts by Atkinson and Brandolini (1999). They argue that the inequality measured by Denniger and Squire uses different variables for different countries, for example; individual versus household income, income vs. expenditure and pre-tax vs. post-tax income. They argue that the adjustment required to make the data comparable across countries has not been carried out.

An alternative global inequality dataset as been constructed by University of Texas Inequality project (UTIP) based on Industrial Statistics data base published annually by United Nations Industrial Development Organisation (UNIDO). This data does not measure household income inequality rather it is a set of measures of the dispersion of pay across industrial categories in the manufacturing sector. This source has been used most often in the literature for the study of inequality over time and across countries. Yet another source for inequality data is ‘Standardising World Income Inequality Dataset (SWIID)’ which provides data for more than 153 countries starting from 1960. It interpolates the missing data from the World Income Inequality Database (WIID). Recently, the updated version of ‘Standardising World Income Inequality Data Set’, SWIID, version 3.1 [Solt (2011)] has made it quite possible to study the issue of inequality for wide panel of countries.

We have used Gini coefficient to measure income inequality and the data on the variable is from SWIID version 3.1. For institutional quality we have constructed an index comprising six features institutional quality. The components of the index of institutional quality include: democratic accountability, government stability, corruption, bureaucratic quality rule of law and investment profile. The data on these features of

<sup>1</sup>The classification of low and lower middle income countries is based on WDI data set. The sample of countries include: Bangladesh, El-Salvador, Egypt, Honduras, India, Indonesia, Pakistan, Philippine, and Sri Lanka.

institutional quality is from International Country Risk Guide (ICRG) published by the PRS Group. The index has been generated using Principal Component Analysis.<sup>2</sup> Computation of the index is shown in Appendix Table 2 while the detailed description of data source is given in Appendix Table 1.

### 3.2. Summary Statistics

Appendix Table 3 presents summary statistics which includes mean, median, standard deviation and skewness for all the variables. Appendix Tables 4 and 5 present the correlation and covariance matrix. Institutional quality, trade openness and investment are positively correlated with per capita income growth while Gini index, population growth and the interactive term (Gini x institutional quality) are negatively correlated. The covariance matrix exhibits relationship similar to the ones observed in the correlation matrix. Gini index, population growth and the product of Gini and institutional quality covariate negatively with per capita income while all others covariate positively.

## 4. EMPIRICAL FINDINGS

This section explains the empirical model in detail along with its interpretation and robustness check in a subsequent manner.

### 4.1. Results

Two methods available for estimating panel data are the fixed effect and random effect model. The results from Hausmann test, reported in Appendix Table 6 reveal that fixed effect model is more suitable for estimation of the empirical model given by Equation 1. Given that Hausman test favours fixed effects method, the model has been estimated using this method and to tackle endogeneity robustness of the results has been checked using two stage least square (2SLS). Per capita income growth the dependent variable: institutional quality, Gini index and the interactive term, Gini x institutional quality are main variables of our interest variables while we control for inflation, investment, trade openness and population growth. The Results are reported in Appendix Table 7.

Institutional quality, positively influences growth, is highly significant and conforms to literature [Acemoglu, *et al.* (2004); Hall and Jones (1999); Knack and Keefer (1995); and Rodrik, *et al.* (2004)]. Income inequality, measured by Gini Index, is negatively correlated growth. The results indicated in the fixed effects model show that the coefficient of this variable is negative and highly significant at 1 percent. The coefficient suggests that a 1 percent increase in Gini Index leads to 0.38 percent decrease in economic growth. The result is consistent with the findings of Alesina and Rodrik (1994), Persson and Tabellini (1994), and Clarke (1994). In low income countries this negative inequality-growth relationship is consistent with the findings of Perotti (1996) who links the negative relationship to the political instability and low human capital development in these countries.

The third variable which is the main focus of this study is the interactive term of income inequality and institutional quality. This is included to capture the effects of institutions on economic growth given high inequality in a society. The results show that

<sup>2</sup>Principal component analysis is based on the frame work used by Bishoi, *et al.* (2009).

the interactive term, which is significant at 1 percent, affects economic growth negatively. A 1 percent increase in the coefficient of the interactive term (Gini x institutional quality) decreases growth by 0.49 percent. Thus despite there being a positive relation between institutional quality and growth the composite impact of income inequality and institutional quality on growth is negative. This implies that for institutions to play a positive role in economic growth a certain minimum level of egalitarianism in a society is essential, this being absent the composite impact is negative.

Inflation, investment, trade openness and population growth are the control variables. Investment/GDP is highly significant at 5 percent level of significance and is positively related to growth; while inflation (CPI), significant at 1 percent, is negatively associated with GDP. Trade openness and population growth influence growth positively. All the results are as expected.

The results obtained from the 2SLS are similar to the results obtained from estimation of equation 1 using the fixed effects model. In 2SLS estimation, the validity of the results depends on the value of J-statistics which tests the null hypothesis of correct model specifications and over identification restriction i.e. the validity of the instruments. The results reported in Appendix Table 6 show that the null hypothesis is not rejected at any conventional level of significance ( $p = 0.129$ ). This confirms the validity of the model and of the instruments used.

#### **4.2. Sensitivity Analysis and Robustness Check**

We have estimated a whole range of regressions using both the fixed effects model and the 2SLS, by including or excluding certain variables. In all the specifications the sign and significance of coefficients of institutional quality, inequality and their interactive term remain consistent. These results are presented in Appendix Table 8.

### **5. SUMMARY AND CONCLUSION**

Institutions are known to influence growth positively. While inequality that was once considered good for growth is now considered harmful. We argued that it is not appropriate to consider the effect of either institutions or inequality on growth in isolation because both may interact to influence growth. For example, given high inequality, otherwise brilliant individuals may not make it to the labour market due to market frictions. Similarly despite equality of opportunity, organisations may not overcome the problem of adverse selection if the institutions meant for identifying the right individual are of poor quality. Therefore the composite impact of institutional quality and inequality is an important determinant of growth. We find that the impact of the interactive term, 'institutional quality times inequality' on economic growth is negative. This is despite the fact that the independent impact of institutions on growth is positive. The implication is that for a sustained and decent growth, improvements in institutional quality as well as alleviation of inequality are important.

## APPENDIX

Table 1

*Description of Variables*

S. No.	Variable	Description / Source
1.	<i>Economic Growth (Y)</i>	GDP per capita growth (% annual). / WDI
2.	<i>Income Inequality (Gini)</i>	Gini Coefficients. / SWIID Version 3.1
3.	<i>Institutional Quality Index(Q)</i>	ICRG Components/PCA Index
4.	<i>Investment (Inv)</i>	Gross fixed capital formation as percentage of GDP. /WDI
5.	<i>Population Growth (PG)</i>	Population Growth(% Annual)./WDI
6.	<i>Inflation (Inf)</i>	Consumer Prices (Annual %)./WDI
7.	<i>Trade Openness (TO)</i>	Sum of Imports and Exports as a ratio of GDP. / WDI

Table 2

*Eigen Values of Correlation Matrix*

	PC1	PC2	PC3	PC4	PC5	PC6
Eigen values	2.93	1.01	0.78	0.51	0.44	0.33
Variance %	192.13	22.59	26.92	7.18	10.92	-
Cumulative %	48.81	65.6	78.62	87.15	94.49	100
<b>Eigen Vectors</b>						
Variables	PC 1	PC 2	PC 3	PC 4	PC 5	PC 6
Bureaucratic Quality	0.43	0.03	-0.43	0.65	-0.44	-0.55
Corruption	0.33	0.47	0.69	-0.01	-0.38	0.20
D. Accountability	0.35	0.63	-0.32	-0.04	0.59	0.18
Government Stability	0.43	-0.52	-0.03	-0.11	0.06	0.72
Investment Profile	0.46	-0.05	-0.23	-0.71	-0.27	-0.40
Law and Order	0.43	-0.32	0.43	0.25	0.49	-0.48

Table 3

*Summary Statistics*

	Mean	Median	Maximum	Minimum	Std. deviation
Economic Growth	2.81	2.86	17.15	-15.70	3.10
Institutional Quality	0.49	0.51	0.78	0.19	0.12
GINI	38.61	35.79	53.23	26.92	6.74
GINI x Inst. Quality	19.15	18.56	34.77	5.41	5.78
Inflation	9.58	8.35	58.39	0.52	7.04
Trade Openness	56.46	53.62	136.75	12.36	26.16
Investment	21.93	21.54	38.11	11.46	5.36
Population Growth	1.80	1.80	3.42	-1.61	0.68

Table 4

*Correlation Matrix*

	Y	Q	GINI	GINI*Q	INF	TO	INV	PG
Economic Growth (Y)	1							
Institutional Quality (Q)	0.29	1						
GINI	-0.18	0.02	1					
GINI x Inst.Q	-0.12	0.83	0.55	1				
Inflation (INF)	-0.41	-0.34	0.05	-0.27	1			
Trade Openness (TO)	0.10	0.25	0.68	0.62	0.01	1		
Investment (INV)	0.30	0.38	0.05	0.33	0.12	0.31	1	
Population growth (PG)	-0.24	-0.42	-0.11	-0.42	0.08	-0.19	-0.05	1

Table 5

*Covariance Matrix*

	Y	Q	GINI	GINI*Q	INF	TO	INV	PG
Economic Growth (Y)	9.591							
Institutional Quality (Q)	0.110	0.015						
GINI	-3.870	0.016	45.303					
GINI x Inst. Quality	-2.234	0.586	21.356	33.237				
Inflation (INF)	-9.091	-0.294	2.515	-11.147	49.433			
Trade Openness (TO)	8.058	0.823	121.008	92.792	17.752	681.432		
Investment (INV)	5.067	0.253	1.709	10.201	4.657	42.953	28.667	
Population Growth (PG)	-0.512	-0.035	-0.501	-1.635	0.378	-3.368	-0.188	0.463

Table 6

*Hausman Test*

Correlated Random Effects—Hausman Test				
Test Cross-section Random Effects				
Test Summary (Panel 1)	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.	
Cross-section Random	24.8906	6.0000	0.0004	
(Panel 2) Cross-section Random Effects Test Comparisons:				
Variable	Fixed	Random	Var(Diff.)	Prob
Institutional Quality	-4.63	3.88	32.19	0.03
GINI x Inst. Quality	0.06	-0.15	0.02	0.18
Inflation	-0.18	-0.16	0.00	0.01
Trade Openness	-0.01	-0.01	0.00	0.01
Investment	0.20	0.15	0.01	0.11
Population Growth	0.07	-1.29	0.15	0.03
Panel (3) Cross-section Random Effects Test Equation:				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.90	1.14	0.79	0.42
Institutional Quality	-4.69	6.41	-0.72	0.47
GINI x Inst. Quality	0.06	0.14	0.42	0.67
Inflation	-0.18	0.02	-6.84	0.00
Trade Openness	-0.001	0.01	-0.13	0.89
Investment	0.20	0.05	4.06	0.00
Population Growth	0.38	0.16	0.02	0.002
Effects Specification				
Cross-section Fixed (dummy variables)				
R-squared	0.45	F-statistic		12.77
Adjusted R-squared	0.41	Prob(F-statistic)		0.00

Table 7

*Empirical Findings*

	Fixed Effect	2SLS	Random Effect
Institutional Quality	14.58 (8.86)***	29.17 (11.44)**	17.710 (7.67)**
GINI	-.38 (0.11)*	-0.53 (0.14)*	-.16 (0.08)***
Inflation	-0.22 (0.02)*	-0.26 (0.03)*	-0.22 (0.02)*
Trade Openness	0.23 (0.02)	0.53 (0.009)	-0.002 (0.02)
Investment	0.23 (0.04)*	0.15 (0.07)**	0.24 (0.03)*
Population Growth	0.07 (0.45)	0.28 (0.75)*	-1.28 (0.2)
GINI x Inst. Quality	-0.49 (0.22)**	-0.87 (0.28)*	-0.56 (0.19)*
C	-14.06 (4.76)*	-18.48 (6.26)*	-2.42 (3.42)
R-square	0.48	0.46	0.417
Adjusted R-squared	0.45	0.41	0.39
F-statistics	14.44	–	23.96
Prob(F-statistic)	0.00	–	0.00
J-statistic	–	9.89	–
Prob(J-statistic)	–	0.13	–

Note: All the values in the parenthesis denote standard errors. The \*\*\*, \*\*and \* indicate the significance at 10 percent, 5 percent and 1 percent respectively.

Table 8

*Robustness Check and Sensitivity Analysis*

Variables	Fixed Effects			2SLS		
	1	2	3	4	5	6
Institutional Quality	6.51 (1.62)*	-4.31 (2.24)***	14.58 (8.86)***	26.25 (13.97)**	5.95 (2.62)	29.18 (11.44)**
GINI	–	-0.19 (0.07)*	-0.39 (0.11)*	–	-0.26 (0.09)*	-0.54 (0.14)*
Inflation	–	-0.22 (0.025)*	-0.23 (0.03)*	–	-0.2 (0.03)*	-0.26 (0.04)*
Trade Openness	–	0.01 (0.02)	0.02 (0.02)	–	0.01 (0.02)	0.03 (0.02)
Investment	–	-0.24 (0.05)*	0.24 (0.05)*	–	0.27 (0.06)**	0.15 (0.07)**
Population Growth	–	0.02 (0.46)	0.06 (0.46)	–	-0.07 (0.54)	0.28 (0.76)
GINI x Inst. Quality	–	–	-0.49 (0.22)**	–	–	-0.87 (0.28)*
C	-0.41 (0.82)*	-6.25 (3.20)	-14.06 (4.76)*	-19.54 (6.57)	-7.84 (3.79)*	18.48 (6.26)
R-squared	0.25	0.48	0.49	0.16	0.38	0.47
Ad. R-squared	0.22	0.44	0.45	0.11	0.33	0.41
F-statistic	8.80	14.87	14.44	–	–	–
Prob(F-statistic)	0.00	0.00	0.00	–	–	–
J-statistic	–	–	–	3.85	6.93	9.89
Prob(J-statistic)	–	–	–	0.28	0.22	0.12

Note: All the values in the parenthesis denote standard errors. The \*\*\*, \*\*and \* indicate the significance at 10 percent, 5 percent and 1 percent respectively.

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## **Spatial Distribution of Socio-economic Inequality: Evidence from Inequality Maps of a Village in Tribal Region of Pakistan**

EJAZ GUL and IMRAN SHARIF CHAUDHRY

### **1. INTRODUCTION**

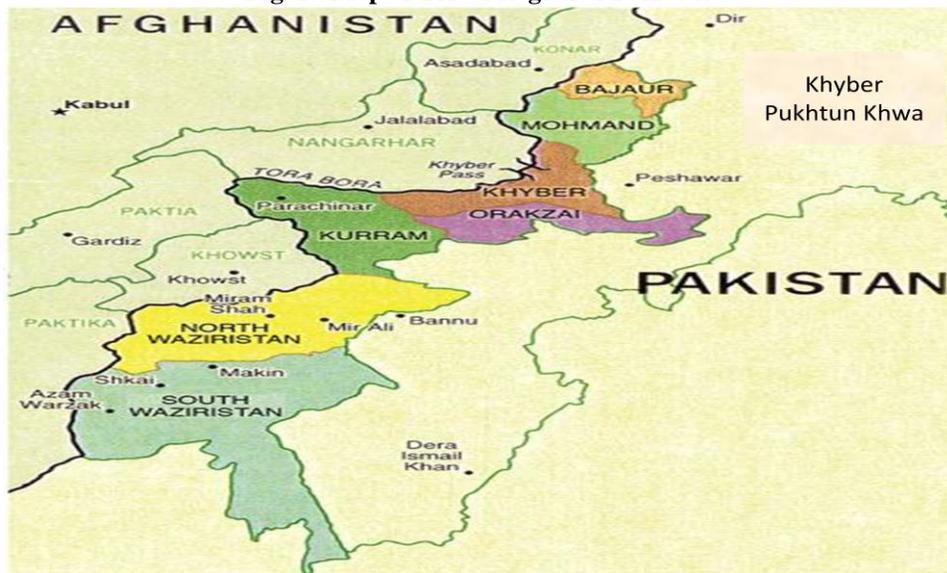
Economic and social inequality is consistently persisting in tribal region of Pakistan. People in the tribal region of Pakistan are living in deprived state whereby they lack even basic necessities in their lives. As described by Gul, the tribal areas are different than the rural areas because tribal areas are located in far flung mountainous terrain where accessibility to basic amenities is much lower than the rural areas [Gul (2013)]. In recent times, the Government of Pakistan initiated many efforts for provision of basic amenities in tribal areas as an essential component of development in the context of Millennium Development Goals (MDGs). However, according to John the desired state is yet to be achieved in tribal areas [John (2009)]. Tribal life is characterised by hardship and great insecurity especially for poor labour. Given the income vulnerabilities, the long run welfare is forgone for short run securities. Interruption, reduction or loss of earnings from the contingencies such as unemployment, underemployment, low wages, low prices and failure to find the market for the produce, old age, ill-health, sickness, disability etc. are the situations which call for social security and protection. As concluded by Talbot, this constant state of deprivation has generated deep rooted inequalities in the tribal society [Talbot (1998)]. People take rescue measures such as sending their earners to urban areas and if possible to foreign countries. Those who have lands and doing agriculture are the blessed one, although, the earning pattern is distorted due to law and order situation. To have an assessment of the overall economic inequality in the tribal region, author conducted a study in a small village Naryab which is located in the tribal region. Primary data was collected from the households physically and it was thoroughly analysed to conclude the pattern of inequality. This inequality was then mapped using latest mapping software “SURFER”. The maps reveal spatial distribution of inequality and many other important social and environmental aspects. Based on the results, policy implications have been described in the paper.

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## 2. LITERATURE REVIEW

Inequality mapping is a new paradigm in economics. Recently many researchers have made an attempt to map the socio-economic inequalities. Baulch has worked on the spatial distribution of poverty in Vietnam and identified the key areas for reduction of poverty [Baulch (2002)]. Alesina has elucidated that to reduce the socio-economic inequality and poverty, we must first explain and predict its distribution in the area [Alesina (2005)]. Economists like Li and Zhao have tried to investigate the extent of income inequality that exists in particular countries and, even in the absence of satisfactory theories of distribution, to determine how these relate to various characteristics of the economies [Li and Zhao (2006)]. There are social researchers like Swinkels worked on poverty mapping in Vietnam and advocated that if inequality trends are mapped they can be very beneficial to economic planners and policy makers [Swinkels (2007)]. This is specifically true in case of Pakistan since the pattern of inequalities changes with the change of geographical, environmental and climatic conditions. As explained by Javaid, Pakistan is blessed with diversified landscape and hence its poverty and economic inequality landscape is correspondingly diversified [Javaid (2001)]. In this context, tribal region can be quoted as example. Tribal region consists of the seven tribal agencies which are located far from urban centers and hence suffering from deprivation of basic amenities and deep rooted socio-economic inequality. Map of tribal region is shown in Figure 1.

**Fig. 1. Map of Tribal Region of Pakistan**



The tribal region is bordered by Afghanistan to the north and west with the border marked by the Durand Line and by Province of Khyber Pakhtunkhwa to the east. The seven Tribal Areas lie in a north-to-south strip. The geographical sequence of the seven tribal areas in order from north to south is: Bajaur, Mohmand, Khyber, Orakzai, Kurram, North Waziristan and South Waziristan.

The economy of the tribal region is underdeveloped. This region is the most impoverished and least developed. While this region has 2.4 percent of Pakistan's population, it contributes only 1.5 percent to Pakistan's economy, making it the smallest contribution to GDP. As of 2013, the per capita income of tribal region was roughly \$663 per year and very small proportion of households has a sustainable living standard above the poverty level. Daniel has elucidated the socio-economic conditions of tribal region in his works on Pakistan's Tribal Belt and he narrated that being a tribal society, the local economy is mainly pastoral based, with some practice of agriculture. Households are involved in primary level activities like subsistence agriculture, rearing of livestock and small scale businesses. Many locals seek employment as skilled and unskilled labourers while some join security agencies and paramilitary forces. Some are able to travel and migrate to larger cities and urban centres outside the tribal areas within Pakistan and abroad. A significant number of these are qualified professionals and in many cases have settled permanently along with their families outside tribal areas, contributing to brain drain effect and shortage of skilled workers. Earners abroad receive their earnings and send remittances to tribal areas to support their families and relatives at home [Daniel (2008)].

There are abundant natural resources in tribal region such as marble, copper, limestone and coal which can create a potentially thriving mining industry, although the current socio-economic situation has not encouraged their profitable exploitation. Angel has explained that trade with neighbouring Afghanistan plays an active role in tribal's economy, and items imported and exported to the country via trucks pass through supply routes in tribal areas. This has made tribal region a transitional point for smuggling and trafficking of goods [Angel (2007)]. Moreover, Tierney has indicated in his works on national identity that there have been calls to implement greater measures for integrating tribal region into the mainstream economy. In this regard, there are several economic, industrial and social development ventures that have been undertaken by the government recently in order to aid tribal economy and bring this region in the mainstream [Tierney (2008)].

According to data available on the official web site of Federally Administered Tribal Areas (FATA), tribal region has a population of roughly 3.18 million. Annual population growth is calculated to be 2.19 percent. Population density stands at 117 persons per square kilometre as a whole. A rough estimate of the population in the tribal region is given in Table 1.

Table 1

*Population in Tribal Region, Pakistan*

Agency	Area (Square Kilometers)	Population	Population Density (Persons per Square Kilometers)	Annual Growth Rate (%)
Complete Tribal Region	27,220	3,176,331	117	2.19
Bajaur	1,290	595,227	461	4.33
Mohmand	2,296	334,453	146	4.28
Khyber	2,576	546,730	212	3.92
Orakzai	1,538	225,441	147	2.69
Kurram	3,380	448,310	133	2.50
North Waziristan	4,707	361,246	77	2.46
South Waziristan	6,620	429,841	65	1.95

Source: Official web site of Federally Administered Tribal Areas (FATA) at <http://www.fata.gov.pk>

The average household size is approximately 9 to 10, while the gender ratio has been estimated as 108 men for every 100 women. The tribal region has literacy rate of 12 percent, which is well below the desired rate of above 60 percent. 15.8 percent of men, and only 7.5 percent of women receive education. There is one hospital bed for every 2,179 people, and there is one doctor for every 7,670 people. Only 23 percent of the citizens have access to clean drinking water.

These social conditions in tribal region indicate that tribal region is deprived and poor. The socio-economic conditions affecting the life of households have been the main stay of recent social research. Huong has worked on the socio-economic inequality and major causes of death in adults of Vietnam. He concluded that socio-economic inequality generates denial and discontent in the society [Huong (2006)]. Similarly, Pyatt in his work on fundamentals of social accounting indicated that inequality in socio-economic factors leads to bigotry in most of the cases [Pyatt (1991)]. Alongside this, many researchers of social science have investigated the relationship between household resource allocations and socio-economic inequality. Sow has described the correlation between household resource allocation and collective well being. He concluded that justice in household resource allocation will create equity [Sow (2010)]. The work of Thomas on household resource allocation in developing countries investigated the income, expenditure and health outcomes of household resource allocation [Thomas (1997)]. Household behaviour is also an important aspect in the overall context of inequality. Few researchers have correlated the living standard with household behaviour. For example Chiappori in his work on collective models of household behaviour indicated that household behaviour has linkage with overall makeup of the society [Chiappori (1997)]. The household behaviour influences the household welfare as concluded by Fafchamps in his study on intra household welfare in rural Ethiopia [Fafchamps (2009)]. Arpino in his investigation on dynamic multi-level analysis of households' living standards and poverty has concluded a linkage between household behaviour, living standards and poverty [Arpino (2007)].

From social science point of view, injustice and corruption generate socio-economic inequality. This has been the main stay of investigation by many social scientists like Glaeser and J. S. You. Glaeser has deduced that injustice not only generates but also accelerate inequality [Glaeser (2003)]. J. S. You has elucidated that relationship between inequality and corruption is casual in nature [You (2005)].

In short we can say that the retarded growth in rural communities is due to prevailing poverty which is the outcome of socio-economic inequality. This vital fact has been investigated by Dercon in his work on growth and chronic poverty [Dercon (2011)].

### 3. RESEARCH AREA

Naryab is the village in tribal region at distance of 350 kilometres west of Islamabad, the capital city of Pakistan as shown in Figure 2. Village Naryab is a bowl amongst the surrounding mountains having heights up to 100 meters. An off shoot of River Kurram passes through east of the village. On this off shoot an irrigation dam of 200 cusecs capacity has been constructed in the north of village which irrigates the fields and has boosted up agriculture activity since its construction. Besides, this dam also serves a recreational spot. A metal road goes up to Naryab and ahead in the north as

shown in Figure 2. A zoom in view in Figure 2, shows that village Naryab has scattered population. There are 2500 houses with a population of approximately 25000 to 30000 at the rate of roughly 10 individuals per house. There are 10 large shops in the village with few numbers of outlets and different locations in the village. There is one hospital and a primary, middle and high school in the village. There is no worthwhile education system for female education except for one private primary girls school in the centre of the village.

**Fig. 2. Satellite Images of Research Area**



Houses are made of mud and bricks with 2 to 3 rooms in each house. People on the fringes of village have fields where they do their subsistence agriculture. Electricity is supposed to be available as per the laid out aerial wire network but it is hardly available. Clean drinking water from natural springs is collected in a water tank of 1000 gallons from where it is supplied to houses through a network of pipe lines.

#### **4. RESEARCH METHODS**

Comprehensive research methodology was adopted for this study. There are about 2500 houses in Naryab and primary data from all the houses was collected. Broadly, following research design was applied to complete this study.

- Detail study of the area was done from satellite and Google imageries to ascertain environmental and climatic aspects of Naryab. The geographical location of Naryab in relation to urban centres was particularly focused.
- Field visits were conducted to assess the prevailing socio-economic conditions of the village in general.
- Survey was carried out to collect primary data about income, agriculture lands, education, health, earners in urban centres, earners in foreign countries, drinking water, electricity, lavatory.
- Data obtained was analysed statistically to conclude about the trend and pattern of inequality with respect to income, agriculture lands, education health, drinking water, electricity and lavatory.
- Inequality modelling was carried out to have clear picture of existing and future trend of each socio-economic factor.
- Prismatic assessment of the inequality was done by calculation of Gini coefficient for each factor.
- Data was transferred to latest mapping software to create maps for socio-economic inequality and indicate its spatial distribution.

#### **5. DATA COLLECTION**

Comprehensive data collection process was adopted for evaluation of inequality in village Naryab. Primary data about income, agriculture lands, education, health, earners in urban centres, earners in foreign countries, drinking water, electricity, lavatory was collected from the village. For this purpose, village was divided into five zones; North, South, East, West and Central. These zones are shown in figure 3. Five data collection teams were made and one team was sent for each zone. Isolated dwellings on the fringes of village and mountain terraces were ignored. A panoramic view of the landscape of each zone is shown in figure 4. North zone is hilly in nature with numerous plateaus available on mountains. People have made their houses on plateaus, terraces and valleys. It's a fairly populated zone. Primary school of Naryab is located in this zone. There is considerable agriculture activity in this zone. East zone is located on the sloping mountain terraces. Small agriculture fields are located on these terraces for subsistence farming. A high school and rural health centre are located in this zone. Naryab agriculture dam is located in the north east of this zone. Central zone is the most populated zone and located on plain surface. Shops and markets are mostly located in this zone. South zone

has scattered population with size of the houses bigger than rest of the zones. Metal road passes through this zone and goes north. Inhabitants of this zone remain busy in agriculture activity on large fields, cattle farming and house poultry. West zone has congested dwellings, however, has huge agriculture fields on its west. The area in this zone is generally sloping from west to east.

**Fig. 3. Division of Naryab Village into Zones for Survey**



**Fig. 4. Panoramic View of Landscape in Zones for Survey**



After zoning of the research area, selection of suitable socio-economic factors for analysis of the inequality was the most important step of the research. Based on detail study of prevailing conditions in the village, a socio-economic factors matrix was developed in which relevant nine factors were included for assessment of the inequality. Factors matrix is shown in Table 2.

Table 2

*Socio-economic Factors Matrix for Evaluation of the Inequality*

Socio-economic factors	Description
Per Capita Income (I)	Average per capita income per year in a zone from agriculture, cattle farming, house poultry, local business, earners in urban centres and foreign countries (US\$)
Agriculture land (AL)	Average agriculture land per household in a zone (acres)
Male Education (Em)	Average number of educated male per house in a zone
Female Education (Ef)	Average number of educated female per house in a zone
Health (H)	Average number of patients per house per month in a zone
Clean drinking water (Cw)	Average number of clean drinking water taps per house in a zone
Electricity (Elec)	Average number of electricity hours per day in a zone
Lavatory (L)	Average number of lavatories per house in a zone
Size of house (SoH)	Average area of house in a zone (square meters)

Door to door survey was conducted in all the zones to record the data about the factors mentioned in Table 2. Field visits and interviews were also conducted by the author. Each factor of the evaluation matrix was discussed with experts. This survey took about three months.

## 6. DATA ANALYSIS

Data collected from the households was summarised and average of selected nine socio-economic factors was calculated for each zone. Descriptive statistics were also calculated to know about the trends. Data along with descriptive statistics is tabulated in Table 3.

Table 3

*Summary of the Data Collected from the Households*

Zones	Average Income Per Year in US Dollars	Average Agricultur e Lands (Acres)	Average Number of Educated Male Per House	Average Number of Educated Female Per House	Average Number of Patients Per House Per Month	Average Clean Drinking Water Taps Per House	Average Number of Electricity Hours Per Day	Average Number of Lavatories Per House	Average Area of House in Square Meters
	I	AL	Em	Ef	H	Cw	Elec	L	SoH
North Zone	254	0.4	2	1	6	2	3	0	300
East Zone	378	0.8	5	0	4	5	2	1	515
Central Zone	603	0.2	3	1	5	6	2	2	245
South Zone	719	1.03	2	1	1	3	6	2	567
West Zone	313	1.5	1	0	5	2	4	0	313
	<b>Descriptive Statistics</b>								
Mean	453.4	0.786	2.6	0.6	4.2	3.6	3.4	1	388
Median	378	0.8	2	1	5	3	3	1	313
Standard Deviation	178	0.461	1.356	0.49	1.720	1.625	1.497	0.894	128
Variance	32045	0.17	1.53	0.19	3.03	2.38	2.05	0.57	20166
Kurtosis	-2.014	-0.843	1.456	-3.33	2.608	-2.231	0.536	-3.000	-2.655
Skewness	2.235	-1.487	1.239	-2.08	0.209	-1.697	-0.286	-2.181	2.234

Some of the relevant aspects can be concluded from table 3. For example the mean per capita income of village Naryab is just \$453.4 which is much below the desired level. However, the mean per capita income of south zone is \$719 which is relatively acceptable, albeit not desirable. This indicates the inequality in per capita income distribution across the different zones of village Naryab. Similar is the case with other socio-economic factors. For example the possession of agriculture lands by households is more in the west zone, educated males per house are more in the east zone due to availability of Naryab high school is near vicinity. However, there are no educated females in the entire east and west zones. The number of patients per house are more in the north zone due to non availability of doctor and health facilities in the zone and also due to less number of clean water taps. Electricity hours are more in the south zone due to its proximity to grid station and less line losses. Lavatories are not available in the houses of north and west zones. The most congested living was observed in the central zone.

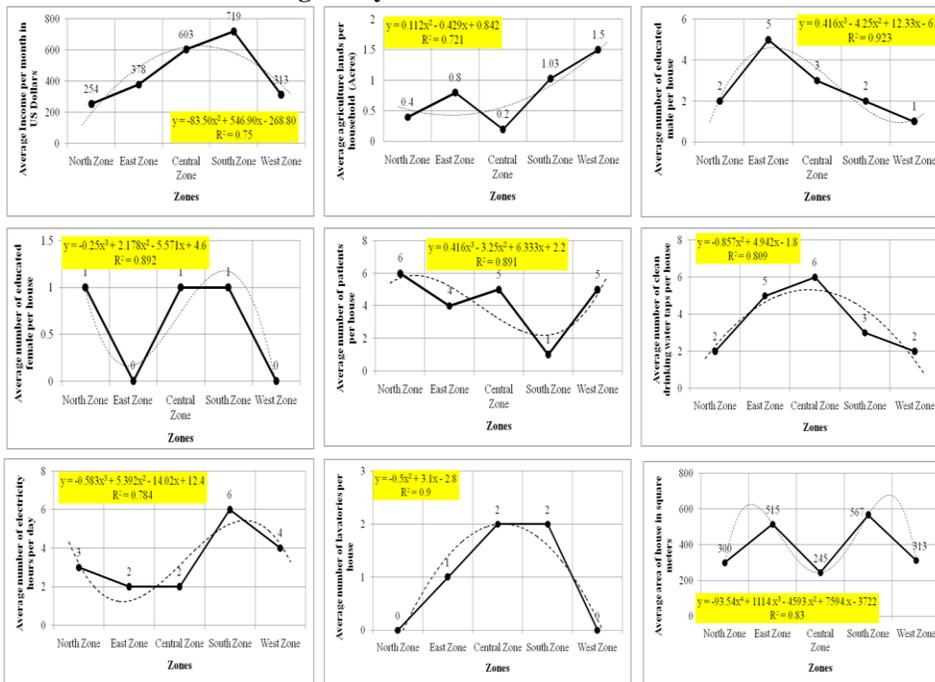
### 7. INEQUALITY MODELING

After statistical analysis, digital model for each selected socio-economic factor was developed using latest computer assisted qualitative data analysis software (CAQDAS). The digitised models indicated existing trends and future tendency with a best fit trend line, econo-mathical representative equation and value of  $R^2$  as shown in Figure 5. Econo-mathical equations were obtained after digital iteration and attenuation by the software. These equations caters for the errors in the variables. Coefficient of determination,  $R^2$  is a statistic that gives information about the goodness of fit of a curve. In regression,  $R^2$  is a statistical measure of how well the regression line approximates the real data points. An  $R^2$  of 1 indicates that the regression line perfectly fits the data as indicated by Brown in his work on multiple membership multiple classification models [Browne (2001)]. For example for the per capita income, the equation of the best fit polynomial trend lines is quadratic in nature with  $R^2$  value as 0.75, which makes the arrangement acceptable. As per the trend line, south zone will continue to hold maximum per capita income followed by central zone. There are two reasons for this; south zone has maximum agriculture activity and number of earners in urban centres and foreign countries while central zone is the hub of all business activities in village Naryab.

Let's now see the scenario with regard to possession of agriculture lands. Figure 5 shows that the best fit polynomial dotted trend line for agriculture has a representative equation of degree two, quadratic in nature and the  $R^2$  value is 0.721. The maximum land possession is in west zone owing to the open agriculture spaces available. As per the trend, south and west zones will have maximum agriculture activity while it may reduce in the east zone owing to construction of new houses and shifting of population in the vicinity of Naryab Dam in south zone. Average number of educated males per house are more in the east zone due to availability of public and private schools in this zone. Opposite conditions exist in the west zone, where due to minimum education facilities, number of educated males per house is less. In this case the best fit polynomial dotted trend line has a cubic equation with  $R^2$  value of 0.923 which means an accurate representation of the trend. As shown by the dotted trend line, east zone will have greater number of the educated males but the situation in west zone is also likely to improve with development of new educational facilities. There are very less number of educated

females in village Naryab. In the east and west zones there are no educated female at all. However, in the north, central and south zones there is one educated female per house. There is only one private female primary education school in the centre zone. The best fit polynomial dotted trend line representing female education in village Naryab has a cubic equation with  $R^2$  value of 0.892. As shown by the trend line, the situation is likely to remain the same unless construction and operation of new female education schools. The number of patients per house are minimum in the south zone owing to better sanitation facility. Number of patients per house are more in the north zone where the sanitation facility is not good and there are no lavatories in the houses.

**Fig. 5. Inequality Modeling of Selected Socio-Economic Factors for Village Naryab**



The best fit polynomial dotted trend line representing average number of patients per house in village Naryab has a cubic equation with  $R^2$  value of 0.891. As shown by the trend line, the number of patients per house will remain minimum in the central and south zones while it will increase in the east and west zones. The best fit polynomial dotted trend line representing average number of clean drinking water taps per house in village Naryab has a quadratic equation with  $R^2$  value of 0.809. As shown by the trend line, the number of clean drinking water taps per house will improve in the south zone in the future. The average number of electricity hours per day are more in the south zone owing to better electricity network and closeness to electricity grid station. In this case, the representative equation of the best fit polynomial dotted trend line is cubic in nature with  $R^2$  value of 0.784. As shown by the trend line situation of electricity is likely to remain the same in future. Average number of lavatories per house is an indicator of sanitation

facilities. In north and west zones there is no lavatory in any of the house. Fields and orchards are being used as lavatories. The representative equation of the best fit polynomial dotted trend line is quadratic with  $R^2$  value of 0.90. No change in the existing trend is expected unless sanitation measures and awareness drive is launched. In village Naryab, the most congested houses are located in the central zone while the most spacious houses are located in the south zone. However, the data exhibited huge fluctuation due variations in the dimensions of houses in all the zones. The representative equation of the best fit polynomial dotted trend line is quartic with  $R^2$  value of 0.0.83. The whole argument regarding the trend of inequality is summarised in Table 4.

Table 4

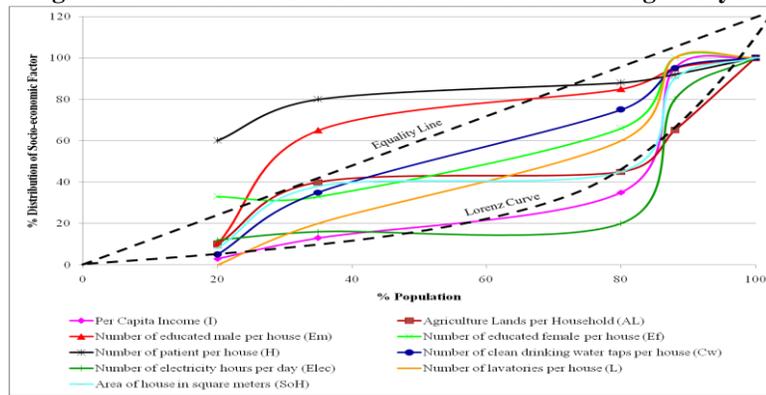
*Summary of Inequality Trend from Modelling Calculus*

Socio-economic Factors	Trend Line	Equation of the Trend Line	Future Trend (Under Existing Conditions)	$R^2$
Per Capita Income (I)	Polynomial	Quadratic	South and central zone will continue to have concentration of per capita income	0.75
Agriculture Land (AL)	Polynomial	Quadratic	South and west zones will have maximum agriculture activity while it may reduce in east zone	0.72
Male Education (Em)	Polynomial	Cubic	East zone will have greater number of the educated males. Situation in west zone is likely to improve with development of new educational facilities	0.92
Female Education (Ef)	Polynomial	Cubic	The situation is likely to remain the same	0.89
Health (H)	Polynomial	Cubic	Number of patients per house will remain minimum in central and south zones while it will increase in the east and west zones	0.89
Clean Drinking Water (Cw)	Polynomial	Quadratic	Number of clean drinking water taps per house will improve in the south zone while it will decrease in the west zone	0.80
Electricity (Elec)	Polynomial	Cubic	Situation is likely to remain the same	0.78
Lavatory (L)	Polynomial	Quadratic	Situation is likely to remain the same	0.90
Size of House (SoH)	Polynomial	Quartic	Situation in the east and south zones is likely to improve	0.83

**8. PRISMATIC ASSESSMENT OF INEQUALITY**

There is very high and most probably rising inequality in the distribution of income and other social factors in tribal region as indicated from the statistics of a small village Naryab. This is rooted in extreme economic imbalances which is directly and indirectly creating uneven income earning opportunities as indicated by Gul in his study on unknown tribal economy [Gul (2013)]. As a result, inequality was found in the distribution of socio-economic amenities. In support of this argument, I took help of Gini coefficient which is a measure of inequality of a distribution of a factor. It has value between 0 and 1 with 0 corresponds to complete equality while 1 corresponds to complete inequality. For prismatic assessment of inequality in village Naryab, Gini coefficients were found for all the nine socio-economic factors. The graphical representation of distribution of socio-economic factors is shown in figure 6. Equality line (45 degree line representing perfect distribution) and Lorenz Curve are also shown in Figure 6.

**Fig. 6. Distribution of Socio-economic Factors in Village Naryab**



Gini coefficients for different factors were calculated using calculus for area under a curve using Lorenz Curve, equality line and Gini coefficient curves of the socio-economic factors [Zhang (2006)]. These values are shown in Table 5.

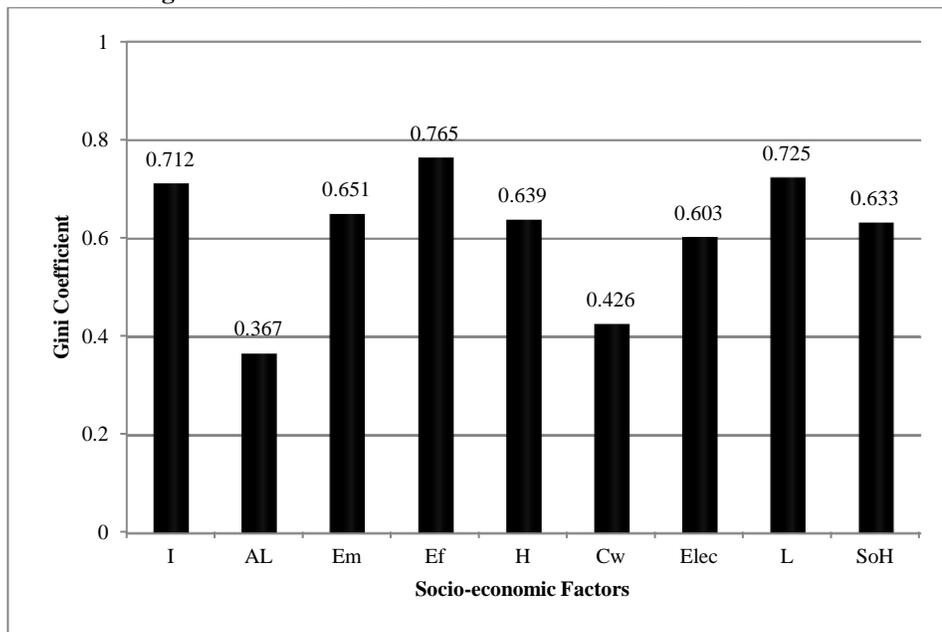
Table 5

*Assessment of Inequality in Village Naryab by Using Gini Coefficient*

Factors	North Zone	East Zone	Central Zone	South Zone	West Zone
Population (%)	20	15	45	8	12
Cumulative Population (%)	20	35	80	88	100
Per Capita Income (I)					
Income (%)	3	10	22	60	5
Cumulative income (%)	3	13	35	95	100
<b>Gini Coefficient</b>			<b>0.712</b>		
Agriculture Lands per Household (AL)					
Agriculture Land (%)	10	30	5	20	35
Cumulative Agriculture Land (%)	10	40	45	65	100
<b>Gini Coefficient</b>			<b>0.367</b>		
Number of Educated Male per House (Em)					
Educated Males per House (%)	10	55	20	10	5
Cumulative Educated Males per House (%)	10	65	85	95	100
<b>Gini Coefficient</b>			<b>0.651</b>		
Number of Educated Female per House (Ef)					
Educated Females per House (%)	33	0	33	34	0
Cumulative Educated Males per House (%)	33	33	66	100	100
<b>Gini Coefficient</b>			<b>0.795</b>		
Number of Patients per House (H)					
Number of Patients per House (%)	60	20	8	4	8
Cumulative Number of Patients per House (%)	60	80	88	92	100
<b>Gini Coefficient</b>			<b>0.639</b>		
Number of Clean Drinking Water Taps per House (Cw)					
Clean Drinking Water Taps per House (%)	5	30	40	20	5
Cumulative Clean Drinking Water Taps / House (%)	5	35	75	95	100
<b>Gini Coefficient</b>			<b>0.426</b>		
Number of Electricity Hours per Day (Elec)					
Electricity Hours per Day (%)	12	4	4	60	20
Cumulative Electricity Hours per Day (%)	12	16	20	80	100
<b>Gini Coefficient</b>			<b>0.603</b>		
Number of Lavatories per House (L)					
Lavatories per House (%)	0	20	40	40	0
Cumulative Lavatories per House (%)	0	20	60	100	100
<b>Gini Coefficient</b>			<b>0.725</b>		
Area of House in Square Meters (SoH)					
Area of House (%)	8	30	7	45	10
Cumulative Area of House (%)	8	38	45	90	100
<b>Gini Coefficient</b>			<b>0.633</b>		

As shown in Figure 7, the highest value of Gini coefficient (0.765) is for female education. There is no facility available for female education in village Naryab except for the girls who go to urban areas and educate themselves. Very few girls are permitted to go to urban areas for education. The Gini coefficient for availability of lavatories, which is the basic element of hygiene and sanitation, is also very high (0.725). There is no lavatory in any house in the north and west zones (32 percent of the population). Similarly, only 8 percent of the population possesses 88 percent of the per capita income in village Naryab which results into a high Gini coefficient (0.712). The lowest Gini coefficient (0.367) is for possession of agriculture land as people from all zones possess agriculture lands barring central zone where the business activity is more than agriculture. Overall Gini coefficient for socio-economic factors in village Naryab is 0.639 which is undesirably high.

**Fig. 7. Gini Coefficients for Selected Socio-economic Factors**



## 9. INEQUALITY MAPPING AND SPATIAL DISTRIBUTION OF INEQUALITY

After assessment of the inequality, its spatial distribution across the entire village Naryab was mapped using SURFER software which is a latest state of the art mapping software. SURFER uses a systematic process to create a map. Firstly, the data grid was created for each factor on excel sheet. Secondly, this data grid was converted to grid map by the software using the values of latitudes and longitudes. Thirdly, grid map was converted into contour map by the software showing spatial distribution of particular socio-economic factor. Separate contour map was created for each socio-economic factor. Key indicating the values of socio-economic factor is available with each map which makes the map comprehensible.

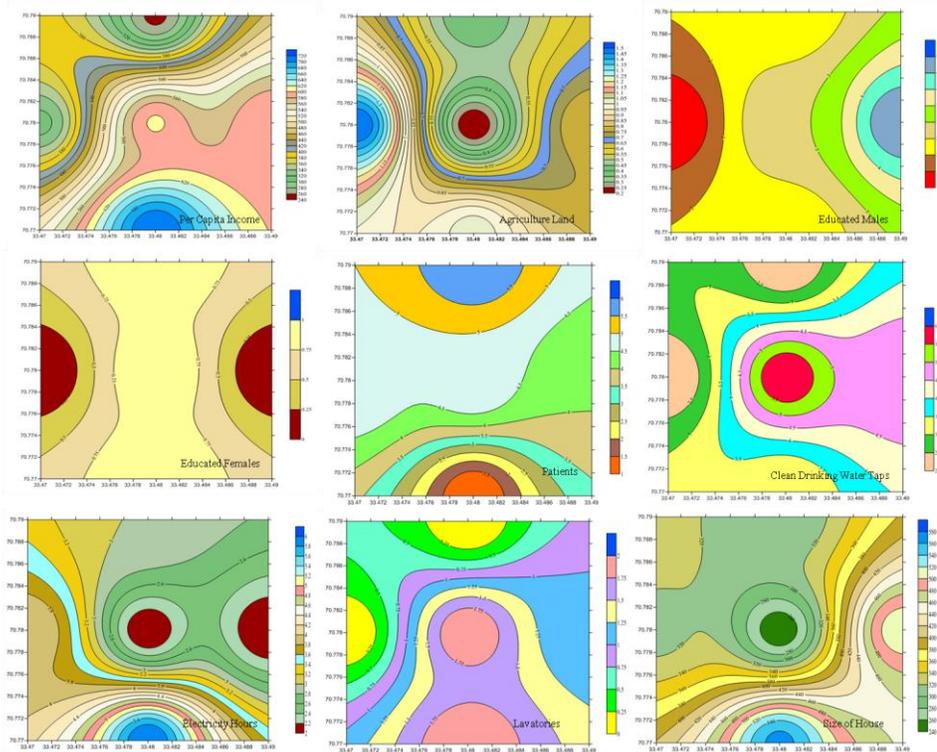
**Figure 8: Spatial Distribution of the Inequality**

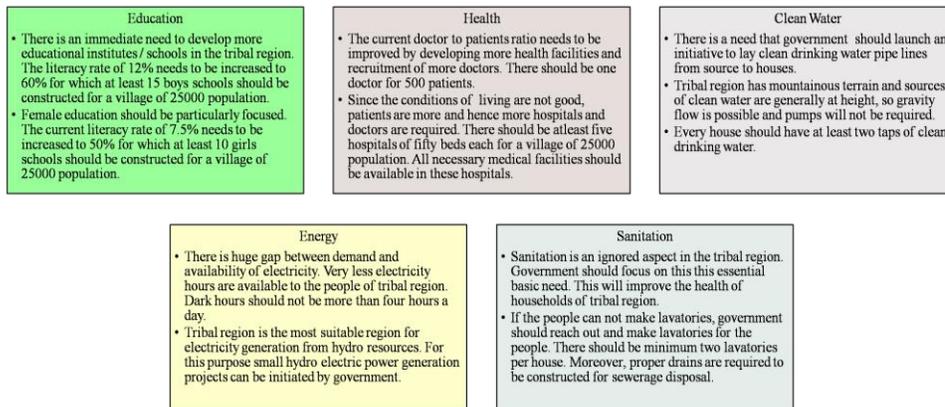
Figure 8 shows the spatial distribution of selected socio-economic factors. As indicated by the map for per capita income, contours of the map are increasing from north zone to south zone. The distribution of per capita income is such that north and west zone are poor compared to east and south zone. The central zone has moderately high per capita income while the higher per capita incomes are mostly concentrated in south zone. Thus, from the map it is clear that there is inequality in the per capita income of the households in village Naryab. Similarly, the map for spatial distribution of inequality in agriculture land shows that less land is possessed by the people living in the central zone and surroundings. The people living in the west zone have a greater possession of agriculture followed by inhabitants of the east zone who own moderate quantity of agriculture land. For educated males, the contours of the map are increasing from west to east zone. Contours of the map are comparatively straight which indicate clear division amongst the zones and hence the inequality. Educated males are mostly concentrated in east zone due to presence of educational institutes. Map for female education indicates that it is highly ignored aspect of village Naryab. There is hardly any female education in the village. As indicated by the map of average number of patients per house, number of patients are less in the south zone due to availability of hospital in the zone while patients are more in the north zone due to non availability of health facilities in the zone. Moreover, due to distance between north and south zones, patients are reluctant to visit hospital and as a compulsion use the home made herbal medicines. As for as spatial distribution of clean drinking water facility is concerned, the north and west zones are at disadvantage having less number of clean water taps compared to central zone where number

of clean water taps per house are more. Due to non availability of clean water, the number of patients per house are comparatively more in the north and west zones. As shown in the electricity map, more electricity hours are available in the south zone due to proximity of grid station and less line losses. Very less electricity hours are available to people living in central and east zones. Sanitation and hygiene conditions are represented by lavatories map. There are no lavatories in the north and west zones. Due to this bad conditions of sanitation, there are more patients in the north and west zones. The map for size of houses shows that houses in the central zone are congested while houses in the south zone are spacious.

## 10. POLICY IMPLICATIONS

Spatial distribution of selected socio-economic factors for village Naryab reflects inequality of sizeable magnitude. If this situation is generalised to complete tribal region, the overall milieu may give extremely worse picture. This perspective has certain policy implications which are shown in Figure 9.

**Figure 9: Policy Implications of the Socio-Economic Inequality in Tribal Region**



## 11. CONCLUSION

The socio-economic conditions in the tribal region are not very encouraging due to prevailing inequality. There are host of reason for this inequality, the major being the deprivation and discontent over distribution of resources. This has, and is still, affecting the life of commoners in the tribal region. Spatial distribution maps indicate that spread of inequality can be controlled if appropriate remedial measures are taken. There is a need to launch major socio-economic initiatives in this region, particularly fields of education, health and energy should be focused. If clean water and sanitation facilities are provided to people of tribal region, the health will improve manifold.

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## Farmers' Perceptions of Agricultural Land Values in Rural Pakistan

SHEHRYAR RASHID and ASJAD TARIQ SHEIKH

### I. INTRODUCTION

Pakistan's agriculture sector is crucial because it is responsible for providing food, shelter, and clothing to a massive population of 180 million people which is growing at a rate of 2 percent per annum. Land is a valuable asset and a symbol of prestige for the rural population in Pakistan. According to the recent Pakistan Economic Survey of 2013-14, the agriculture sector contributes around 21 percent to GDP and provides employment for around 45 percent of the work force, who are primarily based in rural areas. The total geographic area of Pakistan is approximately 79.6 million hectares. Around 27.7 percent of Pakistan's land is currently under cultivation and the cultivatable waste lands offer good possibilities for crop production. The total cropped area of Pakistan increased from 21.82 million hectares in 1990-91 to 22.72 million hectares in 2010-11 [Agricultural Statistics of Pakistan (2010-11)] and the total population of Pakistan increased from 118 million to 175 million during the same time period. Similarly the tenancy status of land management and land ownership pattern has changed over time. For example, large landowners are shifting their preferences from managing their land on their own towards leasing or sharecropping the land to be managed by others [Agricultural Census (2010)].

Land is a difficult resource to exchange because of certain constraints such as the fact that land is immobile and there may be significant differences in the quality of land. Additionally, appropriate institutions may not exist which allow for costless exchange of land. Land is a finite resource and ideally the market with demand and supply forces should be able to determine the equilibrium price. However, this is not the case in Pakistan where land markets mostly don't exist at a formal level and the value of land is being priced arbitrarily and without any scientific backing. In some cases the price of land is being influenced by large landowners. Furthermore, in Pakistan, there is no appropriate or historical collection of data on land buying/selling and land revenue

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(provincial revenue departments are supposed to maintain records of land ownership, however, this data is usually not publicly available). For example, there is no nationally representative survey on household land purchases and only the recently released Pakistan Agriculture Census of 2010 included some data on change in land ownership patterns.

Lack of a formal land market and sufficient data means it is difficult to identify the determinants of value for land in Pakistan. However, the productivity of land can be/is a close proxy for the value of land, because the utility (and value) of any asset depends on how much income or returns that asset provides. Since the productivity of land can be determined and computed fairly accurately, this study uses the productivity of land in various regions as a substitute for farmers' perceptions of the utility of land in Pakistan.

In Pakistan, rural land in the agriculture sector is important because most of Pakistan's land can be classified as rural and is based in the agriculture sector. Since Pakistan is a developing country, the Government is trying to implement policies which promote development and reduce poverty. This can be done by promoting investment and policies which increase the productivity of land, particularly in rural areas. The same policies and investments which increase agriculture productivity indirectly also increase agricultural land prices (Gardner et al 1979). Previous literature has shown that land ownership and the productivity level of agricultural land are very closely related to poverty and development [Deininger (2004) and Hirshima (2008)]. Finding out what factors affect land values in rural Pakistan could help the Government of Pakistan decide what to invest in to promote development of rural land. Similarly, proper investment into rural areas can turn them into centers of commerce which will boost productivity and economic growth. In the long run, this will improve competition in the area.

According to the Food and Agriculture Organisation (2003), price of land is one of the tools which can be used to manage land resources. Price of land itself is important because it reflects the level of government reforms which are used to support agricultural production. However, studying land itself is difficult because land value has different definitions and land markets in Pakistan do not exist at a formal level. In order to resolve the problem of the definition of land value, we will be using the perceived value of the land by the farmers who manage the land.

Previously, many studies revealed that there is a positive impact of attributes/ characteristics of land on the value of agricultural land [Vasquez, *et al.* (2002), Guiling, *et al.* (2009), Cavailhès and Wavresky (2003), Peterson (1984, 1986)]. However, no such study exists for Pakistan. Specifically, this research study will look at the relationship between physical and economic characteristics and whether they are correlated with property values in rural Pakistan. Due to a lack of suitable and reliable data, we used perceived value of land per acre as our dependent variable. Specifically, we asked the farmers managing the land what is their perceived value of the land they are managing. The rest of the paper is organized in the following manner; section II gives a literature review on the subject, section III describes the methodology used and Section IV gives data on the sample. Section V describes the model we will be using to examine the relationship and Section VI provides results. Specifically we will be using a hedonic regression model based on the approach originally presented by Bover and Velilla (2002). Section VII is a conclusion along with brief policy recommendations.

## II. LITERATURE REVIEW

As mentioned above, land is an important social and financial asset, yet there is a high level of inequality of land ownership in Pakistan. For example, the Household Income and Expenditure Survey of 2001-2002 stated that 43.13 percent of households in Pakistan were in rural areas. Out of the rural households 24.02 percent were landless, 42.27 percent owned less than 5 acres, 22.40 percent owned 5 to fewer than 12.5 acres, and 11.31 percent owned 12.5 acres or above. According to Qureshi and Qureshi (2004), the Gini coefficient for land ownership in Pakistan significantly increased from 0.66 in 1972 to 0.75 in 2000. Highest increase in inequality of land ownership is seen in the province of Punjab from 0.63 to 0.71 and KPK (NWFP at the time) from 0.68 to 0.86. Gini Coefficient is almost the same for Sindh 0.69 to 0.67 and Balochistan 0.69 to 0.68. Similarly, Mumtaz and Noshirwani (2006) performed a mapping exercise in 3 provinces (Punjab, Sindh, and KPK) and found that 40 percent of rural land is owned by 2.5 percent of households. They also found that women prioritized inheritance as an issue that bothered them. Women faced issues that they were manipulated out of their inheritance, had to forfeit their share in favour of brother or son, and were unable to pursue inheritance in court.

The Government of Pakistan has tried on three different occasions (1959, 1972, and 1979) to implement land reforms to solve problems with land usage and land development in Pakistan. PANOS (2011) stated that previous attempts at land redistribution have failed because of fragmentation which is hurting agriculture output. Ownership of land is rarely registered (despite law making land ownership registration mandatory) and is passed on through inheritance. An estimated 40 percent of cases brought before lower level civil courts and high courts are land related disputes [Aftab, *et al.* (2012)]. On August 10, 1989 the Supreme Court Shariat Appellate Bench declared that a maximum ceiling for land holding was illegal as per Islamic Law. Therefore, in recent decades, the focus had shifted from land redistribution towards improving records of land ownership.

Hirashima (2008) showed that the price of land in the province of Punjab in Pakistan and India was increasing at a faster rate than rent. The basic reason for this he argued is that the demand for land in Pakistan is price inelastic because of its importance to social status and the inheritance law. He argues that even though land is a factor of production just like labour and capital, land is significantly different because it is not man made and has limited scope of extension. These arguments appear to gloss over an important fact: the supply of land is fixed (at least in the short- and medium-term); therefore, any change in the demand curve will enhance land prices disproportionately—as movements along a (more or less) vertical supply curve.

It is far more common to find international literature examining factors affecting land prices. In this case, a far more widely used approach is done using hedonic modelling. The basis for a hedonic pricing model can be found in Rosen (1974) and this model can be used to estimate the impact of a range of characteristics such and economic, environmental, and location variables and how they affect the price of goods. In this case, the assumption is that consumers value the characteristic of goods or the services they produce rather than the goods themselves. However, no such study has been found examining land values in Pakistan.

For example Peterson (1984, 1986) used a hedonic regression model to analyse land prices in Africa and Europe. The author found that 70 percent of the variation in land prices was due to non-farm factors such as precipitation. Taylor and Brester (2005) look at the impact of a noncash income transfer program on agricultural land values. Specifically they use a hedonic regression model to look at the impact of a sugar program on agricultural land values in Montana. They find that noncash income transfers have a positive impact on land values. Similarly Roberts, *et al.* (2003) provide examples where government cash transfers or other government programs can have a positive impact on land prices. Bover and Velilla (2002) also use a hedonic price model to determine if quality indicators such as location and floor size affect land values of multi-unit housing in various cities in Spain. Results by city vary, however the hedonic regression results indicate that overall there is a positive relationship. Vural and Fidan (2009) provide further evidence while using a hedonic price model studying the effects of factors affecting land prices in Turkey. Results indicate a high correlation between type of organic matter in the area and land size. Saita (2003) uses a similar approach in examining factors affecting land values during auctions in Tokyo. The author's results contradict results mentioned earlier mainly because the housing market bubble in Tokyo had collapsed around the time. The author finds that land prices respond mostly to market conditions.

### III. METHODOLOGY

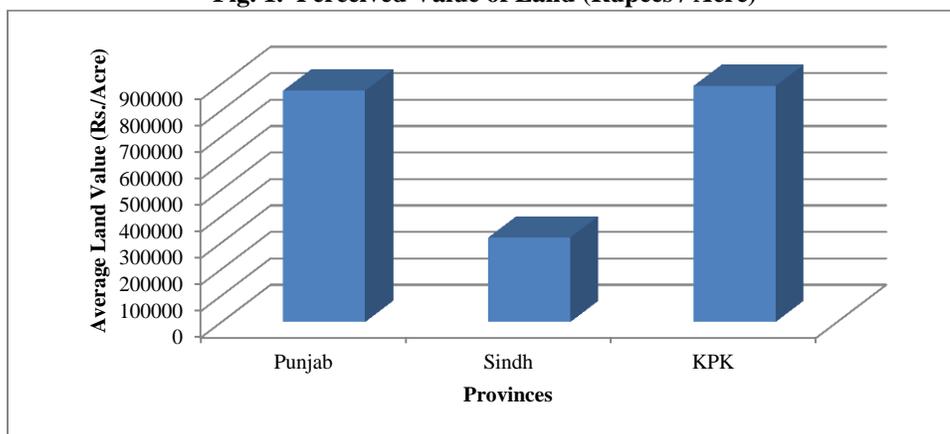
The Pakistan Strategy Support Programme (PSSP) recently completed two related rounds (known as round 1.0 and round 1.5) of a rural household survey in 2012 in which 2,090 households from 19 districts across Pakistan were interviewed. These 19 districts included 12 from Punjab, 5 from Sindh and 2 from Khyber Pakhtunkhwa (KPK)<sup>1</sup>. Round 1.0 was a multi-topic survey which included questions from different economic areas and Round 1.5 was a survey specifically focused on agriculture. Therefore the sample of Round 1.5 only included households from Round 1.0 who were involved in farming (942 households). For a detailed description of the sample please refer to Table 4 in the Appendix section. This survey is known as the Rural Household Panel Survey (RHPS).

This paper will utilize the data from the PSSP's RHPS. Specifically the paper will use data relevant for land valuation from Round 1.0 by using community level data and data from Round 1.5 of the survey. Following the literature review, this study will try to fill in a gap in the current literature by examining what factors affect land prices in rural Pakistan. A selection of variables (physical and economic), which theoretically have an impact on land values, will act as independent variables. Specifically we will be using a hedonic regression model and two-stage least square model approach which has not been used previously for studying land prices in Pakistan. Section IV below provides sample characteristics and Section V will describe the model in more detail.

### IV. SAMPLE CHARACTERISTICS

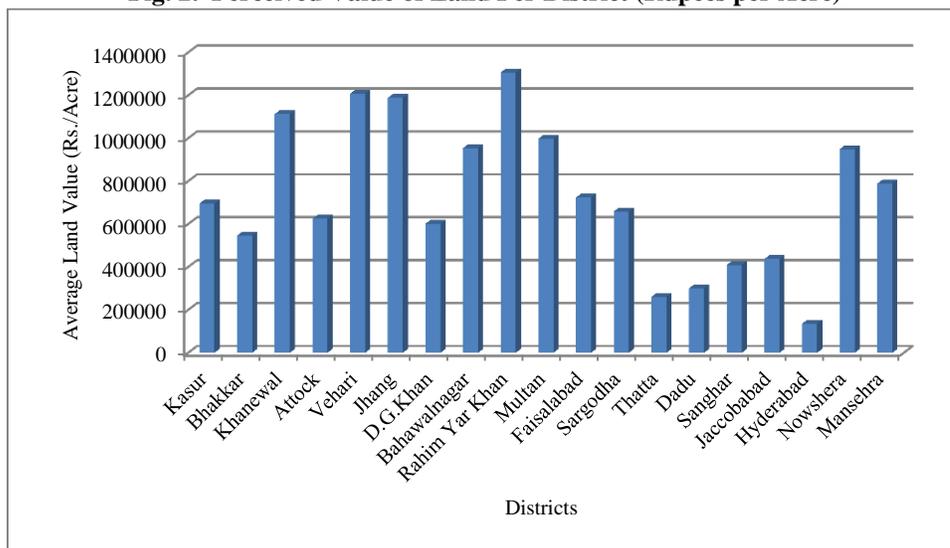
The sample we will be using has 942 households out of which 521 are in Punjab, 305 are in Sindh, and 116 are in KPK. Figure 1 below provides data on perceived value of land per acre in this sample. In this case the household was asked about the perceived value of the agricultural land (Rs /Acre) if it was sold today.

<sup>1</sup> Note: Balochistan was removed from the sample due to security reasons.

**Fig. 1. Perceived Value of Land (Rupees / Acre)**

The data indicates that the self-reported value of land per acre is highest in KPK at 892,115 Rs/acre. This is followed by Punjab with a perceived value of land at 874,439 Rs/acre. In Sindh the perceived value of land per acre is much lower at 319,650 Rs/acre. Lower perceived value in Sindh can largely be explained by physical characteristics such as a larger proportion of salinity and water logging issues. This is supported by Qureshi, *et al.* (2008) who found that there was a large occurrence of water logging and salinity in the Indus Basin specifically in the province of Sindh leading to problems in sustaining irrigating land and livelihoods of farmers. Another possible reason for lower perceived value of land is that the management of labour is not as efficient in Sindh compared to Punjab and KPK.

Figure 2 below disaggregates the data further into districts and provides the perceived value of land per acre by district.

**Fig. 2. Perceived Value of Land Per District (Rupees per Acre)**

The results indicate that in terms of perception, the most expensive land is in Rahim Yar Khan at 1,306,863 Rs/acre. The least expensive agricultural land is in the district of Hyderabad<sup>2</sup> at 135,583 Rs/acre.

Data on average land ownership per farmer from the RHPS proves that the distribution of land is highly unequal with a small amount of households owning a large proportion of the rural agricultural land. Using data from the sample, we were able to calculate Gini coefficients for land ownership by households and compare results with earlier findings from Qureshi, *et al.* (2004). Note that ownership is defined in terms of plots which are in the household's name which means that plots that were rented out or are being operated on sharecropping basis were attributed to the original owner.

Table 1

*Gini Coefficient for Land Ownership in Pakistan from 1972 to 2012*

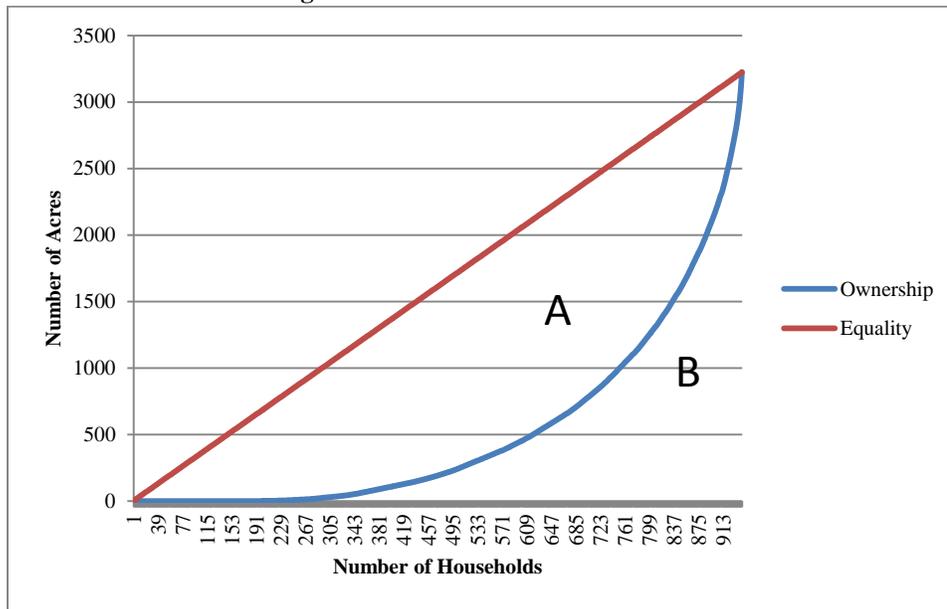
Province / National	Qureshi, <i>et al.</i> 2004				PSSP 2012*
	1972	1980	1990	2000	2012
Pakistan	0.66	0.65	0.66	0.75	0.68
Punjab	0.63	0.62	0.62	0.71	0.61
KPK	0.68	0.69	0.65	0.86	0.60
Sindh	0.69	0.63	0.63	0.67	0.76
Balochistan	0.69	0.68	0.7	0.68	NA**

\*Authors own calculation. \*\*NA = Did not survey due to security reasons.

Qureshi, *et al.* (2004) showed that the Gini coefficient appeared to be rising in Pakistan overall from 1972 till the year 2000. A rising Gini coefficient implied that the inequality of land ownership appeared to be increasing during this time. Our calculation for the Gini coefficient is lower for Pakistan overall (0.59) and for each province. However this does not necessarily indicate that land ownership inequality is decreasing because both studies used separate data sources to calculate the Gini coefficient. Qureshi, *et al.* (2004) used data from the Agricultural Census Reports which had a larger sample size and covered a larger number of districts. We used data from the PSSP's Rural Household Panel Survey. The PSSP's Rural Household Panel Survey excluded a few districts from KPK for security reasons. Additionally our sample did not cover the province of Balochistan.

Figure 3 below gives a graphic representation of how the Gini Coefficient was calculated from our sample. The red line is the line of equality (each household owns the same amount of land) and the blue line is the actual land ownership pattern. The Gini coefficient is calculated as the area of "A" divided by the area of "A" plus "B" ( $Gini = A / (A+B)$ ).

<sup>2</sup> Note that the sample for the PSSP Rural Household Panel Survey was created using data from the most recently available Census of 1998. Since then the district of Hyderabad has been divided into 4 districts known as Hyderabad, Tando Muhammad Khan, Tando Allahyar, and Mititari. Villages in the sample are located outside current day Hyderabad district.

**Fig. 3. Gini Coefficient for Pakistan**

## V. MODEL

We will be using a hedonic regression model and two-stage least square model to analyse the mentioned relationship. The advantage of a hedonic regression model is that it divides the explanatory variables into constituent parts and allows for analysis of different attributes (example physical variables vs economic variables) on the dependent variable. We will be using cross sectional data for the Pakistan's Strategy Support Program's Rural Household Survey from the year 2012. Based on the approach by Bover and Velilla (2002), we used a model with a theoretical form provided below:

$$p_i = \alpha_0 + \delta_i X_i + \dots + \delta_n X_n + \gamma_i Y_i + \dots + \gamma_n Y_n + \varepsilon$$

Where  $p_i$  is the log of perceived value of land per acre and  $X_i$  to  $X_n$  are a set of dummy variables to calculate the effect of specific demographic or physical characteristics and  $Y_i$  to  $Y_n$  are the log of specific demographic, location, or development variables. This model can be considered as a log-log model for continuous variables and not for other types of variables (ex. dummy variables). The independent variables in the model can be categorized into four categories which are demographic variables, site characteristics, development variables, and location variables. The difference between site characteristics and location variables is that location variables are usually fixed for the entire village and surrounding area and cannot be changed. Site characteristics can differ between each plot. Development variables capture the socio-economic wellbeing of the residents of the mouza. The independent variables are grouped in these three categories mainly to separately identify variables that can be influenced or changed through policy or other actions (these are classified as developmental variables), from variables that represent some inherent characteristics of the area—e.g. geography, population etc. By focusing on variables that can be impacted through policy or managerial actions, the choice of

policies or projects/programs can be made more focused, and the ones that contribute the most towards reducing poverty or enhancing productivity can be pursued.

There are four different versions of the model and the first two are standard hedonic regression models where one considers the impact of renting a plot and the other considers the actual value of rent per acre. The next two models used a two-staged least squares approach in order to counter potential issues with endogeneity in which we used proxies to capture the effect of a change in wealth or development in a village. Theoretically it is safe to assume that villages with a higher level of income are more likely to travel longer distances, and therefore these variables can be used as proxies for average agricultural income. Variables such as distance to nearest bank, city, and market are meant to capture the effect of a change in the level of income of a village.

Summary statistics for the variables used in the model are provided in the table below.

Table 2

*Summary Statistics for Variables used in the Model (Dependent variable:  
Land value (Rs/acre))*

Variables	Obs.	Mean	Std. Dev.	Min	Max
Land Value (Rs. / Acre)	1296	724023.9	634639	16000	5200000
Age of Respondent	1296	41.80324	13.71747	14	92
Value of Rent	1296	2688	8317.84	0.01	75000
Average Mauza Income	1296	168779.6	146951.9	0.01	917090
Ever Attended School	1296	0.5933642	0.4913954	0	1
Dummy for Ownership of Plot	1296	0.617284	0.486238	0	1
Dummy for Renting in Plot	1296	0.1296296	0.336025	0	1
Dummy for Flat Land	1296	0.7091049	0.4543505	0	1
Dummy for Fertile Land	1296	0.1589506	0.3657712	0	1
Dummy for Moderate Fertile Land	1296	0.7908951	0.4068265	0	1
Dummy for No soil erosion	1296	0.8333333	0.3728219	0	1
Dummy for Mild Soil Erosion	1296	0.1466049	0.3538482	0	1
Dummy for Salinity	1296	0.121142	0.3264182	0	1
Dummy for Waterlogging	1296	0.1535494	0.3606554	0	0
Number of Canal Irrigations	1296	10.02627	11.88117	0.01	77
Number of Ground Water Irrigations	1296	8.414097	10.91017	0.01	60
Dummy for Plot at Head	1296	0.087963	0.2833504	0	1
Dummy for Plot at Middle	1296	0.2214506	0.4153834	0	1
Dummy for Village Electrification	1296	0.9128086	0.2822242	0	1
Dummy for Internal Road	1296	0.2932099	0.4554096	0	1
Dummy for Cotton Grower	1296	0.0864968	0.142917	0	1
Dummy for Rice Grower	1296	0.1220263	0.194041	0	1
Dummy for Sugarcane Grower	1296	0.0306345	0.108021	0	1
Distance to Nearest City	1296	12.7284	7.644005	1	35
Distance to Nearest Tehsil Katcheri	1213	3.04642	0.5749389	0.7	4.32
Distance to Nearest Bank	1296	13.0463	8.247837	0	35
Distance to Nearest District Katchari	1296	42.77932	23.49335	10	115

## VI. RESULTS

Table 3 below provides the results from the hedonic regression models described above.

Table 3

*Results from all Models*

Variables	Log-Log (Dummy for Rent in)	Log-Log (Value of Rent- in)	2SLS Model (Dummy for Rent in)	2SLS Model (Value of Rent in)
Constant	12.70*** (0.502)	12.69*** (0.499)	10.79*** (0.602)	10.82*** (0.544)
Rent	-0.0262 (0.0789)	-0.00104 (0.00549)	0.112 (0.542)	0.0111 (0.0377)
Average Mauza Income	0.0135 (0.0129)	0.0136 (0.0129)	0.113*** (0.0316)	0.113*** (0.0317)
Ownership of Plot	0.00320 (0.0619)	0.00921 (0.0620)	0.0881 (0.291)	0.114 (0.291)
Age of Respondent	-0.0541 (0.0616)	-0.0541 (0.0616)	-0.0322 (0.0634)	-0.0329 (0.0635)
Ever Attended School	-0.0174 (0.0460)	-0.0178 (0.0460)	-0.0359 (0.0513)	-0.0376 (0.0510)
Flat Land	-0.000108 (0.0529)	-0.000369 (0.0529)	-0.0328 (0.0557)	-0.0344 (0.0556)
Fertile Land	0.323*** (0.114)	0.322*** (0.114)	0.237** (0.120)	0.233* (0.121)
Moderately Fertile Land	0.133 (0.0985)	0.133 (0.0985)	0.0732 (0.104)	0.0699 (0.104)
No Soil Erosion	0.589*** (0.147)	0.589*** (0.147)	0.685*** (0.146)	0.684*** (0.146)
Mild Soil Erosion	0.480*** (0.148)	0.480*** (0.148)	0.522*** (0.148)	0.522*** (0.148)
Waterlogging	-0.152* (0.0913)	-0.153* (0.0913)	-0.220** (0.0938)	-0.219** (0.0939)
Salinity	-0.125 (0.0930)	-0.125 (0.0930)	-0.155* (0.0941)	-0.156* (0.0943)
Number of Canal Irrigations	0.0397*** (0.00975)	0.0396*** (0.00975)	0.0369*** (0.0103)	0.0368*** (0.0103)
Number of Ground Irrigations	0.0326*** (0.00994)	0.0327*** (0.00994)	0.0430*** (0.0100)	0.0431*** (0.0100)
Plot Located at Head	0.363*** (0.0954)	0.362*** (0.0954)	0.254*** (0.0969)	0.254*** (0.0969)
Plot Located at Middle	0.233*** (0.0641)	0.233*** (0.0641)	0.167** (0.0681)	0.166** (0.0684)
Village Electrification	0.162 (0.119)	0.162 (0.119)	0.244** (0.119)	0.243** (0.119)
Internal Developed Road	0.191*** (0.0651)	0.191*** (0.0651)	0.181** (0.0776)	0.184** (0.0773)
Cotton Grower	0.359* (0.212)	0.359* (0.212)	0.115 (0.221)	0.115 (0.221)
Rice Grower	-0.106 (0.243)	-0.107 (0.243)	0.234 (0.250)	0.232 (0.250)
Sugarcane Grower	0.378* (0.208)	0.375* (0.208)	0.260 (0.264)	0.248 (0.259)
Distance Nearest Weekly Market	0.00743 (0.0437)	0.00752 (0.0437)	-	-
Distance Nearest Bank	-0.00111 (0.0395)	-0.00156 (0.0395)	-	-
Distance Nearest City	-0.167*** (0.0422)	-0.167*** (0.0422)	-	-
Distance District Katcheri	-0.0327 (0.0595)	-0.0323 (0.0595)	-	-
Distance Tehsil Katcheri	-0.0171 (0.0461)	-0.0163 (0.0462)	-	-
District Dummies	Yes	Yes	Yes	Yes
Observations	1120	1120	1120	1120
R-squared	0.514	0.514	0.478	0.478

Robust standard errors in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

The table above indicates that most of the site characteristics have a correlation with perceived plot value per acre. The site characteristics also have the expected sign; for example fertile land, no soil erosion, number of irrigations by canal and ground water, plot located at head and middle of water course all have a positive correlation with the dependent variables across most of the model versions. Similarly, waterlogging and salinity have a negative correlation on perceived value of land per acre although salinity is not statistically significant across all of the models. Four of the coefficients for development variables are correlated with the dependent variable. Access to electricity, internal road, cotton growers, and sugarcane growers are positively correlated with perceived land values across most of the model versions. Variables for access to electricity and cotton growers were chosen to act as a proxy for other variables which captured the effect of an increase in income or development of a village. Similarly dummies for cotton growers and sugarcane growers were chosen to capture the effect of an increase in prices of crops and choice of crop. Most of the physical variables were not correlated with the dependent variable with the exception of distance to nearest city. Demographic variables such as the age of the respondent or if the respondent has ever attended school do not appear to have any correlation with the dependent variable, however average mauza income does have a positive correlation with perceived land value in some of the model versions. Model results indicate that ownership status and renting of plots are not correlated with land value per acre.

Another way of looking at the results is by classifying the results that have a correlation with perceived land value at the 1 percent level. Three of these variables have an impact on soil fertility and erosion (quality of land) and four of these are related to water quality and access. This again shows the importance of access and maintenance of good quality land and water as well as the importance of physical characteristics such as waterlogging and salinity.

## **VII. CONCLUSION AND POLICY IMPLICATIONS**

Our research study used a hedonic regression model and two-staged least square model to determine what demographic, site, development, or physical characteristics have a correlation with the perceived value per acre of agricultural land. Four different versions of the model were used to analyze the impact of rent vs. value of rent and to counter potential issues of endogeneity. Data for this study was obtained from the Pakistan Strategy Support Program's Rural Household Panel Survey (RHPS) of 942 households across 19 districts and 3 provinces who are currently involved in agriculture. Overall, the results are consistent with international literature on the subject. Model results indicate that most of the site and physical characteristics are correlated with perceived land value and only a few of the development indicators and none of the demographic variables have a correlation with perceived land value. Specifically fertile land, lack of soil erosion, number of canal and ground water irrigations, location of plot at head and middle of watercourse, access to electricity, internal road, cotton grower, sugarcane grower, and average mauza income are positively correlated with perceived land value per acre. Waterlogging, salinity, and distance to nearest city are negatively correlated with perceived land value.

These results provide some important policy implications which the Government of Pakistan can consider. Overall, variables related to site characteristics such as soil erosion and the fertility level of the land have larger coefficients than development variables related to development of an internal road. This suggests that site characteristics have more of an impact than say geographic location or development variables. Therefore it can be argued that the Government should focus less on overall development projects and priority should be given to reducing salinity and educating farmers on best watering techniques etc.

It is worth noting that the Government of Pakistan has already announced a series of reforms to boost the economy and development. One of the main themes of the Vision 2025 of the Government and the Planning Commission include modernization of infrastructure and regional initiatives. Results from the model above suggest that the improvement of infrastructure and usage of regional initiatives could have the desired effect of increasing agriculture productivity through land development.

One of the limitations of the model used above is that we could only include characteristics which were measurable or observable (ex. access to road, access to water, soil quality etc.). Theoretically, there are other variables that could be correlated with perceived land value. For example, implementing institutional rules which improve good governance, land titling policies, inheritance policies, and promoting ownership of land by foreigners could all be positively correlated with land values. All of these factors could be used as mechanisms to achieve the desired objective to promote agriculture productivity and development in rural areas.

Lastly, considering the development needs of Pakistan, the area of land ownership and development of rural agricultural land cannot be ignored. Similarly, proper investment into rural areas can turn them into centers of commerce which will boost productivity and economic growth. In the long run, this will improve investment and competition in the area.

## APPENDIX

Table 4

*Description of Sample from Round 1.5 of PSSP Rural Household Survey*

Province	District	Number of Households
Punjab	Attock	16
Punjab	Bahawalnagar	58
Punjab	Bhakkar	78
Punjab	DG Khan	42
Punjab	Faisalabad	43
Punjab	Jhang	55
Punjab	Kasur	39
Punjab	Khanewal	45
Punjab	Multan	22
Punjab	Rahim Yar Khan	42
Punjab	Sargodha	27
Punjab	Vehari	54
Sindh	Hyderabad	57
Sindh	Jacobabad	86
Sindh	Sanghar	26
Sindh	Thatta	86
Sindh	Dadu	50
KPK	Mansehra	45
KPK	Nowshera	71
<b>Total</b>		<b>942</b>

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# Targeting Performance of Community-based Development Interventions: An Econometric Analysis of a Women-Focused and Women-Managed Non-Governmental Organisation in Rural Pakistan

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## 1. INTRODUCTION

The approach of community-based development (CBD) is expected to improve targeting and reduce programme costs of poverty reduction policies, besides other positive contributions [Mansuri and Rao (2004)].<sup>1</sup> Furthermore, the use of local knowledge is expected to bear greater relevance in a situation where credible monetary data for potential use in targeting activities are not available. According to Alatas, *et al.* (2012), in developing countries—where the majority of potential target group is employed in the informal sector—the availability of verifiable income records is always an issue. Therefore, it is difficult to identify target groups by employing conventional targeting techniques such as means tests. For these reasons, identification through the CBD approach is expected to improve targeting.

However, the absence of institutional support and/or homogeneity within a community may diminish the usefulness of local information. In the absence of local governance institutions, it is difficult to ensure accountability in the course of implementing CBD initiatives in decentralised settings. For instance, according to Conning and Kevane (2002), within-community heterogeneity may result in a variety of perceptions vis-à-vis poverty, and this may adversely impact targeting performance. The situation becomes worse when the perceptions of donors (i.e., governments, non-government organisations (NGOs), multilateral donors, and philanthropists) with regard to poverty differ from those of the local community. These conditions may create an environment conducive to elite capture.

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<sup>1</sup>The CBD approach is also expected to contribute to the decentralisation of power; the creation of high-quality, low-cost public goods; and empowerment. These, however, are not the focus of this paper.

In addition, even when the CBD approach is able to target poorer villages, it may fail in reaching out to the poor households within each village [Mansuri and Rao (2004)], which can be termed as “poor targeting or mistargeting.” For instance, the study of Galasso and Ravallion (2005)—whose motivation closely resembles that of this paper—investigates the targeting performance of the Food-for-Education (FFE) Programme in Bangladesh. The targeting mechanism adopted for the programme comprises two stages: selection of the participating communities by the central government and the identification of eligible households by the communities concerned. By employing both household and community-level data, Galasso and Ravallion (2005) show that the larger a programme is, the lower the levels of land inequality and remoteness therein are, the lower the number of shocks is, and also the lower private redistribution of transfers is, the more improved the within-village targeting becomes. Furthermore, the decision-making ability of the community has a strong influence on the programme outcomes and the centre’s programme placement did not take into account village attributes that may potentially help in reaching out to the poor.

Given these findings within the literature, this paper attempts to garner a better understanding of targeting performance for the case of Pakistan.<sup>2</sup> First, we employ village and household-level data that contain an array of geographic, socioeconomic, demographic, and vulnerability-related measures, to analyse the targeting performance. The list of variables therein is more comprehensive than any adopted in the existing literature. Second, some of the parameters—like networking with the local elite and environmental vulnerability—are used here for the first time, to analyse the targeting performance of CBD interventions. In assessing the performance of targeting, we define “good” targeting as the success of an implementing NGO in placing its programmes in poor villages (in terms of lower adult literacy, poor access to basic amenities, higher level of susceptibility to the natural disasters, etc.) and reaching out to the poor households (poorer access to basic civic services and environmental vulnerability). This is because the aim of the NGO is to improve the livelihood of poor and vulnerable households.

The rest of this paper is organised in the following manner. Section 2 describes the study area while Section 3 elaborates the data used in the empirical analysis. Section 4 proposes the empirical strategy, followed by Section 5 that shows quantitative results. Section 6 concludes the paper.

## 2. STUDY AREA AND THE NGO

Pakistan is an under developed country in terms of both economic and human development. As per the United Nations Development Programme [UNDP (2013)], Pakistan is ranked the 146th of 185 countries on Human Development Index. Moreover, the country has very low mean years of schooling, i.e. 4.9 years and per-capita gross national income, i.e. USD 2,566 (in purchasing power parity dollars of 2005). Meanwhile, over 60 percent of the Pakistan’s population dwells in rural areas. The rural population of the country has generally poor access to basic amenities and is highly vulnerable to various shocks.

<sup>2</sup> There is not much quantitative evidence regarding the CBD approach in Pakistan using a microeconomic approach. Notable exceptions include Khwaja (2004), Kurosaki (2005), Khwaja (2009), and Kurosaki and Khan (2012).

Given the public sector's failure to deliver basic public services to the nation—and especially to the rural poor—NGOs have been actively intervening and providing such services. Several of them have adopted CBD approaches since the 1990s. To analyse the targeting performance of such NGOs and success or failure to outreach the rural poor, in 2010, we began a study on an NGO called the Pakistani Hoslamand Khawateen Network (PHKN), which has its headquarters in District Haripur of Khyber Pakhtunkhwa (KP).

PHKN intervenes in areas of microfinance, human resource development (HRD) training, microinfrastructure projects, and the like. In providing these services, PHKN adopts a CBD approach, under which dwellers of a village or rural community are outreached and organised into community-based organisations. In the case of PHKN, such organisations are called “Community Organisations” (COs). Owing to socio-cultural norms, PHKN has separate COs for males and females. On average, the COs have 16–40 members. PHKN is a woman-led and a women-focused NGO. Its current president is a woman, all members of its board of directors are women, almost three-quarters of the COs are managed by women, and most of its activities are focused on women. This characteristic distinguishes PHKN from other NGOs in the region. Such NGOs are rare in the context of the male-dominated society of Pakistan [Khan (2013)].

The formation of a CO involves a number of steps (Khan et al, 2011).<sup>3</sup>Under the CO formation process, some of the contacted villages may refuse to form a CO in their village(s). Similarly, some of the non-CO villages can eventually become CO villages, although this did not happen frequently after we began our survey in 2010. Once a CO is formed in a village, PHKN's interventions become active and routine.<sup>4</sup>

<sup>3</sup>The CO formation process involves the following steps. First, PHKN contacts a village through a meeting with peer leaders (e.g., village elders, school teachers, local elected members, and religious leaders). At the first contact, initial assessment of the area is undertaken, covering general information on the village society and on its development needs. The introduction of PHKN to a village can be made through PHKN staff members who find potential villages from available secondary information, the concerned local administration (e.g., social welfare, agriculture, health, education, and livestock departments) or local politicians, and the peer leaders of a village. The first route i.e. contact through the PHKN staff is employed most frequently. After the initial contact, PHKN holds a series of meetings with peer leaders, local communities, and stakeholders. This stage is called the 1st Dialogue, and it is recorded in the PHKN log books. Subject to satisfying the minimum criteria qualification and eliciting the willingness of a considerable number of villagers, a CO is formed. This stage is called the 2nd Dialogue. During the 2nd Dialogue, community development tools such as participatory rapid appraisal and village resource mapping are employed to identify developmental needs and priorities, and CO office bearers (the president, secretary, and activists) are elected and trained on how to run a CO (i.e., record-keeping, accounting, and savings management). All interventions undertaken by PHKN are categorised as the 3rd Dialogue.

<sup>4</sup>Usually, COs have a monthly meeting called the general body meeting, where CO members discuss PHKN activities, prevailing issues in the village, and future plans to address issues. CO members also deposit savings during these meetings. CO savings are recorded in individual savings accounts. All COs are provided with HRD training, the emphasis of which is on the development of income-earning skills and microenterprise management; the exact training differs from CO to CO, reflecting each community's unique needs. In villages with deficits in educational institutions, PHKN sometimes provides assistance to community-based schools. Similarly, in villages with poor health facilities, PHKN may train and mobilise informal health workers, such as traditional birth attendants (TBAs). PHKN staff members regularly visit each CO, with the average visit frequency being once every two months. During these visits, PHKN personnel discuss various issues with CO members while also checking CO records.

### 3. DATA

During September–December 2010, we implemented a benchmark survey comprising three tiers; the three tiers are villages, COs, and households. Khan, *et al.* (2011) describe the survey in detail. In this paper, we employ village- and household-level data.

The village survey was designed as a census survey to cover all villages that were (potential) target areas of PHKN. We gathered 105 observations of villages, of which 99 are located in District Haripur. COs of PHKN existed in 40 out of 105, all in District Haripur. We call them CO villages. The rest, 65 villages, are called non-CO villages.

Table 1 lists variables taken from the village survey and analysed in this paper. The variables include village population, the occupation-based distribution of the populations of the villages, the literacy rate,<sup>5</sup> connectivity with canal-irrigation system, access to amenities, health and education institutions, local-governance institutions (we call them dispute settlement forums, or DSFs below), and susceptibility to shocks including damages due to the July-August 2010 floods.

In the household data, three types of households were randomly chosen: (i) those who have been members of PHKN activities (henceforth referred to as *T*-group households), (ii) non-member households (henceforth called as *C*<sub>1</sub>-group households) living in CO villages, and (iii) households living in non-CO villages (henceforth labelled as *C*<sub>2</sub>-group households). The total size of the sample is 583, divided into 249 *T*-group households, 234 *C*<sub>1</sub>-group households, and 100 *C*<sub>2</sub>-group households.<sup>6</sup> The sample represents predominantly rural households living in Haripur District that are potential targets of PHKN.

Table 3 lists variables taken from the household survey and analysed in this paper. The variables include demographic characteristics, education, housing conditions, access to amenities, assets holding, susceptibility to shocks, and social status of the sample households and their networking with the local elite (native and social status, and relationship with local elite). The statistics suggest household-level disparity in education between male and female members, which is a reflection of male domination in the study area. The housing conditions and asset holding reveal that most of the sample households are poor. We consider housing conditions and land ownership exogenous to PHKN's outreach, while livestock ownership and access to amenities as potentially endogenous to PHKN interventions.

<sup>5</sup> Both the occupational distribution of population and the literacy rate figures are consistent with that at the national level.

<sup>6</sup> See Khan, *et al.* (2011) for the detail of sampling procedures. Regarding *T*-group households, in the first stage of sampling, 50 sample COs were chosen, and in the second stage of sampling, we collected information on five-member households, randomly chosen from the member list. To collect information on *C*<sub>1</sub>-group households, we surveyed non-member households living in the CO village where *T* households were surveyed. The sample for *C*<sub>1</sub> households was randomly selected from the electoral list of the villagers, at the rate of one per one *T* household. Regarding *C*<sub>2</sub>-group households, we randomly selected five households from 20 non-CO villages; these 20 villages were randomly selected from the village list.

Table 1

*Comparison of CO villages and non-CO villages (bivariate analysis)*

Variable	Definition	Mean for each group		Difference (A)-(B)	
		(A) CO villages (n=40)	(B) Non-CO villages (n=65)	Mean	(S.E.)
<b>Demography</b>					
lit_rate	Adult literacy rate (%)	49.13	57.54	-8.41*	(3.86)
vil_pop	Village Population	2252	2612	-360	(369)
agri_prof_~c	%age of total population in agriculture	55.28	52.06	3.21	(4.36)
services	%age of total population in services	16.80	22.11	-5.31+	(2.97)
self_emp	%age of total population in self employment	5.60	9.14	-3.54*	(1.47)
lab_nform	%age of total population in non-farm labour	15.10	11.58	3.52	(2.29)
other_prof	%age of total population in others	7.23	5.11	2.12	(1.65)
<b>Basic amenities, infrastructure, and shops</b>					
irrigated_~e	Connection to canal irrigation (dummy variable)	0.250	0.292	-0.042	(0.090)
rd_length	Length of the road (in km) connecting the village with a major market	14.13	15.51	-1.38	(2.22)
cln_drnk_wat	Clean drinking water availability (%age of total village population)	71.38	76.52	-5.15	(6.64)
gas	Availability of gas connection in the village (dummy var.)	0.025	0.323	-0.298**	(0.064)
c_tv	Avail. cable TV connection (dummy var.)	0.175	0.323	-0.148+	(0.084)
i_net	Avail. internet connection (dummy variable)	0.100	0.354	-0.254**	(0.077)
kar_shop	Avail. Karyana (grocery) shop (dummy var.)	0.725	0.877	-0.152+	(0.082)
veg_shop	Avail. vegetable shop (dummy var.)	0.625	0.492	0.133	(0.100)
frt_shop	Avail. fruit shop (dummy var.)	0.325	0.431	-0.106	(0.097)
<b>Existence of medical facilities in the village (dummy variables)</b>					
bhu	Basic Health Unit (Govt)	0.125	0.185	-0.060	(0.072)
rhu	Rural Health Center (Govt)	0.025	0.062	-0.037	(0.039)
dr_bhu_rhu	Doctor's presence in BHU or RHC	0.125	0.215	-0.090	(0.074)
tba	Avail. traditional birth attendant (TBA)	0.825	0.646	0.179*	(0.085)
<b>Existence of education institutions in the village (dummy variables)</b>					
prim_school	Primary school (1st to 5th grades)	0.850	0.877	-0.027	(0.070)
mid_sch	Middle school (6th to 8th grades)	0.325	0.369	-0.044	(0.096)
hi_scho	High school (9th to 10th grades)	0.250	0.200	0.050	(0.085)
cbsch	Community based school	0.250	0.092	0.158*	(0.078)
d_madra	Deni Madrassah (religious school)	0.475	0.446	0.029	(0.101)
<b>Dispute settlement forums (DSF) (dummy variables)</b>					
jirga	Avail. Jirga - traditional DSF	0.850	0.769	0.081	(0.078)
dsf	Avail. non-traditional DSF	0.925	0.769	0.156*	(0.067)
ler	Locally elected representative is from the village	0.650	0.738	-0.088	(0.094)
<b>Susceptibility to natural disasters</b>					
dis_prone_~l	Village is prone to disaster (dummy var.)	0.975	0.831	0.144**	(0.053)

Notes: 1. The standard errors (SE) are reported in parenthesis, estimated under the assumption that allow unequal variance of two groups. 2. The definition of a CO village is the default definition (listed as having a CO or similar activities in the PHKN village list). 3. \*\*  $p < 0.01$ , \*  $p < 0.05$ , +  $p < 0.1$ . 4. The table is prepared by the authors.

#### 4. EMPIRICAL STRATEGY

To assess the targeting performance of the CBD approach, we test the two following hypotheses. First, we test  $H_1$ : Whether CO villages are systematically poorer

and more vulnerable than non-CO villages. As a statistical test, we employ the null hypothesis that observable characteristics of CO villages and non-CO villages are the same. Second, we test  $H_2$ : Whether CO members ( $T$ -group) are systematically poorer and more vulnerable than non-members ( $C_1$ -group) within CO villages. As a statistical test, we employ the null hypothesis that observable characteristics of  $T$ -group and  $C_1$ -group households in CO villages are the same.

To focus on targeting—rather than on impact—throughout this paper, we mainly analyse the predetermined and exogenous factors that reflect the targeting performance of the PHKN, which makes non-CO villages a valid counterfactual.<sup>7</sup> We conduct both bivariate and multivariate regression analyses to obtain robust results. The reason we conduct regression analyses is that many of variables are correlated so that partial correlation controlling for other variables may be more meaningful. The multiple regressions exactly controls for other variables.

#### 4.1. Inter-Village Comparison

Testing  $H_1$  is an *inter*-village targeting analysis. If, in the course of testing  $H_1$ , we find that CO villages are poorer than non-CO villages, say the CO villages have lower adult literacy, access to basic amenities, and higher susceptibility to the natural disasters, etc., we will conclude that the PHKN targets poorer villages. This finding would reflect the net effect of two mechanisms: that the PHKN endogenously approaches poorer villages, and that poorer villages elect themselves in approaching the PHKN.

Hypothesis  $H_1$  is tested both using village-level characteristics and household-level characteristics. We compare (i) CO villages and non-CO villages, and (ii) households living in CO villages and households living in non-CO villages. Considering PHKN's community mobilisation process described in Section 2, we test  $H_1$  by altering the definitions of "CO villages" and "non-CO villages." As the results are qualitatively similar, we report only the results based on the default definition in this paper due to the space limit (Khan, 2013). To implement (ii), we compare the weighted sum of  $T$ - and  $C_1$ -group households (those living in CO villages) and that of  $C_2$ -group households (those living in non-CO villages). As the sampling probability is different across villages and across the three groups of sample households ( $T$ ,  $C_1$ , and  $C_2$ ), we employ the weighted average when we use household-level observations to test  $H_1$ .

#### 4.2. Intra-Village Comparison

Hypothesis  $H_2$  is tested using household-level characteristics. It is a comparison between the  $T$ -group (member households in CO villages) and the  $C_1$ -group (non-member households in CO villages). In other words, this is an *intra*-village targeting analysis. If we test  $H_2$  and we find that member households have worse access to amenities and are more vulnerable to natural disasters than non-member households, we infer that the member households are poorer than the non-member households. This would reflect the self-selection of households, as we analyse  $H_2$  only using households in CO villages.

<sup>7</sup> As robustness check, we also investigate factors that are potentially endogenous to PHKN interventions, particularly in the village-level multivariate analysis.

In the bivariate analysis (the comparison of means between  $T$  and  $C_1$  households), we employ the weighted average to control for the difference in sampling probability. In the multivariate analysis (regression analysis), we also add village fixed effects to the list of explanatory variables, to cleanly identify the difference.

## 5. EMPIRICAL RESULTS

### 5.1. Comparison of CO and Non-CO Villages using Village Characteristics

Table 1 shows empirical results comparing CO and non-CO villages using village-level variables in a bivariate way. It reports statistical tests of equality of means.

CO villages are characterised by a literacy rate lower than that of non-CO villages by 8 percentage points. Both village types are similar in their population size. Non-CO villages have a higher level of occupational diversification, which is an indication of their higher standard of living. The two sets of villages are similar in their access to basic amenities like clean drinking water and market access roads, whereas they are noticeably different in accessibility to natural gas, cable TV, and internet. Non-CO villages have better access to the aforementioned amenities, which are generally associated with economically better-off areas. Non-CO villages tend to have more grocery shops called *Karyana* shops and hence a better village market place.

We find no difference between the two sets of villages in access to formal health facilities, whereas CO villages have better access to informal health services, e.g., trained TBAs, than CO villages. Similarly, the villages are similar in the availability of formal educational facilities, whereas CO villages have better access to informal education facilities, e.g., community-based schools, than non-CO villages. The strong presence of informal institutions and facilities in CO villages suggests minimal presence and/or effectiveness of government at the grass-root level in the study area and PHKN's provision of these informal services.

DSFs provide a basis for local governance. No difference is found between CO and non-CO villages in terms of the presence of a traditional DSF (e.g. *jirga*)—a characteristic exogenous to PHKN interventions and is evenly spread across all the villages. However, the number of nontraditional DSFs in CO villages is significantly larger than that in non-CO villages;<sup>8</sup> this reflects the strong presence in the CO villages of local-governance institutions essential to the effective use of local information, the presence of accountability, and hence better targeting performance [Mansuri and Rao (2004)].

Regarding the incidence of damage due to the 2010 floods, the damages were higher in CO than in non-CO villages. This suggests that CO villages tend to be more vulnerable to natural disasters.

Table 2 shows the regression results using the dummy for CO villages as the dependent variable and variables analysed in Table 1 as the explanatory variables. As the multivariate analysis is meant to be used solely for descriptive purposes, we employ a linear probability model.<sup>9</sup> Owing to the small sample size and inherent multicollinearity

<sup>8</sup>This illustrates PHKN's facilitation in bringing about a local-governance system that is more inclusive than traditional institutions. Analysis in this vein is left to future research.

<sup>9</sup>The Probit results are qualitatively the same as the results reported in this paper.

Table 2

*Correlates of Village-level Participation (Multiple Regression Results)*

	Dependent variable: CO village - dummy ( <i>d_coi</i> )				
	Model 1	Model 2	Model 3	Model 4	Model 5
<b>Village-level variables</b>					
lit_rate/100	-0.1812 (0.300)	-0.0471 (0.329)	-0.1163 (0.329)	-0.1657 (0.300)	-0.0208 (0.294)
vil_pop/1000000	-0.0069 (0.039)	0.0008 (0.038)	-0.0038 (0.034)	0.0082 (0.038)	0.0131 (0.034)
agri_prof_prc	-0.0021 (0.003)	-0.0030 (0.003)	-0.0040 (0.003)	-0.0022 (0.002)	-0.0034 (0.002)
<b>Basic amenities, infrastructure, and shops</b>					
irrigated_village	-0.0420 (0.139)	-0.0440 (0.137)	-0.0700 (0.136)	-0.0980 (0.139)	-0.1150 (0.134)
rd_length	-0.013** (0.004)	-0.014** (0.004)	-0.013** (0.004)	-0.012** (0.004)	-0.012** (0.004)
cln_drnk_wat	0.0001 (0.002)	-0.0007 (0.002)	-0.0003 (0.002)	-0.0010 (0.002)	-0.0010 (0.002)
gas	-0.436* (0.195)	-0.380* (0.179)	-0.436* (0.193)	-0.354* (0.177)	-0.419* (0.175)
i_net	-0.2180 (0.182)	-0.2140 (0.167)	-0.1980 (0.172)	-0.2380 (0.172)	-0.2140 (0.162)
kar_shop	-0.1600 (0.151)	-0.1580 (0.157)	-0.1500 (0.147)	-0.1930 (0.134)	-0.1770 (0.140)
<b>Access to education and medical facilities</b>					
prim_school	-0.0490 (0.144)	-0.0310 (0.146)	-0.0520 (0.144)	-0.0600 (0.137)	-0.0480 (0.139)
mid_sch	-0.0730 (0.111)	-0.0740 (0.109)	-0.0750 (0.110)	-0.1110 (0.113)	-0.1060 (0.111)
hi_scho	0.0950 (0.154)	0.0590 (0.157)	0.0860 (0.152)	-0.0060 (0.155)	-0.0190 (0.155)
d_madra	0.1520 (0.116)	0.1600 (0.116)	0.1030 (0.112)	0.1590 (0.116)	0.1190 (0.113)
bhu	0.0960 (0.164)	0.0350 (0.165)	0.0650 (0.164)	0.0900 (0.158)	0.0230 (0.156)
<b>Susceptibility to natural disasters</b>					
dis_prone_vil	0.2550 (0.156)	0.2830 (0.155)	0.1970 (0.159)	0.2980 (0.152)	0.2570 (0.155)
<b>Potentially endogenous variables</b>					
dsf		0.246* (0.118)			0.1640 (0.130)
cbsch			0.289* (0.138)		0.260* (0.128)
tba				0.312** (0.097)	0.252* (0.104)
Intercept	0.852** (0.284)	0.5630 (0.310)	0.926** (0.290)	0.679* (0.299)	0.5860 (0.329)
R-squared	0.291	0.321	0.327	0.352	0.393
F-statistics for zero slopes	6.045	4.503	6.985	5.901	8.110
Level of Significance	0.000	0.000	0.000	0.000	0.000

Notes: 1. In addition to those explanatory variables listed above, intercept, Mansehra dummy, and Abbottabad dummy are also included. 2. Estimated by OLS (linear probability model), with robust standard errors (reported in brackets). 3. The number of observations is 105. 4. \* p<0.1, \*\* p<0.05, \*\*\* p<0.01. 5. Number of observations is 105. 6. The table is prepared by the authors.

issues, we opt for a reduced-form regression model.<sup>10</sup> In Model 1, we employ as explanatory variables only those time-invariant variables that are clearly determined prior to PHKN interventions, with the objective of analysing only the targeting result. We include some potentially endogenous variables in Models 2–5, but only as robustness checks. The aforementioned endogenous variables are non-traditional DSFs (*dsf*), availability of CBS (*cbsch*), and availability of TBAs (*tba*).

The results of the multivariate analysis agree with those of the bivariate analysis, with varying levels of statistical significance. Once we control for other factors, the literacy rate is no longer associated with the presence of a CO in a village. The pattern of pro-poor targeting persists, regarding the access to natural gas, internet, and grocery shops, and susceptibility to disasters. These results provide slightly weaker evidence than that suggested through the bivariate analysis but the direction of targeting remains robust.

Unexpectedly, the coefficient on market road access (*rd\_length*) becomes significantly negative in multivariate regressions. This suggests that CO villages are more likely to beat shorter distances from a major market than non-CO villages, when controlling for other factors. Although this is against our expectation of pro-poor targeting, we interpret this as a reflection of a cost-minimisation strategy on the part of PHKN—especially in the wake of rising transportation costs.

When we add the potentially endogenous variables (*dsf*, *cbsch*, and *tba*) to Models 2–5, positive and significant correlations are derived; this accords with the results of the bivariate analysis. What is important here is that the inclusion of the potentially endogenous variables does not qualitatively alter coefficients on the more predetermined variables.<sup>11</sup>

To summarise the village-level analysis using village characteristics, we found that a village that is closer to a major market, lacks amenities, and is prone to natural disasters is more likely to be targeted by PHKN and hence form a CO. This suggests that the overall targeting by PHKN is pro-poor. The results of both bivariate and multivariate analysis support this.

## 5.2. Comparison of CO and Non-CO Villages using Household Characteristics

Table 3 shows empirical results comparing households in CO villages and households in non-CO villages using household-level variables in a bivariate way.

The two sets of households are similar in demography, whereas the education level is higher in non-CO villages than in CO villages. We also find a sharp contrast regarding household assets. Except for the livestock assets, the *T* and *C*<sub>1</sub> group households are poorer than those in the *C*<sub>2</sub> group in terms of housing conditions (i.e., house flooring and access to drainage) and access to amenities (i.e., gas, internet, and cable TV). The livestock asset level is higher among the *T* and *C*<sub>1</sub> group households than those in the *C*<sub>2</sub> group, probably reflecting the PHKN's facilitating role for the poor households to accumulate livestock. Overall, the bivariate analysis shows a tendency that the *T* and *C*<sub>1</sub> group households are poorer than *C*<sub>2</sub> group households in various aspects. Moreover, the *T* and *C*<sub>1</sub> group households are highly vulnerable to shocks (e.g., wild boar attacks), compared to the *C*<sub>2</sub>

<sup>10</sup>A number of variables have a potential association with some other variables, or do not show variation in the bivariate comparison; they are not included as explanatory variables in multivariate analysis.

<sup>11</sup>See Khan (2013) for a quantitative analysis of the causal impact of PHKN's interventions.

Table 3

*Household-level Comparison of CO Villages and non-CO Villages (Bivariate Analysis)*

Variable	Definition	Weighted Mean for Each Group		Difference: (T and C <sub>1</sub> )-(C <sub>2</sub> )	
		(T and C <sub>1</sub> ) Households in CO villages (n=483)	(C <sub>2</sub> ) Households in non-CO villages (n=100)	Mean	(S.E.)
<b>Demography</b>					
hhsz	Number of household members	6.088	6.681	-0.593	(0.561)
fem_rate	Ratio of female over male members	1.127	1.042	0.085	(0.125)
fem_hh	Dummy for a female-headed household	0.097	0.050	0.046	(0.031)
hh_edu	Years of education of the household head	5.847	6.846	-0.999	(0.840)
hh_lite	Literacy dummy of the household head	0.701	0.744	-0.043	(0.077)
hh_age	Age of the household head	50.164	50.518	-0.354	(1.953)
<b>Education</b>					
educ_yrs	Average years of education of adult household members	5.603	7.018	-1.415**	(0.538)
fem_edu	Av. yrs of education of female members	2.170	2.912	-0.742**	(0.251)
mal_edu	Av. yrs of education of male members	3.594	4.623	-1.030*	(0.469)
d_lit	Adult literacy rate	0.746	0.775	-0.029	(0.035)
fem_lite	Female literacy rate	0.318	0.321	-0.003	(0.029)
mal_lite	Male literacy rate	0.428	0.454	-0.026	(0.034)
<b>Household asset indicators</b>					
h_floor	The flooring of the house is paved (dummy var.)	0.083	0.461	-0.378**	(0.098)
drainge	The house has drainage (dummy var.)	0.424	0.819	-0.394**	(0.057)
gas	The house is connected with gas for cooking (dummy var.)	0.001	0.822	-0.821**	(0.045)
land_val	Value of land owned (Rs.1,000,000)	0.491	0.670	-0.179	(0.374)
livestock_val	Value of livestock owned (Rs.1,000,000)	0.015	0.003	0.012**	(0.002)
radio	The household has and uses a radio (dummy)	0.334	0.290	0.044	(0.097)
internet	The household uses internet (dummy)	0.000	0.167	-0.167*	(0.085)
cab_tv	The house is connected with cable TV (dummy)	0.003	0.341	-0.338**	(0.102)
<b>Susceptibility to natural disasters</b>					
fldaffected_hh	Affected by 2010 floods	0.329	0.289	0.040	(0.084)
wildboar_attack	Suffered damages due to attacks by wild boars	0.333	0.066	0.268**	(0.034)
<b>Social status</b>					
native	Native household	0.961	0.768	0.194*	(0.086)
sol_status	Social status is high	0.927	1.000	-0.073**	(0.018)
networking	Blood or non-blood relation with local elite	0.408	0.058	0.350**	(0.063)

Notes: 1. Means are weighted to reflect differences in sampling probability. 2. The standard errors are reported in parenthesis. 3. \*\*  $p < 0.01$ , \*  $p < 0.05$ , +  $p < 0.1$ . The table is prepared by the authors.

group; this result reflects village-level PHKN placement and supports our earlier claim of pro-poor targeting by the PHKN, that is, the PHKN can successfully outreach environmentally vulnerable segments of society. A larger number of the T and C<sub>1</sub> group households are native, compared to the C<sub>2</sub> group households; however, among the former, there is a lower proportion of households with higher social status. Both of these characteristics suggest that CO villages are homogenous and the least socially empowered, which once again confirms that PHKN targets the marginalised segments of Pakistani society. We find an interesting difference between the CO village households and non-CO village households, based on their networking with the local elite. The TandC<sub>1</sub> group has better networking with the local elite than the C<sub>2</sub> group households.

Table 4 shows multiple regression results to predict the probability of households belonging to the  $T$  and  $C_1$  group households against the  $C_2$  group households. The

Table 4

*Correlates of Village-level Participation (Household-level Multiple Regression Results)*

Explanatory Vars	Model 1	Model 2	Model 3
	Dependent Variable: Dummy representing $T$ or $C_1$ household with $C_2$ household as the reference ( $d_{t-c1}$ )		
<b>Village-level variables</b>			
lit_rate/100	-0.300 (0.304)	-0.300 (0.305)	-0.298 (0.307)
vil_pop/1000000	0.051 (0.026)	0.051 (0.026)	0.052 (0.027)
agri_prof_~c	-0.002 (0.001)	-0.002 (0.001)	-0.002 (0.001)
rd_length/100	0.015 (0.768)	0.017 (0.769)	0.007 (0.767)
cln_drnk_wat	-0.001 (0.001)	-0.001 (0.001)	-0.0013 (0.001)
<b>Household education</b>			
d_lit	0.052 (0.055)		
fem_lite		0.059 (0.060)	
mal_lite		0.044 (0.065)	
fem_edu/10			-0.003 (0.054)
mal_edu/10			-0.013 (0.067)
<b>Household asset indicators</b>			
h_floor	0.041 (0.040)	0.041 (0.040)	0.043 (0.041)
drainge	-0.054 (0.037)	-0.054 (0.037)	-0.052 (0.038)
gas	-0.690*** (0.132)	-0.691*** (0.132)	-0.691*** (0.133)
land_val	-0.027** (0.008)	-0.027** (0.008)	-0.027** (0.009)
radio	0.051* (0.023)	0.051* (0.023)	0.052* (0.024)
internet	-0.151 (0.141)	-0.147 (0.141)	-0.141 (0.142)
cab_tv	-0.04 (0.090)	-0.04 (0.090)	-0.038 (0.090)
<b>Household level susceptibility to natural disasters</b>			
fldaffecte~h	-0.025 (0.025)	-0.025 (0.025)	-0.025 (0.025)
wildboar_a~k	0.037 (0.028)	0.038 (0.029)	0.039 (0.028)
<b>Household level social status and networking</b>			
native	0.296** (0.104)	0.296** (0.104)	0.299** (0.104)
sol_status	-0.081 (0.047)	-0.08 (0.046)	-0.081 (0.047)
networking	0.137* (0.054)	0.137* (0.054)	0.138* (0.054)
Intercept	0.809*** (0.214)	0.812*** (0.214)	0.840*** (0.210)
R-squared	0.578	0.579	0.578
F-statistics for zero slopes	71.067	68.376	68.953
Level of Sig.	0.000	0.000	0.000

Notes: 1. Standard errors in parentheses. 2. \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ . 3. The number of observations is 583. The table is prepared by the authors.

coefficients on most of the explanatory variables bear signs that are similar to the one seen in the bivariate analysis. A significantly small proportion of the  $T$  and  $C_1$  group households use natural gas for cooking, while a significantly larger proportion of the same exhibit radio ownership and usage, compared to the  $C_2$  group households. The use of radio could be interpreted as the sign of relative poverty. The  $C_2$  group households have larger land holdings than the  $T$  and  $C_1$  group households. On the other hand, the  $T$  and  $C_1$  group households have stronger networking with the local elite than the  $C_2$  group households.

To summarise the findings of village-level analysis using household characteristics, we found that villages whose households have poor access to basics amenities (e.g. natural gas), less land assets, and strong networking with the local elite are more likely to be served by PHKN.

### 5.3. Intra-Village Analysis Comparing Member and Non-Member Households

Within CO villages, what kinds of households are more likely to be a member? To address this issue, the results of bivariate comparison between member and non-member households in CO villages are reported in Table 5. Mostly, the two groups are highly similar. At the 5 percent level, only two variables show a statistically significant difference: Member households are more likely to be affected by the 2010 floods than non-member households; member households are less connected with the local elite than non-member households. Although significant only at the 10 percent level, member households are more likely to be affected by wild boar attacks than non-member households. In contrast, the two groups of households have similar characteristics in demography, education, and assets. We interpret these patterns as an outcome of self-selection, that is, the households prone to natural disasters and have less network connections, even within the same village, are more likely to join a CO. These findings thus support the pro-poor targeting of PHKN interventions within CO villages.

Table 6 shows multiple regression results to predict the probability for a household living in a CO village to participate in a CO. We regress a dummy that represents the  $T$  group households on a set of household-level variables from Table 5, as well as all village dummies as explanatory variables, for a subsample of CO villages. The results confirm that the two groups are highly similar. There are two variables whose coefficients are statistically different from zero at the 1 percent level: A significantly smaller proportion of the  $T$  group households use natural gas for cooking; the  $T$  group households have better access to cable TV than the  $C_1$  group households. Although the sign is the same, these two variables were associated with insignificant differences in the bivariate analysis. The negative correlation with the gas access is a sign of pro-poor targeting. On the other hand, we interpret the positive correlation with cable TV as more aware and socially sensitised are more likely to become CO members owing to their access to independent and vibrant electronic media on cable TV than the state-run terrestrial TV network. The higher probability for households prone to natural disasters to be a member is confirmed from the regression analysis as well, statistically significant at the 5 percent level.

Table 5  
 Comparison of Member and Non-member Households within CO Villages  
 (Bivariate Analysis)

	Weighted Mean for Each Group		Difference: (T) - (C <sub>1</sub> )	
	(T) Member households in CO villages (n=249)	(C <sub>1</sub> ) Non-member households in CO villages (n=234)	Mean	(S.E.)
<b>Demography</b>				
hhsiz	6.403	5.899	0.504+	(0.280)
fem_rate	1.123	1.130	-0.007	(0.095)
fem_hh	0.088	0.102	-0.014	(0.033)
hh_edu	6.098	5.697	0.401	(0.533)
hh_lite	0.738	0.680	0.058	(0.054)
hh_age	50.046	50.235	-0.189	(1.598)
<b>Education</b>				
educ_yrs	5.767	5.505	0.262	(0.262)
fem_edu	2.157	2.178	-0.021	(0.209)
mal_edu	3.773	3.486	0.287	(0.216)
d_lit	0.763	0.735	0.028	(0.027)
fem_lite	0.317	0.318	-0.002	(0.023)
mal_lite	0.447	0.417	0.030	(0.023)
<b>Household asset indicators</b>				
h_floor	0.115	0.063	0.052+	(0.029)
drainge	0.456	0.406	0.051	(0.058)
gas	0.000	0.002	-0.002	(0.002)
land_val	0.553	0.454	0.100	(0.133)
livestock_val	0.016	0.014	0.002	(0.003)
radio	0.319	0.343	-0.023	(0.055)
internet	0.000	0.000	0.000	(0.000)
cab_tv	0.008	0.000	0.008	(0.006)
<b>Susceptibility to natural disasters</b>				
fldaffected_hh	0.405	0.284	0.121*	(0.053)
wildboar_attack	0.397	0.296	0.101+	(0.054)
<b>Social status</b>				
native	0.977	0.952	0.025	(0.021)
sol_status	0.936	0.922	0.014	(0.031)
networking	0.322	0.460	-0.138*	(0.055)

Notes: 1. Means are weighted to reflect differences in sampling probability. 2. The standard errors are reported in parenthesis. 3. \*\*  $p < 0.01$ , \*  $p < 0.05$ , +  $p < 0.1$ . The table is prepared by the authors.

Table 6  
*Correlates of Household-level Participation Within CO Villages*  
*(Multiple Regression Results)*

Explanatory Vars	Model 1	Model 2	Model 3
	Dependent Variable: Dummy representing <i>T</i> household with <i>C</i> <sub>1</sub> household as the reference ( <i>d</i> <sub><i>t</i></sub> )		
<b>Household Education</b>			
d_lit	0.025 (0.058)		
fem_lite		-0.018 (0.074)	
mal_lite		0.080 (0.100)	
fem_edu			0.001 (0.009)
mal_edu			0.020* (0.009)
<b>Household level susceptibility to natural disasters</b>			
h_floor	0.097 (0.066)	0.094 (0.063)	0.089 (0.064)
drainge	0.031 (0.046)	0.030 (0.047)	0.038 (0.046)
gas	-0.380*** (0.037)	-0.373*** (0.039)	-0.386*** (0.038)
land_val	-0.002 (0.013)	-0.003 (0.015)	-0.003 (0.015)
radio	0.007 (0.041)	0.007 (0.042)	0.003 (0.043)
cab_tv	0.479*** (0.057)	0.487*** (0.058)	0.472*** (0.076)
<b>Household level susceptibility to natural disasters</b>			
fldaffecte~h	0.107* (0.046)	0.108* (0.047)	0.110* (0.043)
wildboar_a~k	0.094* (0.042)	0.091* (0.041)	0.087 (0.042)
<b>Household level social status and networking</b>			
native	0.272 (0.133)	0.184 (0.119)	0.255 (0.131)
sol_status	-0.054 (0.083)	-0.056 (0.084)	0.015 (0.040)
networking	-0.104 (0.074)	-0.112 (0.075)	-0.11 (0.087)
Village fixed affect	Yes	Yes	Yes
Intercept	0.118 (0.151)	0.113 (0.152)	0.088 (0.137)
R-squared	0.075	0.076	0.079
F-stat for zero slopes	122.43	88.81	26.20
Level of Sig.	0.000	0.000	0.000

Notes: 1. The number of observations is 483 (only a subsample of households belonging to CO villages is used).  
 2. Standard errors in parentheses. 3. \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ . 4. The table is prepared by the authors. 5. "F-stat for zero slopes shows the F-statistics for the null hypothesis that all slopes are zero except for the intercept and village fixed effects.

To summarise the findings of household-level analysis within CO villages, we found that member households and non-member households are somewhat similar in their characteristics. If something, the tendency for the poor and less-connected to become a member was found. Regarding vulnerability to natural disasters, we found that more vulnerable households were more likely to join a CO.

## 6. CONCLUSION

In this paper, we quantitatively investigated the targeting performance of the CBD approach using detailed primary data at the village and household levels. The village-level data was collected through a census survey, whereas the household-level data was collected from a random sampling survey that covered both member and non-member households of a woman-led and women-focused NGO in rural Pakistan.

We found that villages whose households are poorer in terms of access to amenities and more susceptible to natural disasters are more likely to have a CO of the NGO. The correlation involving the networking showed an interesting contrast: Villages where networking with the local elite is strong are more likely to form a CO, while within such villages with a CO, households whose networking with the local elite is weak are more likely to become a member. In contrast to the sharp contrast between CO villages and non-CO villages, the difference between member and non-member households within CO villages was not highly significant. In other words, the NGO's pro-poor targeting functioned well at the selection of recipient villages, whereas we found no evidence of anti-poor targeting within CO villages.

To conclude, the women-focused NGO has been able to target villages and households that are poor and vulnerable to natural disasters. The results suggest that the CBD approach through woman-led and women-focused NGOs is able to improve targeting performance of a poverty reduction policy. The higher likelihood of more socially endowed villages joining the NGO may raise concerns about potential elite capture. The results for within-village analysis presented here and our preliminary analysis using the same dataset and later rounds of primary data (see Chap. 4, Khan, 2013, for details) do not support these concerns, however.

In the current paper, we were not able to separately identify the endogenous placement effect and the self-selection effect. In future research, we intend to overcome this shortcoming by having further rounds of surveys and through collection of recall data.

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## **Fiscal Policy and Its Role in Reducing Income Inequality: A CGE Analysis for Pakistan**

ARSHAD ALI BHATTI, ZAKIA BATOOL, and HASNAIN A. NAQVI

### **1. INTRODUCTION**

Income inequality is one of the critical barriers to growth and development in most of the developing countries including Pakistan. Every third man in Pakistan falls below the poverty line<sup>1</sup>. Moreover, the budget deficit has also been a serious issue throughout the history of Pakistan's economy. The persistent budget deficit is the constant source of increasing poverty and deterioration of income distribution. Since deficit is financed by increasing indirect taxes and money supply, it causes the reduction in purchasing power and leads the masses towards poverty [Arif and Farooq (2011)]. Therefore, it is a dire need of the economy to have a good public policy such that it could reduce budget deficit, alleviate poverty and redistribute income. Malik and Saqib (1985) suggest that the resources of the economy can be distributed equally only through appropriate changes in the tax system. Fiscal policy can have a significant influence on removing the gap between haves and have-nots both directly and indirectly. It directly affects the disposable income of individuals, whereas affecting their future earning capacities indirectly.

It is important to note that there is a significant trade-off between equity and efficiency. The policies focusing on equity, by hitting the current and future income of investors, may discourage investors from investment. For example, income transfers may reduce inequality which results in the diversification of scarce resources from investment to subsidisation of consumption; consequently, it reduces economic growth by negatively affecting investment. Therefore, it is pertinent to consider how much cost the economy has to bear in the form of decreased economic growth. The International Monetary Fund (IMF) and other financial institutions stress Pakistan on reducing fiscal deficit. With reference to income distribution, an IMF policy paper<sup>2</sup> emphasises that high income inequality results in impeding macroeconomic stability. Thus, policies related to tax and expenditure may be designed in such a way that the economy could achieve both the distributional and efficiency objectives during fiscal consolidation. Therefore, considering the significance of good governance, this study focuses on the impact of

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<sup>1</sup>SDPI's study (2012).

<sup>2</sup>IMF Policy Paper, "Fiscal policy and income inequality" January 23, 2014.

fiscal policy on income distribution and their possible trade-off, since the application of fiscal policy may involve the issue of trade-off between equity and efficiency<sup>3</sup>. Further, it investigates the most feasible mixture of taxes and transfers.

Plan of the paper is as follows: This section introduces the problem. The review of literature is given in second section. Third section discusses the methodology. Section four provides results and discussion. Finally, conclusion and policy implications are provided in section five. References are also provided at the end of this study.

## 2. LITERATURE REVIEW

Income inequality remains a core issue in designing an effective fiscal policy. In case of Pakistan, Suleman (1973) observes the income inequalities to be increasing over the period of 1963-69, whereas Khandkar (1973) shows that the trend in income inequality is decreasing over the period of 1963-69. In 1980s, most of the studies focus on measuring income inequality using different indices [Mahmood (1984)], while merely few studies are based on making redistribution strategies [Cheema and Malik (1985)]. Many studies have been conducted in developed and developing countries to find out the effective policy measures to reduce the inequality in income distribution.

A fine policy mix of tax and transfers can significantly improve the distribution [Leubker (2011)]. Cubero and Hollar (2010) show that government can give any shape to the income distribution pattern by using tax and transfers. The nature of tax plays a very critical role in policy making. There is also a lot of discussion on the effectiveness of government spending over tax on income distribution. For example, Martinez-Vazquez (2008) and Harberger (2006) argue that fiscal adjustment based on tax system does not affect the distribution pattern.

In evaluating the impact of fiscal policy, many researchers find a visible trade-off between equity and efficiency due to which many policy makers and politicians are seen reluctant in using fiscal policy for the fair distribution of income. Bertola and Allan (1993), Dollar and Aart (2000) and Perugini and Martino (2008) discuss the trade-off issue and conclude that any change in fiscal policy requires a detailed analysis of its effect on both equity and efficiency. Alesina, and Rodrik (1984) show that the growth oriented policies are favoured by a government that concerns capitalists only and found a negative relationship between economic growth and income distribution. However, Deininger and Squire (1996) and Ravallion and Chen (1997) see no relationship between growth and inequality.

The Computable General Equilibrium (CGE) model has a distinguishing feature: it identifies the impact of any small exogenous change on the overall economic system. Adelman and Robinson (1978) and McLure (1977) argue that the general equilibrium models can assess the economic behaviour in an interesting dimension that cannot be viewed in partial equilibrium studies. On the other hand, this approach has a drawback in assuming that within-group distribution is fixed. Lofgren, *et al.* (2003) further suggest that to overcome this drawback, the households in the CGE model can be disaggregated into more sections.

In Pakistan, Iqbal and Siddique (1999) use CGE approach to analyse the impact of fiscal adjustments on income distribution. Their results show that reduction in consumption subsidies and expenditures on health and education adversely affects

<sup>3</sup> "Equity versus efficiency: The elusive trade-off" by J. Le Grand (1990).

income distribution. Further, Siddique and Iqbal (2001) examine the impact of tariffs on income distribution using CGE model and conclude that any reduction in tariff helps to reduce the gap between rich and poor. Kemal, *et al.* (2001) use CGE model and SAM for 1989-90 conclude that reduction in tariff affects the forces of demand and supply in the commodity market, which further worsens the distribution pattern by affecting the consumption as well as income of rich more positively than that of poor. Naqvi, *et al.* (2011) use CGE model for Pakistan to study the impact of agriculture taxes on income distribution and welfare of households and conclude that a combination of reduction in sales tax and the imposition of agriculture tax is an effective distribution policy tool.

Overall, the above literature shows that fiscal policy can play an effective role in reducing income inequality. However, in the framework of computable general equilibrium (CGE) model, the above literature ignores the deterioration in budget deficit while analysing the impact of different tools of fiscal policy on the distribution of income. In this study, we take up this issue and considering the budget deficit, investigate the impact of household income tax and subsidies on the distribution pattern using CGE framework.

### 3. ESTIMATION METHODOLOGY

In order to assess the impact of fiscal policy measures on income distribution, computable general equilibrium model of Pakistan (hereinafter CGEM-Pak) is used. This model is in accordance with the static model structure constructed by Lofgren, *et al.* (2001). The CGEM-Pak is a domestic model and it captures the economic activities of the country. This model follows the SAM<sup>4</sup>2001 [Dorosh, *et al.* (2006)], segregation of activities, commodities, factors and institutions. With few amendments in the model, different scenarios are presented to show the net impact of fiscal adjustments on the economy under consideration. These amendments include the desegregation of agriculture activities and services. Table 1 demonstrates the disaggregation of activities, institution, factors of production and households.

Table 1

#### *Sets and Elements of CGEM-Pak Model*

Set	Element	Disaggregation
Institutions	-	Household, Government, Entrepreneur, Rest of the world
Household	Rural	Large, medium, small and landless farmer, poor non-agricultural labour, poor non-farm labour, rich non-farm labour
	Urban	poor labour, rich labour
Activity	Agriculture	-
	Non-agriculture	Mining, Food manufacturing, yarn, Textiles, leather, Other Manufacturing.
	Services	-
Factors of Production	-	Own large farm labour, own medium farm labour, own small farm labour, agriculture wage labour, non-agriculture unskilled labour, skilled labour, large farm land, irrigated medium farm land, irrigated small farm land, non-irrigated small farm land and capital.

There are four blocks of equations in the model. (All the equations are given in Appendix in Table 4 through 7).

<sup>4</sup> Social Accounting Matix.

### 3.1.1. Price Block

The model is constructed with the framework that each activity produces one commodity only. Export price (PE) is calculated by multiplying commodity's producer price by exchange rate and then subtracting the export tax from it. Domestic consumers pay price of the imports to the rest of the world. They pay tariff on these imports, so import price (PM) is determined by adding the tariff in the import price. The final supply price (PX) for the domestic commodity is obtained by the interaction of producer and export price. The final supply price (PX) for the non exported commodity depends on producer price only. Composite commodity's price (PQ) is determined by adding import and domestic prices. The final market price is then determined by adding sales tax to the Composite commodity's price. The final market price of composite non-imported commodity's price depends on domestic price and sales tax. Gross revenue per activity (activity price) is calculated as

$$PA_a = \sum_{c \in C} \theta_{a,c} PX_c \quad \text{Where } \theta_{a,c} \text{ is Yield of output } c \text{ per unit of activity } a$$

Price of value added (factor income per unit of activity) is determined by subtracting the value of intermediate input from gross revenue per activity.

### 3.1.2. Production and Commodity Block

The model includes nine production activities<sup>5</sup> using primary and intermediate inputs. These activities collect their revenue from selling the products they produce. They then use the revenue for the purchase of the required inputs to carryout production. Eleven factors are involved in production which includes six labour types, four types of land and capital. Primarily income distribution is determined by measuring how much value added flows from the sector of production to factors of production. This distribution depends on the household's ownership of different factors of production. Households differ in skills so they get different income accordingly. Subject to constant returns to scale, the producers are assumed to maximise their profit. This implies that the factors of production receive their income, where marginal cost equals marginal revenue. Leontief technology is used to combine factors with fixed share intermediates.

Thus, the output from these activities is measured using primary factor under Cobb-Douglas function. These activities also use intermediate inputs. Model includes the foreign trade with the assumption that this trade is based on imperfect substitutability between domestic and imported goods. This substitution is governed by CET<sup>6</sup> function. Energy is the only product in this model which is produced and consumed domestically that is production of energy sector is neither exported nor imported. The final composite good which is the combination of imported and domestic goods is supplied to meet the final and intermediate demand.

### 3.1.3. Institution Block

Institutions obtain their income from factors of production after their involvement in the value added. Nine household groups<sup>7</sup> are included in the model. Income of capital

<sup>5</sup>Details of activities and factors of production is given in Table 1.

<sup>6</sup>Constant elasticity of transformation.

<sup>7</sup>Large farm, Medium farm, Small farm, Landless farmers, Rural agriculture landless, Rural non-farm non-poor, Rural non-farm poor, Urban non-poor, Urban poor.

is distributed among the nine types of households, enterprises and government. Household's income is calculated by summing transfer payments from government, firms and rest of the world. The quantity of investment demand for commodities is calculated by multiplying base year investment demand by investment adjustment factor which is exogenous. The government sector collects income from direct and indirect taxes and also from capital ( $YF_{g,t}$ ) and uses it on consumption expenditure and transfers to households. Both of these payments are fixed in real terms. In this model, Government's consumption for each of the commodity is exogenously fixed. Thus, the government budget surplus (GBS) is determined by subtracting government expenditures from government revenue. Entrepreneurs receive their income only from capital. Their saving is calculated as the difference between their income and expenditures. It is also assumed that they do not consume commodities. Rest of the world is taken because the model assumes open economy. Thus, country exports its product to and imports product from rest of the world.

### 3.1.4. System Constrained Block

This block contains the equations showing the constraints in the model. In factor market, the quantity of factors supplied must be equal to the sum of quantity demanded from activities and the unused supply of factor. Market of composite commodity also involves the constraint that quantity supplied must be equal to the quantity demanded. The constraint related to current account balance expressed in foreign currency imposes that there must be equality between foreign exchange earnings of the country and its spending. Finally saving of institution must be equal to the quantity of investment demand for commodities.

### 3.2. Model Closure

The closure presents the macroeconomic assumptions to conduct simulations which are usually done by changing the value of policy variables that are exogenous. The closure in this model assumes fixed Foreign Savings (FS) and hence a flexible exchange rate (EXR) clears the current account. For savings/investment account, savings-driven investment is assumed, therefore savings are fixed, and Investment adjustment factor (IADJ) is flexible, permitting investment to adjust. For capital market, it is assumed that capital is activity-specific and fully employed. This means that the price of capital is fixed and factor price distortion adjusts to clear the market. There are four types of land in our model<sup>8</sup> and all types are being used in agriculture sector, which has only one activity (agriculture). For land market, it is assumed that all types of land are fully employed and hence price of land will clear the market. There are four types of agriculture<sup>9</sup> and two types of non-agriculture labour<sup>10</sup> in the labour market of the model. They are mutually exclusive and there is no mobility of labour across these sectors. The assumption of four types of agriculture labour is that they are fully employed and hence price of labour (wage rate) will clear the market. In CGEM-Pak, non-agriculture sector has eight types of activities and each type of activity uses two types of labour (non-

<sup>8</sup>Large farm land, irrigated small farm land, irrigated medium farm land, non-irrigated small farm land.

<sup>9</sup>Own large farm labour, own medium farm labour, own small farm labour, agriculture wage labour.

<sup>10</sup>Skilled labour, non-agriculture unskilled labour.

agriculture labour; skilled and unskilled). Full employment is assumed for non-agriculture labour. Moreover, labour is fully mobile within the sector and a unique wage clears the labour market.

### 3.3. Inequality Measures

Due to the limitation of our data, only inequality between household groups is captured. To calculate inequality, Theil-L, Theil-T and Theil-S indices are used. The Range of Theil-T index from 0 (lowest inequality) to 'ln(N)' (highest inequality). Conversely, the Theil-L index ranges from 0 to infinity and the higher the value of Theil-L, the higher the inequality is. Mathematical expressions of these indexes are given in Appendix.

### 3.4. Data and Model Calibration

Due to some miscalculations in SAM 2007-08, it is not used in this study. This study uses the available Social Accounting Matrix (hereinafter SAM) developed by Dorosh, Niazi and Nazili (2006), for the year 2001-02 as benchmark dataset. This square matrix (SAM) reflects the receipts and payments of different transactions done by different agents of the economy and satisfies all equilibrium conditions and properties of CGEM-Pak.

#### 3.4.1. Structure of SAM (2001-02)

The SAM 2001-02 consists of 5 major accounts, namely activities, commodities, factors of production and institutions and savings. Institution account includes household, enterprises, government and rest of the world. Table 2 presents the macro SAM of Pakistan for the year 2001-02. Micro SAM explains the disaggregation of accounts in macro SAM. The original SAM has many categories of agriculture and service sector as the objective was to check the impact of agriculture growth on poverty. But in this study, a modified micro SAM is used which aggregates the service and agriculture activities into only one category each because there is no need to include details of agriculture and service sectors.

Table 2

#### *Macro SAM Pakistan 2001-02 (Million Rs)*

	Activity	Commodity	Factor	Household	Govt.	Entrepreneur	Row	Saving	Total
Activity	0	22525207	0	0	0	0	0	0	12527165
Commodity	10709923	0	0	7439429	0	817880	1057903	1049023	14933492
Factor	9678120	0	0	0	0	0	0	0	5466875
Households	0	0	5711329	0	663581	33595	239097	0	4510186
Govt	0	0	1474624	0					737312
Enterpreneur	0	466741	64018	146152					429795
Row	0	1939586	0	0					1030152
Saving	0	0	0	357242	73731	-8457	167539		534109
Total	12527165	14933492	5466875	4510186	737312	429795	1030152	534109	

Source: SAM 2001-02 for Pakistan.

Given limited resources as well as data constraints, it is not possible to estimate elasticity parameters for this study. Therefore, elasticity parameters employed by Ahmed and Donoghue (2008), examining similar question have been used. These trade elasticities are shown in Table 1 in Appendix.

The model is solved primarily for equilibrium to make sure that the base year dataset is reproduced. Afterwards, we give a shock to the model by changing the value of one of the exogenous variables. The model is then re-solved for equilibrium (as before) and changes in the values of the endogenous variables. These values are then compared with the base-year equilibrium to establish the impact of exogenous shocks. The distributional impact of exogenous shocks (macro variable) is determined by the indicators, that is, Theil T, Theil L, and Theil S. At the same time, the impact of these policy measures on economic growth and other macroeconomic variables such as exports, imports, investment etc. is analysed to check the trade-off between equity and efficiency, which is supposed to be involved in the implementation of fiscal policy.

### 3.5. Simulation Design

Different simulations are designed to run on the model of study, CGEM-PAK. These simulation exercises are carried out by increasing or decreasing the values of suggested policy tools until the income inequality measures show a decline in inequality. For the simulation exercise any percentage number can be taken, but should be attested with various sensitivity analysis [Israel (2006)]. The proposed simulation strategies are shown in Tables 3 and 4. Simulations in Table 3 test the significance of government transfers to households, income tax and sales tax in reducing inequality without suggesting any measure to increase revenues to cover the resulting budget deficit. Simulation 1 tests the impact of an increase in government transfers to households on income distribution. As sales tax has a regressive nature, simulation 2 discusses the impact of a decrease in sales tax and simulation 3 discusses the impact of an increase in income tax with the assumption that it has a progressive nature.

Simulations in table 4 include different policy mix in order to reduce the gap between haves and have-nots by considering its impact on budget deficits. These simulations are designed in such a way that we could have a significant reduction in budget deficit. In Simulation 4, sales tax is reduced to decrease the economic burden of poor and transfers from government to households are increased to increase the welfare of households. On the other hand, the resulting deficit in budget is financed by raising income tax. Simulation 5 and 6 test the effect of different mixtures of sales tax, income tax and government expenditure on income equality and overall economy. In each of these simulations, we reduce the sales tax to correct the income distribution while to cover the resulting deficit in budget we cut the government expenditures and increase the income tax rate.

Table 3

*Simulation Scenarios (Budget Deficit is Allowed to Change)*

SIM	Base Scenario
1	35% increase in government transfers to households
2	6 % decrease in sales tax
3	5.81% increase in income tax

Table 4

*Simulation Scenarios (Budget Deficit is Not Allowed to Increase)*

SIM	Base Scenario
4	4.14% decrease in sales tax, 26.2% increase in government transfers to households and 10.25% increase in income tax.
5	3.62% cut in government expenditures, 7% reduction in sales tax and 3.65% increase in income tax
6	3.99% cut in government expenditures, 7.01% reduction in sales tax and 2.5% increase in income tax

**4. RESULTS AND DISCUSSION**

Results are presented in Table 5 through 8, where the negative sign with government budget surplus shows government budget deficit. GDPMP1 shows GDP from spending side at market price while GDPMP2 presents GDP from income side at market price. GDPMP1 and GDPMP2 must be equal.

**4.1. Simulation Results Allowing the Change in Budget Deficit**

These simulation exercises are carried out by increasing or decreasing the values of suggested policy tools until the inequality measures show a decline in inequality while we did not suggest any measure to cover the resulting deficit in budget.

**4.1.1. Government Budget Surplus, Income Distribution**

Economic policies affect income distribution through three mechanisms. Firstly, they directly affect the income of households by changing the return to primary factors. Secondly, a change in income tax or subsidies affect the disposable income of households and lastly these economic policies affects the price level thus the price effect bring changes in the household's real income. Table 5 presents results of first set of simulations. In simulation 1, the income inequality index Theil T shows a decrease in its value interpreting an improvement in income distribution. Theil T responds to variations in the upper expenditure category. This policy of increasing transfers to household causes budget deficit to increase from 8457 to 18208.037 millions in Pakistani Rupees because transfers cause an increase in expenditure and no measure has been taken to raise revenue to cover the costs. Simulation 2, in which sales tax is reduced by 6 percent, presents a similar result. The value of Theil T decreases to 0.317 but, other inequality indicators remain unchanged. A drastically negative effect on budget deficit is observed which causes 137.06 percent increase in deficit when compared to its benchmark value.

Table 5

*Government Budget Surplus and Inequality*

Variables	Base	SIM1	SIM2	SIM3
Government Budget Surplus	-8457	-18208.037	-20048.964	1.985
Theil T	0.318	0.317	0.317	0.318
Theil L	0.326	0.326	0.326	0.326
Theil S	0.322	0.322	0.322	0.322

Result of Simulation 3 shows that an increase of more than 5.9 percent in the income tax rate leaves an adverse effect on income distribution. In developing countries, income tax is shouldered by middle class and the tax acts are full of tax exemptions and the corruption factor makes tax evasion easy for rich.<sup>11</sup> In Pakistan, majority of tax payers belong to middle or upper middle income group.<sup>12</sup> Therefore, a 5.81 percent increase in the tax rate does not affect the income distribution pattern. At the same time, the revenue raised by income tax causes budget deficit to reduce and a surplus of Rs. 1.985 million is observed. Thus, in Pakistan's economy income tax policy fails to serve as a tool for reducing inequality.

#### 4.1.2. Macroeconomic Effects of Policies

Table 6 presents the macroeconomic effects of distribution policies as discussed above. The 35 percent increase in transfers causes the GDP at factor price to decline. GDP at market prices (both from expenditure and income side) shows a decline. A little improvement in equity is achieved at the cost of 0.016 percent reduction in GDP at factor price and 0.023 percent reduction in GDP at market price. It is because the government transfers to households leave fewer funds with the private investors, therefore investment decreases that cause the economic growth to slow down. Further, investment decreases by 1.720 percent, imports by 0.23 percent, and exports by 0.29 percent. As in this simulation transfers have been made, therefore the index of net indirect tax presents a decline in its value relative to the base year that is by 0.123 percent. These transfers on the other hand induce an increase in private consumption.

Simulation 2 makes GDP at factor cost to increase by 1.32 percent because a reduction in sales tax (by affecting price) induces more consumption that causes the demand as well as output to increase. An increase in GDP is translated into more exports; raising the later by 4.816 million Rupees. While, GDP at market prices indicate a decrease in its value which confirms the tradeoff between equality and economic growth. When GDP is calculated at market prices, it includes the taxes and subsidies (taxes enter in the equation of GDP with positive and subsidies with negative signs). A decrease in sales tax reduces the GDP measured at market prices. The existing literature shows that an increase in the sales tax brings a boom in real investment,<sup>13</sup> thus a decrease in investment is observed. Further, government consumption, imports and private consumption also increase because reduction in sales tax causes the prices to fall and increases the purchasing power whilst decreasing the value of net indirect taxes. Moreover, reduction in sales tax induces more consumption.

Results of simulation 3 (increased by 5.81 percent) show that this policy doesn't affect the distribution pattern but cause an increase in economic growth rate. As the government's revenue from tax collection increases, more expenditure can be made thus

<sup>11</sup>Tapan (2006).

<sup>12</sup>“Contrary to claims: Tax burden grows heavier for salaried people” Report by Shahbaz Rana in *The Express Tribune*.

2. Murtaza, N (2012).

<sup>13</sup>1. Jorgenson, D.W. (1996), “the impact of taxing consumption,” testimony before the committee on ways and means, U.S House of Representation, March 27.

2. Kotlikoff, Laurence J. (1993), “The Economic Impact of Replacing Federal Income Taxes with a Sales Tax,” Cato Institute Policy Analysis No. 193, April 15.

government consumption increases. Further, this policy doesn't affect the investment decisions of investor class, the revenue raised may be used to increase the investment level and thus the exports increases by 0.24 percent while imports increase by 0.19 percent. On the other hand, increase in income tax causes disposable income to reduce so the private consumption declines by 0.23 percent.

Table 6

<i>Macroeconomic Indicators (Change is Measured in Percentage)</i>				
Variable	BASE	SIM1	SIM2	SIM3
GDP FC	3377101.00	-0.01572	0.324203	0.01215
GDPMP1	3628735.00	-0.02314	-0.02277	0.018631
GDPMP2	3628735.00	-0.02314	-0.02277	0.018631
GOVCON	408940.000	-0.11805	0.03895	0.092421
INVESTMENT	534109.00	-1.72018	-1.5195	1.453104
EXPORTS	677841.00	-0.29434	0.000682	0.236578
IMPORTS	1.03015E6	-0.23201	0.590205	0.187351
NITAX	251634.000	-0.12274	-4.67945	0.10561
PRVCON	3037997.00	0.2775	0.236991	-0.23511

*Notes:* GDPFC (GDP at factor cost), GDPMP1 (GDP at market price form expenditure side), GDPMP2 (GDP at market price form income side), GOVCON (government consumption), NITAX (net indirect tax) and PRVCON (private consumption).

#### 4.2. Simulation Results Considering Budget Deficit

Policies which address only distributional issue may cause a huge gap in revenue and expenditures. Therefore, these simulation exercises are carried out to find the policy measures which are helpful in reducing inequality while not deteriorating the existing deficit in budget.

##### 4.2.1. Government Budget Surplus and Income Distribution

Table 7 shows the impact of policy mix (tax and transfers) on inequality. In Simulation 4, a decrease in sales tax and increased government transfers to households cause inequality to reduce; this is evident from a decrease in the value of Theil T. The resulting deficit in budget is covered by increasing the income tax rate. The overall increase in budget deficit is 336.255 million which is much less than what is observed in simulations 1 through 3.

Table 7

<i>Government Budget Surplus and Inequality</i>				
Variables	Base	SIM4	SIM5	SIM6
Government Budget Surplus	-8457	-8793.255	-1.708	4.612
Theil T	0.318	0.317	0.317	0.317
Theil L	0.326	0.326	0.326	0.325
Theil S	0.322	0.322	0.321	0.321

In simulation 5, Theil T and Theil S indices of inequality indicate improvement in income distribution due to 7 percent reduction in sales tax and 3.65 percent increase in income tax. This policy reduces the budget deficit from 8457 million to 1.708 million Rupees, where 3.62 percent cut in government expenditures combined with the increase in income tax rate is used to reduce the budget deficit. Simulation 6 includes 3.99 percent cut in government expenditures, 7.01 percent reduction in sales tax and 2.5 percent increase in income tax. The distributional effect of this policy is more significant than the policy discussed in simulation 5. All the Theil indices point out a reduction in the gap between rich and poor. This simulation results in a considerable surplus of 4.612 million Rupees in the budget.

#### 4.2.2. Macroeconomic Effects of Policies

Table 8 shows the macroeconomic effects of simulated policies. Simulation 4 positively affects the GDP at factor price. Reduction in sales tax affects GDP at market price positively but at the same time increase in government transfers to households offsets this positive effect, thus a slight decline in the value of GDP (at market price) is observed. The government transfers cause government consumption and private investment to increase. A decrease in sales tax causes the price of goods to decrease which results in increased demand for goods and stimulates the investment, thus increasing its level. The increase in private investment further induces an increase in the exports as well. A decrease in sales tax leaves a positive effect on income, thus private consumption and consumption of imported goods also increases. A cut in the sales tax rate reduces the net indirect taxes, and at the same time must have a positive impact on private consumption; but increase in income tax by 10.25 percent offsets this positive effect on consumption.

Table 8

*Macroeconomic Indicators (Change is measured in percentage)*

Variable	BASE	SIM4	SIM5	SIM6
GDP FC	3377101.00	0.233051	0.32627	0.31837
GDPMP1	3628735.00	-0.00068	-0.03687	-0.04265
GDPMP2	3628735.00	-0.00068	-0.03687	-0.04265
GOVCON	408940.000	0.101808	-3.70059	-4.10606
INVESTMENT	534109.00	0.232903	2.348692	2.385953
EXPORTS	677841.00	0.196818	0.930279	0.963261
IMPORTS	1.03015E6	0.160171	0.728049	0.752318
NITAX	251634.000	-3.13753	-4.91048	-4.88775
PRVCON	3037997.00	-0.04514	0.080368	0.122466

In simulation 5 and 6, there is an increase in the value of GDP at factor price and a decrease in the value of GDP at market price because these simulations include sales tax which causes GDP (at market price) to shrink. Further, due to a cut in the government expenditures, value of government consumption declines which helps to recover the deficit in budget caused by decrease in sales tax. On the other hand, with the decrease in

government expenditures, private investors will have enough funds to invest thus investment level increases. Increase in investment leads to more output, thus having a positive effect on exports which causes real GDP to increase. This policy involves leaves a positive effect on the income of households due to which some households switch to imports, causing an increase in level of imports. Moreover, sales tax reduction results in a decrease in the net indirect tax collection and encourages private consumption but this effect is offset by increase in income tax.

#### 4.3. Sensitivity Analysis

In CGE models, the selection of parameters takes the paramount importance. As there is no readily available method to estimate the parameters and elasticities of the model, therefore it is important to employ sensitivity analysis to check the influence of elasticities and parameters used in the model<sup>14</sup>. In order to conduct the sensitivity analysis, this study uses +10 percent to –10 percent changes in the armington and export elasticity used in the model (Different combinations of these elasticities are shown in Appendix table 2). The effect of changes in these parameters on macroeconomic analysis is not significant, leading to the conclusion that results are reliable. Result of sensitivity analysis is shown in Table 3 in Appendix.

#### 4.4. Concluding Remarks

A brief analysis of simulations 1 through 3 is presented in Table 9. Theil T is more sensitive to changes in expenditure than the other inequality indices, therefore only Theil T is shown in the table. GDP at market price is used to discuss the tradeoff issue. The positive sign with these indicators shows an increase in their value and the negative sign shows a decrease. As in simulation 3, Theil T doesn't record any change, therefore the idea of increasing income tax to solve the problem of inequality doesn't work here. Both the simulations 1 and 2 verify the existence of a strong trade-off between equity and efficiency. In simulations 1 and 2, inequality is reduced but in both the scenarios, it is observed that budget deficit increases and economic growth (GDPMP) decreases. The government budget deficit increases drastically in simulation 2. Simulation 1 shows more adverse effect on economic growth when compared to simulation 2. Thus, as cost involved in these two policies is more than the benefit, efficiency requires that these two policies should not be employed to correct the distribution pattern.

Table 9

<i>Change in Inequality, Budget Deficit and Economic Growth</i>			
	SIM 1	SIM 2	SIM 3
Theil T	-0.001	-0.001	No change
GBD	+9751.037	+11591.964	-8455.015
GDPMP	-839.747	-826.435	+676.061
GDPFC	-530.904	+10948.648	+410.31

Note: GBD(Government budget deficit), GDPMP(GDP at market price), GDPFC (GDP at factor price).

<sup>14</sup> Domingues, E.P. and E.A. Haddad (2005).

Table 10 discusses the changes in inequality, budget deficit and economic growth due to policy packages discussed in simulation 4 to 6. The GDP records a positive change for all of these simulations. Except simulation 4, other simulations show a decrease in budget deficit. In simulation 4, a negative change is observed in economic growth. While in simulation 5, equality is achieved with Rs 8455.292 million reductions in the deficit and at the cost 1337.978 million decrease in GDP. In simulation 6, GDP decreases more than what is recorded in simulation 5.

Table 10

<i>Change in Inequality, Budget Deficit and Economic Growth</i>			
	SIM 4	SIM 5	SIM 6
Theil T	-0.001	-0.001	-0.001
GBD	+336.255	-8455.292	-8461.612
GDP MP	-24.751	-1337.978	-1547.577
GDP FC	+7870.352	+11018.461	+10751.664

On the basis of above discussions, we can conclude that among budget deficit and economic growth if we are more concerned towards budget deficit then simulation 5 presents the best policy package to overcome inequality whereas simulation 4 is favourable only if we want equality with minimum efficiency cost together with a little positive change in budget deficit.

## 5. CONCLUSION AND POLICY IMPLICATION

This study aims at analysing the role of fiscal policy in reducing budget deficit, alleviating poverty and redistribution of income fairly. Like other developing countries, a fall in income of Pakistan accompanied by high budget deficits, corruption and political unrest causes a widening gap between the rich and poor. This study, using CGEM-Pak model, shows that fiscal instruments have a potential role in correcting income distribution. It is found that the use of sales tax or transfers alone can affect income distribution but it causes the budget deficit to deteriorate. Thus, it is concluded that a mix of fiscal instruments can have a positive effect on income distribution, GDP at factor cost, and budget surplus, while GDP at market price shows a slight decline. As in the current scenario, the focus of politicians and economists is to reduce the financial dependency, therefore among simulation 4 and 5, simulation 5 (3.62 percent cut in government expenditures, 7 percent reduction in sales tax and 3.65 percent increase in income tax) is the best possible policy to reduce the increasing inequality.

It is important to note here that government policies implemented to remove income inequality need a strong political will and support to promote progressive scales in income tax and to reduce the government expenditures particularly the non-development expenditures so that the reduction in sales tax could be made possible. A responsive government is needed to have a proper check and balance to make sure the implementation of policies in their true sense. Thus, a corruption free economy and good governance are needed to get the desirable outcomes from these policies.

There are some limitations of this research. Like most of the CGE models, CGEM-Pak is a comparative-static model, that is, the results are interpreted as “the condition expected to happen in the future after the specific policy is undertaken, compared with the situation without the adaptation of policy”. Thus, the future research should use Dynamic CGE model which traces each variable through time. Secondly, due to limitation of data, only between household inequalities can be determined, while within group inequalities are not possible to find here. We can overcome this problem by disaggregating the households into more groups while making SAM.

## APPENDIX

Table 1

*Trade Elasticity's*

Commodities	Armington Elasticity	CET Elasticity
C-AGRI	4.0	4.0
C-MINE	3.0	3.0
C-FMAN	3.5	3.0
C-YARN	3.2	3.0
C-TEXT	3.5	3.0
C-LEAT	3.5	3.0
C-MANF	3.2	3.0
C-ENRG	3.0	3.0
C-SER	2.7	2.0

Table 2

*Simulation Parameters for Sensitivity Analysis*

Experiment	Change in Elasticity
S0	Original Armington and CET elasticity's
S1	10% increase in Armington elasticity
S2	10% increase in CET elasticity
S3	10% decrease in Armington elasticity
S4	10% decrease in CET elasticity
S5	10% increase in Armington and CET elasticity
S6	10% decrease in Armington and CET elasticity
S7	10% increase in Armington and 10% decrease in CET elasticity
S8	10% decrease in Armington and 10% increase in CET elasticity

Table 3

*Effect of Sensitivity Experiments on National Income Accounts (% Change from Base)*

Variables	S0	S1	S2	S3	S4	S5	S6	S7	S8
GDPFC	5.106	5.103	5.09	5.101	5.106	5.098	5.105	5.103	5.099
GDPGAP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00
GDPMP1	-0.32	-0.33	-0.329	-0.339	-0.329	-0.321	-0.337	-0.32	-0.338
GDPMP2	-0.32	-0.33	-0.329	-0.339	-0.329	-0.321	-0.337	-0.32	-0.338
GOVCON	1.08	1.51	1.08	0.58	1.07	1.50	0.50	1.50	0.60
INVEST	-5.30	-4.90	-5.60	-5.80	-4.90	-5.10	-5.70	-4.50	-6.00
EXP	11.5	15.1	12.3	6.84	10.4	16.6	6.60	12.9	7.00
IMP	8.9	11.6	9.2	5.32	8.47	12.4	5.40	10.5	8.30
NITAX	-18	-18	-19	-19	-18	-19	-19	-17	-19
PRVCON	1.26	1.38	1.28	1.13	1.20	1.40	1.10	1.30	1.10

Table 4

*Parameters*

Parameter	Definition
$ad_a$	Activity parameter of production function
$aq_c$	Shift parameter of Armington function
$ax_c$	Shift parameter for output transformation (CET) function
$cwts_c$	Weight of commodity $c$ in the $CPI$
$Ir_{c,a}$	Quantity of $c$ as intermediate input per unit of activity $a$
$Shr_{y_{if}}$	Share for institutions $i$ in income of factor $f$
$\alpha_{f,a}$	Value added share for factor $f$ in activity $a$
$\beta_{c,h}$	Share of consumption spending of household $h$ on commodity $c$
$\delta q_c$	Share parameter for the composite good
$\delta x_c$	Share parameter for output transformation
$\theta_{a,c}$	Yield of output $c$ per unit of activity $a$
$\rho q_c$	Exponent of Armington function
$\rho x_c$	Exponent used in the CES aggregation function
$\sigma q_c$	Elasticity of transformation for composite goods
$\sigma x_c$	Elasticity of transformation for output transformation.

Table 5

*Exogenous Variables*

Variable	Definition
$CPI$	Consumer price index
$INV_c$	Base year investment demand
$MPSIN_h$	Initial marginal propensity to consume
$MPSDUM_h$	0–1 dummy: 1= for those H that saving changes, 0 otherwise
$MPS_h$	Marginal propensity to save for household $h$
$PWE_c$	World price of exports (Foreign currency units)
$PWM_c$	World price of imports (Foreign currency units)
$QFS_f$	Supply of factor $f$
$QG_c$	Quantity of consumption of commodity $c$ by government $g$ .
$te_c$	Sales tax on imports
$tm_c$	Import tariff rate
$tq_c$	Rate of sales tax
$TR_{ij}$	Transfers from institution $j$ to institution $i$
$TSTAX_c$	Total sales tax on commodity $c$
$TTAR_c$	Total tariff on commodity $c$
$ty_h$	Household income tax rate

Table 6

*Endogenous Variables*

Variable	Definition	No.
$CPIH_h$	Consumer price index of household $h$	9
$EH_h$	Consumption expenditure of household $h$	9
$EXR$	Foreign exchange rate as domestic currency per unit of foreign currency	1
$FPD_{f,a}$	Factor price distortion for factor $f$ in activity $a$	99
$FS$	Balance of payment (foreign currency units)	1
$GBS$	Government budget surplus	1
$IADJ$	Investment adjustment factor	1
$PA_a$	Gross revenue per activity (activity price)	9
$PD_c$	Domestic price of domestic output	9
$PE_c$	Domestic price of exported good	8
$PF_f$	Rate of return to factor $f$	11
$PM_c$	Domestic price of imported goods (local-currency unit),	8
$PQ_c$	Composite price of commodity $c$	9
$PVA_a$	Price of value added (factor income per unit of activity)	9
$PX_c$	Commodity price of producer $c$ for activity $a$	9
$QA_a$	Quantity (level) of activity $a$	9
$QD_c$	Domestic sales quantity	9
$QE_c$	Supply of exports	8
$QF_{f,a}$	Quantity demanded of factor $f$ from activity $a$	99
$QFU_f$	Unused supply of factors $f$	11
$QH_{c,h}$	Quantity consumed of commodity $c$ by household $h$	81
$QINT_{c,a}$	Quantity of commodity $c$ as intermediate input coefficient	81
$QINV_c$	Quantity of investment demand for commodity $c$	9
$QM_c$	Quantity of imported commodities	8
$QQ_c$	Quantity of goods supplied to domestic market (composite supply)	9
$QX_c$	Aggregate quantity of domestic output of commodity	9
$UH_h$	Utility of household $h$	9
$WALR$	Dummy variable	1
$YFRM$	Income of enterprise	1
$YFRMTS$	Total saving of enterprise	1
$YF_{h,f}$	Transfers of factor income to household	99
$YF_{s,f}$	Transfer of factor income to firms	11
$YH_h$	Income of household $h$	9
$\mu_h$	Weight of utility of household $h$	9

Table 7

## Equations Price Block

Equation	Domain	
1 $PM_c = (1 + tm_c) PWM_c EXR$	$c \in CM$	8
2 $PE_c = PWE_c(1 - te_c) EXR$	$c \in CE$	8
3 $PQ_c QQ_c = (PD_c QD_c + PM_c QM_c)(1 + tq_c)$	$c \in CM$	8
4 $PQ_c QQ_c = PD_c QD_c(1 + tq_c)$	$c \in CNM$	1 R
5 $PX_c QX_c = PD_c QD_c + PE_c QE_c$	$c \in CE$	8
6 $PX_c QX_c = PD_c QD_c$	$c \in CNE$	1 R
7 $PA_a = \sum_{c \in C} \theta_{a,c} PX_c$	$a \in A$	9
8 $PVA_a = PA_a - \sum_{c \in C} ir_{c,a} PQ_c$	$a \in A$	9

## Production Block

9 $QA_a = ad_a \prod_f QF_{f,a}^{\alpha_{f,a}}$	$a \in A$	9
10 $FPD_{f,a} PF_f = (\alpha_{f,a} PVA_a QA_a) / QF_{f,a}$	$f \in F,$ $a \in A$	99
11 $QINT_{c,a} = ir_{c,a} QA_a$	$a \in A,$ $c \in C$	81
12 $QX_c = \sum_{a \in A} \theta_{a,c} QA_a$	$c \in C$	9
13 $QX_c = ax_c [(1 - \delta x_c) QD_c^{\rho x_c} + \delta x_c QE_c^{\rho x_c}]^{1/\rho x_c}$	$c \in CE$	8
14 $QX_c = QD_c$	$c \in CNE$	1
15 $QQ_c = aq_c [(1 - \delta q_c) QD_c^{-\rho q_c} + \delta q_c QM_c^{-\rho q_c}]^{-1/\rho q_c}$	$c \in CM$	8
16 $QQ_c = QD_c$	$c \in CNM$	1
17 $QM_c / QD_c = [(\delta q_c / 1 - \delta q_c)(PD_c / PM_c)]^{\sigma q_c},$ $\sigma q_c = 1 / (1 + \rho q_c) > 0$	$c \in CM$	8
18 $QD_c / QE_c = [(\delta x_c / 1 - \delta x_c)(PD_c / PE_c)]^{\sigma x_c},$ $\sigma x_c = 1 / (\rho x_c - 1) > 0$	$c \in CE$	8

**Institution Block**


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19	$YF_{i,f} = shry_{i,f} \sum_{a \in A} FPD_{f,a} PF_f QF_{f,a};$	$i \in I,$ $f \in F$	99
20	$YH_h = \sum_{f \in F} YF_{h,f} + TR_{h,g} CPI + EXR \cdot TR_{h,r} + TR_{h,s}$	$h \in H$	9
21	$HTS = \sum_h MPS_h (1 - ty_h) YH_h$		1
22	$HDS = HTS - \sum_h TR_{h,r} \cdot EXR$		1
23	$MPS_h = MPSIN_h (1 + MPSADJ \cdot MPSDUM_h)$		9
24	$UH_h = \prod_c \left( \frac{QH_{c,h}}{\beta_{c,h}} \right)^{\beta_{c,h}}$	$h \in H$	9
25	$QH_{c,h} = \frac{\beta_{c,h} EH_h}{PQ_c}$	$h \in H,$ $c \in C$	81
26	$EH_h = (1 - MPS_h) (1 - ty_h) YH_h$	$h \in H$	9
27	$CPIH_h = \prod_c PQ_c^{\beta_{c,h}}$	$h \in H$	9
28	$CPI = \sum_h \mu_h \cdot CPIH_h$		1
29	$\mu_h = \frac{UH_h}{\sum_h UH_h}$	$h \in H$	9
30	$QINV_c = INV_c IADJ$	$c \in C$	9
31	$GBS = \sum_{h \in H} ty_h YH_h + EXR \cdot TR_{g,r} + \sum_{c \in C} tq_c PD_c QD_c +$ $\sum_{c \in CM} tq_c PM_c QM_c + YF_{g,f}$ $+ \sum_{c \in CM} tm_c EXR \cdot PWM_c QM_c + \sum_{c \in CM} te_c EXR \cdot PWE_c QE_c$ $- \left[ \left( TR_{s,g} + \sum_{h \in H} TR_{h,g} \right) CPI + \sum_{c \in C} PQ_c QG_c \right]$		1
32	$YFRM = YF_{s,k}$	$s \in I$	1
33	$YFRM_{TS} = YF_{s,k} - TR_{h,s}$		1

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**System Constraint Block**


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34	$\sum_{a \in A} QF_{f,a} + QFU_f = QFS_f$	$f \in F$	11
35	$QQ_c = \sum_{a \in A} QINT_{c,a} + \sum_{h \in H} QH_{c,h} + QG_c + QINV_c$	$c \in C$	9
36	$FS + \sum_{c \in CE} PWE_c QE_c + \sum_{i \in I} TR_{i,r} = \sum_{c \in CM} PWM_c QM + \sum_{i \in I} TR_{r,i}$		1
37	$WALR = \left[ \sum_{h \in H} MPS_h (1 - ty_h) YH_h + YFRMTS + GBS + EXR \cdot BOP \right] - \sum_{c \in C} PQ_c QINV_c$		1

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**Comments**

The paper titled “Fiscal Policy and its Role in Reducing Income Inequality: A CGE Analysis for Pakistan” is an excellent and systematic effort to explore the relationship in the shocks to Fiscal policy on the income inequality for Pakistan. Rather it presents solution to a million \$ question of improving equity and efficiency of the economy while maintain the fiscal balance.

However the following are some of my comments which the authors may like to consider before the final submission of their papers:

- (i) I will comment in a reverse order, and the authors have also recognised it at the end of the paper. The limitations of the methodology. It is a static estimation method. Does not take into account the behavioural changes which might occur because of the regime change. Especially in the present case since Fiscal policy is under consideration, so essentially we are talking about regime changes with each possible strategy. The CGE model has rigid assumptions such as constant return to scale in the production block. Another example is less substitution among the imported and export goods where as the case me opposite especially with the enactment of WTO. Fixed foreign savings leading to an assumed flexible exchange rate regime, where as actually foreign savings are very vulnerable especially for the developing countries. Finally the robustness tests for the results from this technique may be questionable and an empirical issue.
- (ii) Statements need qualifications, page 1, “...this persistent deficit is the constant source of increasing poverty and deterioration of income inequality in Pakistan”.
- (iii) Sales tax being regressive for Pakistan seems not to be the case.
- (iv) If the model presented in the paper here is an adopted one then simply give reference instead of giving all the details. If the authors have added something to it than that can be explained in the paper. In that case please also provide some descriptive statistics.
- (v) The SAM used for this paper is of 2001-02, 13 years old, definitely needs an upgrade before any policy oriented results could be interpreted. Why couldn't the available latest SAM not used needs some reasons.
- (vi) The parameter values (such as external sector elasticities) are not for Pakistan, so author should be very care full in selecting the appropriate parameters. Assumption such as no change in fiscal deficit could be more rational if it is linked with the FRDLL-2005 value.

- (vii) Table 3.2 on structure of Macro SAM, just a wild thought that in the column for government can we also add other transfer payments to enterprises such as rebates, tax charges and in the commodity column against government can we include surcharges as it is one of the major source of revenues for Pakistan, lastly also add PSEs, Provincial revenues/expenditures?
- (viii) Deficit financing methods and such reforms implementation have a cost which needs to be part of the system.
- (ix) The results for transfer payments are a bit skeptical, especially with the modus operandi in vogue. E.g. wheat subsidy is identified to be benefiting just 6 percent of the poor households, similarly the electricity subsidy is uniform across the board etc.
- (x) Further any tax increase may not result in the same proportion at which it was earlier (Tax Laffer curve), so that may be mentioned as a short coming of the model.
- (xi) In the macroeconomic effects section 35 percent increase in transfer causes the GDP at factor prices to be reduced. Put some economics with every result.
- (xii) For the macroeconomic indicators tables please give the percentages as the actual figures does not offer much orientation.
- (xiii) In the sensitivity analysis a 50 percent +- is on the higher side.
- (xiv) Other possibilities of change in tax and expenditures where say inequality is kept constant and efficiency has increase or vice versa may also be considered as there could be a number of iterations.
- (xv) Can we compare the simulation based exercise with those which are resulting because of a natural experiment (robustness).

The paper makes an interesting case and presents the results in accordance with the theoretical understanding. Over all the paper is a good contribution to the existing knowledge on the subject.

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## **Income Inequality, Redistribution of Income and Trade Openness**

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### **1. INTRODUCTION**

Literature on nexus between trade openness and government spending is impressive [Atif, *et al.* (2012), Rudra (2004), Dani (1997) and McGuire (1999)]. The literature is growing rapidly. Analysts have documented the positive effects of government social spending [see for example Mesa-Lago (1994); Huber (1996); Weyland (1996); McGuire (1999)]. Unfortunately, Pakistan lacks empirical evidences on the impact of government social spending. Although Government of Pakistan has taken number of initiatives to have some form of redistribution policies, however, inequality in Pakistan is higher as compared to other Least Developed Countries that are open to trade. This situation is alarming. This paper therefore tries to identify the nexus between trade openness and social spending for the period 1975–2012.

International evidence suggests that government social spending influences poverty and distribution of income. Pakistan's low level achievement in terms of reducing inequality, given the likely adverse economic impact of trade openness, point towards the fact that government has to design the policy in such a way that it affects the distribution of income. Thus, exploring the effect of social spending on income inequality is necessary for the concerned policy makers.

Literature exploring nexus between trade openness and social spending provides mixed results. For example, Dani (1997) and Quinn (1997) have reported positive impact of trade on welfare. However, Garrett (1998, 2001), Rudra and Haggard (2001) stress that increasing the trade will result in unequal distribution of income only when government does not influence the income distribution through social spending.

Literature exploring such effects provides ambiguous evidences. For example, Dollar and Kraay (2002) found out that openness affects income inequality while Lundberg and Squire (2003) and Barro (2000) predict no impact. Furthermore, using the data of developed countries Edwards (1997), Higgins and Williamson (1999), and Calderón and Chong (2001), found no support for the argument. Barro (2000) and

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Ravallion (2001) point out that openness affects inequality, but in developed countries openness appeared to be decreasing inequality.

Most recently, Atif, *et al.* (2012) have tested the causal effect of globalisation on income inequality for 68 developing countries and found that developed countries show support for the hypothesis. Jaumotte, *et al.* (2013) assessed the impact of the financial globalisation and trade openness on income inequality, the former decreases the inequality while the latter does not. Whereas Faustino and Vali (2011) showed that trade openness, among OECD countries reduces income inequality but FDI causes inequality.

Moreover, literature also hypothesised that when a country opens up to trade its factor endowments affect inequality. However, very few researchers found support for this hypothesis. For example, Dollar and Kraay (2002) found no effect but Spilimbergo, *et al.* (1999) and Fischer (2001) found significant effect. Their study argues that countries that are more open to trade and are relatively skill abundant have high inequality, while countries, which are more open to trade but are capital abundant have lower inequality.

In view of the findings of earlier studies, this study has developed a simple model to investigate the relationship among openness, government social spending and income inequality. In formulating the model, this study has also considered two more factors; economic development, and population. These factors have been included in the model as the important determinants of inequality. Using the Johansen Co-integration approach, the study analyses the short run and long run effects of openness on income inequality.

The rest of the paper proceeds as follows. Next section provides the model specification. Third section discusses the estimation technique and presents the data explanation. The fourth section reports the results. Final section provides overall conclusions.

## 2. MODEL ESTIMATION TECHNIQUE AND DATA EMPLOYED

### 2.1. Model

To test the relationship among income inequality, provision of social services (income redistribution) and trade openness (globalisation), we first develop relationship between income inequality and trade openness.

$$GINI = f(OP) \quad \dots \quad (1)$$

Here, 'GINI' stands for GINI-coefficient, it is a standard measure of income inequality. Higher GINI represents higher level of inequality. 'OP' in Equation (1) stands for trade openness. Openness affects inequality through different channels.

Anderson (2005) discussed the channels through which trade may affect inequality. First, relative factor returns—when a country opens to trade the demand for its abundant factors increases, this increase the returns of that factor. Second, if openness benefits the poor by increasing their income, it would increase asset accumulation and thus investment. In the long-run, this will contribute in reducing inequality. Third, openness may expand employment and wages in selected regions, which in turn would affect income distribution. Finally, Anderson (2005) suggests that countries more open to trade implement redistribution policies more effectively as particular group in a society suffers a loss of income due to trade.

Previous research has documented that state sponsored social assistance programme diminishes the disruptive effects of trade by compensating the losers of trade openness. Hence, if people can easily access social services (redistribution of income) it will help in reducing income inequality.

$$GINI = f(OP, LSS) \quad \dots \quad (2)$$

Where, *SS* represents provision of social services and *LSS* is the log of social services. Government commitment for the provision of social service is captured here by the government expenditure on health, education, and social safety nets. If this expenditure is redistributive, then *LSS* will be negative and significant or vice versa.

In exploring the nexus between trade openness and welfare, one cannot ignore other factors that are considered as important determinants of income inequality. Among such factors, economic development, and population are important ones [Kuznets (1955); Crenshaw (1992); Burkhart (1997); Sheahan and Iglesias (1998); Boschi (1987); Vanhanen (1997)].

First, considering argument given by Kuznets (1955) study a negative and significant relationship is expected between economic development and income inequality. Kuznets hypothesised an inverse U-shaped (means, non-linear relation) relationship between development and inequality. According to this, inequality in an economy first increases but as countries develop it begins to decrease. Hence Per-capita GDP variable is included in the model to represent level of economic development. To capture the non-linearity, square of per-capita GDP variable is included in the model.

$$GINI = f(OP, LSS, PGDP, PGDP^2) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (3)$$

Further, population growth has also been hypothesised to have an inverse relationship with inequality. The reason is that growth in population increases burden on the country's economic resources and therefore on the shares of income among the population. Thus, including population growth, our model becomes:

$$GINI = f(OP, LSS, PGDP, PGDP^2, POP) \quad \dots \quad \dots \quad \dots \quad \dots \quad (4)$$

To test the relationship among the variables included in Equation (4) the study estimates the following baseline equation:

$$GINI_t = \alpha_0 + \beta_1 GINI_{t-1} + \beta_2 OP_t + \beta_3 LSS_t + \beta_4 PGDP_t + \beta_5 PGDP_t^2 + \beta_6 POP_t + \mu_t \quad \dots \quad \dots \quad \dots \quad \dots \quad (5)$$

Where subscript 't' denotes time period

## 2.2. The Data

For empirical estimation, this study has employed the data on Gini coefficient (GINI), representing the income inequality (income distribution). The interpolated series has been constructed from the UN-WIDER dataset. A quadratic curve was fitted on the actual observations by regressing log of poverty measure (or log of Gini Coefficient) on time and time square variables [see Jamal (2006) for more detail]. *LSS* represents provision of social services; comprised of government spending on Health, Education and Social safety nets. The data for social services 'SS' has been taken out from Budget

Documents, Government of Pakistan and 50 years of Pakistan. Economic development has been taken as the per capita GDP (PGDP), population growth (POP), and openness (OP)- imports plus exports as percent of GDP, a common measure of trade openness, taken from World Bank's World Development Indicators dataset [WDI (2013)]. This study performs the analysis using the annual data spanning the period from 1975 to 2012. The empirical estimation is done using the VAR approach proposed by Johansen and Juselius (1990). The econometric approach will help in detecting the long run and short run relationship among the variables of interest. Though both Cointegration and Vector Error Correction models have been used usually but recently scholars are applying Autoregressive Distributed Lag model (ARDL) to detect the long run and short run relation among the variable as well. ARDL is usually adopted when the variables under consideration have different order of integrations (i.e. a mix of I(0) and I(1)). As in our case the variables under consideration are all integrated of order 1 I(1) we have applied Johansen and Juselius (1990) method to identify the long run co-integrating vectors and short run effect of the variable of interest on income inequality.

### 3. EMPIRICAL ANALYSIS

The study first examined the long-run relationship among the said variables using Johansen approach [Johansen (1988) and Johansen and Juselius (1990)]. However, before applying the co-integration test, this study has also examined whether the series are stationary or non-stationary. For further analysis, ADF test has been applied, which includes a trend term. This is a common practice in the literature. Table 1 reports the ADF test results. The results show that all variables are integrated of order one, i.e., I(1)

Table 1

*UNIT ROOT—Augmented Dickey-Fuller (ADF)*

Variables	LEVEL	1ST DIFFERENCE
	INTERCEPT & TREND	INTERCEPT& TREND
GINI	-3.07	-91.04*
OP	-2.84	-7.24*
PGDP	4.91	-4.23*
LSS	-2.48	-6.69*
POP	-2.56	-6.03*

After examining order of integration, we have applied Johansen cointegration test. To determine the number of cointegrating vectors, the study has computed the Johansen trace statistic and Eigen-values. Before that, AIC and SIC values have been analysed to determine the lag length. These values indicate one lag in the system (AIC=1.487 & SIC=3.315). Thus, the study performs Johansen's test by employing one lag. The results of co-integration based on the trace and Eigen-values are reported in Table 2.

Table 2

*Johansen Co-integration Test*

	Maximal-Eigen Test	5 Percent Critical Value	Trace Test	5 Percent Critical Value
R=0	309.1877*	44.4972	574.7456*	117.7082
R<=1	113.9585*	38.33101	265.5579*	88.8038
R<=2	97.23964*	32.11832	151.5994*	63.8761
R<=3	27.31337*	25.82321	54.35977*	42.91525
R<=4	19.08776	19.38704	27.0464*	25.87211
R<=5	7.95864	12.51798	7.95864	12.51798

Note: \* denotes rejection of the hypothesis at 5 percent significance level.

L.R. test indicates 5 co integrating equation(s) at 5 percent significance level.

Table 2 reveals that the null hypothesis of no cointegration is rejected at 5 percent significant level by both trace and Eigen-value. Cointegration test indicates five co-integrating vectors (rank =5) in the system. Our results, therefore, confirm that provision of social service, trade openness, per-capita GDP, per capita GDP Square and population growth are cointegrated. The results therefore provide the strong evidence of the long run relationship among the variables under study.

These results imply that, in general, all variables (except openness) included in our analysis adjust in a significant fashion to clear any short-run disequilibrium.

Although both trace test and Eigen-value have indicated the presence of cointegrating vectors in the model, yet there is a further need to explore the issue concerning impact of explanatory variables on income inequality in long run. Table 3 reports the cointegrating coefficients normalised on  $GINI_t$ .

Table 3

*Co-integrating Coefficients Normalised on GINI*

	LSS	OP	PGDP	PGDP <sup>2</sup>	POP	Trend	C
	-0.115171	0.005956	-46.51904	0.000156	0.95587	0.089119	
<b>GINI</b>	(0.05636)	(0.00408)	(5.15783)	(4.60E-05)	(0.04856)	(0.02227)	30.78963
	[-2.04342]*	[1.45842]	[-9.01910]**	[3.42296]**	[19.6835]**	[4.00100]**	

Note: \*\* (\*) denotes significant at 5 percent (1 percent). Standard errors in ( ) and t-statistics in [ ].

Variables in the model have yielded statistically significant coefficients with expected signs except for OP. The implied long run significant and positive elasticity (0.00015) of  $PGDP^2$  in the model also provides support for Kuznets's hypothesis.

The long run elasticity of social spending (-0.0115) is also significant indicating that increase in the government spending for the provision of social services will enable Pakistan to reduce the income inequality in the long run. Moreover, PGDP has a negative and significant impact on GINI in the long-run whereas  $PGDP^2$  has positive and significant impact on GINI hence our results supported by Kuznets's Hypothesis. Finally, POP has a positive and significant impact on GINI, which shows that in the long-run, as the population increases, GINI will also increase.

Evidence of co-integrating relation among these variables has several implications. First, it rules out 'spurious' correlations and also the possibility of Granger non-causality. Second, the actual number of cointegrating (or equilibrium) relationships(s), found to be 5 percent, will result in a corresponding number of residual series. The residual series measures the speed of adjustment back to the long run. These are termed in literature as error-correction terms (ECTs). ECTs are exogenous variables and appear as lagged variable as part of the vector error-correction model (VECM).

Table 4

*VECM Model*

	D(GINI(-1))	D(LSS(-1))	D(OP(-1))	D(PGDP(-1))	D(PGDP2(-1))	D(POP(-1))	ECT(-1)	C
<b>D(GINI)</b>	-	0.000671 (0.00102)	4.04E-05 (6.20E-05)	0.388682 (0.19217)	-3.49E-06 (9.80E-07)	-0.004905 (0.00253)	-0.007691 (7.00E-05)	-0.063598 (0.00036)
		[ 0.65945]	[ 0.64968]	[ 2.02256]*	[-3.56882]*	[-1.93546]**	[-109.875]*	[-175.312]

Note:\*\* (\*) denotes significant at 5 percent(1 percent). Standard errors in ( ) and t-statistics in [ ].

Table 4 reports the results of VECM. As discussed above the  $ECT_{t-1}$  generates a force that cause the variables to return to the long run equilibrium when it deviates from it. Thus, the longer the deviation, the greater would be the force tending to correct the deviation [Banerjee, *et al.* (1993)]. The coefficients of the lagged values of  $\Delta LSS_t$ ,  $\Delta OP_t$ ,  $\Delta PGDP_t$ ,  $\Delta PGDP_t^2$  and  $\Delta POP_t$  are short run parameters, which measure the immediate impact of independent variables on the dependent variable.

The results indicate that the sign of coefficient of lagged ECM term is negative and significant at 5 percent level of significance. This further confirms that there exists stable long run relationship among the variables. The value of lagged ECT term shows that changes in GINI from short run to long run A are adjusted by almost 0.7 percent every year with high significance.

Table 4 also reports that Social Spending and openness are insignificant in explaining the inequality in the short run. Moreover, the coefficient of  $\Delta PGDP_t$ ,  $\Delta PGDP_t^2$  and  $\Delta POP_t$  are found to be Granger causing  $\Delta GINI_t$  in the short run.

Based on the empirical findings, the study indicates that Per Capita GDP, Per Capita GDP Square and Population are effective in explaining income inequality. The Study draws following conclusions based on the findings:

- Although results do not provide support for the hypothesis that openness, create income inequality in Pakistan but still in the long-run, negative and significant impact of government commitment for the provision of social services points out that government policies e aimed at redistribution are important to maintain a favorable distribution of income. Thus for this variable study draws the conclusion that state sponsored social assistance is helping in reducing the income inequality prevailing in Pakistan.
- For economic development, our study supports Kuznets Hypothesis i.e.(significance of Per capita GDP variables) in the presence of social spending. Many scholars have also focused on the curvilinear relationship of wealth to inequality, establishing Kuznets Curve as both a stylised fact and economic law.

- For population growth, study concludes that it is a burden on the country's economic resources thus increases inequality in the long-run but in the short run population growth, by providing more employment and modern work force, reduces income inequality in Pakistan.
- Trade Openness is not found to affect income inequality. Our result is consistent with Lundberg and Squire (2003), Barro (2000) and others.

To summarise, trade openness though may promote economic development but it does not affect income distribution in Pakistan. However, the negative and significant results for the social spending point out that government policies aimed at redistribution are important to maintain a favourable distribution of income.

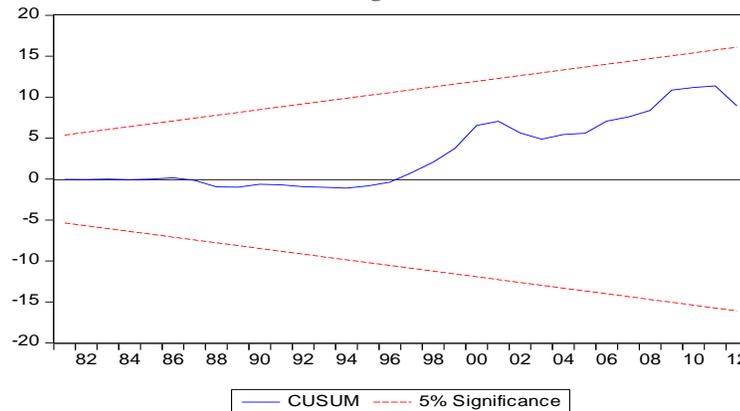
#### 4. CONCLUSIONS

A number of researchers have explored the nexus between trade openness and the welfare but unfortunately, there have not been enough empirical evidences on the distributional impact of government spending in Pakistan. In this paper, we have explored the relationship among trade openness, social spending, and income distribution for Pakistan economy using long-run and short-run tests.

Although our results do not provide support for the hypothesis that openness affects income inequality but still negative and significant impact of government commitment for the provision of social service on the income inequality points towards the fact that government policies with respect to social spending to are important to maintain a favourable distribution of income. In addition, this study also found that population growth increases income inequality in the long-run while in short-run, tends to reduce it by providing employment opportunities and modern work force that leads to greater productivity and income for the poor.

#### ANNEXURE

**Fig. 1.**



Furthermore, CUSUM stability test is also conducted for the estimated model. If the plot of the CUSUM sample path moves outside the critical region, and in this case at 5 percent significance level, the null hypothesis of stability over time of the intercept and

slope parameters is rejected (assuming the model is correctly specified). The plot of the CUSUM in Figure 1 reveals that the null hypothesis of parameter stability is not rejected at the 5 percent level of significance.

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### Comments

The paper titled “Income Inequality and Redistribution of Income in the Era of Globalisation” is an interesting paper in the where the authors explore the income inequality situation for Pakistan with the advent of more globalisation.

Following are some of the observations which if incorporated may improve the quality of paper and in terms of contribution to the academic knowledge on the subject.

- (i) The title uses the name globalisation, which in my opinion is a very broad concept and many dimensions to it are possible to study. This particular study uses the trade liberalisation, so better use that in the title also.
- (ii) Theoretical discussion of the variable selection is appropriate. However inclusion of population (assuming more population would put more pressure on the existing resources, which may be wrong as population is the necessary ingredient for economic growth through skilled labour force) and urban population are highly correlated.
- (iii) In the estimation portion, for the data on government spending on health, social safety net and education are taken to be federal only, it should be consolidated. Data on Gini is interpolated, but no information as to how many values have been interpolated.
- (iv) Now once it was observed that all the variables are I(1). Then a simple cointegration method like Johanson and Jusilus or Engle and Granger was more appropriate leaving these two, as the ARDL is adopted if the variables under consideration have different order of integrations (i.e. a mix of I(0) and I(1)).
- (v) While comparing the wald-F test for existence of cointegration Pesaran, *et al.* (2001) tables are used, which were for large samples (500-1000), for our case where the total observations are around 37 we have to use the tables provided by Naryan (2005) other wise it may get non-parsimonious results as the F-test used here has a non-standard distribution and depends on the (1) Variables being I(0) or I(1), (2) No of repressors, (3) Intercept and/or trends and the (4) sample size. So we cannot use the old tables for exploring the critical bound.
- (vi) The Cusum and Cusum Square tests are not used in the paper.
- (vii) The results are some what unexpected also not validated with the help of other studies, e.g. insignificance of almost all the variables and the one variable which is significant has an opposite sign (Government expenditure on health, education and social sector). Provide economics of the results. Further there may be need to rethink about the model being used.
- (viii) There is a strong possibility of multicollinearity in the estimation, such as Trade openness and GDP, then urban population and total population, so may be variable used need to be considered.

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## Are Defense Expenditures Pro Poor or Anti Poor in Pakistan? An Empirical Investigation

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### I. INTRODUCTION

Recent increase in defense expenditure (Dexp hereinafter) in Pakistan due to increase in internal security and terrorism is an issue of concern to many Pakistani and other stakeholders in the Pakistan economy. Presently, internal security issues especially that of the increasingly violent homegrown terrorism is forcing increasing financial cost on government's expenditure towards defense sector. According to Budget documents, defense budget amounts to Rs 700.2 billion for the 2014-15 fiscal year compared with Rs 627.2 billion allocated in the preceding fiscal year, showing an increase of Rs 73 billion. However, these figures do not include Rs 163.4 billion allocated for pensions of the military personnel.<sup>1</sup> In addition to this, military would also be given Rs 165 billion under the contingent liability and Rs 85 billion under the Coalition Support Fund (CSF). This means that in reality Rs 1113 billion has been allocated for the military which is about 28.2 percent of the country's total budget [Sheikh and Yousaf (2014)]. This has led to diversion of the money needed for much-needed development projects, as the share of current expenditure in total budgetary outlay for 2014-15 is 80.5 percent.<sup>2</sup> This diversion of funds has economic implication since some social sectors are likely to suffer in Pakistan.

Military expenditure retard development by diverting government resources that could be used for public services, infrastructure, or lower taxes [Collier (2006)]. This view has been expressed by the UN Committee for Development Planning which states that the single and the most massive obstacle to development is the worldwide expenditure on national defense activity [Olofin (2012)]. The adverse effects of increased Dexp in a developing country such as Pakistan are likely to exacerbate the existed poverty since almost all the military hardwares are imported. According to the Stockholm International Peace Research Institute (SIPRI) statistics, Pakistan stands at third position

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<sup>1</sup>There is no generally agreed definition of military expenditure worldwide. Stockholm International Peace Research Institute (SIPRI), Sweden includes in its definition of military expenditure all costs incurred as a result of current military activities. It includes retirement pensions. The International Monetary Fund's Government Financial Statistics Yearbook (GFSY) collects expenditure data according to a functional classification which places military pensions within the social security function, military healthcare within the health function, etc. Government of Pakistan also put military pensions under the civilian budget.

<sup>2</sup>*Economic Survey of Pakistan 2013-14.*

with global share of 5 percent of major arms importer for the 2009-2013 [Wezeman and Wezeman (2014)].

The adverse effects of Dexp have not deterred countries from stockpiling military arsenals. According to Stockholm International Peace Research Institute (SIPRI), world military expenditure in 2012 is estimated to have been \$1756 billion, representing 2.5 percent of global gross domestic product (GDP) or \$249 for each person in the world. During the last fiscal year 2012, Pakistan spent Rs 507.159 billion on defense sector which constitutes 12.9 percent of total federal government expenditures. Unfortunately, Pakistan is still among the poorest countries and the per capita gross national income for Pakistan was US\$ 1261 which is 143rd among 182 countries in the world in the same year.<sup>3</sup> Thus on the one hand, Pakistan is facing several problems such as poverty, poor infrastructure and poor health status. On the other hand, Pakistan does spend a considerable amount on military expenditure which might use scarce resources and crowd out growth-leading expenditures such as health and education expenditures.

A large chunk of population in Pakistan is living below the poverty line. Statistics show that 45.7 percent people (Approximately 82 million) in Pakistan are living below the poverty line. And out of these 45.7 percent people 36.5 percent million (Approximately 65 million) of the total population are living in chronic poverty [Adnan (2012)]. On the other hand, the large size of Dexp in presence of high budget deficits, declining development expenditure and increasing debt services on account of exploding public debt got the attention of researcher on the subject. Besides these factors, Pakistan's pursuit of nuclear capability, its arms race with its India and incidence of poverty also got the attention of foreign researchers [Khan (2004)].

For policy purposes, it is very important to determine the channels by which Dexp influence the economic growth process. For the policy makers, the impact of Dexp on economic development, which can be positive or negative, can have different implications with respect to what strategy to apply to stimulate economic growth [Braşoveanu (2010)]. The issue of Dexp is widely debated in the literature. Defense expenditure can affect the economy either negatively or positively. They are considered as unproductive, have higher opportunity costs and crowd out investment. They retard the pace of the economic growth by distorting the resource allocation. But contrary to this view, they also have growth-promoting potentials, cause expansion of aggregate demand, production and employment generation. They exhibit spillover effects on the economy. The empirical literature is divided between pro and against school of thoughts. The former group is less dominant in the literature [Frederiksen and McNab (2001); Hassan, *et al.* (2003); Halicioglu (2004); Yildirim, Sezgin, and Ocal (2005); Bose, *et al.* (2007); Ando (2009) which enlist the positive effects of Dexp on economic growth. The latter group of researcher find adverse of effects of Dexp on economic growth [Abu-Bader and Abu-Qarn (2003); Galvin (2003); Klein (2004); Karagol and Palaz (2004); Kentor and Kick (2008); Smith and Tuttle (2008); Mylonidis (2008); Hou (2010); Dunne (2010); Braşoveanu (2010); Iftikhar ul Husnain and Shaheen (2011); Dunne and Tian (2013)].

There is extensive literature available on the relationship between Dexp and economic growth, but there are a few studies on the impact of Dexp on poverty [Olofin (2012); Henderson (1998)]. To the best of our knowledge, no study has empirically

<sup>3</sup>Data refer mostly to the year 2012. World Economic Outlook Database-October 2013, International Monetary Fund. Accessed on 8 October 2013.

examined the impact of the Dexp on poverty level in Pakistan.<sup>4</sup> Thus, this study intends to fill the gap by examining the impact of Dexp and some other explanatory variables on poverty level in Pakistan. Therefore, the goal of this paper is to analyze the relationship between Dexp and poverty in Pakistan along with other explanatory variables like GDP, population, Foreign Direct Investment (FDI), Inflation and public spending on Education and has tried to find out the existence, direction and intensity of this connection.

The remaining part of the paper is organised as: Section II provides the glimpse of Dexp in Pakistan, Section III gives the theoretical understanding and review the available literature on the topic, Section IV describes the research methods undertaken to achieve the objectives and gives data sources, Section V discusses the results and lastly conclusion and policy implications are given.

## II. TRENDS IN DEFENSE EXPENDITURES OF PAKISTAN

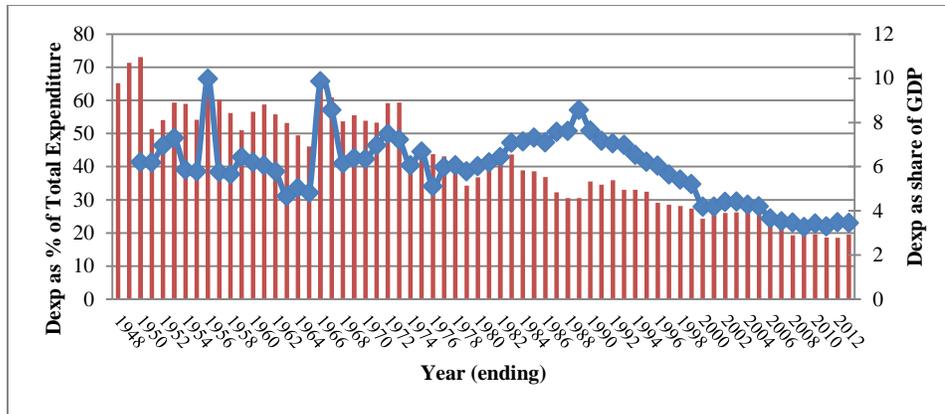
The trend of Pakistan's Dexp (as a proportion of GDP) is shown in Figure 1. The range of Dexp is from 3.3 per cent to 9.97 per cent. Pakistan's Dexp remained one of the largest components of total government expenditures since independence. Although sizeable variation in Dexp to GDP ratio has been witnessed over the past five decades and the ratio declined significantly with the advent of the 21st century, the absolute size of Dexp is considered still very high. The defence expenditure were considerably high during the initial years after independence, it remained 6.4 percent during the first half of 1950s. It rose to 9.97 percent in the year of 1956. This exceptionally high share of Dexp in early years of independence may be largely attributable to the government efforts to achieve a minimum level of deterrence, necessitated by the hegemonic attitude of India towards Pakistan.

Afterwards, the share of defence expenditure witnessed a considerable decline with some fluctuations before spiking up again in year 1966 on account of 1965 war with India. In the post-1965 war era, the defence expenditure saw a modest decline. However, this decline proved short lived, as ratio surged again in the fiscal year 1972 due to 1971 war. The post-1971 war period saw a decline and it remained 6.11percent till 1980. However, the declining trend once again reversed during the decade of 1980s as Pakistan got involved in war against Soviet Union occupation in Afghanistan. The average Dexp remained during the period was 7.26 percent.

The withdrawal of Russian forces from Afghanistan coupled with the prevalence of high fiscal deficits propelled government to revisit its defence spending. As a result, the decade of 1990s recorded considerable decline in the share of Dexp [Khan (2004)]. The decline in second half of 1990s was more pronounced compared to the first half. Despite tensions on borders with Afghanistan (following the September 11 incident) and India (due to incident of December 13), the share of Dexp continued to decline and averaged 4.29 percent during first half of 21<sup>st</sup> century. The second half is averaged 3.46 percent despite Pakistan is a front line state in war against terrorism. But Dexp once again has started climbing up.

### Fig. 1. Defense Expenditure Profile of Pakistan (1947–2013)

<sup>4</sup>Kalim and Hassan (2013) Presented conference paper on "Military expenditure and poverty in Pakistan: a complex phenomenon" at 3rd International Conference on Business Management organised by University of Management and Technology, Lahore. Paper was subsequently published in Conference Proceedings.



Data Sources:

- (a) Singh and Cheema (2000).
- (b) World Development Indicators (Online).

The share of Dexp to the total federal government expenditure (FGE) is also an important indicator to understand the pattern of Pakistan's Dexp. Figure (1) also gives time-series data for Pakistan's Dexp as share in the total federal government expenditure. During the period 1948-1960, the defense share was almost 60 percent of FGE. The average share of the decade of 1960s was 56 percent. After that it started declining and it averaged 43 percent during 1970s. Since 1970s defense share in FGE showed a sharp decline. In 2013, Dexp constitutes 19.47 percent of total federal government expenditure.<sup>5</sup>

To sum up the discussion, Pakistan's defense burden historically has been higher especially during the tension period of war with India and front line state against Soviet aggression of Afghanistan. The share of non-development expenditure has been alarming disproportionate to development expenditure. And the share of Dexp in the current expenditure has been on higher side. This defense share promotes the economic growth and retards it; this is the question of empirics.

### III. THEORETICAL UNDERPINNING AND REVIEW OF LITERATURE

The use of government expenditure as a fiscal policy tool is well established; however the usefulness of Dexp as a tool of fiscal policy especially for developing countries is yet to be established. Theoretical background on the relationship between Dexp and economic growth argues both positive as well as negative relationship. The positive correlation between Dexp and economic growth springs out from the theory of military Keynesianism. The advocates of the theory argue that as Dexp is part of the budgetary outlay and the government has a considerable control over it. Therefore having positive effects on economy, it can be used as a fiscal instrument to stabilise the economy when it is needed [Khan (2004)]. In order to achieve economic growth, the government should enhance defence spending Peter (2010) and Veronique de Rugy (2012)]. The theory focuses on Dexp as a component of aggregate demand and spillover effect of these spending also explains the economic effect of Dexp. Increased aggregate demand due to high Dexp will add in economy's output and generate employment [Alpetekan and Levine (2009)].

<sup>5</sup>This data is according to World Development Indicators (WDIs) database. But according to *Economic Survey of Pakistan 2013-2014*, defense expenditures accounted for 11.2 percent in 2012-13.

Braşoveanu (2010) and Pardhan (2010) enlist positive and negative effects of defence spending. Some of these positives are summarised here as follows:

- Dex promotes Research and Developments (R&D) in defense sector which brings technological innovations and this technological spill-overs applied to civil sector can enhance economic growth.
- Dex promotes economic growth, if some of the expenditure is used for the creation of public infrastructure development and human capital formation.
- Dex provides security which promotes a stable business environment, a necessary condition for encouraging foreign investment and market exchange.
- Dex can improve productivity and generate welfare, if the part of spending is used for revamping the economy during crisis times like earthquake, floods, terrorist attacks and so forth.
- Dex in the period of unemployment provides stimulate effect to economic growth as it causes an expansion of aggregate demand.

On the other hand, there are arguments regarding the negative relationship between Dex and economic growth. Some of them are summarised here as follows:

- Dex can adversely effect economic growth by crowding-out private investment. This is classical and neoclassical argument: an increase in public spending substitutes public goods for private goods. The higher Dex generates a distortion in resource allocation and the diversion of resources from productive activities to the accumulation of military arsenal.
- Dex has the opportunity cost as these expenditures hinder economic development by reducing savings and misallocating resources away from more productive use in the public or private sector. The resources spent on preparation for war and on war-fighting could be better employed on more productive avenues.
- Dex may further bring constraints on budget. If financed by non-distorting revenues, has a positive effect on economic growth; if financed by distorting revenues, it might have a positive or negative effect on economic growth, depending on the level of the Dex.
- Dex may affect efficient resource allocation as it is not governed by market processes, so it tends to create distortions in relative prices.
- Dex may be driven not by security needs, but by a rent seeking military industrial complex, and may cause arms races or damaging war.
- Under the assumption of fixed government expenditure, high defence expenditure undermines the government efforts to spend more on infrastructure, which is a prerequisite for economic growth.

The first seminal empirical study on the relationship between Dex and economic growth was carried out by Benoit (1973, 78). He studied 44 less developed countries (LDCs) for the period 1950-65 and found a positive link between Dex and economic growth. Benoit (1978) proposes a neo-classical supply side explanation on the link between Dex and growth where Dex can affect growth in two directions, negatively and positively. It affects negatively by taking away the resources which may be better used in civilian economy, and it affects positively by providing jobs and increasing employment, involving in infrastructure, training and research and development (R&D). The works of Benoit have been criticized on account of his conclusions and methodology

by later researchers. But his empirical work induced more research and the subsequent research has been greatly influenced by his postulates [Alpetekan and Levine (2009)].

The opinions of the researchers are divided on the account of the effects of Dexp. The “pro” group of researchers view Dexp is a guarantee of peace, security and welfare. This school of thought believes that Dexp increases purchasing power and brings improvements in human and physical capital in addition to direct technology benefits that enhance economic growth [Benoit (1978); Beenstock (1998); Sezgin (2001); Atesoglu (2002); Yildirim, Sezgin, and Ocal (2005)]. The other “against” group of researchers sees Dexp as a wasteful enterprise that influences the economy beyond the resources it takes up. The Dexp is a consumption good that reduces saving and crowds out private investment and affects growth negatively. Moreover Dexp diverts resources from productive uses to unproductive uses [Karagol and Palaz (2004); Dunne and Tian (2013)]. Researchers have also found that Dexp has neither positive nor negative effect on growth [Al-Yousif (2002)]. The question of link between Dexp and economic growth is empirical in nature.<sup>6</sup>

As evident from the above narration, the findings of the empirical literature are contradictory. Some are getting support of the positive relationship between Dexp and economic growth, while others do not. The reasons on having varying results could be attributed to sample size, method applied, time period, other control variables and the functional form used in the analysis. Therefore, the empirical studies must be interpreted with underpinning hypotheses tested and the other conditioning variables used [Dunne (1996)].

The literature review reveals that numerous studies have been conducted to explore the relationship between Dexp and economic growth and the possible spillover effects of Dexp. But few studies have taken to explore the direct relationship between Dexp and poverty. Recently, the study [Olofin (2012)] considered the poverty among Nigerians and uses principal component analysis to create a poverty index as a dependent variable and also uses infant mortality rate as second dependent variable used in Dynamic OLS model. The study finds that capital intensiveness of the military and the participation rate have important implication on poverty level in Nigeria. Findings rebut the Keynesian argument that defense spending is positively related to well-being. In the case of Pakistan, Kalim and Hassan (2013) investigate the impact of military expenditures on poverty along with inflation, industrialization, service sector, and FDI for both long term and short term for the period of 1972-2009. The findings show that military expenditures are significantly elevating poverty in both long-term and short-term.

Keeping this gap in literature on exploring direct relationship between Dexp and poverty, the objective of the study is to verify the military Keynesian hypothesis of negative relation between Dexp and poverty level. The study uses literature-supported determinants of poverty alongwith Dexp.

### **III. DATA SOURCES AND RESEARCH METHOD**

<sup>6</sup> For survey of literature, see Nijkamp and Poot (2004), Alpetekan and Levine (2009), and Dunne and Uye (2010).

The data on Poverty (Head Count Ratio) have been taken from the study done by Jamal (2006)<sup>7</sup> and data on Dexp have been taken from the Federal Bureau of Statistics' publication "50 Years of Pakistan" and Economic Survey of Pakistan (various issues). The data on GDP, Public spending on education, Population and Inflation have been from the World Development Indicators database available online from the data bank of World Bank while the data on FDI have been taken from UNCTAD. The time period covered in the study is from 1973 to 2011. Both short term and long term relationships between Dexp and poverty have been computed, where Poverty (HCR) is dependent variable and Defense Expenditure (DX) is independent variable. Other explanatory variables are Foreign Direct Investment (FDI), Inflation (INF), Gross Domestic Product (GDP), Public Spending on Education (SEDU), and Population (POP). All variables are in log form. Literature on Log Linear Approach made by various researchers such as Ehrlich (1977), Layson (1983), Bowers and Pierce (1975), Cameron (1994) and Ehrlich (1996) validated that empirical findings computed through Log Linear Approach are more consistent than that of Functional method.

The choice of the independent variables is motivated by the related existing empirical studies focusing on the determinants of poverty and the availability of data. The studies [Hassan and Siddiqi (2010); Jamal (2006); Kalim and Hassan (2013)] lead us to select a set of these variables that are widely used and found to be significant determinants of poverty. A description along with hypotheses of all the variables of the model is given below in detail:

**Head Count Ratio (HCR)** has been used as a proxy for Poverty. It is obtained by taking the ratio of the total number of people who are below the poverty line to the total population.

**Defense Expenditures (DX)** are perceived that whenever any government allocates a major share of its GDP to defense sector then it will eventually add to poverty of the country. Therefore, in order to control the cancer like poverty, resources may be allocated to development and productive side rather on non-productive side.

Hypothesis: Dexp has a negative relation with poverty level (the Keynesian hypothesis).

**Inflation (INF)** Although there are many contributing factors of poverty but inflation is considered as an influential factor. The problem of poverty intensifies even more when the prices of commodities in general and food in particular increase. Several arguments have been made in support of the view that inflation increases poverty [Braumann (2004); Chaudhry and Chaudhry (2008)].

Hypothesis: Inflation is positively related with poverty (Inflation increases poverty by increasing cost of living).

**Foreign Direct Investment (FDI)** is the most useful tool for economic development and long run growth for a country in comparison to other forms of capital inflows. It stimulates the economy which adapts the advanced technological and management skills [Lipsey (2002); Johnson (2006)]. The rapidly growing economies tend to absorb more FDI for its further contribution to economic growth [Walsh and Yu (2010)]. Moreover, FDI also exhibit its positivity associated with social uplift of the people by improving their standard of living [Srinivasan (1983); Gonzalez (1998)]. FDI could also create a virtuous circle of confidence building for the host country. The

<sup>7</sup>Data is upto 2003, for remaining of years of the study; data was taken from *Economic Survey of Pakistan*.

inflows of FDI reinforce local investment environment that subsequently affects both local and foreign investment [Khan and Yun-Hwan (1999)]. Hence, FDI is considered to be one of the important factors of economic growth. It can play significant role in achieving the country's socio-economic objectives for example jobs creation, poverty eradication and technological advancement.

Hypothesis: FDI is Negatively Related with Poverty (FDI Reduces Poverty).

**Gross Domestic Product (GDP)** show the production of goods and services in given period of time which is normally one year. Increase in GDP is positively related with poverty. As the GDP increases, people get new jobs hence increase in their income level and it also reduces poverty.

Hypothesis: The GDP is negatively related with Poverty (GDP has spill over effect on Poverty).

**Public Spending on Education (SEDU)** In traditional neoclassical growth theory, education is emphasized as the main source of human capital formation and ultimately a crucial tool for growth and poverty avoidance. Education remains the key not only to employment in the formal sector but also to various opportunities to better living conditions, though access to education remains uneven for both men and women [Ajakaiye and Adeyeye (2001)].

Hypothesis: Public Spending on Education is negatively related with Poverty (Public Spending on Education reduces poverty).

**Population (POP)** has the potential to impact all aspects of poverty. The relationship between population growth and incidence of poverty has been debated for more than a century. But there is a general consensus among different school of thought that population growth has some relationship with poverty. In Pakistan, population growth has eroded fruits of higher economic growth. It is considered a cause for poverty [Mallick and Ghani (2005)].

Hypothesis: Population has a positive relation with poverty.

### Empirical Model

To examine the long run relationship among HCR, DX, FDI, INF, POP, GDP and SEDU, bounds testing approach to co-integration within the framework of Autoregressive Distributed Lag (ARDL) has been applied. The ARDL estimation technique was developed by Pesaran, *et al.* (2001). Bounds Test is useful for many reasons. First, this technique is more appropriate for small sample size [Pesaran, *et al.* (2001) and Tang (2001, 2002)]. Second, it evades pre-testing of unit roots. Third, short run and long run parameters are estimated simultaneously. Fourth, it is assumed that all variables are endogenous. Finally, this technique does not necessitate that in time series, variables in regression equation have order of integration as I (1). This test can be implemented without consideration of order of integration whether the variables have integrated order as I (0) or I (1) or integrated fractionally.

The representation of ARDL equation (1) is as follows:

$$\begin{aligned} \Delta HCR = & \beta_0 + \beta_1 LDX_{t-1} + \beta_2 LGDP_{t-1} + \beta_3 LFDI_{t-1} + \beta_4 LINF_{t-1} \\ & + \beta_5 LSEDU_{t-1} + \beta_6 LPOP_{t-1} + \sum_{i=0}^k \beta_7 \Delta LDX_{t-i} \\ & + \sum_{i=0}^k \beta_8 \Delta LGDP_{t-i} + \sum_{i=0}^k \beta_9 \Delta LFDI_{t-i} + \sum_{i=0}^k \beta_{10} \Delta LINF_{t-i} \\ & + \sum_{i=0}^k \beta_{11} \Delta LSEDU_{t-i} + \sum_{i=0}^k \beta_{12} \Delta LPOP_{t-i} + DUM01 + \varepsilon_t \quad \dots \quad \dots \quad (1) \end{aligned}$$

Where  $\beta_0$  is intercept,  $\Delta$  is operator for difference and  $\epsilon_t$  is error term. All variables are expressed in logarithm form. The selected lag length is maximum 2 for difference variable for estimation of ARDL equation. Because of limited number of observations, all insignificant variables from model, by following general to specific technique, have been omitted. To check the reliability and accuracy of the model under estimation, different diagnostic tests have been applied.<sup>8</sup>

Bounds testing technique has been used to test the existence of the long run relationship between HCR and DX along with other variables by following Pesaran, *et al.* (2001). Null hypothesis is tested to implement bound test by considering the unrestricted error correction (UECM) for HCR and DX along with other variables. For this, a joint significance test is performed as follows:

$$H_0 = \beta_0 = \beta_1 = \beta_2 = \dots = \beta_7$$

$$H_1 \neq \beta_0 \neq \beta_1 \neq \beta_2 \neq \dots \neq \beta_7$$

This technique of bounds testing is based on F-statistics. The null hypothesis states that there is no co-integration between variables included in the model without considering the order of integration whether it is I (1) or I (1) and asymptotic distribution of F statistics is non-standard. To check the significance level, Pesaran, *et al.* (2001) computed two sets of critical values. Set one assumes that all variables have I (0) order of integration while other set assumes I (1) order of integration. If the estimated F-Statistics surpasses the upper critical bounds value, then the  $H_0$  is rejected and if value of F-statistics remains below the lower critical bounds value, it suggests no co-integration. To check integration order, Augmented Dickey Fuller (ADF) unit root has been used. The descriptive statistics table is available at Appendix A.

#### IV. EMPIRICAL RESULTS AND DISCUSSION

The study has examined the role of Dexp whether they are pro-poor or anti-poor in Pakistan. First of all, order of integration of all variables included in the model has been analyzed by using ADF unit root by Dickey and Fuller (1979). The results are reported in Table 1.

Table 1

*Results of ADF Unit Root*

Variable	Constant (C) / Trend (T) Specification	Level (lags*)	Difference	Decision
HCR	C	-1.21 (3)	-2.46* (0)	I(1)
LFDI	C	-2.35 (0)	-7.44* (0)	I(1)
LDX	C	-3.05* (0)	-	I(0)
LGDP	C	-2.33 (1)	-3.88* (0)	I(1)
LPOP	C	-3.88* (8)	-	I(0)
LSEDU	C	-3.04 (1)	-	I(0)
LINF	C	-3.10* (4)	-	I(0)

\*Note: ADF test is based on the critical values by Mackinnon (1991). Lag Length is selected on basis of AIC. Significance level used is 5 percent.

<sup>8</sup>Such as LM test for serial correlation, ARCH test for heteroscedasticity, normality test and CUSUMSQ for structural stability.

The results of ADF Unit Root state that variables LDX, LPOP, LSEDU and LINF have integration order  $I(0)$  while variables HCR, LFDI and LGDP have order of integration as  $I(1)$ . Due to presence of different order of integration, the most appropriate estimation technique is Autoregressive Distributed Lag (ARDL).

To test the long-run relationship, Ordinary Least Square (OLS) method has been used and results of Un-restricted Error Correction Model (UECM) / long run results have been reported in Table 2. The estimated UECM includes dummy variable<sup>9</sup> and also passed the diagnostic tests. The UECM has also been estimated by using slop dummy along with intercept dummy<sup>10</sup> and results are reported in Table 3. CUSUMSQ test has also been used to check the stability of model over time and results are reported in Figure 2.

**Fig. 2. CUSUMSQ Test of Stability**

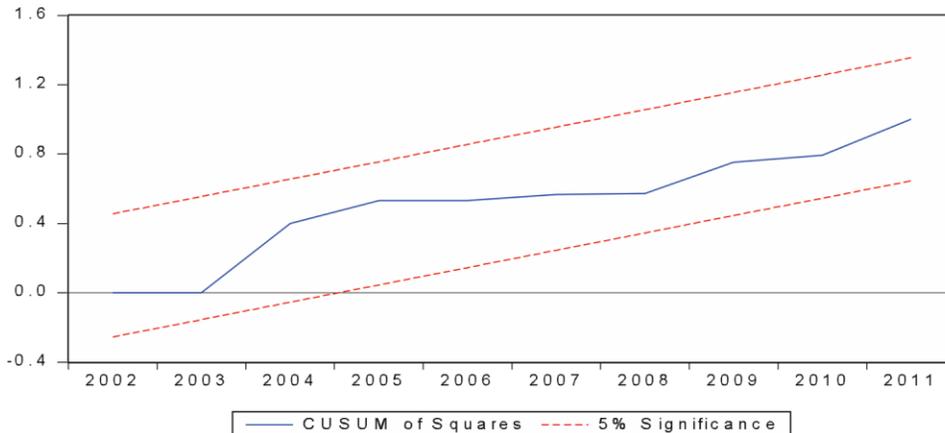


Table 2

*Long Run Results with Intercept Dummy*

Variable	Coefficient	T-Statistics
DHCR(-2)	0.21	1.46
DLGDP	-33.14*	-3.26
DLFDI(-1)	-0.16	-0.38
DLDX(-1)	0.35	0.70
DLHCR	-311.38*	-2.45
DINF	-0.22*	-3.50

<sup>9</sup> Without including dummy variable, the results were spurious. Therefore, intercept dummy variable from 2001 onwards has been included. This is to check whether the shock of 9/11 impacted the Dex which in turn have effect on poverty.

<sup>10</sup> The results show a small effect of all variables included in the model. All variables are showing significance in long run except DX. To check it, slop dummy has been used here.

HCR(-1)	-0.39*	-3.79
LGDP(-1)	-31.03*	-2.89
LFDI(-1)	1.25**	2.30
LPOP(-1)	41.45*	2.91
INF(-1)	-0.32*	-4.23
LDX(-1)	-0.99	-1.24
DUM01	-1.78**	-1.92
R-squared		0.75
Adjusted R-squared		0.62
Durbin-Watson stat		1.72

**Diagnostic Tests**

	F-Statistics	P-Value
Breusch-Godfrey Serial Correlation LM Test	0.16	0.68
ARCH Test	1.06	0.31
Jarque Bera (Normality Test)	0.71	0.69
Ramsey RESET Test	2.90	0.11

**Coefficient Diagnostic Tests**

	F-Statistics	[Upper Bound: 1%, 5%]
Wald Test	4.18	[4.04, 3.24]

Note: Lag length are given in ( ). Critical values of Bounds Testing is given in [ ]. Breusch-Godfrey LM-test, ARCH test, and RESET test are based on F-statistics.

Table 3

*Long Run Results with Intercept and Slope Dummy*

Variable	Coefficient	T-Statistics
DHCR(-2)	-0.41*	-2.86
DLGDP	-35.37*	-2.80
DLFDI(-1)	-0.53*	-2.37
DLDX(-1)*DUM01(-1)	4.40**	1.62
DLPOP	-349.12*	-5.31
DINF	-0.09	-1.70
HCR(-1)	-0.39*	-3.88
LGDP(-1)	-30.51*	-3.15
LFDI(-1)	1.29*	3.17
LPOP(-1)	40.63*	3.17
INF(-1)	-0.12*	-2.47

LDX(-1)*DUM01	-12.51*	-5.46
DUM01	11.70*	4.73
R-squared		0.88
Adjusted R-squared		0.82
Durbin-Watson stat		2.00

All variables are showing significance both in short run and long run. Variables with 'D' indicate short run while variables in level 'L' designate long run. Defense expenditures (DX) that was showing no impact in simple ARDL model, now showing significance both in short and long run; however significance level in short run is 10 percent. The diagnostic tests confirm that model is stable and there is no problem of auto-correlation or heteroscedasticity. The coefficient diagnostic test shows that there exists co-integration between the variables included in the model. The value of F-statistics is 4.18 which is above from upper bound levels both at 1 percent and 5 percent. Therefore, the null hypothesis of no long run relationship has been rejected and it is concluded here that all long run variables are moving in same direction. LDEXP after multiplying with dummy variable shows significance in the long run but the coefficient is negative. LGDP is also significant and impacting poverty negatively as hypothesized. LFDI is also indicating significance with a negative sign. LPOP is also significant and coefficient is positively contributing to poverty that is 1 percent increase in population increases poverty up to 40 percent. Inflation (INF) is significant but the sign is negative. The variable SEDU was omitted from model because the result was insignificant both in short run and long run.

After getting long run coefficient, we normalized the coefficient by generating estimated coefficients series. Lastly, ECM has been estimated by using following Equation (2):

$$\Delta POV = \beta_1 + \beta_2 \Delta POV_{t-1} + \beta_3 \Delta LDX_{t-1} * Dum01 + \beta_4 \Delta LFDI_{t-1} + \beta_5 \Delta INF_{t-1} + \beta_6 \Delta LGDP_{t-1} + \beta_7 \Delta POP_{t-1} + \eta ECM_{t-1} + Dum01 + \varepsilon_t \quad \dots \quad \dots \quad \dots \quad (2)$$

Table 4

## Short Run Results

Variable	Coefficient	T-Statistics
DHCR(-1)	0.38**	1.99
DLGDP	-26.26*	-2.590
DLFDI	0.30	0.83
DLDX(-1)*DUM01	-3.71**	-2.28
DLPOP	-208.16**	-2.43
DINF	-0.21*	-2.40
EC(-1)	-0.26**	-2.61
DUM01	-1.18**	-3.16
AR(1)	-0.33	-1.81
R-squared		0.80
Adjusted R-squared		0.74
Durbin-Watson stat		2.05
EC = -30.51/0.39LGDP+1.29/0.39LFDI+40.63/0.39LPOP0.12/0.39INF+-12.51/0.39LDX + 78.23LGDP+3.30LFDI+104.17LPOP-0.31INF-32.07LDX		

Note: \* and \*\* Indicate the level of significance at 1 percent and 5 percent respectively.

The results indicate that all variables are significant in short run except FDI. The coefficient of Error Correction (EC) is negative and significant [-0.26 (0.02)]. Annual rate of adjustment is 26 percent. The result indicates that DX, GDP, POP and INF have negative relation with poverty. FDI has positive sign but insignificantly related with poverty.

The defense expenditure (DX) has negative and significant relation with poverty both in short and long run. The sign is negative which shows that Dex do not elevate poverty in Pakistan. The Military Keynesian Hypothesis of negative relation of Dex with poverty is not rejected here. The results are contrary to the findings of Kalim and Hassan (2013) where military expenditures have a positive and significant relationship with poverty. The justification may be that the Dex in Pakistan have been increasing but at diminishing rate.

The impact of GDP on poverty is negative and significant both in short and long run. The increase in GDP indicates increase in employment opportunities, increase in income of poor people, hence reducing poverty.

FDI has positive and significant impact on poverty in the long run but insignificant in short run. This may be justified as instead of providing jobs to unskilled labour, FDI is providing employment in selected service sectors like telecommunications and financial service sectors. Findings are also supported by Kalim and Shahbaz (2009).

The results show that Inflation (INF) has negative and statistical significant relation with poverty both in short and long run. Pakistan is a lower middle income country and empirical literature supports these findings that in low and lower-middle income countries the relationship between inflation and poverty can be negative as observed by Talukdar (2012).

Population (POP) has positive and significant impact on poverty in long run. But the impact is negative in short run. This can be justified as many population and birth control methods have been introduced by the government and now population is increasing at decreasing rate in the country. The population growth rate in Pakistan has shown improvement and it decreased from 2.05 percent (2010-11) to 2.03 percent in 2011-12 and 2.00 percent in 2012-13.<sup>11</sup>

## V. CONCLUSION AND POLICY IMPLICATIONS

Efficient expenditure management is an important economic tool for poverty reduction strategies and key development goals because it creates adequate fiscal space which is required to reinforce the provision of public services like health, education, and basic infrastructure. However, in this regard, composition of public expenditure plays a decisive role. The allocation of defense expenditure in developing economies like Pakistan is one of the contentious policy issues. Therefore, the issue of defense expenditure and poverty has been investigated by using time series data-set over the period 1973-2011 by applying ARDL bounds testing approach to cointegration, relationship between Dex and poverty alongwith other explanatory variables.

This paper investigated the impact of Dex, inflation, foreign direct investment, GDP and population on poverty for both long term and short term for the dataset ranging from 1973-2011. The results have shown that Dex are not anti-poor in Pakistan both in

<sup>11</sup> *Pakistan Economic Survey 2012-13.*

the short and long run. They do not elevate poverty level. But Population and FDI are the contributing factors to poverty in the long run. Pakistan has been striving hard to attract FDI, but in recent past only services sectors attracted considerable FDI.

Military has perfected itself as an institution in Pakistan. There are many positivities attached with the defense sector. Besides ensuring national security, it has played its role in many other crucial areas for example conduct of population census and general elections, rescue, relief and rehabilitation processes during and after natural disasters (earthquake and floods), maintenance of law & order especially on religious occasions.

The empirical findings of the study may entail several policy implications. The findings show that Dex are not anti-poor in Pakistan and these do not deteriorate the incidence of poverty in the country. In recent Past, attempts have been made to rationalize Dex and these were presented in the Parliament of Pakistan. The current geo-strategic situation in the region does not also favour to reduce Dex. Policy-makers may rationalize other government expenditures by increasing the size of Public Sector Development Program (PSDP) and reducing the size of unproductive expenditure. It is widely accepted that FDI is most useful tool for economic development and long run growth for a country in comparison to other forms of capital inflows. But unfortunately Pakistan has not been successful in attracting a larger share of investment despite investor friendly policies. Pakistan has recently experienced a short surge in FDI inflows, but these have confined to services sector especially telecommunication and financial businesses. The policy-makers need to revisit investment policies and attract investment in other sectors of the economy that generates employment in the country. As a result, poverty will also be reduced.

The study has used headcount ratio as proxy for poverty. This variable has its own limitations. The study can be extended for future research by using multiple poverty index as phenomenon of poverty is multifaceted.

#### APPENDIX A

	Descriptive Statistics					
	HCR	LDX	LGDP	LINF	LPOP	LSEDU
Mean	25.93821	0.821066	24.79571	2.128626	18.54021	0.840374
Median	23.90000	0.982864	24.91272	2.179053	18.58017	0.827184
Maximum	45.75000	2.993760	25.61419	3.283278	18.98694	1.106018
Minimum	12.40000	-0.811356	23.80318	1.069573	17.97906	0.608580
Std. Dev.	7.473527	0.716300	0.560944	0.542166	0.311785	0.149078
Skewness	0.777391	-0.137418	-0.272739	-0.017894	-0.273043	0.003758
Kurtosis	3.405281	4.393420	1.879696	2.662085	1.797437	1.726144
Jarque-Bera	4.195098	3.277878	2.523019	0.187634	2.834598	2.636995
Probability	0.122757	0.194186	0.283226	0.910449	0.242368	0.267537
Sum	1011.590	32.02158	967.0326	83.01640	723.0681	32.77458
Sum Sq. Dev.	2122.437	19.49727	11.95703	11.16985	3.693984	0.844527
Observations	39	39	39	39	39	39

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### Comments

The paper titled “Is Defense Expenditure Pro Poor or Anti Poor in Pakistan? An Empirical Investigation” touches upon a critical and much debated topic for Pakistan. As a student we see that in macroeconomics we have the **G** increasing normally for the war and not for any non-defense expenditures. Secondly like environmental economic issues such as **climate change** where we have a risk averse behaviour and rather than trying to experiment in letting the change happen and then learn from it we mitigate. Same is true for defense, can we take the risk of taking it to that level where it could be costly for us, can we assume that Defense expenditures don’t have economic benefits.

Having said that let me point out some of the weakness which to my understanding if improved can make this paper very useful both for academia and policy-makers.

- (i) Title needs to be in plural.
- (ii) Key words Defense and Military are the same.
- (iii) Author has referred to Defense expenditures where ever mentioned in the paper as defense burden, whereas the latter is not even proved yet. Further it is also reported by the authors that the relative level of defense expenditure as a percentage of GDP is on the decline.
- (iv) It is stated in the paper that Defense expenditures crowd out investment, to me simple statement is not enough and needs thorough follow up in literature.
- (v) The literature review fascinates me as to a number of studies have been put forth for the growth impeding defense expenditures and growth promoting ones, but authors fail to dilute the situation as to what could be the reasons/justification for such qualifying statements. Is it the nature of defense expenditures what makes say for some countries results to differ, or is the methodology of estimation, or is it the country specificity or war time which matters. Please add some commentary as to why these stark differences to this debate.
- (vi) One issue throughout the paper that the theoretical underpinning for this study is based on a single statement that these expenditures crowd out growth leading expenditures such as Health and education, then it becomes a question of relative costing, it could be others which may have more opportunity cost such as current expenditures, or interest payment.
- (vii) BISP (page 4) itself doesn’t report something; it must be some report or a study.
- (viii) Authors have used a number of data sources, such as SBP, Economic survey and WDI. Sometimes due to reporting definitions and accounting practices the figures may be different, e.g. GDP from Economic survey and expenditures from SBP hand book may result in an otherwise different picture. Secondly is the GDP data adjusted for rebasing which happened at regular periods? Thirdly the authors have extrapolated the data for poverty from 2003-2012, meaning 9 years. Which already for the earlier years there

is no continuous reporting of the poverty would be an extrapolated value. I was curious to see what figure does their extrapolation method come up with and compare it with the outcomes being discussed here at the conference. Couldn't find them.

- (ix) Certain surprising reporting, page 6, Defense expenditures to be more than 60 percent of the total federal government expenditures (which might include both development and current expenditures I guess).
- (x) Figure 2, if these are shares then why don't they total to 100 in the earlier periods, and what happened after 1998-99 there is a sudden jump and the shares are visible. Consequently there is no discussion on the latest picture of the situation.
- (xi) Qualifying statements based on judgments could be risky; such "devolved from federal.... We can expect improvement in their budgetary allocations". There has been quite some time now to that and if it were the case it could be actually seen. Further terms such as "debt trap" and "distorting resources" page 8, are definitions and requires evidence based statements.
- (xii) Section III on Theoretical Underpinning is in dire need of the underpinnings, as I am unable to find the direct channel which this paper explores where there could be a 1-1 correspondence between defense expenditures and poverty. More of a theory less estimation.
- (xiii) There is repetition in literature outcomes cited. The length of the literature could be drastically reduced by clubbing them in some order. E.g. region wise, or may be outcome based. Finally the author seems to find nobody working on this issue for Pakistan.
- (xiv) For the estimation part; equation 1 has serious anticipated problem of multicollinearity which is also not rejected with relevant testing afterwards, e.g. GDP would be highly collinear with GDP per capita, Public spending on Education, FDI. Just curious how much does GDP and GDP per capita variable definition is different?
- (xv) Now a days a number of Stationary tests are used to get robust results, check them.
- (xvi) Stationarity results show some variables to be of  $I(1)$  and some of  $I(0)$ . And the authors have used OLS. So I stop here. Use the ARDL method and then report the results.
- (xvii) Finally there is editing requirement and when you draft again after re-estimating the model, please try to provide policy implications based on your findings.

Over all the study needs a thorough revision both in the context of theoretical understanding and the econometric methodology on how to estimate it.

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## **Synergy or Trade-Off between Agricultural Growth and Nutrition Women's Work and Care**

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### **1. INTRODUCTION**

This paper examines the implications of women's work in agriculture and children's nutritional outcomes in Pakistan. Agricultural growth is an important element of overall economic growth and poverty reduction. It is generally presumed that growth in agriculture will also lead to better nutrition through the higher availability of nutritious foods and increased incomes for the poor. Growth, however, might also imply changes in the amount of time and effort women expend in agricultural work. This may have positive outcomes for nutrition if women have access to their own income, but might also have negative consequences if women's agricultural work diminishes their ability to provide nutrition-related care for themselves and their children. The cotton sector which relies very largely on women's labour, particularly in harvesting [Siegmann and Shaheen (2008)], can serve as a key vantage point for observing the link between women's agricultural work, care and nutrition outcomes in Pakistan.

We first set the context for our research by discussing the problem of under nutrition in Pakistan and why agriculture can play a role in improving nutritional outcomes (Section 2). In Section 3, we introduce the concept of care as it exists in the literature the determinants of nutrition review the existing evidence on the relationship between care and women's agricultural work. Empirical findings from qualitative research in a cotton-growing region in Pakistan are reported in Section 4. The paper concludes in Section 5 with discussion on how growth in agriculture can be made more inclusive.

### **2. CONTEXT**

There is a very high prevalence of undernutrition among women and children in Pakistan. Forty four percent of children less than the age of five are stunted and wasting among children stands at 15 percent while one in two mothers are anaemic. There have been no improvements between 2001 and 2011 and in fact some indicators of nutrition have worsened over time (see Table 1).

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Table 1

*Nutrition Indicators in Pakistan*

	NNS 2001	NNS 2011
<b>Children under 5 Years</b>		
Stunting	42	44
Wasting	14	15
Underweight	32	32
<b>Mothers (Non-pregnant)</b>		
Anaemia	29	50

Source: National Nutrition Survey 2011.

It is well-understood that improvements in nutrition require not only direct interventions such as the provision of micronutrient supplementation and fortified foods and promotion of breastfeeding but also attention to other underlying causes of undernutrition [Ruel, *et al.* (2013)]. Agriculture is one such 'complementary sector' that has been identified as having the potential to become pro-nutrition. The link or pathways between agriculture and nutrition have been discussed in much detail in literature [Gillespie *et al.* (2012); Pinstrup-Andersen (2012); Balagamwala and Gazdar (2013)]. Agriculture influences nutrition outcomes directly through drivers such as food availability and income generation. In addition to these direct influences, women's work in agriculture can impact nutritional outcomes as mothers are key players in the first 1,000 days of a child's life (from conception till the age of two) which is regarded as the crucial period in an individual's life with respect to their nutritional well-being [Horton (2008)]. Women's work in agriculture can be empowering leading to pro-nutrition income spending but has implications on her ability to take care of herself and her children. Moreover, working in agriculture can have adverse effects on a woman's own nutrition and health.

The linkage between women's work in agriculture and nutrition outcomes is particularly important in the context of Pakistan. Labour force data show that three-fourths of women in the workforce are employed in agriculture and this proportion has increased in the last 10 to 15 years along with a rise in the female labour force participation (see Table 2). The proportion of all women of working age who are employed in agriculture has, therefore, been rising over time. Combined with a fall in male agricultural employment, Pakistan does show features of what has been labelled the 'feminisation of agriculture' [de Schutter (2013)].<sup>2</sup>

Table 2

*Labour Force Statistics, by Sex*

Year	Labour Force Participation Rate (%)		Labour Force Employed in Agriculture (%)	
	Male	Female	Male	Female
2001 – 02	82.7	16.2	37.2	64.5
2003 – 04	82.7	18.0	37.0	66.6
2007 – 08	82.4	21.8	35.2	73.8
2010 – 11	81.9	24.4	34.7	74.2
2012 – 13	81.1	24.3	32.9	74.9

Source: Pakistan Employment Trends, 2013.

<sup>2</sup>It is possible that the reported increase in women agricultural workers is due to better counting in surveys [de Schutter (2013)].

An understanding of the linkages between women agricultural work and nutrition, therefore, is particularly relevant if feminisation is a strong correlate of agricultural growth.

### 3. LITERATURE REVIEW

#### 3.1. Care

"Care is the provision in the household and the community of time, attention and support to meet the physical, mental and social needs of the growing child and other household members" [ICN (1992) cited in Engle, *et al.* (1999)]. Care depends not only on the availability of resources at the household level, but also on education and knowledge, and the physical and mental health of the caregiver, the time dedicated to care, and the agency of the caregiver. Resources and support at the community-level also determine the quality and level of care. Care behaviour may vary across communities as social groups or cultures might hold different priorities and beliefs concerning children's well-being. With respect to nutrition, care activities can be divided into six types: care for pregnant women including the provision of adequate food, necessary health care and rest; breastfeeding and complementary feeding i.e. the transition from a breast-fed diet to an adult food; preparation of food; hygiene; health-seeking practices; psychosocial care, that is, providing affection to child and support her psychological and social development [Engle, *et al.* (1999)].

Care, in effect, is the bringing together of resources, knowledge and time dedicated to an individual other than oneself. It is not just the quantity of care that matters for nutrition but also its quality [Glick (2002)]. For example, feeding practices that would lead to good nutrition outcomes would involve the time and attention of a mother (or a caregiver), but also appropriate knowledge about feeding such as giving a child age-appropriate foods, and the ability to be able to access these foods. While 'caring behaviour' is one of the inputs in the widely used nutrition production function, empirical studies of determinants of nutrition have not paid much attention to measuring care.

#### 3.2. Agricultural Work and Care

Although evidence on the relationship between agricultural work and care is limited, it suggests that women's work in agriculture may be an important determinant of care for children. A study in Bolivia finds that women's time dedicated to agriculture is one of the main barriers to improving infant and young child feeding practices and that even when women do have the knowledge of pro-nutrition feeding practices, they do not have the time to adopt these practices [Jones, *et al.* (2012)]. Women working in agriculture may often rely on other household members to provide care for their children but the quality of this care may be poor. However, Headey, *et al.* (2011) find there to be no difference between care given by a mother and care given by others on wasting levels and only a moderate connection is found with respect to stunting.

Women with young children end up having to decide between giving up work, reducing time spent on childcare, or taking their children to work [Kent and MacRae (2011)]. The latter ensures the presence of the mother to provide care but could have negative implications for a child's health and nutrition as he or she would have to spend

the day in the field. With regards to agricultural interventions, the impact on neglect of care is mixed [Bold, *et al.* (2013)]. In Nepal, the adoption of a cash crop that required increased hours of agricultural labour reduced the time spent by women on childcare but had no effect on time dedicated to leisure [Paolisso, *et al.* (2001)]. In India, a study found that a mother's participation in agricultural activities had negative effects on her child's health [Bhalotra, *et al.* (2010), cited in Gillespie, *et al.* (2012)] while Berman, *et al.* (1997) found that despite a rise in income, women's paid employment reduced expenditure on healthcare as the opportunity cost of time used in seeking healthcare increased [cited in Gillespie, *et al.* (2012)]. However, Headey, *et al.* (2011) fail to find evidence that women employed in agriculture spent less time on childcare compared to women working in other sectors.

When testing the relationship between women's work and childcare practices, existing literature identifies several considerations that should be taken into account. The age of a child may have an effect on the relationship between work, childcare and nutrition [Ukwauni and Suchindran (2003)]. A child of breastfeeding age may require more care time (from the mother) and so the link between care and nutrition for this age group may be stronger than for older children. Similarly, it has been found that children of weaning age need more attention [Leslie (1988)] since at that age children are making the transition from breastfeeding to consuming an adult diet which necessitates feeding them specially-prepared meals at frequent intervals.

The type of work that women are involved in may have differing effects on care and nutrition as well. While informal work is thought to be more compatible with childcare than formal employment as there is more flexibility with work and the possibility of taking the child to work, empirical evidence on this subject is mixed. The nature of informal employment may matter. For example, women working in agriculture may not want to take their child to the field as the child is exposed to the weather and to chemicals such as pesticides [Glick (2002)]. Similarly, the amount of work a woman does may determine the magnitude of the effect of work on nutrition outcomes. The intensity-heavy versus light loads- and the duration of work-full-time versus part-time - have to be considered as well.

A number of studies have empirically tested the relationship between a woman's level of empowerment and nutrition outcomes of her children using different measures of empowerment. There appears to be a strong association between the empowerment and nutrition [see Bold, *et al.* (2013) for a review of studies]. Within agriculture, a recent study using an index measuring women's empowerment in agriculture finds that women's autonomy in production and women's work in agriculture improves diet diversity and reduces incidence of stunting [Malapit, *et al.* (2013)]. A woman's empowerment through agricultural work depends on whether she does paid work or not, and on whether she enjoys effective control over the income or the produce. Cash crop adoption, for example, may increase male control on production especially if division of labour is such that men are responsible for all market-related activities.

A closely related issue is the effects of agricultural work on women's own health [Gillespie, *et al.* (2012)]. Care is determined not only by the time dedicated to it, but also by the capacity of the caregiver [Engle, *et al.* (1999)]. Women's work in agriculture requires high levels of energy expenditure which can affect the quality of care provided.

Women's work productivity can be adversely affected by the time and effort expended in care activities. This was found in a study in Zambia where women chose piece work over the more remunerative alternative of cultivating their own land because the latter activity was physically laborious [Kent and MacRae (2010)].

## 4. EMPIRICAL APPROACH

### 4.1. Methodology

While women play an important part in virtually all agricultural sub-sectors, there are some crops and tasks in which their contribution is widely acknowledged. Cotton is one such crop, and the harvesting of cotton (or cotton-picking) is regarded as almost exclusively women's work. Cotton is grown on almost a third of total cropped area during the *kharif* (summer) season (Agricultural Census Organisation, 2012) and around half of Pakistan's exports are connected to cotton e.g. yarn and textiles [Economic Survey of Pakistan (2013-14)]. There have been continuous technological changes in cotton farming with the introduction of more productive varieties. Cotton is grown in some of the most productive agricultural regions—central and upper Sindh, and southern Punjab—which also happen to have relatively high rates of poverty and malnutrition [Balagamwala and Gazdar (2013)]. Cotton-growing regions and women's work in cotton, therefore, are promising areas of research for our study of women's agricultural work and nutrition. Our empirical focus on cotton-growing regions does not mean, however, that we examine women's work in cotton alone. Women's agricultural work is not restricted to cotton-harvesting as they work throughout the agricultural cycle on other crops and on livestock.

In order to analyse the link between women's agricultural work and nutrition in cotton-growing regions, qualitative fieldwork was conducted in a rural site straddling a number of distinct settlements in June 2014. This site consisted of the administrative village or *Deh* RB<sup>3</sup> and a number of settlements in neighbouring administrative villages in *Taluka* Shahdadpur, District Sanghar of the Sindh province which is known for cotton growing.<sup>4</sup> Our selection of this site was based on the fact that the Collective for Social Science Research had conducted extensive fieldwork in this location since 2001, and we had prior knowledge of social and economic conditions in these communities.

The qualitative fieldwork consisted of a series of unstructured key informant interviews, group discussions and individual case studies. These interactions probed the complete range of issues identified in our research framework. In particular, we sought to establish the main milestones in the annual agricultural cycle, technological changes in cotton farming, the deployment of resources such as land, irrigation water and labour through the crop cycle, the organisation of cotton harvesting, norms and behaviour with respect to the 1,000-day period of a child's life, perceptions about the implications of women's agriculture work, particularly in cotton harvesting, for their own health and for the nutrition of their children, the impact and uses of women's cash income from cotton-harvesting as well as the official cash transfer programme (the Benazir Income Support

<sup>3</sup> Village names have been anonymised to protect the identity of respondents.

<sup>4</sup> Sanghar is the largest cotton-growing district of the Sindh province in terms of cotton acreage and output (Agricultural Statistics of Pakistan 2011, Pakistan Bureau of Statistics).

Programme of BISP). Our informants and case studies were purposively selected to reflect the perspectives of women and men, variations in household assets and occupations, and caste, religious, and ethnic heterogeneity, in seven distinct settlements in the fieldwork area.

#### **4.2. Description of Fieldwork Site**

Our fieldwork covered seven settlements of various sizes – ranging from RB which has around 200 households, to two hamlets of share-cropping tenants consisting of four families each. None of the settlements has any public health facility, though there are small private clinics run by paramedics in two settlements. There is, however, coverage by government Lady Health Workers (LHWs) in all of the settlements except for the two small hamlets of share-cropping tenants. LHWs advise women on health issues, particularly those relating to reproductive health. There is a trained birth attendant in village RB, but not elsewhere. None of the settlements, even the larger ones, have any public sewage infrastructure. In the larger settlements most homes have access to latrines even if in some cases these are rudimentary communally-designated spaces. Village RB is relatively well-served in terms of drinking water, with a government-run water filter plant. In other settlements residents use groundwater which is brackish in some cases. All of the settlements, including the smaller hamlets, are connected to electricity supply. No settlement has a gas connection and firewood and dried dung are the main cooking fuels.

Settlements are closely associated with Patrilineal kinship groups. Our fieldwork covered three settlements dominated by the Khaskheli kinship group. The Khaskhelis, who are thought to be descendants of house-servants and serfs of the former rulers of Sindh, have gained a measure of upward mobility and some of them have become landowners. A majority, however, do not own land and work as share-cropping tenants or labourers. The two small hamlets of share-croppers are populated by members of the Bheel ethnic group. Bheels are officially classified as Scheduled Caste Hindus and are known to be vulnerable to extreme forms of labour exploitation such as bonded labour by virtue of their status as a religious minority and members of a historically marginalised caste. According to virtually every criterion, the Bheels are poorest and most food-insecure kinship group in our fieldwork site. We also visited one settlement which was predominantly inhabited by the Baloch Rind kinship group and another where the dominant group was Khichi. The Rinds, some of whom now own land, are mostly share-croppers and labourers but with far greater political voice and autonomy compared to the Bheels. The Khichi settlement includes a number of small and medium landowners as well as sharecroppers.

There are strong gender-based norms in our fieldwork site, as in other parts of rural Pakistan, concerning virtually all dimensions of social and economic activity. Women's access to public spaces, such as markets, urban centres, and government offices is usually mediated through male family members. These norms are widely understood even if they are frequently observed in the breach. They strongly influence, nevertheless, opportunities available to women for economic activity and social interaction. Asset ownership, particularly the ownership and control over land, also follows strong gender norms, with few women exercising effective property rights independently of male family members.

Agriculture dominates the economy across the fieldwork site, but there are variations across settlements in their reliance on non-agricultural incomes, including some men who have migrated to Karachi for work. There are men as well as some women across the settlements that have public sector jobs as teachers, policemen, soldiers, and health workers. An important new source of income in the fieldwork site is a government cash transfer programme (the Benazir Income Support Programme) which provides 3,300 rupees (US\$33) every three months to women in poor households.

The main crops in the fieldwork site are wheat (December to April) and cotton (May to November). There is a limited amount of vegetable farming and rice is sown on land of lesser quality alongside cotton in the summer. Land is also set aside for fodder cultivation and most households own some farm animals. The main focus in the livestock sub-sector is on buffaloes for dairy. Farming is entirely dependent on surface irrigation as the groundwater is brackish and unsuitable for agricultural use. Land ownership in the fieldwork site is highly unequal, as is the case in the province generally. There are several landlords with holdings in the hundreds of acres who dominate the agrarian economy and local politics. While a majority of the households do not own land they farm as sharecropping tenants. Many other landless households are engaged in the agricultural sector as labourers. Between the large landlords and the landless there is a significant segment of self-cultivating households who might own anywhere from 1 to 20 acres.

The agricultural economy in the fieldwork site has witnessed many of the technological changes which have occurred in the country and the province as a whole. New seed varieties have led to yield increases in virtually all major crops. A salient change in the last ten years or so has been the introduction of 'hybrid' cotton varieties which have led to significant improvements in yield.

#### **4.3. Agricultural Economy and Women's Work**

Cotton harvesting is the most conspicuous activity in terms of women's agricultural work. But women's work is important in virtually every other aspect of the agricultural economy. There are gendered norms around certain agricultural tasks but not others. Ploughing, field preparation and sowing (wheat) are activities exclusively carried out by adult males. The same is true of on-farm water management, and the application of fertilisers and pesticides to crops. While there do not appear to be strong gendered norms around weeding, collecting fodder and caring for livestock, these activities are mainly carried out by women and children rather than adult males. Wheat harvesting is carried out by families—men, women and able-bodied children—and makes a major contribution to a household's annual consumption of the staple.

Cotton harvesting is almost exclusively seen as women's work, and the exceptions underline the association of this task with "lesser masculinity". Boys who might have taken part in cotton harvesting begin to distance themselves from this work, particularly in the company of older men. Bheel men take part in cotton harvesting alongside women family members while the dominant Muslim men were often heard saying that it was somehow demeaning to work as cotton harvesters alongside women. Muslim women, when asked about this gendered norm, simply referred to this division as part of tradition (*rivayat*).

The cotton harvesting season begins in late July and goes on till mid-November in our fieldwork site. There are usually 4 to 6 rounds of cotton-picking from a single plant, with intervals of 8-12 days between each picking. The introduction of new 'hybrid' crop varieties in cotton in the last ten years or so is thought to have led to an increase not only in yield but also in the frequency of picking. The older variety, commonly used in our fieldwork site, required only two pickings in the entire season.

A vast majority of older girls (mostly from aged 10-12 years onwards) and adult women in our fieldwork site took part in cotton harvesting. In addition, a large number of women from the town (Shahdadpur) travelled together every day to take part in cotton picking in this area. There are broadly three types of arrangements through which women work in cotton picking. First, a small number work only on own family farms or on farms of close relatives. Second, women from sharecropper tenant families work not only on their own farm but also on farms of other tenants for the same landlord. Third, there are *jamadars* (or labour contractors) who organise teams of women and take prior bookings from farmers for the supply of workers. The three arrangements have some common features. The actual work is carried out in teams, as segments of fields that are ready for harvesting are marked out for harvesting on a particular day by the farmer or the *jamadar*. Women's work, however, is accounted for individually in terms of the weight of cotton harvested. Children or younger siblings who work alongside an adult woman might be treated as contributing to that particular woman's account, but the idea of individual piece-rate work is strongly established. It was reported that even women who work on their own family farms maintain separate accounts of cotton harvested. Rates of remuneration also appear to be standardised across types of labour arrangement—it was reported that in the preceding season 300 rupees (US\$ 3) were paid for every *maund* (40 kilograms) of cotton harvested.<sup>5</sup>

While women in the first arrangement (harvesting on the family farm) may have some amount of flexibility in the number of days worked during the season, for most women, and particularly those belonging to sharecropper households and those mobilised by a *jamadar* it is expected that a full-day's work will be supplied every day. The normal work day goes from 8 in the morning to 5 in the evening with a one-hour break for lunch. For most women harvesters, therefore, the supply of labour during the cotton-picking season seems to be a binary choice between working virtually every day for around three months and not working at all. In fact, for women belonging to sharecropper households there may be limited choice even with respect to whether or not they would take part in cotton harvesting. These households are reported to be under considerable pressure from landlords to supply as much labour as possible for cotton harvesting on a priority basis to fields owned by the landlord. The landlord has additional leverage in these cases because the sharecropper household depends on him for work and food security through the annual cycle, particularly the wheat crop.

There are several reasons for the demand for continuous labour during the cotton season. As we have noted above, new cotton seed varieties are higher yielding and allow for multiple harvests from a single plant. For farmers, cotton represents ready cash income and they are keen to realise this income as quickly as possible. Delay in

<sup>5</sup>There are deductions from the women's accounts of 2 kg per *maund* – 5 percent – to account for wastage. So, in effect, a woman has to harvest 42 kg to be paid for 40 kg.

harvesting leads to a decline in the quality and weight of the harvest. The fear of theft was also cited by many informants as a reason why a crop of high value cannot be left standing for very long. Towards the end of the season farmers are keen to complete the harvest in order to prepare the land for the wheat crop. A number of features of the labour arrangements around cotton picking are associated with farmers' need for an assured supply of continuous labour. The farmer pays an advance to a *jamadars* to ensure that he will engage some minimum number of workers when needed. The *jamadar* uses this cash to make small advances (of around 2,000 rupees each) to women workers who are then obliged to commit their labour to him. There are also *jamadars*, mostly men but also women, who specialise in bringing women workers from nearby urban localities for cotton harvesting.

The farmers' requirement for a secure and steady supply of labour has implications for women workers. While women from sharecropper households are already under pressure to work continuously, women mobilised by *jamadars* come under similar pressure once they have taken advances and committed their labour. Non-compliance would earn a great deal of social opprobrium and foreclose future work opportunities. Women report that they can only take time off in cases of emergency relating to their own health or the health of their children. There is little sympathy for time off for what might be regarded as less serious contingencies.

While the pressure to supply continuous labour might be onerous at times, in general the cotton harvest is regarded as a season of economic well-being. A woman's income during this season depends on how much cotton she picks, and there can be great variation in this, depending on ability and stamina. Many women report that the amount of cotton a woman picks is a manifestation of her *majboori* or need. The more desperate she is for cash income the more hours she puts in, and the harder she works. The weight picked can range from 20 kilograms to 60 kilograms a day, and we heard of women who harvest as much as 80 kilograms in a day. Some women, therefore, can earn between 15,000 to 25,000 rupees (US\$ 150 to US\$250) in the season.

Although these amounts are less than what an able-bodied man might earn over a similar period (around 3 months) from manual labour, they are significant for a number of reasons. Women normally do not have access to the casual labour market and cotton harvesting is one of the few activities that can be a source of independent cash earning for them. It was reported across the board that cotton harvesting accounts are maintained for individual women (plus their children who might assist them) and that women are paid individually for their work. This is quite unlike other agricultural tasks such as wheat harvesting or weeding for which the beneficiary is the entire household. Other activities which earn cash income for women—besides formal sector employment and the government cash transfer programme—are sewing and livestock rearing. Rates of remuneration of the former (home-based) activity are far lower than cotton-picking. In the case of livestock some animals might be individually owned by a woman and she may realise the value once they are sold.

For some sharecropping households women's earnings in the cotton harvest represent a lifeline and not additional income. Women from these households reported that they use their cotton earnings to procure basic kitchen supplies such as cooking oil, sugar and tea—their stock of the main staple is already assured from the wheat harvest.

For many of the others, however, there is a clear sense that income from cotton harvesting can be and is used by the women themselves for their personal consumption or on expenditures which they prioritise. Women buy gold or jewellery for themselves or for their daughters' trousseaux. They purchase new clothes for themselves and their children, as well as non-food household consumables such as soap and shampoo. It was also widely reported that women purchase livestock—mostly goats—as a form of saving and investment.

Women's cotton harvest income contributes to pro-nutrition consumption choices in a number of indirect ways. For sharecropping households as well as extremely poor households for whom the cotton harvest income is a lifeline, the absence of this income might result in greater food insecurity. In other households where women report using the income to add to their savings, it is possible that the final use of savings might be with respect to higher pro-health and nutrition expenditures.

There may be small but significant features of empowerment associated with women's income from cotton harvesting. The fact that an individual woman's work is recognised and counted is a departure from the convention of compounding women's work and economic contribution with that of the household in general.<sup>6</sup> We came across some evidence of women's bargaining power around the cotton harvest. While women from sharecropper households are vulnerable to unfair deductions from their wages, it was widely acknowledged that other women workers cannot be short changed.<sup>7</sup> Women concurred with the view expressed by farmers and *jamadars* that delays in making payments might result in the withdrawal of labour which the latter wish to avoid. We also heard about specific instances of collective action and bargaining. *Jamadars* reported that they were often upbraided and publicly humiliated by women in cases of delayed payments or suspicion of inaccurate accounting. Women of one of our fieldwork settlements (RB) had succeeded in improving their terms of remuneration—in addition to the piece-rate they receive part of their mid-day meal as well as two servings of tea compared with just one serving of tea given to other women.<sup>8</sup> In the same village women had been contributing from their earnings over the last three years to a fund for a new place of worship which was predominantly used by women.

Other seemingly innocuous actions might also signal deviations from patriarchal norms. In women's conversation about their work in the cotton harvest there was frequent mention of *shauq*—a concept that encompasses enjoyment and fulfilment—in contrast to *majboori* (need). Part of *shauq* was clearly referenced to women's ability during the cotton season to work outside in groups, occasionally at some distance from home. Those who were known as particularly efficient and quick cotton-pickers took pride in their ability. The fact that income from cotton harvesting is used by women to visit urban markets to purchase jewellery and clothes is itself a departure from past practice when even such shopping was done for women by men. One *jamadar* reported that women working in his team pooled money on pay day (around once a fortnight) to

<sup>6</sup>Studies of women's empowerment through formal sector paid work have shown that the official recognition of individual identity is regarded as a significant advance [Khan (2014)].

<sup>7</sup>There were also complaints about delays and unfair deductions in payments on the part of women from marginalised groups such as Bheels, some of whom were not sharecroppers.

<sup>8</sup>All women bring their own bread as well as chilies, salt and molasses as accompaniments. Women from RB are supplied cooked vegetables by the *jamadar*.

prepare a special meal where chicken was served instead of the usual fare of vegetables and bread.<sup>9</sup>

#### **4.4. Care**

In some dimensions of care, women and children in our fieldwork site face common conditions which are determined by ecological factors such as the availability of clean drinking water, general sanitary conditions, and physical access (due to remoteness) to high quality health services. There are other elements of care which depend on household-specific constraints and individual preferences and priorities which might vary greatly within the fieldwork site. As we have shown above there are significant inequalities within the site with respect to income, assets, food security and education. There may also be group-based differences in care preference and behaviour of various kinship groups which might be bearers of distinctive cultural patterns and practices. How women's agriculture work, particularly in the cotton harvest, affects care varies across individuals, households and groups. It is possible, however, to describe norms and actual behaviour with respect to some of the dimensions of care which have been highlighted in existing work on nutrition.

Besides being intensive in the use of time, cotton-picking is also a physically intensive task which involves working while standing under the sun all day. Workers need to cover long distances by walking to and back from cotton fields. It is likely that this work is more energy-intensive compared with other activities carried out by women in fieldwork site on a regular basis. There are some indications of increased food consumption during the season. Employers provide one serving of sweet tea a day to most women—though some women receive two tea servings as well as part of a mid-day meal. Women also report eating a little more at home—typically around 25 percent more—than usual when they work in cotton-picking. It is not clear whether or to what extent the extra energy expenditure is compensated by these supplements to the normal diet.

The work environment has other health hazards such as hand injuries, and breathing difficulties due to the presence of dust, cotton fibre and pesticide residue in cotton fields. There are, therefore, direct implications of cotton-picking for women's own health and nutritional status—which are important in their own right, as well as contributory to children's health and nutrition.

#### ***Care for Pregnant Women***

Fertility rates in Pakistan are among the highest in the world, and rural areas including rural Sindh have higher fertility rates than their urban counterparts.<sup>10</sup> There is evidence, however, of fertility decline and changing family size preferences.<sup>11</sup> We found

<sup>9</sup>A similar celebration is reported for cash transfer beneficiaries who go to Shahdadpur town to collect their money from banks and then have a picnic in a public park where they order a meal from a local restaurant. This too is in contrast with the conventional practice of exclusively male public socialisation.

<sup>10</sup>The total fertility rate in urban areas of Pakistan is 3.2 compared to 4.2 births per woman in rural areas. Sindh has a higher fertility rate compared to the average fertility rate in Pakistan [Pakistan Demographic Health Survey (2012-13)].

<sup>11</sup>The total fertility rate declined from 5.4 births per woman in 1985-90 to 3.8 births per woman in 2010-12.

reflections of both, relatively high fertility as well as change, in our fieldwork site. Women in the fieldwork site generally stated that they wanted to stop having children after the birth of 5 or 6 children. Many reported having had tubal ligations after the sixth child, and others reported having received contraception injections from the LHW. Another conspicuous change was the increasing referral to modern medical services for delivery as well as ante-natal and post-natal care in Shahdadpur—something that was facilitated by local paramedics. Awareness about recommended reproductive health practices was associated with exposure to modern services.

Actual behaviour seems to be highly correlated with the household's income as well as access to a reliable intermediary with modern health services. Government medical facilities in Shahdadpur currently enjoy a good reputation—another change from the past—and are available at subsidised prices. There are significant incidental expenses, however, such as transportation costs and informal service charges which can act as barriers to the very poor. The advice of a reliable intermediary—a local paramedic, or a well-informed woman neighbour or relative—is also seen as important for gaining effective access to public health facilities.

In general women as well as men report that pregnant women have the same diet as other adults in the household. While most informants are aware of medical advice that a pregnant woman should not undertake physical work in the last trimester, the main trigger for special treatment of any type—with respect to diet, medical attention, or rest—is the manifestation of a specific problem with the pregnancy. Women who fall ill, become particularly weak, or suffer extraordinary discomfort or pain in the course of the pregnancy are exempted from work. Regular household and agriculture work can be physically demanding, and it is only in exceptional cases that women stop carrying out these activities until just before delivery. Ideas about the resumption of normal physical work vary. While a number of informants report that women should refrain from physical work for at least forty days after delivery, the common period of complete rest is only around a week.

There is recognition of the fact that work on the cotton harvest is more arduous and hazardous for the health of the woman and foetus than ordinary household and agricultural work. Some men acknowledge that in ideal conditions a pregnant or lactating woman should not work in cotton harvesting at all. It is also widely accepted, however, that women will work at least in the first two trimesters before stopping. Cases of individuals who worked till the day before delivery are known and cited, mostly by men, as examples of strong women. Women cite these same cases as those driven by *majboori* (need).

### ***Infant and Young Child Feeding***

Norms regarding the resumption of work in the cotton harvest after delivery are closely linked to the second dimension of care, namely feeding. Awareness in our fieldwork site about the period of exclusive breastfeeding appears to correspond well with the exposure individuals have to modern health services. Many of the respondents stated that there needed to be exclusive breastfeeding for the first six months of the infant's life. The extent to which this was reflected in actual practice varied. A number of Bheel women admitted to giving water to their infants who were as young as two

months old. We also heard different accounts of when weaning foods might be introduced. The willingness of an infant to accept a weaning food seemed to be a common criterion, regardless of specific age. In other words, parents were willing to try out complementary feeding even before the end of the first six months. Breastfeeding, nevertheless, is the norm because alternatives such as infant formula are too expensive for most households.

Infant feeding practices are driven, at least in part, by parents' understanding of what the child can tolerate. It was reported, for example, that goat's milk which can be fed to older infants, is unsuitable for younger ones because it gives them indigestion. Although some women reported giving water to their infants, it is also commonly believed that water leads to "thinning the blood" of the child. Feeding times are generally responsive to the infant's crying.

Most informants understood that there is a trade-off between a woman work and her child's health. Some women were able to articulate this trade-off and act upon it. A woman from a landowning household in KD explained that she does not go for cotton-picking because any income she might earn there would be cancelled out by extra medical expenses of her child falling ill. She felt that the probability of a breastfed child taking ill was high if the mother was not close at hand. There were other women too who felt that cotton-picking compromised their ability to breastfeed their children. Different periods were mentioned, mostly depending on the economic circumstances of the household, as the time that needed to be taken off cotton-picking ranging from a week to two years.

The availability of an alternate care-giver is an important factor in a woman's ability to join the cotton harvest. Several arrangements were reported in the fieldwork sites. Some women with young infants who reported working in the cotton season said that they only go to fields close to their homes. There was a sense that *jamadars* and landlords facilitated this choice of location. These women said that they returned home two to three times during the working day to breastfeed their infants. Some women and men said that infants are left in the care of the fathers who carry them to the mother at feeding time. In fact, there are no fixed feeding times for these infants. Men admitted that they take the child to the mother only when the child cries and cannot be otherwise placated. Women also take their infants to the field, along with an older child, place same under a shade, and feed them periodically. Some women reported leaving their children behind with women relatives who were not going for cotton-picking, usually grandmothers. In some cases, these caregivers were compensated by the working woman for taking care of her child in the form of a gift of cash or clothes.

There are various perceptions in the fieldwork site about the effect of cotton-picking on a woman's ability to properly feed her infant. A number of women claimed that the physical burden of the work reduces a woman's ability to produce enough milk, and that the milk is not as nutritious or healthy as it ought to be. Women working under the summer sun must drink a lot of water, and it is thought that this comprises the quality of breast milk. It is also commonly believed that the working mother's milk is "hot" and can cause indigestion to the child. A more tangible concern is that feeding in cotton fields takes place in unhealthy conditions as the mother is unable to ensure hygiene.

#### **4.5. Implications for Nutrition**

Our findings from qualitative research in a cotton-growing area of Sindh confirm the hypothesis that there is a trade-off between income and care at the household level. Adult household members are aware that women's work in agriculture (cotton-picking in this case) can compromise their own health and nutrition as well as that of their infants and children.

The allocation of time between work, care and leisure is a major element in the trade-off. Cotton-picking is a time-intensive activity and prevailing labour arrangements make it difficult for workers to negotiate flexible work duration or hours. This has implications for nutrition because of gendered norms regarding work and care. Cotton-picking is seen, almost exclusively, as women's work, and for a household to benefit from it women members must supply the labour. At the same time, virtually all key dimensions of care, even those which are not directly linked to women biologically continue to be seen as primary responsibilities of women. Working in cotton-picking and taking part in care activities such as food preparation and ensuring hygiene are equally implicated in loss of masculinity. While men are seen to step up while women are away in covering some household and agricultural tasks normally undertaken by women, their contribution continues to be marginal. Working women report having to return home from a long day in the cotton fields and then cooking the family meal. Other females—older women and girls—who might otherwise replace able-bodied women in these activities are themselves required for cotton-picking. There is evidence of women's empowerment in some areas—both, associated with cotton harvesting, as well as others. This has not translated, as yet, into significant changes in gendered norms of work and care.

The trade-off between income and care is experienced and exercised differentially by individuals and households with different incomes, asset endowments, contractual obligations, understanding of care-nutrition linkages and ability to access public goods and services. The better-off and those who own land have greater flexibility in the rural context. Some sharecroppers, particularly those from socially marginalised groups who are dependent on their landlords for protection and food security, have the least amount of autonomy with respect to their allocation of work time. In-between groups such as small landowners, and sharecroppers and labourers who are not particularly dependent on landlords, display more heterogeneity in terms of their income-care choices.

The greater exposure to modern health services has created awareness among women and men across income groups of recommended reproductive health and nutrition practices. While some of the recommended practices are cited as ideals, there are local norms about women's work during the first 1,000 days since conception. These norms, however, are interpreted in a fluid manner and actual behaviour is understood to be a compromise between ideals, norms and resources. It is well understood that cotton-picking adversely affects the health and nutrition of the woman and the child, but also thought that pregnant and lactating women who work, do so because of economic need which is linked to ensuring food security. Care behaviour, in any case, is often driven not by norms but in response to specific needs of an individual. A pregnant woman might be exempt from work not because she is pregnant but if she is known to be ill. Similarly, an infant of a working mother is not likely to be fed at fixed intervals, but when the alternate care-giver is no longer able to placate the child.

Technological changes in cotton production are associated with the rise in the demand for women's work in agriculture over the last decade or so. There is anecdotal evidence from qualitative research of increases in both the number of women working as cotton harvesters as well as the amount of labour time that a working woman supplies.

## 5. CONCLUSIONS

This paper examined the link between agricultural growth and nutrition as it operates through intra-household choice with respect to employment and care. Women's agricultural work occupies a central position in this regard at least in the cotton-growing regions of Pakistan. We believe that the approach to agriculture-nutrition linkages proposed here can be applied more widely to crops other than cotton, not only in Pakistan but in the South Asia region and beyond. While women's work in cotton (and other similar crops) represents an important source of income for households, there are also significant adverse impacts for their own health and the health and nutrition of their children. Households in some labour arrangements such as share-tenancy have less room for exercising choice in the income-care trade-off.

While we have not examined the sources of agricultural growth, we have shown how any drivers of growth—say, agricultural or infrastructural investments, new technologies, new cropping patterns, higher intensity in resource use—might be the key development objective of improving nutrition. The transmission from growth to nutrition improvement is neither smooth nor linear. Our findings suggest that in the presence of a strongly gendered division of labour and care provision, there can be a trade-off between growth and nutrition. Gender and class-based inequalities can make the trade-off particularly strong. Growth in itself may not always increase opportunities for women, particularly those whose families face economic deprivation and social disadvantage, to make pro-nutrition choices with respect to work and care. The possible trade-off between growth and nutrition needs to receive greater recognition in policy-making if agricultural growth is to play a positive role in improving nutrition in Pakistan.

How can agricultural growth have a greater positive impact on nutrition? The main implication of this paper is that women's empowerment with respect to their work-care choices would be a key determinant of whether and to what extent any growth that takes place is inclusive and pro-nutrition. What kinds of changes and policies might lead to agricultural growth that is more inclusive with respect to women's empowerment and nutrition improvements? Are there alternative cropping patterns which might offer greater flexibility to women and men in terms of income-care trade-offs which affect nutrition? How might social protection programmes be modified to allow for more pro-nutrition choices on the part of women and men? Can redistributive interventions in land or other resource transfers alter the bargaining position of some of households with the most nutritionally-vulnerable women and children? Are there possibilities for social mobilisation for pro-nutrition work and care norms, and for improvements in women's terms of work in agriculture?

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## Quantifying Vulnerability to Poverty in a Developing Economy

RASHIDA HAQ

### 1. INTRODUCTION

The concept of vulnerability extends the idea of poverty to include idiosyncratic as well as aggregate risks which can be defined as the probability of being in poverty or to fall deeper into poverty in the future. It can be categorised on the micro-and macro level where macro vulnerability refers to worldwide threats to social welfare, e.g. globalisation and recent international financial crises. Conversely, micro vulnerability refers to the household level risks including health risks, economic shocks, social shocks, natural disasters, and demographic shocks [Tesliuc and Lindert (2004)]. To assess and estimate vulnerability to poverty, various approaches had been proposed. First, vulnerability can be seen as a probability of falling into poverty in near future [Chaudhuri (2003); Christaensen and Subbarao (2005)]. The other ways of measuring vulnerability consider it as low expected utility [Ligon and Schechter (2003)] and vulnerability as uninsured expose to risk, i.e., measures of cost, in terms of consumption [Tesliuc and Lindert (2004)]. The basic idea is that the state of poverty at a given point actually is not sufficient for assessing poverty and for drawing results to design poverty reduction programs. Households face various risks and do not know whether any possible shock will hit them in future. So the assessment of poverty at a given point in time is a static approach, not considering possible changes in the future. By assessing vulnerability it refers to the dynamic perspective, it is explicitly forward looking and tries to include the risks that may push people into poverty in future.

Although there are different concepts of poverty and vulnerability which are closely related due to two established facts; (i) the poor are typically most exposed to diverse risks, and (ii) the poor have the fewest assets to deal with these risks. However, the importance of vulnerability because if policymakers design poverty alleviation policies in the current year on the basis of a poverty threshold of income or consumption in the previous year, ‘the poor’ who receive income support may have already escaped from poverty and ‘the non-poor’ who do not receive such support may have slipped into poverty due to various unanticipated shocks. Hence, assessing vulnerability helps to distinguish between ex-ante poverty prevention interventions and ex-post poverty alleviation strategies like mitigation and coping arrangements [Holzmann and Jorgensen (2000)].

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Households and communities in Pakistan face the risks of suffering from different types of shocks. Some shocks affect communities as a whole referred as covariate shocks such as economic and financial crises and natural disasters. Others affect one or a few households noted as idiosyncratic shocks, such as a death of a household member or loss of a job. The analysis of vulnerability proposed is crucial for determining which programs to have in place and when to introduce them or adjust their levels and coverage. To make these decisions, policymakers need to have access not only to macro-economic indicators, but also to indicators that provide an understanding of household-level of vulnerability and risk profiles and risk management mechanisms, particularly for the poor. The vulnerability analysis can be useful in the context of Pakistan, given the large proportion of poor people and the low level of human capital as Pakistan is categorised in low human development countries ranked at 146 out of 187 countries with human development index value of 0.537 [UNDP (2014)].

The main purpose of this paper is therefore to: (a) generate the poverty vulnerability indices of the households using expected and variance of consumption expenditures in Pakistan; (b) estimate incidence, intensity and severity of poverty; (c) contribution of vulnerability to poverty (d) estimates of vulnerability and poverty across different socio economic groups; and (e) determinants of vulnerability. The analysis carried out in the paper uses Pakistan Panel Household Survey (PPHS)-2010. Expected results from the analyses are judged to be more relevant to poverty policy formulation in Pakistan.

The rest of the paper is structured as follows. Section 2 provides review of literature. Section 3 outlines the details of the methodology and data. The econometric and other relevant results are presented in Section 4. Section 5 concludes the study highlighting some of the policy issues for reducing poverty and vulnerability to poverty in Pakistan.

## 2. REVIEW OF LITERATURES

The existing literature, which intends to estimate the aggregate vulnerability of households, has been pioneered by Townsend (1994) and Udry (1995), who were some of the first using panel data to analyse, whether households are able to insure their consumption against idiosyncratic income fluctuations over space and time. In this spirit several studies followed analysing consumption fluctuations over time [e.g. Dercon and Krishnan (2000); Jalan and Ravallion (1999); Morduch (2005)], concluding that households are partly but not fully capable of insuring consumption against income fluctuations. A severe drawback of this literature is that it relies on panel data, which is very limited for developing countries.

The second strand of empirical literature on vulnerability, which estimates the impact of selected shocks on households' consumption, has its limitations because information on idiosyncratic and covariate shocks is in most households' surveys very limited or sometimes missing [Günther and Harttgen (2005)]. As a consequence most authors have only been able to focus on the impact of selected shocks on consumption [Dercon and Krishnan (2000); Gertler and Gruber (2002)]. Moreover, these studies have rarely been able to analyse the impact of these shocks on the vulnerability of households. Several measurements to analyse vulnerability to poverty have recently been proposed,

empirical studies are still rare as the data requirements for these measurements are not met by the surveys that are available for most developing countries.

In recent debates on poverty in Pakistan, the issue of vulnerability have been mentioned frequently [Pakistan (2010); World Bank (2002)]. Furthermore, the poverty incidence in KP province is higher and agriculture is more risky than in other parts of Pakistan. Kurosaki (2010) showed that most of the vulnerability measures summarise micro-level information on consumption and income, since the welfare of an individual depends not only on consumption but also on other non-monetary aspects such as education and health in case of KP province.

The literature on risk and vulnerability by using a cross-section survey to map and quantify shocks from all sources, ex-post responses and outcomes for a sample of relatively poor Pakistani households was explored by Heltberg and Niels (2009). They found high incidence and the cost of shocks, with health-related shocks easily the worst. These findings add to the evidence that health shocks often dominate and impose severe coping costs in terms of medical expenses while relying mostly on informal and ad hoc responses: informal borrowing, spending savings, and working more were the most frequently used responses. The extent of household vulnerability to poverty in Pakistan was also estimated by Jamal (2009) who found that about 52 percent population was vulnerable to poverty during 2004-05 while rural headcount ratio in terms of household vulnerability is relatively high as compared to the vulnerability incidence in urban areas. Although monetary poverty has declined during the period 2001-05, the relative incidence of vulnerability has increased from 50 percent in 2001 to 52 percent in 2005.

This review of literatures on shocks, poverty and vulnerability indicating direct implications for welfare loss due to health shock, agricultural shock and natural disaster etc., ultimately, translated in income shock.

### 3. DATA AND METHODOLOGY

#### (a) Data Collection

Ideally, vulnerability measurement would require a long panel data. However, for many developing countries, reliable panel data are scarce and only cross-sectional survey data are available. Pakistan is no exception in this regard. The absence of panel data obliges us, in our assessment of vulnerability to poverty in Pakistan, to adopt the approach proposed by Chaudhuri (2003) which is particularly designed for cross-section data.

This study is based on a cross-section data from 'Pakistan Panel Household Survey (PPHS)-2010' conducted by Pakistan Institute of Development Economics financed by the World Bank. The households' sample of PPHS was selected on the basis of a multi-stage stratified sampling procedure. The survey consists of 16 districts from four provinces (Punjab, Sindh, Khyber Pakhtunkhwa (KP) and Balochistan) with their urban and rural counterparts. The districts included are Attock, Faisalabad, Hafizabad, Vehari, Muzaffargarh, and Bahawalpur in Punjab; Badin, Mirpur Khas, Nawab Shah, and Larkana in Sindh; Dir, Mardan, and Lakki Marwat in Khyber Pakhtunkhwa (KP); and Loralai, Khuzdar, and Gwadar in Balochistan.

The total sample size of PPHS-2010 was 4142 households; 2800 in rural and 1342 in urban (Punjab 1878; Sindh 1211; KP 601 and Baluchistan 452). After cleaning the data (deleting outliers, no responses and missing cases) a sample of 3500 households was selected for final analysis. The analysis was based on this information together with other information concerning characteristics of the head of the household (i.e., individual characteristics such as sex, age, education) and household characteristics, like household size (taken as adult equivalent), dependency ratio,<sup>1</sup> poverty status,<sup>2</sup> quality of house—whether mud house or brick house, agricultural land ownership, livestock ownership (large or small animals), log per adult equivalent consumption expenditure, in addition to community characteristics likes, regions and provinces. The shocks variables included are divided into a number of broad categories: natural/agricultural; economic; political/social/legal; and demographic/life-cycle shocks that inflict welfare loss. Natural/agricultural shocks include flooding, drought, fire, earthquake but also erosion and pestilence affecting crops or livestock. Economic shocks include business closures, mass layoffs, job loss, wage cuts, loss of remittances and other reasons. Social shocks in Pakistan include court cases and bribery, as well as long duration general strikes, violence, crime and political unrest. Health/life-cycle shocks include death, injury and illness of household members. The survey distinguished between death of the primary income earner and death of other household members. Similarly, the respondents were also asked whether the household was affected by idiosyncratic or covariate shocks and with the value of cost of burden.

So finally, in addition to these questions about specific shocks, households were also asked about the most important coping strategies to manage the reduction in income such as (i) asset-based strategies (sale of assets including land, livestock and stored crop); (ii) assistance-based strategies (help from friends and relatives); (iii) borrowing-based strategies (from friends and relatives, banks, NGOs and money lenders); and (iv) behaviour-based strategies (decrease food/non-food consumption, increase labour supply particularly of women and children, dropped out of school and beggary) .

## (b) Methodology

In this section the detailed estimation procedure of the analysis of vulnerability to poverty in Pakistan is delineated as follow:

### Model Specifications

#### (i) Foster, Greer, Thorbecke (1984) Poverty Measure

The methodology that is used in this analysis is the class of poverty measures by Foster, Greer and Thorbecke (FGT) which is widely used because they are consistent and additively decomposable [Foster, *et al.* (1984)].

$$P_{\alpha} = \frac{1}{n} \sum_{i=1}^q \left( \frac{Z - C_i}{Z} \right)^{\alpha} \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (1)$$

<sup>1</sup>The dependency ratio takes the sum of the population under the years of 15 and over 64 and divided by the population in the intermediate range of 15-64.

Where  $Z$  is the poverty line measured as per adult equivalent consumption expenditure of Rs 1671.89,  $C_i$  is the  $i$ th welfare indicator measured in terms of per adult equivalent consumption expenditure,  $n$  is the total households,  $q$  is the number of households who are below the poverty line, and  $\alpha \geq 0$  is a ‘poverty aversion’ parameter. The FGT poverty measure formula delivers a set of poverty indices, i.e. incidence ( $\alpha = 0$ ), intensity or poverty gap ( $\alpha = 1$ ) and severity of poverty ( $\alpha = 2$ ).

**(ii) Vulnerability—the Probability of Being Poor in the Future**

Modeling the Probability of Becoming Poor: In order to analyse the effect of some idiosyncratic and covariate shocks on households’ consumption expenditures, the approach proposed by Chaudhuri (2003) and Chaudhuri, *et al.* (2002) and Suryahadi and Sumarto (2003) developed particularly for cross-section data is used. Vulnerability in this context is defined as expected poverty, or in other words as the probability that a household’s consumption will lie below the predetermined poverty line in the near future. Following Chaudhuri (2000), for a given household  $h$ , the vulnerability is defined as the probability of its consumption being below poverty line at time  $t+1$ :

$$V_{ht} = P_r(\ln C_{h,t+1} < \ln z \mid X_h) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (2)$$

where  $V_{ht}$  is vulnerability of household  $h$  at time  $t$ ,  $C_{h,t+1}$  denote the consumption of household  $h$  at time  $t+1$  and  $Z$  stands for the poverty line.

For generating per adult consumption expenditure ( $C_h$ ) of  $h$  household is given as:

$$\ln C_h = X_h \beta + e_h \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (3)$$

where  $X_h$  represents individual and household characteristics,  $\beta$  is a vector of parameters,  $e_h$  is the error term.

Suppose the variance of  $e_h$  is given by:

$$\sigma_{e,h}^2 = X_h \theta \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (4)$$

To measure the parameters of  $\beta$  and  $\theta$ , a three-stage feasible generalised least square (FGLS) procedure is used. In the first stage, equation 3 is to be estimated with ordinary least square (OLS) method and the square of the generated error terms are to be regressed against the independent variables to generate the predicted values of the error terms.

$$\hat{e}_{OLS,h}^2 = X_h \theta + \eta_h \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (5)$$

The predicted values of the error terms in Equation 5 are used to transform the same equation in a manner specified below:

$$\frac{\hat{e}_{OLS,h}^2}{X_h \hat{\theta}_{OLS}} = \left[ \frac{X_h}{X_h \hat{\theta}_{OLS}} \right] \theta + \left[ \frac{\eta_h}{X_h \hat{\theta}_{OLS}} \right] \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (6)$$

Equation 6 will be estimated using OLS method to obtain an asymptotically efficient FGLS estimate denoted as  $\hat{\theta}_{FGLS}$ . In this case,  $X_h \hat{\theta}_{FGLS}$  is a consistent estimate of,  $\sigma_{e,h}^2$  variance of the idiosyncratic component of households’ consumption expenditures. Therefore, equation 3 is to be transformed with FGLS

$$\sigma_{e,h}^{\wedge} = \sqrt{X_h \theta_{FGLS}^{\wedge}} \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (7)$$

To obtain

$$\frac{\ln C_h}{\sqrt{X_h \theta_{FGLS}^{\wedge}}} = \left[ \frac{X_h \beta}{\sqrt{X_h \theta_{FGLS}^{\wedge}}} \right] + \left[ \frac{e_h}{\sqrt{X_h \theta_{FGLS}^{\wedge}}} \right] \quad \dots \quad \dots \quad \dots \quad \dots \quad (8)$$

Equation 8 is to be estimated using FGLS method, and it yields a consistent and asymptotically efficient estimate of  $\beta$ . The expected log consumption can be estimated by using the estimates of  $\beta^{\wedge}$  and  $\theta^{\wedge}$ . In this case, it can be noted as:

$$E^{\wedge}[\ln C_h | X_h] = X_h \beta^{\wedge} \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (9)$$

The variance of log consumption expenditure for each of the  $h^{th}$  household is given as:

$$V^{\wedge}[\ln C_h | X_h] = \hat{e}_h^2 = X_h \theta^{\wedge} \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (10)$$

The vulnerability level of  $h$  household, which is the probability that household  $h$  with characteristics  $X_h$  will be poor in the future can be estimated by assuming that households' consumption expenditures are log normally distributed. Therefore, suppose  $(.) \Phi$  denotes the cumulative density of the standard normal distribution, probability of vulnerability can be computed as:

$$V_h^{\wedge} = P_r^{\wedge}(\ln C_h < \ln z | X_h) = \Phi \left[ \frac{\ln z - X_h \beta^{\wedge}}{\sqrt{X_h \theta^{\wedge}}} \right] \quad \dots \quad \dots \quad \dots \quad (11)$$

According to Chaudhuri, *et al.* (2002), a vulnerability threshold of 0.5 is applied, indicating that a household with a 50 probability of falling into poverty is vulnerable to poverty at least once in the next years.

**(iii) Measuring Determinants of Vulnerability**

Risk signifies the possibility of adverse effects in the future. It derives from the interaction of social and environmental processes, from the combination of physical hazards and the vulnerabilities of exposed elements. The negative events are not the sole driver of risk, and there is high confidence that the levels of adverse effects are in good part determined by the vulnerability and exposure of societies and social-ecological systems [UNISDR (2004)]. A logistic regression model as specified by Gujarati (2012) is used to examine the determinants of vulnerability to poverty in Pakistan. The vector of independent variables measuring individual characteristics for household head (gender, age, education), households characteristics (household size, dependency ratio, poverty status, housing quality, productive assets), transitory components (agricultural, social, economic and health shocks, four types of coping strategies) and place of residence (urban/rural and four provinces).

#### 4. ANALYSIS

In order to determine the effect of some idiosyncratic and covariate variables on households' consumption expenditures, the approach of Chaudhari (2000) to generate vulnerability indices with single point consumption data is used. At the same time to get three poverty estimates, a class of decomposable poverty measures by Foster, Greer and Thorbecke (FGT) has been adopted. It is worth noticing that the target of policy in this paper is a population of households, not individuals, simply because the data on consumption expenditures are obtained from the household surveys. This means that if we consider a household as poor or vulnerable every member in this household is deemed equally poor or vulnerable. The poverty and vulnerability estimates based on micro data from PPHS-2010 are presented in Table 1. It was analysed that 20.6 percent households in Pakistan are poor while 34.4 percent households are vulnerable to poor in future which is much higher than the point-in-time estimates of poverty, thus, signifies the importance of forward looking poverty analysis. The distribution of population by poverty status can be decomposed in vulnerable and non-vulnerable households indicating that 95.2 percent household will be remain poor in future while only 4.8 percent will be non-vulnerable in next year. It is important to note that 57.1 households are both poor and vulnerable while 42.9 percent are non-poor and vulnerable. Jamal (2009) estimated poverty level at 29.8 percent in 2005 and 33.7 percent in 2001 while vulnerability is 51.62 percent and 49.88 percent, respectively for these two periods. A measure of vulnerability was also developed using a five-year panel for rural Pakistan, which had illustrated that on average 67 percent households are vulnerable between 1986 to 1990 [Mansuri and Andrew (2002)]. It can be concluded that both poverty and vulnerability had decreased in Pakistan while a sizable fraction of non-poor households are vulnerable to poverty.

Table 1

##### *Vulnerability and Poverty at Household Level: 2010*

Vulnerability	Poverty Status		Overall
	Poor	Non-poor	
Vulnerable	57.1 (95.2)	42.9 (18.6)	34.4
Non-vulnerable	1.5 (4.8)	98.5 (81.4)	65.6
Overall	20.6	79.4	100

*Source:* Author's computation is from the micro data of PPHS-2010.

As shown in Table 2, three estimates of poverty are given as headcount, intensity of poverty and severity of poverty across region. A high incidence of rural poverty (22.7 percent) is observed as compare to urban poverty (14.7 percent). In this manner a high intensity of poverty (the average poverty gap, or the amount of income/expenditure necessary to bring everyone in poverty right up to the poverty line, divided by total households) also observed in all areas of Pakistan. This can be thought of as the amount that an average household in the economy would have to contribute in order for poverty to be just barely eliminated. Furthermore severity of poverty is income inequality among the poor. A high intensity and severity of poverty is seen in rural areas as compare to urban areas and overall Pakistan indicating a high risk of future poverty. In addition to, some districts with high average poverty and vulnerability level can be seen in Figure 1.

Table 2

*FGT Poverty Estimates: 2010*

Region	Poverty Measures		
	Headcount	Intensity of Poverty	Severity of Poverty
Urban	14.7	2.60	0.7
Rural	22.4	5.11	1.75
Overall	20.6	4.54	1.5

Source: Author's computation is from the micro data of PPHS-2010.

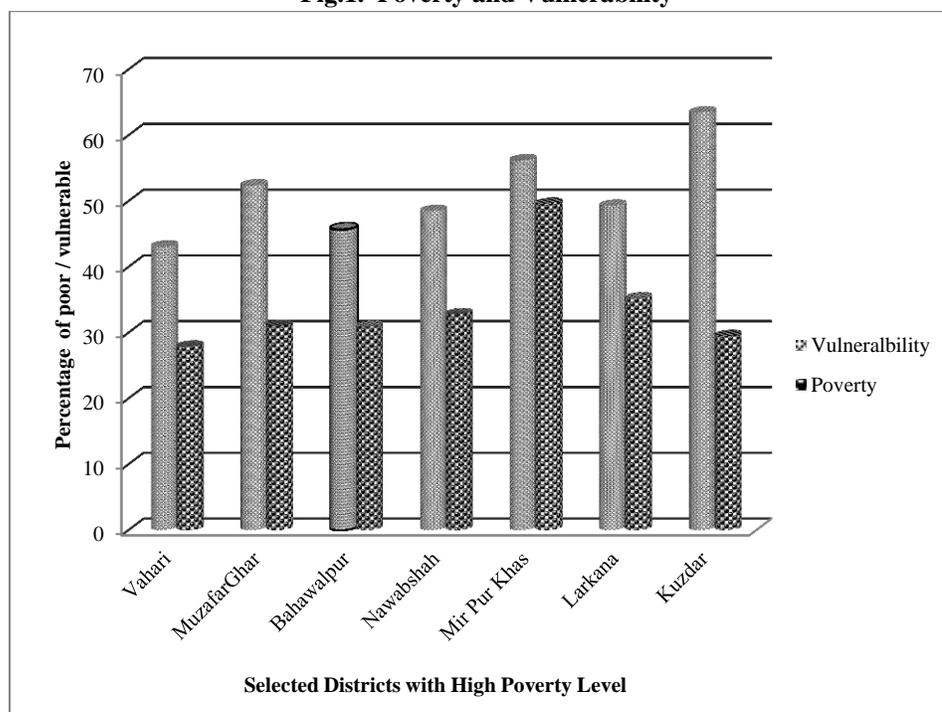
**Fig.1. Poverty and Vulnerability**

Table 3 presents a cross-distribution of the percentage of vulnerability and poverty for the households who had suffered a welfare loss due to a shock during last five years, 2006-2010. The welfare loss is measured in terms of income loss which has resulted in consumption variability of food and non-food expenditure. Households and communities in Pakistan face the risks of suffering from different types of shocks that affect communities as a whole referred to as covariate shocks such as natural disasters while others affect one or a few households denoted as idiosyncratic shocks such as a death of household member or loss of a job. Even though, any household can be affected by these shocks, not all of them have the same probability of recovering from the consequences of suffering from them. Poor households are more vulnerable because they lack the necessary physical and human capital to recover from it. All households who are hit by any type of shock have high poverty rates than average poverty level in Pakistan, as demonstrated in Table 3.

Table 3

*Estimates of Vulnerability and Poverty by Type of Shocks: 2010*

Shocks	Vulnerability and Poverty Status		Ratio of Vulnerability to Poverty
	Vulnerable	Poor	
Incidence of Shock	36.2	23.7	1.53
Idiosyncratic Shock	34.2	21.4	1.60
Covariate Shock	36.5	26.3	1.39
Natural/Agriculture	35.5	23.0	1.54
Economic	37.8	38.2	0.99
Social	37.0	23.3	1.59
Health	36.7	23.5	1.56

Source: Author's computation is from the micro data of PPHS-2010.

In Pakistan covariate shock in the form of flood is a common phenomenon whereby informal insurance mechanism become fail, resulted in high poverty (26.3 percent) and vulnerability (36.5 percent). These estimates indicate that the observed incidence of poverty underestimates the fraction of the population that is vulnerable to poverty. The level of underestimation is revealed by the vulnerability to poverty ratio, which is greater than one for all households in 2010. Although incidence of poverty had decreased but the vulnerability and vulnerability to poverty ratio had increased during 2001-05 [Jamal (2009)]. The level of poverty had further decreased in urban and rural areas of Pakistan but the vulnerability and vulnerability to poverty ratio had deteriorated in 2010. This analysis also documented that health shocks are more costly than agriculture ones as can be seen with high poverty and vulnerability. For example, Kenjiro (2005) found that in rural Cambodia, the economic damage caused by sickness is more severe than that caused by a crop loss. Gertler and Gruber (2002) explored evidence that in Indonesia the economic costs associated with major illness are high and cause a severe reduction in household consumption. Moreover, health shocks may prevent households from using some coping strategies, for example households are less likely to use the labour supply to cope with health shocks because they may affect the ability of the households to provide labour [Kochar (1995)]. However, the experience of shock by rich households might have negatively affected other households that depend on them for livelihoods and economic survival.

In developing countries households face substantial risks, which they handle with risk-management and risk-coping strategies, including self-insurance through savings and informal insurance mechanisms but despite these mechanisms, however, they remain vulnerability to high risk. In Table 4 distribution of vulnerability and poverty is given by risk management strategies when a household is encountered by a shock. These ex-post coping strategies can be divided into four main categories: (i) asset-based strategies; (ii) assistance-based strategies; (iii) borrowing-based strategies; and (iv) behaviour-based strategies. The level of vulnerability and poverty is higher for those households who had adopted behaviour-based strategies such as consuming less, increasing labour supply or taking children out of school for work. These types of coping strategies are practiced more often for natural/agricultural shocks than for economic

Table 4

*Vulnerability and Poverty by Risk Management Strategies: 2010*

Risk Management Strategies	Vulnerability and Poverty Status		Ratio of Vulnerability to Poverty
	Vulnerable	Poor	
Assets based	30.8	21.9	1.41
Assistance based	38.1	25.9	1.47
Borrowing based	40.6	24.6	1.65
Behavior based	43.9	26.0	1.69
One strategy	36.2	23.7	1.53
Two strategies	39.8	27.8	1.43
Three strategies	39.5	28.5	1.39

*Source:* Author's computation is from the micro data of PPHS-2010.

shocks [Haq (2012)]. In previous studies these finding are also supported by Beegle, *et al.* (2006) who found that in Tanzania households respond to transitory income shocks by increasing child labour and the extent to which child labour is used as a buffer is lower when households have access to credit. Jacoby and Skoufas (1997) also showed that in India unanticipated income shocks have a significant effect on children school attendance and that school attendance appears to play an important role in the self-insurance strategy of poor households. It is often noted that some households had to adopt more than one strategy for consumption smoothing. The findings in Table 4 demonstrate that those households who had adopted more than one coping strategies are relatively more vulnerable and poor. In addition, these households reduced food consumption, non-food consumption and increased labour supply of children or women in response to shocks as a second coping strategy because they had limited asset base, and face missing formal insurance and finance markets to smooth consumption expenditure.

An individual can be vulnerable to falling below a threshold across several dimensions, such as education, quality of housing, household's productive assets such as land or livestock, and place of residence etc. The estimates given in Table 5 demonstrate that household heads that had up to primary level education are more vulnerable and poor as compared to higher level education As a consequence, this low level of human capital does not allow them to earn enough income to reduce vulnerability. Similarly, households living in mud houses are more vulnerable to poverty as compared to residence of better quality of houses. At the same time households with low level of physical capital are the most vulnerable and hence remain chronically poor. Vulnerability to shocks can be seen a cause of chronic poverty (poor in both periods). However, Okidi and Mugambe (2002) state that vulnerability to shocks is not just a cause of poverty but is also a symptom of poverty. This is highlighted by Baulch and Hoddinot (2000) who state that "households with greater endowments and greater returns will tend to be less vulnerable to shocks. Furthermore, in this analysis those households who are affected by any type of shocks have high incidence of poverty and vulnerability as compared to households with average poverty level in Pakistan.

Table 5

*Estimates of Vulnerability and Poverty across Groups: 2010*

Groups	Vulnerability and Poverty Status		Ratio of Vulnerability to Poverty
	Vulnerable	Poor	
No Schooling	39.8	24.0	1.65
Primary education	39.1	24.7	1.58
Secondary education	26.4	14.4	1.83
Higher education	10.3	9.4	1.09
Mud house	47.4	30.8	1.54
Mixed (mud and brick house)	27.7	15.3	1.81
Brick house	24.1	12.6	1.91
Landless households	37.6	22.7	1.66
Small landholders (up to 3 acres)	37.7	24.0	1.57
Medium landholders (3 <sup>+</sup> -10 acres)	26.2	14.8	1.77
Large landholders (10 <sup>+</sup> acres)	20.9	10.6	1.97
No livestock	37.6	22.5	1.67
Large animals (No.)	29.5	17.0	1.74
Small animals (No.)	35.4	20.7	1.71
Urban	29.4	14.7	2.0
Rural	35.9	22.4	1.6
Overall	34.5	20.6	1.67

*Source:* Author's estimates based on the micro data of PPHS-2010.

Table 6 presents the results of logit regression of the determinants of vulnerability, where vulnerable households are those who are expected to be perpetually poor or expected to either fall into poverty. The results show that the models produced a good fits of the data as revealed by the statistical significance of the pseudo coefficient of determinations and Wald Chi-square parameters. The analysis shows that as the age of the household head increases, the probability of being vulnerable significantly decreases while large household size significantly increases this probability. Increasing aged/child dependency ratio is another significant variable to increase the probability of vulnerability.

Furthermore, compared to base category 'illiterate head of household', the household heads that had secondary level or high level of education significantly reduces the probability of falling into poverty in future. This is also expected since education is expected to increase capacity for escaping poverty [World Bank (2002)]. The model shows that poor households significantly increases the probability of being poor in future thus remain chronically poor or remain poor in both periods. Physical capital which is related to productive assets such as agriculture land and livestock are important in risk management. The households who had land ownership and large animals are less likely to be vulnerable because, possession of assets leads to an increase in the expectation of future consumption and provide a secure source of income in the face of negative shocks to income. However, households having small animals and residing in lower quality of housing significantly increases the probability of being poor in future. It is also elaborated that households with natural /agricultural shocks, including flood, earthquake, drought, crop failure and loss of livestock, etc. are likely to be more vulnerable as compared to those households who are affected by social shocks while households with health shocks and economic shocks have less probability of being vulnerable.

Table 6

*Determinants of Vulnerability to Poverty in Pakistan*

Correlates	Vulnerable / Non Vulnerable		
	Coefficient	Std. Error	Exp ( $\beta$ )
Intercept	-3.25	1.418	0.039
Male headed households	-0.88	0.677	0.413
Age of HH Head (years)	-0.12 <sup>***</sup>	0.007	0.88
Household size (No)	0.067 <sup>*</sup>	0.027	1.069
Primary Education	-0.050	0.104	0.95
Secondary Education	-0.23 <sup>***</sup>	0.13	0.79
Higher Education	-0.463 <sup>*</sup>	0.119	0.63
Dependency ratio	0.202 <sup>***</sup>	0.106	1.22
Poverty status	4.32 <sup>*</sup>	0.25	75.17
Land ownership (acres)	-0.039 <sup>*</sup>	0.01	0.96
Large animals (No.)	-0.413 <sup>*</sup>	0.055	0.662
Small animals (No.)	0.13 <sup>*</sup>	0.022	1.139
Housing quality (mud house)	1.26 <sup>*</sup>	0.562	3.53
Agriculture shocks	1.054 <sup>*</sup>	0.274	2.86
Economic shocks	-3.33 <sup>*</sup>	0.499	0.036
Health shocks	-1.36 <sup>*</sup>	0.279	0.26
Covariate shock	-0.016	0.25	0.98
Cost of shock (Rs.)	0.366 <sup>*</sup>	0.082	1.44
Asset based strategy	-2.08 <sup>*</sup>	0.246	0.13
Assistance based strategy	-2.14 <sup>*</sup>	0.357	0.12
Borrowing based strategy	-1.36 <sup>*</sup>	0.284	0.26
Multi strategies	0.203	0.047	1.23
Region (Rural=1)	0.397 <sup>*</sup>	0.110	1.48
Punjab	-0.443 <sup>***</sup>	0.24	0.64
Sindh	-0.734 <sup>*</sup>	0.25	0.48
KPK	-1.48 <sup>*</sup>	0.295	0.227
Chi-square		2874.37	
-2 Log likelihood		4807.32	
Pseudo R <sup>2</sup> (Cox and Snell)		0.152	
Observations		3500	

Source: Author's estimates based on the micro data of PPHS-2010.

a. The reference category is: Non Vulnerable households.

\*significant at 1 percent, \*\* significant at 5 percent and significant at \*\*\*10 percent.

When economic hardships occur in developing countries, people resort to various risk coping strategies to smooth consumption, since formal credit and insurance markets are less developed. In this analysis different types of risk management strategies are adopted by households showing that households who had adopted assets, assistant and borrowing based strategies are less likely to be vulnerable as compared to those who had adopted behaviour based strategies. These strategies includes decrease food and non-food consumption, increase labour supply particularly of women and children, beggary/

prostitution, children drop out from school and sent to work and bonded labour arrangements, thus had inter-generational transmission of poverty and vulnerability. The final set of results concerns the geographical locations that also play an important role in determining a household to be vulnerable to poverty. Rural households are more vulnerable as compared to urban residents while households living in province of Punjab, KP and Sindh are less vulnerable as compared to Balochistan.

## 5. CONCLUSIONS

The well-being of poor households depends not only on households' current consumption or expenditures, but also on risk and uncertainty about their future welfare. This paper has developed a measure of vulnerability to poverty that takes both permanent and transitory household characteristics into consideration to forecast vulnerability. The methodology involves a three stage FGLS method for generating vulnerability indices by employing PPHS-2010 data.

The analysis highlights that total vulnerability is found to be 34.4 percent as opposed to the poverty of 20.7 percent. Vulnerability in rural areas is even higher which is estimated to be 35.9 percent as oppose to 29.4 percent of urban statistic. When decomposing vulnerability into poor and non-poor households, it was figured out that 95 percent poor households are also vulnerable while only 18 percent non-poor households are vulnerable. Risks to livelihood are particularly important in Pakistan where there is generally high dependence on agriculture sector. Households who had suffered a welfare loss due to a shock particularly covariate shocks are more vulnerable to poverty. High vulnerability and poverty is found for those households who suffered from agriculture, social, economic and health shocks during the last five years. In addition the ratio of vulnerability to poverty is also high for agricultural, social, health and idiosyncratic shocks. When these shocks occur, household resort to various risk coping strategies to smooth consumption, since formal credit and insurance markets are less developed. Households who had adopted borrowing or behaviour based strategies are more likely to be vulnerable to poverty. The more one is vulnerable, the less one has the capacity to cope, the more one tends to adopt multiple coping mechanisms hence these households are more vulnerable to poverty as observed in this analysis. The study also revealed that households may be vulnerable across several dimensions, such as no schooling, low quality housing, no productive assets and geographical location. The model measuring determinants of vulnerability indicate that households head with no education, large family size, high number of dependents, poverty status, lack of productive assets, agriculture shocks, high cost of shock and rural residence have significantly higher probability of being poor in future.

Finally, a clear observation in this analysis is that vulnerability and poverty is still concentrated in Pakistan. It is important to build productive assets for the poor and vulnerable households, increasing the coverage of education and health, and strengthen the disaster management and relief mechanisms. In addition, this paper argues that despite the limitations of purely cross-sectional data, an analysis of this data can potentially be informative for poverty alleviation programmes.

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## Simulating the Impact of Income Distribution on Poverty Reduction

SYED KALIM HYDER, QAZI MASOOD AHMED and HAROON JAMAL

### 1. INTRODUCTION

The traditional notion that has influenced the development thinking for almost half a century is that economic growth is fundamental to the development process, and that the objective of poverty reduction can only be achieved by allowing the benefits of growth to ultimately trickle down to the poor. The ‘primacy of growth’ paradigm is based on the premise that high growth, through high investment, would lead to higher employment and higher wages, and thereby reducing poverty. The ‘trickle-down’ paradigm assumes that the benefits of economic growth would, in the first round, accrue to the upper income groups, and the ensuing consumption expenditures of these households would, in subsequent rounds, accrue incomes to relatively lower income households.

Importance of equity consideration in poverty alleviation efforts has been brought out of the cold and now has re-entered the mainstream development policy agenda in many developing countries. This is the consequence of a deep-rooted disillusionment with the development paradigm which placed exclusive emphasis on the pursuit of growth. During 1990s, the proliferation of quality data on income distribution from a number of countries has allowed rigorous empirical testing of standing debates on the relative importance of growth and redistribution in poverty reduction. While the debate is still inconclusive, the majority of development economists emphasised, based on empirical cross-country data, that an unequal income distribution is a serious impediment to effective poverty alleviation [Ravallion (1997, 2001)]. Many researchers suggested that growth is, in practice the main tool for fighting poverty. However, they also reiterated that the imperative of growth for combating poverty should not be misinterpreted to mean that “growth is all that matters”. Growth is a necessary condition for poverty alleviation, no doubt, but inequality also matters and should also be on the development agenda.

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The purpose of this paper is to supplement the debate by providing empirical evidence from Pakistan's poverty trends. The paper simulates the impact of inequality on poverty reduction in a macroeconomic general equilibrium framework. Time series macro and social data are used to explore the relevance of inequality for growth and poverty reduction. Section 2 presents a brief review of cross-country evidence and discusses the linkages among poverty, inequality and growth. The results of econometric specification, which treats inequality as a determinant of poverty reduction, are furnished in Section 3. The proximate macroeconomic and structural determinants of inequality are discussed in the next section. Section 5 presents the simulation results of poverty under alternative inequality scenarios. The last section gives concluding remarks.

## 2. INEQUALITY, GROWTH AND POVERTY NEXUS

The conceptual validation of the inevitability of inequality as a by-product of growth is drawn from the Kuznet hypothesis, propounded in 1955. Kuznets (1955) argued that the income distribution within a country was likely to vary over time with its progress from a poor agricultural society to a rich industrial society. The hypothesis predicted an increase in inequality during early periods of growth, and reduction in inequality as the economy reaches a higher stage of development. Thus, the 'primacy of growth' model assumes a trade-off between growth and equity.

Based on cross-country studies, it is maintained that distribution policies give rise to distortions in the economy, resulting in inefficiencies that may be substantial enough to adversely affect the overall well being of society. For instance, research by Kaldor (1957) and Bourguignon (1981) suggests that the marginal propensity to save of the rich is higher than that of the poor, implying that a higher degree of initial inequality will yield higher aggregate savings, capital accumulation, and growth. It is also argued that inequality within a country is stable over time and changes too slowly to make a significant difference in poverty reduction [Deininger and Squire 1998]. The conclusion drawn is that growth must precede distribution, and that the poor will pay the price of growth in terms of inequality and poverty until such time that growth builds up a 'reservoir' of wealth and its benefits trickle down in sufficient measure to reduce poverty.

The 'primacy of growth' paradigm has been challenged by empirical evidence based on rigorous testing of more recent cross-country data, and the 'trickle-down' paradigm has been effectively discredited. Further, it is reasoned that there does not exist an unavoidable trade-off between growth and equity [Naschold (2002)]. Results show that high inequality is an impediment not only to poverty reduction, but also to growth. Initial cross-country studies, including Birdsall, *et al.* (1995), found that greater initial income inequality actually reduces future growth even after controlling for initial levels of GDP and human capital. The robustness of these findings has been the subject of much debate; however recent analysis using an updated and more comparable inequality data reconfirms the negative effects of inequality on growth [Knowles (2001)]. Low inequality can therefore benefit the poor in two ways. By increasing overall growth and average incomes and by letting them share more in that growth.

It is also argued that a more equitable distribution of assets and income is likely to strengthen aggregate market demand, expand the economic base, and foster growth. Thus, distribution is not only a final outcome, but also a determinant of

economic growth. Given that there is no trade-off per se between growth and equality, it follows that distribution can be pursued as an additional policy objective to enhance the poverty reducing effect of growth. The removal or correction of the various anti-poor institutional constraints and policy-induced biases is likely to actually improve market efficiency, besides promoting equity. For instance, social policy ensuring adequate provision of education and health services to the poor can improve their productivity and contribution to the economy. Therefore, the conclusion drawn is that poverty reduction is not a function of high or low growth, but rather of distribution sensitive growth.

Policies and growth patterns that improve distribution are therefore potentially significant additional tools in the fight against poverty. Past changes in distribution occurred without active policy intervention, as the focus of development policy and research was on growth, rather than distribution issues. If, in future, development policy makes inequality an explicit target, it will greatly enhance the poverty reducing effect of growth.

### 3. INEQUALITY AS A DETERMINANT OF POVERTY

International evidence shows that the poverty elasticity of growth depends on the specific poverty measure being used [Kakwani (1993)], the degree of inequality of the income distribution [Revallion (1997)] as well as the specific characteristics of growth episodes, i.e., whether growth is inequality increasing or decreasing. As such, the degree of poverty is postulated to be a function of two factors: the average income level of the country and the extent of income inequality. Formally,

$$P = P(Y, L(p)) \quad \dots \quad (1)$$

Where  $P$  is a poverty measure,  $Y$  is per capita income and  $L(p)$  is the Lorenz Curve measuring the relative income distribution. The Lorenz Curve is based on ranking of population according to income and plotting the cumulative proportion of income against the cumulative proportion of population enjoying that income.

Changes in poverty can be decomposed into a growth component that relates changes in per capita income, and an inequality component that relates poverty to changes in inequality. In general, increases in average income (growth) will reduce poverty. Thus, growth elasticity of poverty ( $\lambda$ ) may be hypothesised as follows:

$$\lambda = \left[ \frac{\partial P}{\partial Y} * \frac{Y}{P} \right] > 0 \quad \dots \quad (2)$$

Measuring the effect of inequality on poverty is slightly more complex because inequality can change in infinite manners. It is hard to say anything general about the growth-poverty relationship when the distribution is allowed to change during growth. Although intuitively progressive distributional change is likely to reduce poverty, this result cannot be generalised without additional assumption regarding the distribution. Kakwani (1993) developed a formula for the inequality elasticity of poverty under the assumption of an equal proportionate change in the Lorenz curve. Under this assumption it is possible to express the inequality elasticity of poverty  $\omega$  as the elasticity of poverty with respect to the Gini coefficient (G).

$$\omega = \left[ \frac{\partial P}{\partial G} * \frac{G}{P} \right] > 0 \quad \dots \quad (3)$$

To establish the relationship between poverty, growth and inequality, Pakistan's time series (1979-2013) data on per capita income, headcount (poverty incidence or population below the poverty line) and Gini coefficient are used to estimate the following specification. In order to capture the asymmetric impact of Gini coefficient on poverty, the Gini is decomposed into two variables<sup>1</sup> by taking the threshold of no change; the Gini coefficient that observe the increasing (positive) trend and the Gini coefficient that observe the declining (negative) trend. These two variables are added in the Equation (4) instead of one time series of Gini coefficients to capture the disproportional impact of inequality on poverty.

$$\begin{aligned} \text{Log (Poverty)}_t = & [\alpha + \lambda \text{Log(GDP)}_t + \bar{\omega}_1(\text{Gini}^{\text{positive}})_t \\ & + \bar{\omega}_2(\text{Gini}^{\text{negative}})_t + \mu_t] \quad \dots \quad \dots \quad \dots \quad \dots \quad (4) \end{aligned}$$

As consumption and income data are collected occasionally from Household income and expenditure Surveys, poverty and inequality series are interpolated before estimation. Moreover, a consistent time series of poverty is developed to avoid the inter-temporal methodological biases.<sup>2</sup> The estimated results of Equation (4) are furnished below.

Table 1

*Determinants of Poverty*  
*Dependent Variable – Log (Poverty Incidence – Headcount)*

Explanatory Variables	Coefficient	t-Statistic	Significance
GDP Per Capita	-0.42	-2.26	0.03
GINI (High Changes)	2.30	4.13	0.00
GINI (Low Changes)	2.04	3.69	0.00
Time Trend	0.01	2.46	0.02
Constant	6.60	3.36	0.00
R-squared	0.95	F-Statistic	103
Adjusted R-squared	0.94	Probability (F-Statistics)	0.000
Durbin-Watson stat	1.60	Number of Observations	40
Q <sub>(1)</sub>	0.81	Jarque-Bera	2.01
	(0.80)		(0.36)
Q <sup>2</sup> <sub>(1)</sub>	0.50	LM <sub>(1)</sub>	3.00
	(0.48)		(0.12)
ARCH <sub>(1)</sub>	0.44		
	(0.51)		

*Notes:* All variables are in logarithmic form and statistically significant.

Equation also contains a dummy variable for the year 2011 and 2012 due to large residual effect.

LM and ARCH tests are applied and found no evidence of serial correlation.

Wald test is applied to test the hypothesis that Gini has symmetric impact on poverty. The hypothesis is rejected by F-test (F-value 22.75 with probability of 0.00).

<sup>1</sup>Ideally Atkinson class of measures or extended Gini should be used with high value of inequality aversion parameters to represent the level of society concern about inequality. Nonetheless, this was not possible due to non-availability of time-series raw data.

<sup>2</sup>The data and methodological details for interpolation and construction of consistent poverty estimates are provided in Jamal (2006).

The results from the econometric analysis clearly indicate the importance of income distribution in determining absolute poverty level. The poverty elasticity with respect to Gini observing increasing trend (positive changes) and Gini witnessing declining trend (negative changes) is estimated as 2.30 and 2.04, while the estimated poverty elasticity with respect to income is 0.42. The higher elasticity of poverty with respect to Gini implies that distribution is more important as poverty predictor than income and confirms the role of inequality in the prevalence of and/or increase in poverty.

#### 4. EXPLAINING INEQUALITY

Given the importance of inequality as a determinant of absolute poverty, an attempt has been made to identify important variables that influence the Gini coefficient, particularly factors that can be manipulated at the policy level to affect poverty.

There is widespread consensus that macroeconomic stability is a prerequisite for pro-poor growth. In particular, it has been found repeatedly that high inflation (particularly above a level of about 10 percent) hurts the poor and economic growth. Therefore, inflation (food prices) may be a good proxy for fiscal stabilisation in an economy.

A negative relationship is hypothesised between development expenditure, especially on social services<sup>3</sup> and income distribution. More public expenditure on health and education certainly increases the human capital endowment of the poor and hence affects on the empowerment.

A major redistribution policy is to make the tax structure pro-poor. Therefore, it is hypothesised that there is a direct link between progressive tax structure<sup>4</sup> and equity. Investments, especially in infrastructure have a major impact on making economic growth pro-poor. Growth in investments is essential for reducing rate of unemployment and under-employment in the economy. Public investments by providing infrastructure play an important role in reducing poverty and increasing the share of people at the bottom of the income distribution.<sup>5</sup>

Two elements of economic structure are considered in the analysis: first, the manufacturing to agriculture wage<sup>6</sup> gap and secondly, the manufacturing to agriculture terms of trade.<sup>7</sup> Keeping the economic structure of the country, it is expected that the increase in these ratios will worsen the income distribution and will have a positive relationship with the Gini coefficient.

Equation 5 summarises these determinants<sup>8</sup> of income inequality, while estimated results of the equation are furnished in Table 2.

<sup>3</sup>This is included as percent of GDP.

<sup>4</sup>The ratio of Direct taxes to Indirect taxes is used as a proxy for progressivity in tax structure.

<sup>5</sup>Some other possible candidates for explaining inequality, like economic and food subsidies, remittances, unemployment rate etc. were also tested, but not turned out statistically significant.

<sup>6</sup>Sectoral wage is computed as the sectoral value added divided by sectoral labour force.

<sup>7</sup>This is the ratio of manufacturing implicit GDP deflator to that of agriculture implicit GDP deflator.

<sup>8</sup>Data on the per capita income, investment, term of trade between agriculture and manufacturing and food prices are taken from various issues of Pakistan Economic Survey. Relative wages are taken from various issues of Labour Force Survey. Development expenditures, direct tax and indirect taxes are collected from various issues of Federal Budget in Brief.

$$\begin{aligned}
\text{Log}(Gini)_t = & \alpha + \beta_1 \text{Log}(\text{Per Capita GDP})_t + \beta_2 \text{Log}(\text{Food Prices})_t \\
& + \beta_3 \text{Log}(\text{Taxation})_t + \beta_4 \text{Log}(\text{Public Investment})_t \\
& + \beta_5 \text{Log}(\text{Government Spending})_t + \beta_6 \text{Log}(\text{Wage Differential})_t \\
& + \beta_7 \text{Log}(\text{Terms Of Trade})_t + \varepsilon_t \quad \dots \quad \dots \quad \dots \quad (5)
\end{aligned}$$

Table 2

*Determinants of Inequality*  
*Dependent Variable: Log (Gini Coefficient)*

Explanatory Variables	Coefficient	t-Statistic	Significance
Per Capita GDP	0.172	3.81	0.00
Real Price of Wheat	0.133	4.82	0.00
Wage Gap	0.076	2.72	0.01
Direct to Indirect Tax Ratio	-0.037	-1.87	0.07
Development Expenditure on			
Social Services	-0.139	-8.07	0.00
Investment	-0.167	-4.59	0.00
Constant (Intercept)	-1.805	-3.50	0.00
R-squared	0.922	F-statistic	39.321
Adjusted R-squared	0.898	Probability (F-St.)	0.00
Durbin-Watson stat	1.409	Number of Observations	40
Q <sub>(1)</sub>	0.227	Jarque-Bera	1.299
	(0.14)		(0.52)
Q <sup>2</sup> <sub>(1)</sub>	0.104	LM <sub>(1)</sub>	2.127
	(0.49)		(0.16)
ARCH <sub>(1)</sub>	0.452		
	(0.51)		

*Notes:* Variables (except dummy) are used after Logarithmic transformation.

LM and ARCH tests are applied and found no evidence of serial correlation.

Three dummy variables are also used in the equation to captures the extreme point estimates.

The determinants of income inequality in the order of estimated magnitude of impact (elasticities) are: food prices; per capita income; manufacturing-to-agriculture terms of trade; investment/GDP ratio; direct/indirect tax ratio; ratio of development expenditure on social services to GDP; and ratio of manufacturing and agricultural wages.

The results indicate that average growth worsens distribution and is unlikely to help in reducing poverty, without explicit distribution policies. This is evident from the fact that an increase in per capita income also raises inequality, with a one percent increase in per capita income raising inequality by 0.172 percent. Real wheat prices emerge as the most important determinant of inequality as measured by magnitude of the estimated elasticity. The analysis shows that a one percent decline in real wheat prices lowers inequality by 0.133 percent. Raising direct tax revenues, investment, and development expenditure on social services by one percent each is likely to reduce inequality by 0.037, 0.167 and 0.139 percent, respectively. Further, improving agricultural wages are also likely to reduce inequality by 0.076 percent.

### 5. POVERTY SIMULATIONS

The Integrated Social Policy and Macroeconomic (ISPM) model<sup>9</sup> of the SPDC is employed to simulate poverty and inequality under various assumptions and scenarios. The ISPM model incorporates the social, fiscal and macroeconomic dimensions of the economy under one interrelated system. It provides the basic framework for analysing the implications of numerous economic measures on the long-term development of Pakistan’s social sectors. The Poverty Module has recently modified and Income distribution is introduced in the block after having powerful evidence of the fact that the nature of growth in Pakistan is ‘inequality-increasing’ and the income distribution is an important determinant of absolute poverty. The Poverty and Income Distribution Block of the model consists of Equations (4) and (5) with the specification and estimated magnitudes described above.

Table 3 presents the simulation results of various combinations of growth and inequality to achieve the desired level of poverty. The simulations results show that if the GDP growth rate continued to be maintained at 6 percent per annum and measures were adopted to hold the Gini coefficient constant at the 2012 level of 0.400, poverty incidence would probably decline to 38.3 percent by 2020. However, with the Gini coefficient held constant at 0.400, lower GDP growth rates of 5 and 4 percent are likely to result in a higher incidence of poverty in 2020; 39.3 and 40.2 percent respectively. Similarly, if the GDP growth rate were assumed to be 6 percent, reducing poverty incidence to 35 percent in 2020 would require that the Gini coefficient to be lowered to 0.35 from 0.4.

Table 3

*Simulation of Poverty Incidence with Alternative Growth and Inequality Scenario*

Year	Gini Coefficient Scenario								
	0.400			0.385			0.350		
	GDP Growth Rate Scenario								
	6%	5%	4%	6%	5%	4%	6%	5%	4%
2013 = Base	40.5	40.5	40.5	40.5	40.5	40.5	40.5	40.5	40.5
2015	39.3	39.5	39.6	38.1	38.3	38.4	35.6	35.7	35.8
2017	39.0	39.5	39.8	37.8	38.3	38.6	35.3	35.6	35.9
2020	38.3	39.3	40.2	37.2	38.1	39.0	34.7	35.4	36.3

Source: SPDC Macroeconomic Model Simulations.

The simulation results presented in the table clearly establish the insufficiency of growth alone as a vehicle for poverty reduction, and consequently, the inevitability of engaging with the task of reducing inequality.

### 6. CONCLUDING REMARKS

Poverty reduction has always been a priority of development policy, albeit sometime only at the rhetorical level. The end of the 2000s brought increased emphasis on bringing the benefits of growth to the poor. However, growth alone is a rather blunt instrument for poverty reduction, since the consensus of empirical work

<sup>9</sup>The detail description of the model with various linkages is provided in the Appendix A.

suggests that it is distribution neutral. Along with emphasis on poverty reduction, a shift occurred in the policy literature towards a *moiré* favorable view of policies to redistribute income and assets. An integration of distributional concerns and a priority on poverty reduction could be the basis for a new policy agenda to foster growth with equity.

This paper highlights the importance of distribution policies in poverty reduction using Pakistan time series macroeconomic and social data during the period 1979 to 2013. Simulation exercise is carried out by employing SPDC integrated macroeconomic model.

Following are the main findings of this research. First, the poverty elasticity with respect to Gini coefficient is statistically significant and also the magnitude is relatively high as compared with poverty elasticity of growth. Second, the study found inflation, sectoral wage gap, and terms of trade in favor of manufacturing as the significant positive correlates of inequality, while progressive taxation, investment and development expenditure on social services are negatively impacting on inequality. Third, the simulation exercise in a general equilibrium framework clearly demonstrates that a high GDP growth rate, without accompanying equity-promoting policy shifts, is by itself unlikely to reduce the incidence of poverty.

Finally, it is true that redistribution often has limited potential and that growth is a necessary condition for poverty reduction. Yet the level of inequality and change therein, still matters. This is because the level of inequality affects the degree of poverty as well as growth elasticity of poverty. Further, low level of inequality contributes for an acceleration of poverty reduction for a given level of growth. For these reasons, inequality still matters, and the search for effective policies for reducing inequality, or at least prevent them from rising, should be an integral part of the development agenda.

## APPENDIX – A

### INTEGRATED SOCIAL POLICY AND MACROECONOMIC MODEL

Social Policy and Development Centre (SPDC) has developed one of the pioneer models which can be used as an effective planning tool for social sector development. The Integrated Social Policy and Macroeconomic (ISPM) model integrates the social, fiscal and macroeconomic dimensions of the economy under one interrelated system. It provides the basic framework for analysing the implications of numerous economic measures on the long-term development of Pakistan's social sectors. Recently the ISPM model incorporated the changes in Pakistan's economy by endogenising both interest rate and exchange rate variables.

The model is highly disaggregated and covers all three levels of government. It is capable of predicting outcomes in considerable detail, even at the level of individual social service provision. The ability to disaggregate the model at the provincial level in terms of revenues and expenditures on social services (e.g., schools, hospitals, doctors, teachers, enrolments, etc.) is helpful in analysing the impact of related initiatives on the macro economy and social development.

The ISPM model is based on consistent national level data from 1973 onwards and is estimated by single equation regression techniques. It consists of 409 equations, of

which 172 are behavioral and the rest are identities. These equations are subsumed into 18 interrelated blocks. The blocks, along with their size in terms of equations and identities, are listed in Table A.1.

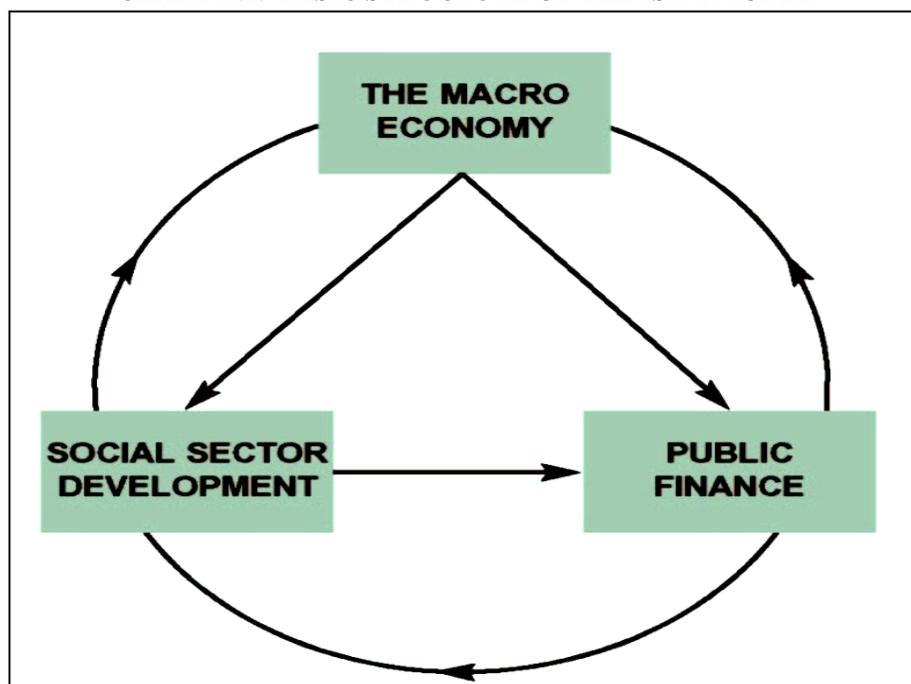
Table A.1

*Integrated Social Policy and Macro Model (ISPM)*

	Total	Equations	Identities
Block A Production Block	27	11	16
Block B Input Block	37	16	21
Block C Aggregate Demand Block	34	20	14
Block D Trade and Balance of Payments Block	19	11	8
Block E Monetary and Prices Block	10	7	3
Block F Federal Revenue Block	12	4	8
Block G Federal Expenditure Block	16	9	7
Block H Sub-National Revenue Block	26	11	15
Block I Sub-National Expenditure Block	32	22	10
Block J Debt and Budget Deficit Block	12	2	10
Block K Education Block	47	24	23
Block L Human Capital Index Block	16	5	11
Block M Health Block	27	18	9
Block N Public Health Index Block	4	3	1
Block O Human Development Index Block	7	0	7
Block P Poverty and Income Inequality Block	12	3	9
Block Q Goals Block	63	6	57
Block R Costing and Financing Block	8	0	8
<b>Total</b>	<b>409</b>	<b>172</b>	<b>237</b>

Although the model is broadly Keynesian in spirit, the specification of individual blocks and equations is based on a pragmatic approach and also captures the non-market clearing aspects of Pakistan's economy. Thus, the macroeconomic block is essentially supply driven. In addition, the social sector indicators are also resource determined.

CHART A.1. BASIC STRUCTURE OF THE ISPM MODEL



The model has dynamic specifications which vary across the blocks. In some cases, the linkage is simultaneous and in some cases it is recursive. Examples include the linkages between the macro-production and input blocks; the production and expenditure blocks; the fiscal revenues and expenditure blocks; and the macro production, poverty and inequality blocks. The broad links (see Chart A.1) of the model can be traced as follows.

***Macro → Public Finance***

The key link here traces the impact of developments in the macroeconomy on the growth of the tax bases (including divisible pool taxes) and thus affects the fiscal status of different governments.

***Public Finance → Social Sector Development***

The availability of resources, both external and internal, determines the level of development and recurring outlays to social sectors by different levels of government, particularly provincial and local.

***Social Sector Development → Macroeconomy***

Higher output of educated workers and their entry into the labour force raises the human capital stock and could contribute to improvements in productivity and a higher growth rate of output in the economy. Similarly, an improvement in public health standards may also have a favorable impact on production.

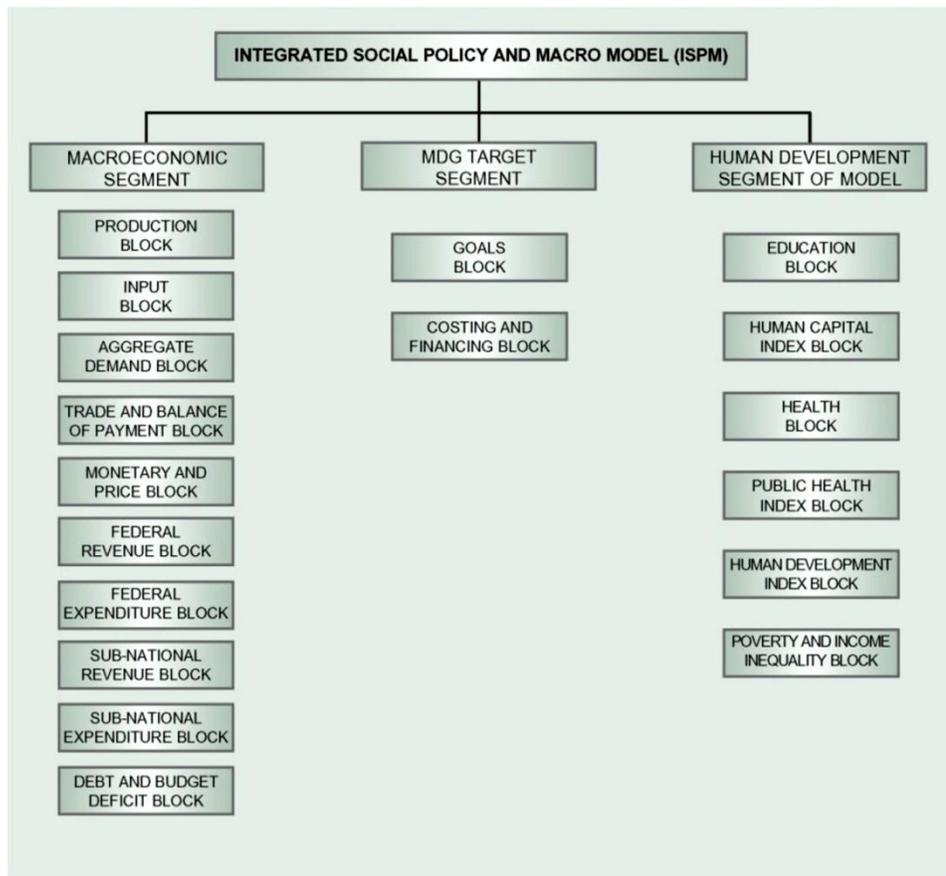
**Public Finance → Macroeconomy**

The level of government expenditure could exert a demand side effect on national income, while the size of the overall budget deficit of the federal and provincial governments influences the rate of monetary expansion and consequently the rate of inflation in the economy.

**Social Sector Development → Public Finance**

A vital link in the model is between the rate of social sector development and the state of public finances. Higher social sector development implies higher recurring expenditures of provincial governments, which are consequently reflected in the budget deficit, level of debt stock and debt servicing of provincial governments.

**CHART A. 2. STRUCTURE OF SPDC ISPM MODEL**



**Macro Economy → Social Sector Development**

Macro and other socio-economic changes affect the demand for social sector facilities such as schools and hospitals, and thus influence the level of social sector outputs.

Apart from these broad linkages among different modules, there are also links between different blocks within each module (see Chart A.2).

An example of a major linkage within the macro module is the two-way linkage to and from the macro-production block and macro-input blocks. This link is due to the dependence of sectoral value added to the factors of production and input demand functions on the value of production. Macro production determines macro expenditure, just as private consumption is influenced by income.

The two-way link between the macro-production block and the trade block is due to the fact that the value of imports and exports determines and is determined by economic production activity. The trade gap affects the level of money supply.

Important linkages in the fiscal module consist of the simultaneous dependence of revenues and expenditures of various levels of government. Non-tax receipts of governments have been made a function of the recurring expenditure on particular services via cost recovery ratios. Similarly, the level of government expenditure is affected by the government's level of resource generation.

Important vertical links between levels of government include fiscal transfers in the form of divisible pool transfers and non-development grants (in line with the feasible level of decentralisation) from provincial to local governments. The link between the budget deficits of the federal and provincial governments and their revenues and expenditures is obvious.

### **Forecasting and Policy Analysis Tool**

Given the richness of its structure and the complex web of interrelationships and interactions it embodies, the ISPM model can be used both as a forecasting tool for the medium and long term, and for undertaking policy simulations to analyse the consequences of particular policy actions by the government.

For example, if the federal government decides to pursue a policy of higher tax mobilisation and opts for a rigorous fiscal effort, the model can forecast the impact, not only on federal finances, but also on the fiscal status of the provincial governments. In this scenario, it could also forecast key macroeconomic magnitudes such as growth in the gross domestic product, social development, budget deficit, changes in income inequality and the inflation rate.

The model can also perform simulations to find the relative strength of different policy options for a specific objective. In the case of the macro economy, it can provide the impact of different policy options on:

- short and medium-term projections of the growth of important sectors (agriculture, manufacturing, construction, electricity and gas distribution);
- short and medium-term projections of the growth of GDP, GNP, per capita income;
- factor input (e.g., capital and labor) demand; and
- short and medium-term projections of the public and private investment in various sectors of the economy.

In the case of public finance, it can:

- provide short and medium-term projections of the quantum of revenue transfers to the provincial governments by the federal government under different scenarios;

- determine the impact of different rates and patterns of economic growth on provincial tax bases and revenues; and
- determine the impact of changes in provincial expenditure priorities on fiscal status, levels of service provision and the overall macro economy.

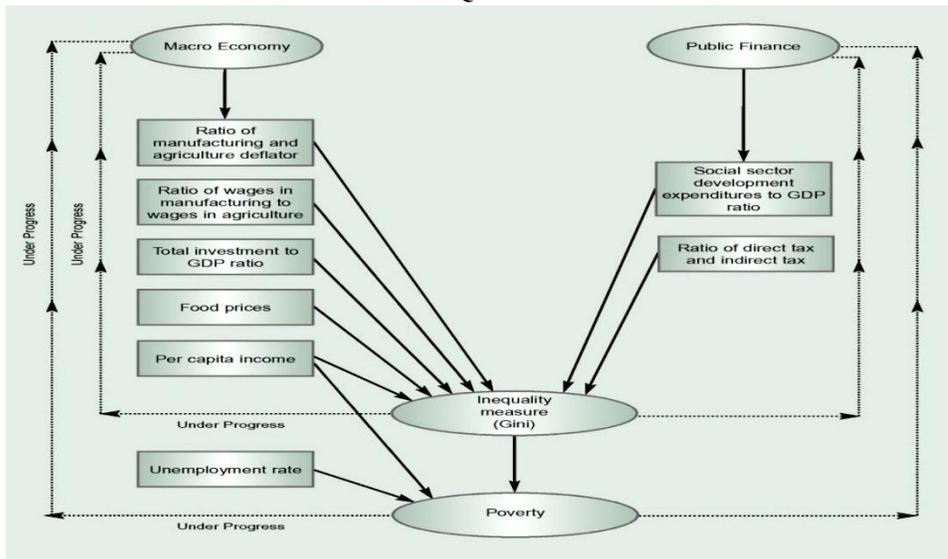
In the case of social development, it can determine the impact on:

- poverty reduction strategy related expenditures;
- social sector expenditures by provincial governments on income inequality that further changes the poverty rate;
- education expenditures by provincial governments on sectoral inputs (schools, teachers), enrolments, outputs, entry into the labour force and literacy rates;
- health expenditures by provincial governments on sectoral inputs (beds, rural health centres, doctors, nurses, paramedics) and on the health status of the population; and
- higher levels of resource mobilisation by provincial governments on federal transfers, sectoral levels of expenditure and fiscal status.

**Income Inequality and Poverty Block**

An important aspect of the SPDC’s macro model is the incorporation of the poverty and inequality block. In this block, the linkage of macro, public finance and human development variables with the measure of income inequality (Gini Coefficient) is developed, which also helps in determining poverty. This is one of the pioneer works in the economic literature of developing countries that explores the impact of economic growth and government expenditures on income inequality and poverty. The complete linkages between growth, income distribution and poverty are shown in Chart A3.

**CHART A3. LINKS OF ISPM MODEL WITH SPECIAL REFERENCE TO POVERTY AND INEQUALITY**



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## **Socio-economic Status of Transferred and Non-transferred Urban Slums: A Case Study from Faisalabad**

RIAZ AHMED, USMAN MUSTAFA, and ATTA ULLAH KHAN

### **1. INTRODUCTION**

The rapid urbanisation has become a burning challenge across the developing countries of the world for the last four decades. The population pressure on the cities has caused many problems like environmental pollution, sanitation, education, health, traffic level and housing etc. In this context, housing is one of the most important issues related to urbanisation. Slums are reflected as the carbuncle in cities and looked extemporaneously and arbitrarily [Shafqaat, *et al.* (2013)]. The share of world urban population was 32 percent in 1950, it rose up to 39 percent in 1980 and 48 percent in 2000, which reflects that 3 out of 10 people were living in cities in 1950. In 2011, about half of the world population was living in the big cities and at the end of the third decade of this century; that make up the formation as 6 out of 10 people [World Bank (1999)]. Pakistan's town populace is fixed to become identical to its rural population in the year 2030. This needs for an effective urban planning instrument to confirm universal distribution of simple municipal amenities, regulator of the spread of slums, reducing of effluence and the control of crime and political might [Khan, *et al.* (2012)].

“The earth has urbanised even faster than originally predicted by the Club of Rome in its notoriously Malthusian 1972 report, Limits of Growth. In 1950 there were 86 cities in the world with a population over one million; today there are 400, and by 2015, there will be at least 550. Cities, indeed, have absorbed nearly two-thirds of the global population explosion since 1950 and are currently growing by a million babies and migrants each week. The present urban population (3.2 billion) is larger than the total population of the world in 1960. The global countryside, meanwhile, has reached its maximum population (3.2 billion) and will begin to shrink after 2020. As a result, cities will account for all future world population growth, which is expected to peak at about 10 billion in 2050” [Davis (2004)]. Cities indeed have observed nearly two-third of the global population explosion and are currently growing by a million babies and migrants each week across the world [UN Population Division (2002)], whereas, the situation is even more

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dangerous in the developing countries. Alike rest of the developing countries, the share of urban population was 17.8 percent in 1951 which rose to 28.3 percent in 1981 and 32.5 percent during 1998 in Pakistan [Population Census Organisation (2001)]. Such higher urbanisation trends arise mainly because of inadequate employments avenues and low quality of life. People belonging to low income group are unable to build appropriate shelter for themselves in the big cities. Resultantly, they are forced to establish squatter settlements and these squatter settlements are called urban slums. Poverty, illiteracy, unemployment, poor health facilities, poor sanitation and non-availability of clean drinking water facilities are the common characteristics of the inhabitants of urban slums.

The concept of "Slums" was firstly defined in Vaux's 1812 (vocabulary of the English language) where it is synonymous with 'racket' or 'criminal trade'. According to Encyclopedia of Britannica, Slum is defined as "a residential area that is physically and socially deteriorated and where satisfactory family life is impossible. Thus, bad housing is major index of slum conditions which includes bad dwellings, improperly heated rooms, absence of family privacy and no space for recreational facilities [Britannica (2010)].

The root cause of emergence of urban slums is poverty as poor cannot afford to have a reasonable house to live and they settle themselves in open spaces of city, which leads to the emergence of urban slums. Slums show the worst of urban poverty and inequality [Mustafa (2007)]. The other major cause is the rapidly increasing population. Growing number of people rush to the slums of the city create urban crises [Akhtar (2009)]. Most of the migrants coming from rural areas are poor, and hence the urban areas remain numerically dominated by the poor. The migrants have originated largely from the economically depressed areas of the country [Sarwar and Rahman (2004)].

Urban poor face serious problems due to population pressure, deterioration in the physical environment and quality of life [Sribas and Samita (2013)]. Housing conditions have deteriorated in urban centers because of population explosion and rural urban migration [Siddique (2007)]. People residing in the slums are poor. The worse socio-economic conditions do not allow them to live a healthy life. They do not have access to sanitation. They are unable to get safe water supply [Naveed and Anwar (2014)]. Unemployment rate is very high in such areas [Ali (2010)]. Housing facilities in the planned schemes are too expensive to be availed. Therefore low income government employees as well as the laborers have no choice except urban slums for the affordable accommodation [Qadeer (1983)].

Slums do not have proper drainage. The streets are narrow and unpaved. Slum dwellers have to face water stagnation in rainy season. This makes the environment of that area very unhygienic. Such environment causes a number of diseases [Daziuban, *et al.* (2006)]. Urban Slums are characterised by poor living conditions, inadequate, social services coupled with high level of diseases [Agyaro-odure (2009); Baloch and Mustafa (2012)]. There is need to take steps to improve the physical condition of dwelling places like basic amenities of toilets, proper drainage, sewerage system and water supply [Sufaira (2013)].

The poor slum dwellers face many problems including health at top. Women are unable to get proper treatment during pregnancy. So mortality rate is very high in such areas [Awashti and Agarwal (2003)]. Slums improvement programs should be started in

Pakistan through local councils [Hina (1999)]. There are both transferred and non-transferred slums in Pakistan. The socio-economic conditions of transferred slums are better than those of non-transferred [Bhatti (2001)].

The study in hand is a pioneering effort to make comparison of socio-economic conditions of inhabitants of non-transferred slums and those of transferred slums in Faisalabad. To materialise the primal objectives of the research, the study firstly, explores the socio-economic profile of Katchi Abadis' inhabitants on the basis of specific set of indicators i.e. health, community participation, educational attainment, income level, demographic features, employment status, housing status and sewerage system. Secondly, it examines the socio-economic conditions of slums of Faisalabad. Thirdly, the study in hand investigates the difference in socio-economic conditions of different kind of slums and also suggests some policy recommendations to curb out the problem of slum dwellers and its spread in Faisalabad.

## 2. METHODOLOGY

### 2.1. Sampling

The following section briefly discusses the target population of Faisalabad, sampling frame and technique. Furthermore, selection of sample urban units and respondent is also presented, followed by data analysis tools and techniques adopted in the study.

#### 2.1.1. Target Population

Total number of slums in Faisalabad are 106, while the information available regarding dwelling units is 104, thus, the universe consisted of 104 Katchi Abadis (slums) of Faisalabad.

#### 2.1.2. Sampling Frame

A list of 104 Katchi Abadis of Faisalabad was received from the Directorate of Katchi Abadis, Government of the Punjab. This list was used as a sampling frame.

#### 2.1.3. Sampling Technique

In order to take the representative sample, stratified random sampling technique was adopted. From the list of Katchi Abadis it was found that number of dwelling units varied from 42 to 2851. It was assured that the Katchi Abadis differ on following basis:

- Educational facilities available within the area.
- Involvement of NGO's.
- Area of the Katchi Abadi.
- Medical facilities available.

Majority of the Katchi Abadis (33) have number of dwelling units below 80, followed by 32, covered in the stratum of 81-200 units. There were only five numbers of Katchi Abadis which come in the stratum where there dwelling units number were above 1000.

Table 1

*Category of Dwelling Units*

Stratum	No of Dwelling Units	No. of K/A
1	Below 80	33
2	81-200	32
3	201-350	16
4	351-500	11
5	501-1000	7
6	Above 1000	5

Source: Researcher's own calculations.

#### 2.1.4. Selection of Sample Urban Slums

The samples of Katchi Abadis were selected on the basis of variability of dwelling units in different Katchi Abadis. Following proportional allocation method was used [Parel, *et al.* (1973)

$$n = \frac{N \cdot \sum N_h S_h^2}{\frac{N^2 d^2}{Z^2} + \sum N_h S_h^2}$$

Where:

N= Total number of Katchi Abadis (104).

$N_h$  = Total numbers of Katchi Abadis in "h" Stratum.

d= (Sampling error acceptable for study). Due to resource and time constraint 0.1 error was accepted at Abadis level.

Z= Confidence level = 95 percent.

$$n \cong 15$$

(For detail see Appendix A-1).

Proportional allocation method was used to obtain Sample from each stratum:

$$n_i = \frac{N_h}{N} \times n$$

(For detail see Appendix A-2).

Almost all selected slums are located near road, small and medium enterprises factory areas. Most of the slums are generally build in low-lying, unhygienic, and environmentally poor areas. These are the rejected areas where there is no civic facilities available/ Even no electricity because these are mostly government abandon land, initially inhabitant settled there in tents and kacha houses and latterly after giving bribes to local municipal administrative authorities make their houses pacca (concretes. The local political parties and influence people also support than. In some cases even they encourage the immigrants to settle down. Latterly, they registered their vote in local area and also use than to grasp government land. Shafqaat (2013) also revealed that transportation positions, zones which are already settled and small scale and cottage manufacturing play an important part in the formation of slums in Faisalabad.

### **2.1.5. Selection of Sample Respondents**

After Selection of Sample Katchi Abadis, the sample size of respondents was found. This was done on the basis of variability in Income. For this purpose a pre-survey was conducted from 36 households in six strata. Proportional allocation method was adopted to determine the sample size of the respondent which was 213. (For detail see Appendix A-3).

This over all sample size was proportionally distributed in different strata (For detail see Appendix A-4).

## **2.2. Data Analysis**

Quantification of different qualitative variables, Cross tabulation, methods of vital statistics, percentiles and test of significance (Independent sample T-test) statistical tools were used for data analysis.

## **3. ANALYSIS OF DATA AND INTERPRETATION OF RESULTS**

The summary of results of four variables (Education, Health, Income and Housing) is given as follows:

### **3.1. Education**

Education is one of the basic parameters to evaluate the socio-economic conditions of people. To find the literacy rate generally accepted definition of literacy rate was used. According to this definition, a person who can read and write a single line of Urdu is literate. The overall literacy rate is calculated 65.91 percent. Only 0.18 percent people hold master degrees or above. This shows that slums dwellers have very low trend towards higher education. The literacy rate is higher among males (70.04 percent) than those of females (60.93 percent). Literacy rate is found to be comparatively higher in the slums which are notified, regularised and close to the city centre (Mai De Jhugi, Partab Nagar, Fire Brigade, Malik Pura, Muslim High School, Tariq Abad) and low in those which are not regularised and situated away from the city centre (Bishan Singh Wala, Gharib Abad, Pull Tariq Abad, Girga Ghar, Railway Phatak, Malkhanwala, old water works and Madan Pura) while it is moderate in those which have been regularised and found at moderate distance from the city center (Chowk Choudhry Floor mills, Bahadar Singh Wala and Manawala sq. no.80). For detail see Appendix A-5.

#### **3.1.2. Field of Education**

The percentage of general Education, Engineering, Health, Law, Agriculture, Commerce and Computer was calculated 92.23 percent, 0.62 percent, 0.99 percent, 0.00 percent, 0.49 percent, 2.22 percent and 0.62 percent respectively. This shows that people residing in slums have low inclination towards higher and professional education.

#### **3.1.3. Reason for not Attending the School**

The major reason for not attending the school is poverty. In 93 percent of the cases, children are not going to school due to financial reasons. So to increase the literacy rate, there is need of income generation activities in such area.

### 3.2. Health Profile

Slums badly affect the health conditions of their dwellers due to lack of health services, basic infrastructure, and poor sanitation and environment condition [Yusuf (2007)]. In Manila and Philippines, children living in slums were found to be nine times more victims of tuberculosis (TB) than children living in other areas [Fry, et al. (2002)]. Overcrowding in slums is the major cause of psychological stress [Sundari (2003)]. Attack rate of ARI (Acute respiratory infections) and ADD (Acute diarrheal diseases) was estimated 14.6 percent and 7.73 percent respectively in under 5 year children of Gokaepari settlements of Delhi. These diseases were attributed to lack of sanitation and lack of portable water for drinking [Gupta, *et al.* (2007)]. Crude birth rate, infant mortality rate and incidence of disability were used as parameters to find health profile in current study.

#### 3.2.1. Crude Birth

Crude birth rate indicates the number of live births occurring during the year, per 1000 population estimated at midyear<sup>1</sup>. This rate is higher in poorer and non-transferred slums (51.02, 38.10, 36.36, 34.48 and 32.89 in Old Water Works GM Abad, Fire Brigade K.A, Bishan Singh Sala, Pull Tariq Abad Girga Ghar and Madan Pura respectively) while it is lower in transferred and settled slums (18.69, 15.27 and 9.62 in Chowk Choudary Floor Mills, Mai Di Jhugi and Pertab Nagar respectively) than the national level (For detail see Appendix A-6).

#### 3.2.2. Infant Mortality

Infant mortality is the number of infants dying before reaching one year of age, per 1000 of live birth in a given year. The infant mortality was calculated 111.11 which is much higher than national level.<sup>2</sup> (For detail see Appendix A-7).

There are many other studies which show high infant mortality in slum areas. Gupta and Pandey (2007) found that 97.0 percent of the deliveries were conducted in institutions like nursing home and hospitals etc., in case of new urban colonies of East Delhi, while it was only 29.0 percent for the slum dwellers of same locality. Gupta, *et al.* (2007) found that the level of care during the deliveries was very low among the mothers of slums areas. About 68 percent of the deliveries were carried out in the houses, without a skilled nurse, mid wife or doctor in such areas as compared to 21 percent and 7 percent deliveries in rural and urban areas respectively. Kimani, *et al.* (2007) reported that prevalence of diarrheal diseases among the children of people residing in slums of Nairobi was 32 percent while in rural areas it was 17 percent. Similarly, Gupta (2007) showed that in eastern Delhi, the prevalence of diarrheal diseases (per 1000) were highest among children of slum residents (25.1) and least among those residing in new urban colonies (2.2). This difference was due to poor unhygienic living conditions in the slums areas.

<sup>1</sup>Crude birth (per 1000 people) in Pakistan was last measured at 27.28 in 2010 according to world development Indicators.

<sup>2</sup>infant mortality rate (per 1000 of live births) in Pakistan was last measured at 69.70 in according to world development indicators.

### **3.2.3. Incidence of Disability**

Out of disabled people 45.45 percent were found to be crippled which is dangerous. (For detail see Appendix A-8).

### **3.3. Income**

Average household income is found in Partab Nagar (Rs 9822.5) followed by Chowk Choudhry Floor Mills (Rs 9615), Fire Brigade (Rs 9500), Bahadar Singh Wala (Rs 9317.5), Muslim High School Tariq Abad (Rs 9285), Old water works G.M Abad (Rs 9035.5), Malkhanwala (Rs. 9037.5), MadanP ura (9027.5), Gharib Abad (Rs 8702), Manawala Sq. no. 80 (Rs 8685), Malik Pura (Rs 8671.5), Railway Phatak no.8 (Rs 8667.5), Pull Tariq Abad Girga Ghar (Rs 8565) and Bishan Singh Wala at the bottom with income Rs. 7400 per household. Low average income shows that majority of population is living below poverty line. (For detail see Appendix A-9).

### **3.4. Housing Status**

The information related the housing conditions such as number of rooms, wall and roof material and source of drinking water have been covered under this aspect. Due to poverty, the slum dwellers could not afford a proper piece of land and usually selected a neglected area or vacant plots and developed slums there. Most of the slum dwellers were found to have katcha houses, where wood was used as a supporting material. In the similar manner, the houses of people residing in Coimbatore area of Tamilnadu were made up of similar kind of material with more than 43.4 percent people living in katcha houses [Sundari (2003)].

#### **3.4.1. Number of Rooms**

Is an important parameter to measure the socio-economic conditions of inhabitants of slum-dwellers. More than 23 percent of the households from selected slums are living in a single room dwelling unit followed by 42.25 percent in two rooms, 18.78 percent in three rooms. (For detail see Appendix A-10).

Similar to this study, the single and two room accommodation was very common among the slum dwellers of Coimbatore of Tamilnadu [Sundari (2003)] and Aligarh city of Uttar Pradesh [Rahman (2008)]. In another study conducted by Ray (2002) in Calcutta, it was found that about 96 percent of slum dwellers had single room accommodation.

#### **3.4.2. Wall and Roof Material**

About 87 percent of the walls have been constructed with the help of baked bricks while 13 percent with unbaked bricks. Similarly, it has also been calculated that majority of roofs have been constructed by cement and iron sheets but significance use of wood/bamboo (36.60 percent) reflects that socio-economic conditions of the slum-dwellers are worse. (For detail see Appendix A-11).

#### **3.4.3. Source of Drinking Water**

The drinking water of Faisalabad is not clean. It was estimated that about 65.75 percent of the slum-dwellers are using the water from motor pumps. That is why;

hepatitis is very common in these slums. These results are consistent with WHO (2008), which narrates that poor water quality is one of the basic causes of morbidly and mortality worldwide. Growing number of poor people who lack basic needs, such as access to clean water are more victims to the diseases driven by malnourishment and air, water and soil pollutants [Pimentel (2007)]. The slums dwellers of Nairobi city use sewerage water, rain water and water from broken pipes for various purposes such as drinking and washing etc. [Amuyunzu and Taffa (2004)]. Afsar (1999) found that urban slums dwellers in Bangladesh were deprived of water supply to their homes and the average time to collect the water from a common stand pipe or well was 30minutes per trip and at least two trips were needed to collect the bucket of drinking water. Further Osamanu (2007) found that most of the urban poor of Tmale city of Ghana collected water from the sources located in distance. In another study, the water supply to the 128 migrants in Tirupur slums was found to be of poor quality and unfit for human consumption [Sundari (2003)]. In similar way, the quality of drinking water was found substandard in the slums of Tamilnadu [Sundari 2003] and Delhi, Karswara, *et al.* (2005)].

### 3.5. Hypothesis

Whether socio-economic conditions of inhabitants of non-transferred slums are different than those of transferred slums.

Table 2

*Group Statistics of Non-Transferred V/s Transferred Katchi Abadis*

	TNT	N	Group Statistics			P value when Equal Variance Assumed
			Mean	Std. Deviation	Std. Error Mean	
<b>Housing Status</b>	Transferred	14	2.79	1.051	.281	.353
	Not Transferred	19	1.84	.958	.220	
<b>Educational Attainment</b>	Transferred	14	3.21	2.359	.631	.072
	Not Transferred	19	3.47	2.816	.646	
<b>Household Income</b>	Transferred	14	9822.5	.267	.071	.000
	Not Transferred	19	8685	.513	.118	

#### 3.5.1. Housing Status

The p-value of housing status is  $P=0.014$  which is less than  $\alpha = 5 \text{ percent} = 0.05$  (level of significance). This shows there is significance difference between housing status of transferred and non-transferred slums. Mean reflects that housing status of transferred slum is better than that of non-transferred slum.

#### 3.5.2. Education Attainment

The P-value of education attainment is  $P = 0.776$  which is greater than  $\alpha = 5 \text{ percent} = 0.05$  (level of significance). This shows, there is no significance difference between the educational attainment of the two slums.

### 3.5.3. Household Income

$P = 0.003 < \alpha = 5 \text{ percent} = 0.05$  (level of significance) which shows there is significance difference between the household income of transferred and non-transferred slums. Mean reflects that household income of transferred slum is better than non-transferred slum.

## 4. CONCLUSION AND RECOMMENDATION

### 4.1. Conclusion

The rapid urbanisation during last four decades has given birth to urban slums. The poor slum dwellers face worse socio-economic conditions. The streets are unpaved and there is poor system of sanitation and drainage. Although, literacy rate was found reasonable yet the trend towards higher education is almost equal to nothing. The reason behind it is when the children grow in age; they are forced to do physical work as source of earning. There is high birth and infant mortality rate. The housing status is poor. Most of the people live in a single room house. Majority of the houses have no separate kitchens and toilets. About half of the slum population lives in unpaved houses. A large number of the population is deprived of clean drinking water which has given birth to infectious diseases. The majority of slum residents has very low income and is living below the poverty line. It was found that property rights of some slums have been transferred to the people residing there. These are called transferred urban slums while still there are some slums whose property rights have not been transferred to dwellers living there. These are called non-transferred slums. The socio-economic conditions in transferred slums were found better than those in non-transferred.

### 4.2. Recommendations

- (i) Urban planning should be focused to cater the increasing pressure of urbanisation. Steps should be taken to improve the physical conditions of slums. The basic infrastructure should be upgraded.
- (ii) Government should take steps to provide basic health facilities and clean drinking water. High infant and maternal death can be substantially reduce by providing basic sanitation facilities in these areas.
- (iii) The property rights should be given to those whom these rights have not been given so far but steps should be taken to stop the emergence of new slums.
- (iv) Government should lay stress on women development. A strategy should be made for establishing the proper marketing network for the sale of good produced by them.
- (v) Keeping in view Oringi Pilot Project model, community participation based development programs should be launched to improve the physical conditions of these poor areas.
- (vi) NGO's should play their role to improve the socio-economic conditions of these most deprived areas in cities.

## APPENDIX

Table A-1

*Selection of Sample Katchi Abadi on the Basic Of Variation in Number of Household*

Stratum	Mean	S.D	$S_h^2 N_h$	$N_h$	$N_h \times S_h^2$
1	58.75758	14.01122	0.056862	33	1.876456
2	131.0625	31.88076	0.05917	32	1.893435
3	276.6875	39.0405	0.019882	16	0.318114
4	427.3636	42.34447	0.009817	11	0.107992
5	725.4286	132.0151	0.033123	7	0.231858
6	1857.4	812.2831	0.191257	5	0.926255
					5.35411

Table A-2

*Selected Katchi Abadis*

Sr. No.	Selected Katchi Abadis	No of Dwelling Units
1	Bishan Singh Wala	42
2	Chowk Choudhry Floor mills	56
3	Muslim High School, Tariq Abad	58
4	Gharib Abad	66
5	Madan Pura 279/R.B	78
6	Bahadar Singh Wala	97
7	Malik Pura	133
8	Old Water Works	116
9	Manawala Sq. 80	180
10	Malkhanwala	256
11	Railway Phatak No. 8	288
12	Pull Tariq Abad, Girga Ghar	408
13	Fire Brigade	443
14	Partab Nagar	638
15	Mai Di Jhugi (Bilal Gunj)	2851

*Source:* Researcher's own calculations.

Table A-3

*Selection of Sample Size on the Basis of Variation per Capita Income*

Stratum	Mean	S.D	$S_h^2 N_h$	$N_h$	$N_h \times S_h^2$
1	1810	809.1971	0.199872	2135	426.7267
2	1433.333	615.042	0.181726	3703	671.8205
3	1556.333	581.0393	0.139382	4648	647.8475
4	2126.667	772.1118	0.131814	5957	785.216
5	1299.767	285.6644	0.048348	4466	215.9222
6	1320	319.9375	0.058747	19957	1166.888
	<b>Total</b>				<b>3914</b>

36 Households were interviewed in 6 strata to estimate the variation in socio-economic condition of households.

Table A-4

*Selection of Sample Respondents*

Sr. No.	Name of Selected Katchi Abadi	Distribution of Sample
1	Bishan Singh Wala	10
2	Chowk Choudhry floor mill	13
3	Muslim High school Tariq Abad	14
4	Gharib Abad	15
5	Madan Pura	18
6	Bahadar Sing Wala	11
7	Old Water works	13
8	Malik Pura	14
9	Manawala Sq.80	19
10	Malkhanwala	13
11	Railway Phatak No. 8	15
12	Pull Tariq Abad Girga Ghar	13
13	Fire brigade	15
14	Partab Nagar	14
15	Mai Di Jhugi	14

Source: Researcher's own calculations.

Table A-5

*Literacy Rate*

Stratum	Colony	Literacy Rate	Literacy Rate (Male)	Literacy Rate (Female)
1.	Bishan Singh Wala	23.26%	36.84%	12.50%
	Chowk Choudhry Floor Mills	65.91%	73.47%	56.41%
	Muslim High School, Tariq Abad	81.33%	89.19%	73.68%
	Gharib Abad	48.05%	48.89%	46.88%
	Madan Pura	50.77%	46.48%	55.93%
	Sub Total	<b>56.17%</b>	<b>59.28%</b>	<b>52.60%</b>
2.	Bahadar Singh Wala	77.05%	81.82%	71.43%
	Old Water Works (GM Abad)	51.43%	52.94%	50.00%
	Malik Pura	82.93%	89.80%	72.73%
	Mananwala Sq. No. 80	69.72%	76.92%	59.09%
	Sub Total	<b>70.50%</b>	<b>76.80%</b>	<b>62.41%</b>
3.	Malkhana Wala	59.42%	59.52%	59.26%
	Railway Phatak No. 8	46.43%	52.17%	39.47%
	Sub Total	<b>52.29%</b>	<b>55.68%</b>	<b>47.69%</b>
4.	Pull Tariq Abad Girga Ghar	54.17%	63.41%	41.94%
	Fire Brigade K.A	88.37%	86.67%	90.24%
	Sub Total	<b>72.78%</b>	<b>75.58%</b>	<b>69.44%</b>
5.	Partab Nagar	<b>80.95%</b>	<b>90.24%</b>	<b>72.09%</b>
6.	Mai Di Jhugi (Bilal Gung)	<b>88.89%</b>	<b>90.74%</b>	<b>86.67%</b>
	Overall Literacy Rate	<b>65.91%</b>	<b>70.04%</b>	<b>60.93%</b>

Source: Researcher's own calculations.

Table A-6

*Crude Birth Rate*

Colony	Less Than		Total Population	CBR/1000
	One Year			
Bishan Singh Wala	2		55	36.36
Chowk Choudhry Floor Mills	2		107	18.69
Muslim High School, Tariq Abad	2		94	21.28
Gharib Abad	2		94	21.28
Madan Pura	5		152	32.89
<b>Sub Total</b>	<b>13</b>		<b>502</b>	<b>25.90</b>
Bahadar Singh Wala	0		92	0.00
Old Water Works (GM Abad)	5		98	51.02
Malik Pura	3		111	27.03
Mananwala Sq. No. 80	4		131	30.53
<b>Sub Total</b>	<b>12</b>		<b>432</b>	<b>27.78</b>
MalkhanaWala	0		89	0.00
Railway Phatak No. 8	4		140	28.57
Sub Total	4		229	17.47
Pull Tariq Abad Girga Ghar	3		87	34.48
Fire Brigade K.A	4		105	38.10
<b>Sub Total</b>	<b>7</b>		<b>192</b>	<b>36.46</b>
Partab Nagar	1		104	9.62
Mai Di Jhugi (Bilal Gung)	2		131	15.27
<b>Total</b>	<b>39</b>		<b>1590</b>	<b>24.53</b>

Source: Researcher's own calculations.

Table A-7

*Infant Mortality Rate*

Particulars	Less Than		No. of Infant	Birth in Last 12 Months	Infant Mortality Rate / 1000
	One Year	Children			
Male	26		3	29	103.44
Female	22		3	25	120
<b>Total</b>	<b>48</b>		<b>6</b>	<b>54</b>	<b>111.11</b>

Source: Researcher's own calculations.

Table A-8

*Incidence of Disability*

Particulars	Incidence of Disability			% of Total Disables
	Male	Female	Total	
Blindness	0	1	1	9.09%
Deaf/Mute	0	0	0	0.00%
Crippled	3	2	5	45.45%
Madness	1	0	1	9.09%
Mentally Retarded	2	0	2	18.18%
More Than 1 Disability	1	0	1	9.09%
Other	1	0	1	9.09%
<b>Total</b>	<b>8</b>	<b>3</b>	<b>11</b>	<b>100.00%</b>

Source: Researcher's own calculations.

Table A-9

*Average Income of Household*

Stratum	Colony	Average Income
1	Bishan Singh Wala	7400
	Chowk Choudhry Floor Mills	9615
	Muslim High School, Tariq Abad	9285
	Gharib Abad	8702
	MadanPura	9027.5
2	Bahadar Singh Wala	9317.5
	Old Water Works (GM Abad)	9037.5
	Malik Pura	8671.5
3	Mananwala Sq. No. 80	8685
	MalkhanaWala	9037.5
4	Railway Phatak No. 8	8667.5
	Pull Tariq Abad Girga Ghar	8565
5	Fire Brigade K.A	9500
	Partab Nagar	9822.5
6	Mai Di Jhugi (Bilal Gung)	9500
	Overall Average	9220

Source: Researcher's own calculations.

Table A-10

*Number of Rooms*

Stratum	Colony	One	Two	Three	Four	Five	Six	> Six
1.	Bishan Singh Wala	7	2	0	1	0	0	0
	ChowkChoudhry Floor Mills	0	11	2	0	0	0	0
	Muslim High School	2	3	5	4	0	0	0
	Gharib Abad	6	7	1		1	0	0
	MadanPura	6	8	1	2	1	0	0
	<b>Sub Total</b>	<b>21</b>	<b>31</b>	<b>9</b>	<b>7</b>	<b>2</b>	<b>0</b>	<b>0</b>
2.	Bahadar Singh Wala	1	4	4	0	0	0	2
	Old Water	2	7	3	1	0	0	0
	Malik Pura	3	6	2	3	0	0	0
	Mananwala Sq. No. 80	8	8	1	2	0	0	0
	<b>Sub Total</b>	<b>14</b>	<b>25</b>	<b>10</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>2</b>
3.	MalkhanaWala	3	6	2	2	0	0	0
	Railway Phatak No. 8	2	7	3	0	2	1	0
	<b>Sub Total</b>	<b>5</b>	<b>13</b>	<b>5</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>0</b>
4.	Pull Tariq Abad	6	6	1	1	0	0	0
	Fire Brigade K.A	0	5	7	2	1	0	0
	<b>Sub Total</b>	<b>6</b>	<b>11</b>	<b>8</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>0</b>
5.	Partab Nagar	0	8	2	3	1	0	0
6.	Mai Di Jhugi	4	2	6	1	2	0	0
	<b>G. Total</b>	<b>50</b>	<b>90</b>	<b>40</b>	<b>22</b>	<b>8</b>	<b>1</b>	<b>2</b>
	<b>% of G. Total</b>	<b>23.47%</b>	<b>42.25%</b>	<b>18.78%</b>	<b>10.33%</b>	<b>3.76%</b>	<b>0.47%</b>	<b>0.94%</b>

Source: Researcher's own calculations.

Table A-11

*Wall and Roof Material*

Wall Material	% of Total Sample		Roof Material	% of Total Sample	
	Houses			Houses	
Baked Bricks	86.90%		Lantern (RCC/RBC)	10.80%	
Unbaked Bricks	13.10%		Cement / Iron Sheet	48.40%	
Wood/Bamboo	0		Wood/Bamboo	36.60%	
Other	0		Other	4.20%	

Source: Researcher's own calculations.

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# **Impact of Nature-based Tourism on Earnings of Local People: Evidence from Keenjhar Lake in Pakistan**

TEHMINA MANGAN and HEMAN D. LOHANO

## **1. INTRODUCTION**

Nature-based tourism is the fastest growing part of tourism [Kuenzi and McNeely (2008)]. Wetland areas including lakes are an important source of nature-based tourism as tourists like their scenic views and enjoy doing different activities including swimming, canoeing, diving and learning about nature [van der Duim and Henkens (2007)]. Wetlands are amongst the most important ecosystems on Earth and provide numerous goods and services including recreational services [Mitsch and Gosselink (2007)]. Increasing demand for nature-based tourism has raised the importance of wetlands.

In the developing countries, millions of people depend on wetlands for their livelihoods. However, due to population growth and lack of alternative livelihood resources, wetlands have been threatened due to over-exploitation of their resources, which, in turn, would affect the livelihood of poor people and lead to increased poverty. In order to break this vicious circle, tourism has increasingly been considered as a possible solution [van der Duim and Henkens (2007)]. Pro-poor tourism can be best strategy for both poverty alleviation and wetland conservation [Ashley, *et al.* (2001)]. According to United Nations World Tourism Organisation [UNWTO (2011)] there are many ways by which the poor can get economic benefits from tourism such as by getting employment, supplying of goods and services to tourism enterprises, direct sales of goods and services to tourists, revenue generation, voluntary support and investment in infrastructure. Poor households have surplus labour that is well suited to tourism activities. Measures can be taken to increase the level of employment of poor people within all kinds of tourism related activities and enterprises including hotels, resorts, transport companies and tourism services.

Keenjhar lake is one of the largest natural freshwater lake of Pakistan. Keenjhar Lake, also known as Kalri Lake, is located in Thatta district. It is 24 km long and 6 km

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wide and has an area of 14,000 haectares [WWF-Pakistan (2007)]. The lake has a vital wetland area of great ecological significance and provides habitat for internationally important water birds. Due to its ecological functions and economic, cultural, scientific and recreational value, the lake has been declared as one of the Ramsar sites recognised as the wetlands of international importance under Ramsar Convention in 1971. The lake has also been declared as wildlife sanctuary under Sindh Wildlife Protection Ordinance, 1972. The lake is located 122 km from Karachi city and 19 km from Thatta city in Sindh province. The lake has great scenic beauty and attracts national and international tourists. In the year 2010, the official annual visitor count at Keenjhar lake was 385,000. Tourists pay an entrance fee varying between 2 Pakistan Rupees (Rs) for students and children under five years and Rs 5 for every adult (and additionally Rs 5 for a scooter and Rs 20 for a bus). The revenues from entrance fees are US\$ 38,000 [STDC (2010)]. With proper sustainable management of the recreational facilities at Keenjhar Lake, the number of tourists could be increased and the tourism could become an even more important source of revenues for lake conservation and improvement of the livelihoods of the poor living around the lake.

According to WWF-Pakistan (2007), about 50,000 people from surrounding villages depend on the lake for their livelihood, especially on fishing and tourism. Most of the local people who depend on this lake for their livelihoods are landless and earn marginal incomes for their families. Keenjhar lake and its aquatic ecosystem are seriously threatened by over-exploitation and poor management of the lake. Due to illegal fishing, improper fishing methods, and poor management, the fish stock in Keenjhar Lake is depleting and fishing cannot sustain livelihood of poor people due to reduced catch rates [WWF-Pakistan (2007)]. Thus, these poor people need alternative earning opportunities.

Keenjhar lake has a great potential for nature-based tourism, largely because of its location near Karachi, the most populated city of Pakistan with population over 13 million and among top ten mega-cities of the world [Pakistan (2010)]. Tourism can potentially be an effective strategy that can provide income generating opportunities for local poor people and generate revenue for wetland management and conservation. Thus, for effective sustainable planning and policy-making, there is need to evaluate the contribution of tourism on livelihood of local people. Knowing the economic value of this contribution provides an important indicator of the social desirability of maintaining and further improving the site [Carrier and Macleod (2005)]. Previous studies on contribution of Keenjhar lake have focused on the valuation of various goods and services, especially recreational services [e.g., Mangan, *et al.* (2013); Dehlavi and Adil (2011); Amjad and Kidwai (2003)]. Although these studies have highlighted the importance of tourism by providing recreational value of Keenjhar lake, there is a lack of information on the contribution of tourism towards the livelihood of local people who live in the adjoining areas of the lake and participate in the tourism related work.

The main objective of this study is to investigate the contribution of tourism at Keenjhar lake to local livelihoods. This study attempts to answer the question, do the households who participate in the tourism related work enjoy higher levels of welfare relative to the conditions they would have been in had there been no tourism activities? This study uses econometric model with endogenous dummy variable to investigate the impact of tourism participation on the household earnings of local people. In the

econometric modeling, we account for self selectivity of household's decision whether to participate or not in tourism activities. To our knowledge, this is the first application of endogenous dummy variable model to estimate the impact of nature-based tourism on local livelihoods in Pakistan.

The remainder of this paper is organised as follows. The next section presents a brief literature review. Section 3 specifies the model of this study and estimation methods. Section 4 describes the data used in the study. Section 5 presents the empirical results of the study. Finally, Section 6 draws conclusions and offers their policy implication.

## 2. LITERATURE REVIEW

Poverty has been one of the most complex social challenges facing the world today. A review of literature indicates that poverty and wetland degradation are interlinked [van der Duim and Henkens (2007); Goodwin (2006); Jamieson, *et al.* (2004); Holland, *et al.* (2003); Ashley, *et al.* (2001); Bennett, *et al.* (1999)]. There are many strategies that can be followed for poverty reduction and to improve wetland management and conservation. Tourism can potentially be one of the most important strategies that can provide income generating opportunities for local poor people and can generate revenue for wetland management and conservation. This section provides a brief review of previous studies on the contribution of nature-based tourism towards local livelihoods.

Bennett, *et al.* (1999) highlighted the importance of tourism as a tool for ensuring minimum environmental damage (green tourism), conservation of resources through community-based tourism, and enhancing welfare and wellbeing of poor people.

Guha and Ghosh (2007) examined the contribution of tourism in providing livelihood of the local people in Indian Sundarbans. In this study, household expenditure was compared between tourism participants and non-participants using regression analysis in order to control for other factors. The results of their study showed that the households who participate in tourism activities were found to spend 19 percent more on food items per capita and 38 percent more on non food items per capita as compared to non-participants households.

Leon (2007) evaluated the impact of tourism on rural livelihoods of the Dominican Republic's coastal areas. This study conducted survey of 23 coastal communities covering a range of tourism levels and types and followed the Dominican Republic's Central Bank's methodology to estimate household income. This study used household income as a measure of the standard of living. Results of this study also highlighted that tourism play a very important role in improving the standard of living of people involved in tourism related income generating activities.

Bandyopadhyay and Tembo (2010) in their study on "Household consumption and natural resource management around National Parks in Zambia" investigated the impact of community-based wildlife management and participation in related community institutions on household welfare. They used household and community level survey data from Game Management Areas (GMAs) and other areas near national parks (non-GMAs) and employed Maddala's treatment regression techniques. Their study found significant welfare gains, measured as consumption per capita, in some GMAs but these gains were

unevenly distributed. The welfare gains accrued mainly to the relatively well off, while the poor did not gain. Bandyopadhyay, *et al.* (2004) evaluated the benefits of community conservancies in Namibia based on a survey covering seven conservancies and 1192 households. They divide their study in two parts i.e. evaluation of conservancy impact and evaluation of economic impact of participation in conservancies. They used multivariate analysis method to evaluate the impact of household participation in conservancies. They found a positive impact of conservancies on standard of living of local poor people.

### 3. MODEL AND ESTIMATION METHODS

Keenjhar lake is an important source of livelihood for the poor people living in the adjoining areas of the lake. About 50,000 people from the surrounding villages depend on the lake for their livelihood [WWF-Pakistan (2007)]. Majority of people depend on fishing for their livelihood. Other professions of these local people include providing tourism services, agriculture labour, farming, livestock rearing, stone mining, shop-keeping, business, mat making, transport, teaching, government service, tailoring and nursing.

Local people working in tourism at Keenjhar lake are involved in different income generating activities and provide services such as boating, huts for resting, vending services, swimming dresses, and tour guidance. Local people also work on part-time basis on the restaurants and furnished huts established by the Sindh Tourism Department. Households working in tourism at Keenjhar lake do not entirely depend on tourism-based earnings due to seasonal variation in tourism activities. Annual visitor count at Keenjhar lake is 385,000. During the peak season of summer from May to August, more than 15,000 tourists visit the lake weekly. During the off-peak season of winter from October to January, the number of tourists decline significantly and reach up to 50 tourists per week during very cold days.

Households living in the adjoining areas of Keenjhar lake make a choice whether or not to participate in the tourism related work. This study examines the impact of tourism on the income of households who participate in tourism related work.

This section specifies the model and estimation methods to measure the impact of tourism on the income of households who participate in tourism related work. We first specify a model where participation in tourism related work is assumed to be an exogenous variable. Next we relax this assumption because it is the household's choice whether to participate in the tourism related work or involve in other income generating activities. We then specify an endogenous dummy variable model, where participation in tourism related work is assumed to be endogenous variable.

An early work on self-selection of professions is discussed in Roy (1951) who studied the problem of individual's choice between two professions, hunting and fishing, based on their productivity (earnings) in each. The issue of self-selectivity has also been addressed in the studies on the behaviour of females' labour supply in Gronau (1974) and Heckman (1974).

Endogenous dummy variable model used in the present study has been used in a variety of application. This model has been used for evaluating the impact of participating in natural resource management in Game Management Areas in Zambia on

the household welfare [Bandyopadhyay and Tembo (2010)]. This model has also been applied for measurement of treatment effects and programme effectiveness when there are cross-sectional data. The model presented in this section is based on the conceptual framework for evaluating treatment effects as given in Greene (2012) and Stata (2011).

### 3.1. Model with Exogenous Dummy Variable

To evaluate the impact of tourism, the econometric model is specified as:

$$y_i = x_i\beta + \delta z_i + \varepsilon_i \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (1)$$

where  $y_i$  denotes annual income of household;  $x_i$  is the vector of explanatory variables including number of earning members of household, value of household's productive asset, average years of schooling of earning members, and average age of earning members of the household;  $\beta$  is the vector of unknown parameters;  $\delta$  is unknown parameter;  $\varepsilon_i$  is the error term representing the unobserved other factors; and  $z_i$  is a dummy variable indicating whether or not the household participates in tourism related work:

$$z_i = \begin{cases} 1 & \text{if household participate in tourism related work} \\ 0 & \text{otherwise} \end{cases} \quad \dots \quad \dots \quad (2)$$

If  $z_i$  is an exogenous dummy variable, then the expected earnings of household who participates in tourism related work are given by:

$$E[y_i|z_i = 1, x_i] = x_i\beta + \delta \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (3)$$

In this case, the impact of participating in tourism related work on household earnings is:

$$E[y_i|z_i = 1, x_i] - E[y_i|z_i = 0, x_i] = \delta \quad \dots \quad \dots \quad \dots \quad \dots \quad (4)$$

### 3.2. Endogenous Dummy Variable Model

In the above model, the dummy variable indicating whether or not the household participates in tourism related work,  $z_i$ , is assumed to be exogenous variable. However,  $z_i$  is an endogenous dummy variable and is selected by the household as the household makes a decision whether to participate in tourism related work or involve in any other income generating activities. In this case, household's earnings ( $y_i$ ) and decision to participate in tourism related work ( $z_i$ ) are jointly determined by two equations:

$$y_i = x_i\beta + \delta z_i + \varepsilon_i \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (1)$$

$$Prob(z_i = 1|w_i) = \Phi(w_i\gamma) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (5)$$

where Equation (5) represents a probit model;  $\Phi(\cdot)$  is the standard normal cumulative distribution function; and  $w_i$  denotes the vector of exogenous covariates that may affect household's decision to participate in tourism related work. In this study,  $w_i$  includes a variable defined as distance from household's village to the recreational site of Keenjhar lake. The probit model is represented based on an underlying latent variable model. Let  $z_i^*$  be a latent variable that determines whether or not the household participate in tourism related work:

$$z_i = \begin{cases} 1 & \text{if } z_i^* > 0 \\ 0 & \text{otherwise} \end{cases} \quad \dots \quad (6)$$

We do not directly observe  $z_i^*$  but instead we observe a binary outcome  $z_i$  that depends on  $z_i^*$ , as given in Equation (6). It is assumed that  $z_i^*$  is a linear function of  $w_i$  and a random error term  $u_i$ .

$$z_i^* = w_i\gamma + u_i \quad \dots \quad (7)$$

The two error terms  $\varepsilon_i$  and  $u_i$  have bivariate normal distribution with mean zero and the following covariance matrix:

$$Cov = \begin{bmatrix} \sigma^2 & \rho\sigma \\ \rho\sigma & 1 \end{bmatrix} \quad \dots \quad (8)$$

where  $\rho$  is the correlation between the two error terms  $\varepsilon_i$  and  $u_i$ , and  $\sigma$  is the standard deviation of  $\varepsilon_i$ . The expected earnings of household participating in tourism related work are given by:

$$E[y_i | z_i = 1, x_i, w_i] = x_i\beta + \delta + \rho\sigma \left[ \frac{\phi(w_i\gamma)}{\Phi(w_i\gamma)} \right] \quad \dots \quad \dots \quad \dots \quad \dots \quad (9)$$

where  $\phi(\cdot)$  is the standard normal density function, and  $\Phi(\cdot)$  is the standard normal cumulative distribution function. The expected earnings of household not participating in tourism related work are given by:

$$E[y_i | z_i = 0, x_i, w_i] = x_i\beta + \rho\sigma \left[ \frac{-\phi(w_i\gamma)}{1-\Phi(w_i\gamma)} \right] \quad \dots \quad \dots \quad \dots \quad \dots \quad (10)$$

In this case, the impact of participating in tourism related work on household earnings is given by:

$$E[y_i | z_i = 1, x_i, w_i] - E[y_i | z_i = 0, x_i, w_i] = \delta + \rho\sigma \left[ \frac{\phi(w_i\gamma)}{\Phi(w_i\gamma)[1-\Phi(w_i\gamma)]} \right] \quad \dots \quad (11)$$

In this study, the above model is estimated by the maximum likelihood estimation method using ‘treatreg’ command in Stata 11.2.

The last term in Equation (9),  $\left[ \frac{\phi(w_i\gamma)}{\Phi(w_i\gamma)} \right]$ , is referred to as selectivity correction variable. Comparing Equations (3) and (9) shows that the selectivity correction term is an omitted variable in Equation (3) where the self selectivity of  $z_i$  is not accounted for. If the correlation between the error terms is zero,  $\rho = 0$ , then the Equations (4) and (11) will yield the same results for estimating the impact of working in tourism sector on household earnings. However, if  $\rho \neq 0$  and the selectivity correction term is omitted, then the least squares estimates through Equation (3) would be biased and the impact of working in tourism sector on household earnings given by Equation (4) may be overestimated or underestimated.

#### 4. DATA

To examine the impact of participating in tourism related work on earnings of households, we collected data from two types of households: participants and non-participants in tourism related work. Tourism participant household has been defined as

the household with at least one of its family members earns from the activities directly related to the tourism sector while households having none of its family members engaged with tourism related income generating activities are defined as the non-participants.

Through a preliminary survey conducted on recreational area, it was identified that tourism related households come only from some of the villages in two union councils, namely Sonda and Ongar. Total number of villages in these two union councils is 44 villages (27 in Sonda and 17 in Ongar). Social mapping of these villages was done to identify villages where both tourism and non tourism households are living. Based on social mapping, we selected six villages: Abdullah Gandhro, Wadero Adam Manchri, Haji Khameso Khaskheli, Yousuf Hilayo, Sonehri, and Jafar Hilayo. These villages are located within 10 kilometers from recreational site in north-east to south of Keenjhar lake. Total population of these six villages is 1345 households. Figure 1 shows the map indicating the location of Keenjhar lake while Figure 2 presents map of the study area where household data were collected.

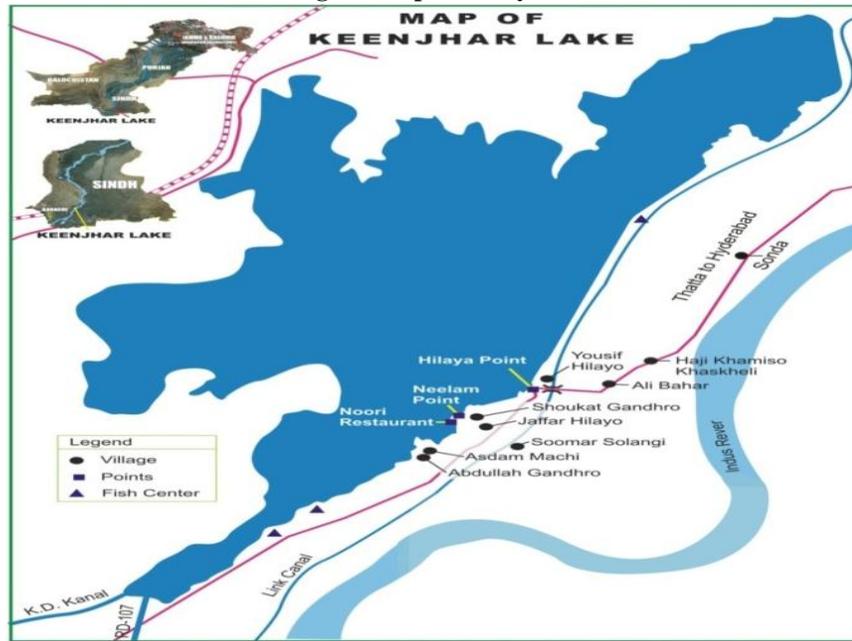
Stratified random sampling method was used to select 264 households from the selected six villages. From each of these six villages, 44 households were selected with 22 tourism participants and 22 non-participants. In each village, starting at a certain location, surveyors were asked to knock at every third house on their left, alternating between left and right at every turn. In case of non-response, they were asked to knock on the next door.

Face to face interviews of head of the households were conducted using a structured questionnaire pre-tested through a pilot survey of 25 households. The data were collected for twelve months of year. The survey was conducted two times for ensuring the accuracy of data. The first survey was conducted to collect data for six months (March to August 2010) which included peak season of tourism. The second survey was conducted to collect data from the same households for six months (September 2010 to February 2011) which included off-peak season of tourism.

**Fig. 1. Location of Keenjhar Lake**



Fig. 2. Map of Study Site



## 5. EMPIRICAL RESULTS

### 5.1. Descriptive Statistics

Table 1 presents the summary statistics to compare the average values of variables between the households who participate in tourism related work and households who do not participate in tourism related work. Simple test of means between both types of households are also included (last column). The results indicate that the average annual earnings of tourism participants are higher than the non-participants by Rs 16,021. However, this difference in earnings cannot be attributed as the impact of the participation in tourism because of the difference in other household characteristics. Partial effect of participation in tourism related work on household earnings can be statistically identified using regression analysis, presented in the next subsection.

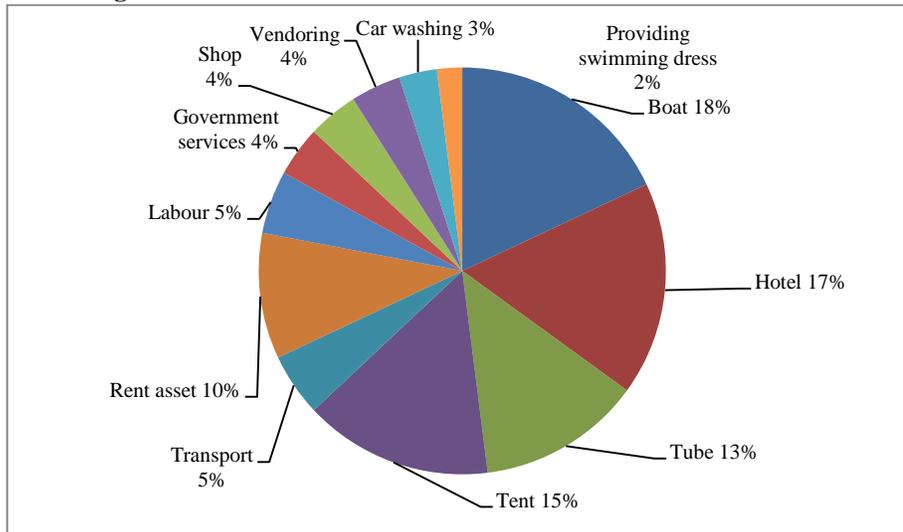
Results in Table 1 show that the average household size is statistically not different in both types of households but the number of earning members in tourism participant households is higher than the non-participant households. Average education of earning members is statistically not different while earning members of participant households are younger (28 years) than non-participants households (33 years). However, the average value of assets owned by households is statistically different. On average, the distance from participant households' villages to the recreational site of Keenjhar lake is 2.2 km while it is 3.45 km from non-participant households' villages. Summary statistics in Table 1 also indicate that both groups of households have overall very low earnings, low education level, low value of assets, and large family size.

Table 1  
Summary Statistics

Variables	Definition	Tourism Household (mean)	Non-tourism Household (mean)	Mean Comparison Test (p-value)
Earnings	Annual earnings of household in Rupees	138,412	122,391	0.034
Household Size	Number of family members in household	7.77	7.60	0.664
Earning Members	Number of earning members in household	2.61	2.30	0.047
Education	Average years of schooling of earning members	4.51	4.15	0.610
Age	Average age of earning members in years	28.15	33.80	0.000
Assets	Value of productive assets owned by the household in Rupees	23,440	28,748	0.354
Distance	Distance in kilometers from household's village to the recreational site of Keenjhar lake	2.22	3.45	0.001

Tourism related income generating activities are presented in Figure 3. Providing boating and hotel facilities to the tourists are the highest income earning activities with 18 and 17 percent contribution in the earnings of households, respectively. Providing tent and tubes to the visitors are the subsequent highest incomes earning tourism activities with 15 and 13 percent contribution, respectively. Renting productive assets in tourism business is also a profitable business and makes 10 percent contribution in the earnings. Providing transport and labour services at the recreational site of the lake make 5 percent contribution each. Vendor services, shop keeping and government services account for 4 percent of their earning, while car washing is the lowest earning activity at the lake (3 percent).

**Fig. 3. Income Earned from Tourism Related Economic Activities**



## 5.2. Regression Results

In our model, household earnings depend on the number of earning members, value of productive assets, average age and average education level of earning members. Participation dummy is equal to one if the household participates in tourism related work, otherwise zero. As discussed in Section 3, the household makes a decision whether to participate in tourism related work or involve in any other income generating activities. This makes the decision to participate as an endogenous dummy variable.

Table 2 presents the regression results of three models. Third column of the table presents results of a model where participation dummy variable is assumed to be exogenous. In this case, the model is represented by only Equation (1) with earnings as a dependent variable. Fourth and fifth columns present results of the endogenous dummy variable model. In this model, participation dummy variable is assumed to be endogenous. In this case, the model is represented by two equations: Equation (1) with earnings as a dependent variable and Equation (5) with participation dummy as a dependent variable. For this model, two specifications are presented. In the fourth column, the exogenous variables affecting the participation include distance as well as other variables which also affect household earnings. Following the exclusion restriction, in the last column of the table, the exogenous variable affecting the participation is distance only.

The estimate of the correlation between the error terms ( $\rho$ ) is reported in Table 2. The Chi-squared test results show that this correlation estimate is statistically significant at 1 percent significance level. The test indicates that we have  $\rho \neq 0$  and supports the endogenous dummy variable model. Endogenous dummy variable model is also supported by the Jarque-Bera statistic for normality test for normality of the error term. In this test, the null hypothesis is that the error term is normally distributed. As p-value is much greater than 0.05, the test does not reject the null hypothesis. Thus, the diagnostic tests support the endogenous dummy variable model. As Specification 2 of this model (in the last column of Table 2) satisfies the exclusion restriction, we will discuss and interpret the result of this model.

The results of participation equation in the last column show a negative coefficient estimate for distance variable which is statistically significant at 1 percent significance level. These results show that the likelihood of household's participation in tourism related work decreases when distance from household's village to the recreational site of Keenjhar lake is higher. Results of earning equation in the same column show that the explanatory variables earning members, assets, and education are statistically significant at 1 percent significance level. The estimates indicate that the marginal effect of an additional earning member on household's average annual earning is Rs 13,987.

The marginal effect of productive assets is 0.2, which indicates that any additional Rs 100 investment in productive assets would result in higher earnings by Rs 20. The marginal effect of an additional year of education level is Rs 5,258 on household's average earnings.

As explained in Section 3, the impact of participating in tourism related work on household earnings is given by Equation (11). Results in Table 2 show that the impact of the participation on household annual earning Rs 9,251, which is 7.6 percent of the earnings. These results show that the households who participate in the tourism related

Table 2

*Regression Results*

Dependent Variable	Explanatory Variables	Model with Exogenous	Model with Endogenous Dummy	
		Dummy	Specification 1	Specification 2
<b>Earnings</b>				
	Constant	47,365*** (3.680)	1,091 (0.0622)	24,276* (1.800)
	Earning members	15,619*** (7.219)	15,133*** (6.184)	13,987*** (6.546)
	Assets	0.236*** (4.248)	0.268*** (4.243)	0.204*** (3.718)
	Education	5,523*** (11.61)	5,487*** (10.21)	5,258*** (11.42)
	Age	279.5 (0.937)	1,046*** (2.794)	400.4 (1.371)
	Participation dummy	12,003** (2.317)	58,073*** (5.095)	62,677*** (5.802)
<b>Participation Dummy</b>				
	Constant	–	1.839*** (4.455)	0.360*** (3.586)
	Distance	–	–0.127*** (–4.516)	–0.114*** (–5.126)
	Earning members	–	–0.0546 (–0.757)	–
	Assets	–	–3.87e–06* (–1.953)	–
	Education	–	–0.0114 (–0.742)	–
	Age	–	–0.0381*** (–3.759)	–
	Observations	264	264	264
	R-squared	0.586		
	Goodness of fit F-statistics	73.16***	–	–
	Goodness of fit Chi-Square	–	308.2***	367.3***
	Correlation between error terms ( $\rho$ )	–	–0.655***	–0.704***
	Jarque-Bera statistic for normality test	11.88	0.298	0.434
	p-value of above	0.003	0.861	0.805
<b>Impact of Participation in Tourism on Earnings</b>				
	Impact in Rupees	12,003	9,051	9,251
	Impact in percentage	9.8	7.4	7.6

t-statistics in parentheses.

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1.

work enjoy 7.6 percent higher level of earnings relative to the conditions they would have been in had there been no tourism activities. When the participation dummy variable is assumed to be exogenous, the impact of the tourism participation on household annual earnings is Rs 12,003 (9.8 percent of the earnings), which is overestimated as the correlation between the error terms ( $\rho$ ) is statistically significant. In endogenous dummy variable model, the results of two specifications are similar. The impact of the tourism

participation on household annual earnings is 7.4 and 7.6 percent, respectively. Results of this study show that tourism at Keenjhar lake makes a positive contribution in the earnings of the poor local people and in sustaining their livelihoods.

Results of the present study are similar to those in the study by Bandyopadhyay and Tembo (2010), which also shows that tourism has positive impact on overall welfare of households. Findings by Ashley (2000) are also supported in the results of this study. Ashley (2000) found that tourism has positive impact on livelihoods of rural people and generally generates various types of cash income for rural households.

## 6. CONCLUSIONS AND POLICY IMPLICATIONS

This study examines the impact of nature-based tourism on the livelihood of local people at Keenjhar lake in Pakistan. For this study, primary data were collected from 264 households selected by stratified random sampling method. This study applies endogenous dummy variable model to evaluate the impact of households' participation in tourism related work on their earnings.

Results of this study show that the households who participate in the tourism related work enjoy 7.6 percent higher level of earnings relative to the conditions they would have been in had there been no tourism activities. Study finds that tourism at Keenjhar lake makes a positive contribution in the earnings of the poor local people and in sustaining their livelihoods. Furthermore, the estimates of marginal effect of productive assets indicate that any additional Rs 100 investment in productive assets would result in higher earnings by Rs 20. Education level of earning members also increases the earnings of the household.

This study finds that tourism at Keenjhar lake improves the standard of living of local people by raising their earnings, and that the nature-based tourism can be an effective poverty alleviation strategy.

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## **Historical Role of Islamic Waqf in Poverty Reduction in Muslim Society**

MUHAMMAD TARIQ KHAN

### **INTRODUCTION**

Since the emergence of known civilisation poverty is a major challenge and in the present era, it is a wide spread world problem specifically afflicting the developing countries and also is a breeding ground for terrorism and conflicts between nations [Shirazi and Khan (2009)]. Poverty problem, with issues, of defining poverty, determining who is poor and where to draw the poverty line has been at the forefront of national and international policy-making forums, and a topic of heated debates among economists and policy makers [Khan (2007)].

Increasing per capita income along with equal distribution of wealth leading to better standard of life (with better facilities and opportunities of: food, health, clothing, housing, drinking water, income and employment, and social and cultural life) is pertinent way to reduce poverty. Islam encourages with stress on working hard and investment for earning the livelihood. For extremely poor who have no means to meet basic needs, no sources to invest, and no opportunity to earn, Islam suggested voluntary and compulsory endowments [Zakat, waqf, sadqa] for catering the needs of different degrees of poor from destitute to less poor, and also causing, circulation of wealth leading to it equal distribution, which is also another way to reduce poverty.

This study is dedicated to search and highlight the historical role played by Islamic waqf in the reduction of poverty so it is pertinent to elaborate the concepts of ‘poverty’ and ‘Islamic Waqf’.

### **Elaboration of Concepts of ‘Poverty’ and ‘Waqf’**

#### **What is Poverty?**

Lipton and Ravallion (1993) highlighted that the most important dimension of poverty and a key determinant of other aspects of welfare is the inadequate command over commodities, such as longevity, health, and self-ism. Lipton and Ravallion (1993) were of the view that ‘poverty’ exists when people fall short of a level of economic

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welfare, deemed to constitute a reasonable minimum, either by the standards of a specific society or in some absolute sense. "Reasonable minimum", is defined by pre-determined basic consumption needs" especially nutrition. Developing countries have often taken a fairly narrow definition of 'economic welfare' referring to consumption of goods and services of a person.

The United Nations Development Programme (UNDP) has introduced concept of human poverty meaning 'deprivation of essential capabilities such as a long and healthy life, knowledge, economic resources and community participation'. Adequate levels of health, education, water, sanitation and social protection are the social progress objectives of human development [Report of OECD (2001)].

### **Multidimensional Concept and Measurement of Poverty**

In its report OECD (2001) acknowledged the multidimensionality of poverty and argued that poverty denotes exclusion of people from socially adequate living standards and encompasses a range of deprivations. Poverty dimensions cover many distinct aspects of human capabilities including human (health, education), economic (livelihoods, income, decent work), socio-cultural (status, dignity) political (rights, empowerment, voice), and protective (vulnerability, risk, insecurity). OECD (2001) widened the concept of poverty by including different dimensions of deprivation. Generally, it is peoples' inability to meet economic, social and other standards of their well-being. Both 'Millennium Development Goals' and 'The 1995 World Summit for Social Development' in Copenhagen assumed that poverty is multidimensional. The World Bank has defined poverty as unacceptable human deprivation in terms of economic opportunity, education, health and nutrition, as well as lack of empowerment and security.

According to Mwangi and Markelova (2008) the poor are those that have few assets (both tangible and intangible), are more vulnerable to different forms of risk, and are often at a lower end of a power continuum, with limited ability to influence policy and practice.

Khan, *et al.* (2011) quoted from some studies that the process of poverty approximation has propagated from mere income deprivation to a broad multidimensional phenomenon, addressing the broad, complex nature issues; encompassing thereby through the multiple domains of well-being because the dream of economic development in the presence of poverty cannot be materialised in the true sense. The term goes beyond mere monetric deprivation and international community widely accepts it as a complex issue, which covers several socio-economic aspects of human well-being.

Mwangi and Markelova (2008) expressed that poverty has many other dimensions, which are non-monetary such as health. Mwangi and Markelova (2008) quoted Amartya Sen (2001) who recommended a broader conception of poverty that reaches beyond a shortage in income. Poverty is also associated with insufficient outcomes with respect to health, nutrition, and literacy, and with deficient social relations, insecurity, low self-esteem, and powerlessness.

### **Defining Poverty**

According to Khan (2007) it is very difficult to have a precise definition of poverty. Poverty is a huge, complex and confusing term, and as yet there is no consensus on the concept and definition of poverty, some relate it to paucity of food, while others call it a state of being underpaid for a given job. Further no two social scientists agree on how to define poverty, what is the poverty line, and how to measure it, has made this issue more complex.

Abdullah and Joseph (2011) disclosed that until 1995 there was no internationally agreed definition of poverty when, in Copenhagen the World Summit for Social Development adopted the definition of absolute poverty as “a condition characterised by severe deprivation of basic human needs, including food, safe drinking water, sanitation facilities, health, shelter, education and information. It depends not only on income but also on access to services”. Poverty encompasses, lack of income, lack of productive assets, lack of education and quality entertainment, ill health, inadequate housing, unsafe living environment, and poor social and cultural life.

Khan (2007) quoted that the UNDP (in its report 2000), defined poverty in these dimensions: “deprivation of a long and healthy life, knowledge, a decent standard of living and social exclusion”. World Bank in its Report “Poverty and Vulnerability in South Asia,” (2002) defined poverty as: being associated with “deprivation from health, education, food, knowledge, influence over one’s environment and other things that make a difference between truly living and merely living”.

Mwangi and Markelova (2008) in their study revealed that poverty refers to whether individuals or households possess enough resources or abilities to meet their current needs. This definition also implicitly includes the probability or risk of falling (deeper) into poverty at some point in the future, i.e. an individual’s or household’s vulnerability to shocks. Poverty is usually determined on the basis of income or consumption thresholds, which define an individuals or households ability to meet a basket of basic goods and services.

### **Gist of Literature in the form of Poverty Problems**

From the above literature it has become clear that poverty is an obnoxious situation when people are deprived from access to many things but most common of these are longevity (long and healthy life) health (adequate levels of health), nutrition (food,), education, literacy, knowledge, water, sanitation, economic opportunity and economic resources and community participation empowerment, security social protection, social and other standards of their well-being, influence over their environment, and deprivation from other things that make a difference between truly living and merely living. In other words poor people suffer from hunger, shortage of food, ill health, lack of shelter, clothing, lack of education (not being able to receive education), deficient social relations, insecurity, low self-esteem, and powerlessness, lack of income, lack of productive assets, quality entertainment, inadequate housing, unsafe living environment, and poor social and cultural life.

However among these the most important and tangible dimensions of poverty or the problems of poor people were and are:

- (1) Hunger or Malnutrition (Shortage of food leading to ill-health).
- (2) Ill Health (in-adequate levels of health due to less food, lack of medicine and sanitation).
- (3) Lack of Education and (literacy, knowledge) education opportunities.
- (4) Lack of Shelter, Clothing and Empowerment.
- (5) Lack of Economic opportunities and Economic resources and Lack of Income.
- (6) Non availability of Water (for drinking and sanitation and irrigation).
- (7) Deficient social relations, poor social and cultural life.

These were the problems of poverty in the past and still exist with their ugly obnoxious face in the society.

### **What is Waqf?**

#### **Definition of Waqf**

According to Heidemann (2009) al-Kasani (d. 587/ 1189) the Aleppan legal scholar in the twelfth century defined the endowment (Waqf) in brief:

“The waqf is a continuous charitable act for the sake of God-He is exalted (al-waqfu sadaqatun jari’ atun fi sabili llahi ta’ala)”.

As a part of Islamic law Waqf regulations were developed in the 3<sup>d</sup> century H. According to these regulations, waqf (endowment) is established by a legal deed that names the owner of the endowed property, the substance of the endowment (‘ayn or asb, and the beneficiary (mawquf’alayhi) of its income (manfta). According to the ‘Hanafi School of law’, by the act of endowment, the founder relinquishes all his property rights, transforming it into a haqq Allah, an inalienable “claim of God”.

Ali (2009) expressed that in Islam the institution of Waqf is augmented by the prevailing spirit of altruism, which forms an integral part of the Islamic way of life. Islam views charity as a means of transfer of wealth from the rich to the poor as well as a mechanism for self-development and a way for achieving pleasure of Allah Almighty and also his reward in the hereafter world.

Abattouy and Al-Hassani (n.d) asserted that there are three basic principles of Islamic law of Waqf defining the charitable trust: it must be 1. irrevocable, 2. perpetual, and 3. inalienable and in addition, to qualify as charitable the ultimate purpose of the Waqf must be of pious. Cizakca (1998) and Abattouy and Al-Hassani (n.d) asserted that the Awqaf system has remarkable resilience so indeed many Awqaf had survived even for more than a millennium and some considerably longer than half a millennium. According to historical sources, good examples are the Awqaf of the Ayyubids and the Mamluks in Egypt, Syria, and Palestine so at the beginning of the 12th century Jerusalem had sixty-four Waqf properties supported schools from Palestine, Syria and Turkey and forty of these schools were made from Awqaf by Ayyubid and Mamluk rulers and their governors.

#### **History of the Role Played by Waqf in Poverty Reduction**

Islamic endowments (Waqf and Zakat) have played a positive supportive and remedial role in the reduction of poverty in the history. The role Islamic waqf played in

the history to reduce poverty particularly with reference to above listed seven 'poverty problems' is discussed problem-wise in below given lines. First general view of waqf contribution is given and then one by one problems and waqf contribution in their solution are discussed.

### **General View**

Zuki (2012) quoted from some studies that establishing a waqf is the idea for the cause of humanity and the mosque of Quba was first established waqf in the Muslim world. In the Muslim world, many humanitarian projects were operated through the institution of waqf such as building houses for the needy people, springs development for providing water for public consumption, helping the handicapped and the poor, building bridges, financing orphanages and homes for the elderly and financing the marriage of young people in need.

Abattouy and Al-Hassani (n.d.) revealed that in actual historical practice Waqf institutions played varying and extremely important roles in the economic, social, and political development of Islamic societies. Abattouy and Al-Hassani (n.d.) also elaborated that the subjects of Waqf included properties such as agricultural land, even whole villages, farms, gardens, as well as apartment buildings, houses, hotels, warehouses, shops, baths, mills, bakeries, looms, soap works, paper works, oil and sugar presses, stables, and post houses. Except the money needed to repair the basic corpus of the Waqf itself the proceeds of the waqf property is to be spent on the object of the Waqf, which according to Ahmed (2007) may be for the benefit of society at large, such as socio-economic relief to the needy segment, the poor, provision of religious services, education, scientific, environmental, and other purposes. Therefore Ahmed (2007) reported that Muslims established various kinds of awqaf including those for, education and research, health care and public utilities. Awqaf for education also covered scientific research and there were awqaf specifically for research in astronomy, science, mathematics, pharmacology, physiology, etc. Ahmed (2007) asserted that the history of awqaf is very rich with prominent achievements in enhancing the welfare in general and serving the poor in particular.

Babacan (2011) expressed [referring Hodgson (1974); Kuran (2001)] that in the Islamic States waqf system is the most dominant economic actor outside the government and observed to be the primary "vehicle for financing Islam as a society". After the early Islamic periods, importance of waqfs was increased, when economic activities significantly shifted from mercantilist trade toward agricultural land-based static systems, and waqfs in the Ottoman world, (in Turkey when the Ottoman Turkis empire was stretched in Middle East and Eastern Europe) had their most significant economic implication, so in the Ottoman State the total waqf land in the early 18th century, were nearly one-third of the productive land. Waqfs had many different immovable assets, such as production facilities, residences, shops, and other public/social facilities. Waqfs provided many consumption goods, such as operating commuter ships, delivering water to a local area, supporting retired sailors, defending a town, paying a neighborhood's taxes, etc.

Hasan (2006) asserted that throughout the history, proceeds from awqaf (plural of waqf) have been dedicated to health and hygiene, soup kitchens, learning, places of

worship, urban services etc. Hasan (2006) mentioning experiences from different communities expressed that in many countries, waqf funds, have been used for three main social and human development related purposes, i.e., education, urban services, and health and hygiene. Awqaf in modern times are providing shelters, delivering water to a locality, supplying foods to children, etc.

Chepkwony (2008) narrated referring Sadeq (2002), that shrines, and Eid prayer grounds which were also used for many other meetings and social occasions were attributed to waqf. Through waqf commercial centres and shopping complexes have been established, which helped to generate some income for financing target projects.

Zuki (2012) referring some studies [e.g. Cajee (2007)] asserted that waqf was a “powerful community supporting institution, through educational programs, provision of infrastructure and health.”

The conference web is started with sentence of famous economist Dr Mahbul Haq “We were taught to take care of our GNP because it would take care of poverty. Let us reverse this and take care of poverty because it will take care of the GNP”, that he wrote in 1971. How poverty could be reduced without increasing GNP. Islamic WAQF in the past was one recipe for this problem.

### **Problem-wise Discussion of the Role Played by Waqf in Poverty Reduction**

What the role Islamic Waqf played in reducing poverty specially with reference to above mentioned seven poverty problems are discussed in below mentioned lines.

#### **Poverty Problem No. 1.**

#### **Hunger or Malnutrition (Shortage of Food Leading to Ill-health) and Waqf Contribution in Reducing it**

Hasan (2006) expressed that in modern times Awqaf provide shelters, deliver water to a locality, and supplying foods to children, etc.

About a waqf in Beirut Hamouche (2007) reported that there was an office called a “basket of bread” located near the Great Mosque of Beirut (Lebanon) from which food used to be distributed to poor men on Friday by the end of the Ottoman period.

Frenkel (2009) extracting from many studies revealed that endowment document occasionally, arranged for the distribution of clothing and provision of food. In the al-Umariyah madrasah, the endowment provided bread and gateaux (ulmah). The list of endowments depended institutions that accommodated students, teachers, and Sufis is long. Their donors took great pains to specify the distribution of food, clothing, and expenses that the Sufis and their shaykhs were to receive.

Abattouy and Al-Hassani (n.d.) in their study narrated that when famous traveller Ibn Battuta visited Damascus there were endowments for travelers, for giving them food, clothing, and the expenses of conveyance.

#### **Poverty Problem No. 2.**

#### **Ill Health (in-adequate levels of health due to less food, lack of medical facilities, lack of medicine and sanitation and non-hygienic life) and Waqf Contribution in reducing it**

Mannan (2005) asserted while quoting examples that even in early period, hospital for children treatment was built in Istanbul out of the Waqf fund. In Spain hospital facilities were available for both Muslims and non-Muslims alike.

Hasan (2006) also expressed that an important beneficiary of Muslim Awqaf has been the health and hygiene sector. In the early days of Islam public bath became one of the major beneficiaries of awqaf because cleanliness is a major part of the Islamic belief system.

Ahmed (2007) reported that hospitals and medicines were the most famous sub-sectors of awqaf. Muslims until the first part of the 20th century continued to establish awqaf health care centres and hospitals. Waqf Children Hospital in Istanbul Turkey was founded out of waqf funds.

Abattouy and Al-Hassani (n.d.) stated that in the Islamic world most hospitals were financed from the revenues of Waqfs. Awqaf were used for structured actions of social nature, like health services, covering the expenses on patients as well as the provision of physicians and training, besides construction of hospitals. Wealthy Muslims, especially rulers, endowed property, consisting of shops, mills, caravanserais, or even entire villages whose revenue went toward building and maintaining the institution of waqf. In Islam caliph al-Walid ibn Abd al-Malik in 88H was first who built a hospital (or bimaristan) and appointed doctors who were paid for caring the sick and quarantine of the lepers. The revenue of endowment (waqf) was spent for the maintenance and running costs of the hospital, and sometimes even spent for paying small stipend to discharged patient. Such hospital in the 3rd Islamic century were spread all over the Islamic world, and were a source of happiness for the Muslim community because the patients received treatment, care, food, and clothing. Additionally many of these hospitals performed the function of a medical education center along with treating patients.

Abattouy and Al-Hassani (n.d.) further narrated with examples that in the Islamic world, in every town of reputation there had been at least one waqf hospital. Ibn Tulun in 261 H, in Egypt built the first hospital and endowed it with several Waqfs to provide for its expenses. To the hospital he also added bathrooms, separately for men and women. When patients came to the hospital, their clothes, with all their money were deposited with the secretary of the hospital; then they wore hospital clothes and were looked after until they recovered. Adhud al-Dawla (d. 982 A.D) built on the western side of the Baghdad 'Adhudi hospital with expenses of great deal of money for providing it with the best medical care available at the time. Construction of this hospital was finished in 978 A.D. Salah al-Din al-Ayyubi in Egypt, founded a large hospital in Cairo comprising three separate wards, one each for men, women and the insane. The Qalawun complex built by Sultan Al-Nasir Muhammad Ibn Qalawun in 1284-85 A.D in the Bayn al-Qasrayn quarter in the heart of Cairo which included a hospital, a madrasa, and a mausoleum was once the most lavish and impressive hospital of its time and functioned throughout the late Ottoman period, and demolished in 1910. Qalawun complex hospital offered many amenities to the sick and poor, including food, drugs, clothing and shelter along-with medical treatment. Within the hospital pharmaceutical drugs were produced for medical treatment, as well as research and teaching. One of the famous hospitals in the healthcare sector was Al-Nuri Hospital built in Damascus in 1145 A.D on Waqf land, which had been in operation for seven centuries and was one of the first hospitals to adopt medical

records. This hospital had two doctors, a surgeon, an eye specialist, a pharmacist, ten attendants for the patients, one cook and kitchen help, a janitor and doorkeepers. In these hospitals the Waqfs covered all expenses on food, lodging, medicine and treatment. The doctors were well paid from the endowed funds. The Hospitals established on Awqafs had a major impact on health care delivery to all sections of society especially for the needy and poor patients, and offered a valuable service in their treatment, feeding them and following the conditions of both; those who were hospitalised or those treated in their own homes. Due to Islamic Waqf law, the number of hospitals multiplied throughout Islamic world. In the 11th century, every Islamic city had many hospitals. The Waqf trust institutions funded the hospitals for various expenses, such as the wages of doctors, surgeons, ophthalmologists, pharmacists, chemists, domestics and all other staff, the purchase of medicines and foods; hospital equipment such as beds, mattresses, bowls and perfumes; and buildings repairing. In different parts of the Islamic world Waqf revenues benefited many famous hospitals, including Al-Mustansiri in Makka, Argun al-Kamili in Aleppo, and the hospitals of Madina, Tunis, Ray, Granada and Marrakech. Many other hospitals that had sprung up in different parts of the Islamic world were also depending mostly on Awqaf for their financing. In women's Awqaf health services received the lion's share as depicted by establishment of hospitals, offering free treatment to poor patients, besides establishing Waqf on medical education. With a full Waqf there were children hospitals, for children to meet their needs, including nurses to attend them. For the children born outside the marriage there were also nurseries to provide them necessary medical aid and providing women to suckle them. The women of the Ottoman rulers were keen to endow hospitals, for example the Waqfs established by the mother of Sultan Abdul Majid, the mother of Sultan Murad III, the Sultana Hafiza and Sultana Turiana. The hospital of Sultana Turiana remained functional until 1927. During Muslim rule in Spain hospital facilities were available to Muslims and non-Muslims alike.

Frenkel (2009) also expressed that those religious endowments (awqaf) were particularly instrumental which were providing relief services such as hospitals and other care for the needy. Frenkel wrote about Syrian rulers that many sultans and their viceroys financed the buildings and maintenance of hospitals (bi-maristan) that were known in Syria and the development of hospital facilities in peripheral sites.

### **Poverty Problem No.3.**

#### **Lack of Education (literacy, knowledge) Educational opportunities and Waqf Contribution in reducing it**

In a research report of OECD (2001) it is asserted that education is a crucial factor for defeating poverty. Role of waqf in propagation of education is highlight in below lines.

Frenkel (2009) wrote about Syria that religious endowments financed a large number of educational institutions such as madrasah; maktab; dar al-quran; dar al-adith, proliferated throughout Bilad al-Sham (Syria). Awqaf deeds also stipulated the curricula for these institutions.

According to a study of Abattouy and Al-Hassani (n.d.) education is the second social institution attracting Awqaf support and investments (after mosques). Education

has been financed by voluntary contributions since the beginning of Islam. Even governments have been financing education by constructing schools and assigning certain property as Waqf of the schools. Al-Azhar University the best-known madrasa in the Muslim world, throughout the ages founded in 972 in Cairo (Egypt) is an example which was founded, like every madrasa and financed by its Waqf revenues until 1812 when government of Muhammad Ali in Egypt took control over the Awqaf. Education financing of Waqf has freedom of education approach which means it was not restricted to religious studies and usually covered books, libraries, stipends to students and salaries of teachers and other staff so this financing helped to create a learned class separate from the ruling and rich classes. Therefore majority of Muslim scholars were from poor segments of society causing in the Islamic societies an extremely important and unprecedented process of dynamic social change. In the field of education some other most significant endowments were:

- (1) The regular Nizamiyya school established in Baghdad in 459 H, in which a library was set up and a keeper and supervisors were appointed from the resources of endowments. Nizam al-Mulk, founder of school endowed much money, for the teaching of students, and for the purchase of valuable books.
- (2) Abbasid Caliph Al-Muntasir Billah allocating great endowments established in 623 H in Baghdad the Mustansiriya School, which was supplemented in 631 H and no school in the world was built like it.
- (3) Wife of the Abbasid Caliph Al-Musta'sim Billah, endowing books and money to Al-Bashiriya school and library established in 1255 in Baghdad.
- (4) Al-Zahir Baybars established Al-Zahiriyya School in Damascus in 1279 A.D., equipped with endowments and allocated funds with a huge Zahiriyya library containing books of all sciences and this library is now part of the Syrian National Library.
- (5) In Makka Sultan Qaitbay School was opened in 884 H endowed with many endowments.

Muslim women also offered contributions to education in the field of Waqfs reflecting in development of Islamic civilisation their effective charitable role. Shams al-Dhuha, the granddaughter of Salah al-Din al-Ayubi, founded famous al-Mu'tasimiyya school in Baghdad besides establishing many other schools.

Ismat al-Din Sitt al-Sham bint Ayyub ibn Shadi (died in 1220) founded a Waqf for establishing two schools in Damascus. She built, Al-Shamiya al-Barraniya madrasa, a complex of madrasa and turba (tomb) and had her residence rebuilt to become madrasa Al-Shāmiya al-Juwvaniya.

Two schools one Al-Shamsiyya school in Taz, Yemen and another school bearing the same name in Zubayd were established by Al-Dar al-Shamsi, the daughter of Sultan Mansur ibn Rasul to which she allocated a good Waqf and also established a Waqf in favor of the Imam, Muezzin, Nazir, teacher and orphan learners of the Qu'ran.

In Yemen Mariam (1313 A.D.), wife of Sultan al-Muzaffar, allocating a good Waqf built the prestigious Al-Sabiqiyya school and appointed an Imam, a Muezzin, a Nazir and a teacher to teach the Qu'ran and allocated a sufficient Waqf to all of them.

In the Arabian Peninsula in modern times and in Najed in particular, among the women who dedicated books was Fatima Bint Hamad al-Fadhili, known as Al-Sheikha al-Fadhiliya (died in Makka in 1847-48 A.D.). She manifested an interest in collecting books on different subjects and dedicated all her books to the Hanbali students.

Babacan (2011) expressed (referring many studies) that foundation of schools was an important social service that waqfs provided. In the Ottoman period, the number of the schools for higher education built by the waqfs totaled more than 500, from the conquest of Constantinople (Istanbul 1453 A.D.) until the 19th century.

Mannan (2005) revealed that awqaf also helped for the cause of Islamic education and research by establishing Madrasahs, schools, and public libraries. Waqf resources were used to construct libraries, reading rooms, for other research activities such as copying services by professional copies, center for decorative arts and also for residential quarters of the scholars etc. To encourage research, revenue of the Waqf properties was used to support translation programs so with the support of the Waqf funds Muslim scholars and scientists either wrote or translated a large number of books. Researches using scientific and empirical methods were encouraged and supported.

Abattouy and Al-Hassani (n.d.) and Mannan (2005) revealed that the Waqf funded the medical schools, and also covered various expenses such as the payment of teachers and students and their maintenance out of their revenues. The Waqf supported funds encouraged the development of medical science, provided facilities for education and better public health through establishment of medical schools, hospitals, and by encouraging development of local medicine and chemistry. By attending these hospitals students learned medicines and their applications. Students by attending hospitals used to learn medicines and their application.. Abattouy and Al-Hassani (n.d) expressed that medical education sometimes included in endowed schools, such as in the medicine teaching specialised school Al-Mansuriyya established by Al-Mansur ibn Qalawun in 683 H in Egypt benefiting from a wide range of shops and arable land. Similarly 'Imad al-Din Muhammad Al-Dnaysari established for medical education and graduation of doctors an endowed Al-Dnaysariya school in 686 H.

Hasan (2006) asserted that Al Azhar University of Egypt is one of the oldest and a major awqaf supported seat of Islamic teaching and research and higher education. Some madrasahs or orphanages have been successful in receiving waqf funds in Muslim communities, for generations. Awqaf provided support for education in different parts of South Asia. Therefore in south Asia like many other Muslim countries, almost all the functioning madrasahs, are established, financed, and managed through many awqaf funding. In Malaysia, awqaf funds establish and operate Islamic educational institutions, especially the pondoks (boarding schools).

White (2006) stated that in the Ottoman Empire in the mid-19th century, three-fourths of the lands were established as waqf lands; waqf 'agricultural land constituted one-third in Tunisia; and half of the size of land in Algeria' and even in the mid-20th century, one-eighth in Egypt. Today, in Bangladesh more than 123,000 mosques and more than 8,000 educational institutions alone are financed through waqf.

**Poverty Problem No. 4.****Lack of Shelter, Clothing, Empowerment and Waqf Contribution in reducing it**

Ahmed (2007) reported that most of the Awqaf were for mosques and education. The large investments in the social sector succeeded in transforming the society and empowering its poor segments. Only 'Awqaf offered education' (a way of empowerment), enabled the poor to obtain high levels of economic and political power by moving up the economic ladder (another way of empowerment).

Frenkel (2009) extracting from many studies revealed that endowment (Waqf) document occasionally, arranged for the distribution of clothing and provision of food.

Abattouy and Al-Hassani (n.d) narrated that the Waqf institution to a great extent in the Islamic history, had been relied upon for the provision of goods and services necessary for the comprehensive development of the community. When famous traveller Ibn Battuta visited Damascus, there were endowments for travelers, for giving them food, clothing, and the expenses of conveyance.

**Poverty Problem No. 5.****Lack of economic opportunity, economic resources and lack of income, and Waqf Contribution in reducing it**

Because if a person is not financially sound s/he cannot purchase good food and medicine, cannot get good education and training, cannot be happy and satisfied, cannot be a respectable member of society (specially in societies where wealth is a status symbol) and cannot be free to exercise political rights of opinion or vote (Khan and Khan 2011). Zuki (2012) wrote with reference to Ahmed (2004) that the historical role of waqf was very rich. It played an essential part in developing various aspects of the society and the economy.

Abattouy and Al-Hassani (n.d.) in their study narrated that in fact the main objective of all kinds of Awqaf, except Waqf ahli the private Waqf represented by the family endowments, is to reduce poverty by helping and supporting the needy and the poor. The Waqf went beyond meeting the immediate needs of the poor to provide means for the long-term amelioration of the deprived by providing them tools for earning income and climbing to higher social status. Waqf provided education, health care and taking charge of the elderly and handicapped were essentially processes to increase the productive capacity of persons on the lower economic strata and to reduce their economic burden. Waqf revenue supported schools offered education, to enable the poor to climb up the economic ladder and at times to obtain high levels of economic and political power. Among these objectives, after the building and funding of mosques and schools, and before spending on hospital and health services, the third big beneficiary of Waqf, is the category of the needy, poor, orphans and persons in prisons. Waqf revenues provided services and manifested concrete social solidarity to all these categories of needy people. Abattouy and Al-Hassani asserted that the study of Waqf deeds showed the great effort devoted to education in the history of Islam and the long life of the Waqf institution. Various service positions were provided for, demonstrating that madrasas (schools) were

centers of both social life and learning. Study of these documents showed that the highest-paid academic positions were professorships in fiqh (madrassa administrators earned even more). The Waqfiyyat allowed the scholar to contrast the higher wages and stipends offered in the field of law versus other subjects. Awqaf also provided a class of scholars ('ulama') and religious notables with an economic base, independent of the government authorities.

Ahmed (2007) mentioned a waqf of grain that was used as seeds, and forms of waqf to provide loans to persons who needed financing and provided services and supplementary income, to low-income people.

Hamouche (2007) expressed that in traditional Islamic cities urban management relied largely on endowment foundations voluntarily financed by the people, called as "Habus" in North Africa and "Waqf" in the Middle East. Habus through a sustainable and autonomous financial system depending on incomes from the assets of these foundations covered most municipal services and public utilities and also performed a significant socioeconomic role with regard to the needy. Habus (awqaf) had also a deep impact on the urban economy of cities in their regions. Foundations were in control of a great variety of industrial, commercial, and agricultural undertakings. Endowed assets occupying a strategic position within the economic networks were generators of capitals through economic vocations and leases, and insuring financial fluidity in the local markets.

Frenkel (2009) reported that in Dalamiyah madrasah built by Abu al-Abbas Amad ibn Zayn al-Din al-Khawajaki (d. 1443–44) in al-Zaliziyyah quarter of Damascus the orphans received 10 dirhams and their supervising shaykh was paid 60 dirhams per month.

Zuki (2012) also stated that, waqf provided as a part of the voluntary sector, certain welfare enhancing services to the society financed through the investment of the allocated resources. The waqf sector can be one of the best instruments for wealth redistribution between the rich and the poor and also managing it to decrease socio-economic disparities.

White (2006) wrote that in Dakha, Bangladesh a large shopping complex is a waqf property, financing a large auditorium, a publication house, and a mosque and providing employment to a large number of people.

#### **Poverty Problem No. 6.**

#### **Lack of Water (for drinking sanitation and irrigation), Public Utilities, Social welfare and Waqf Contribution in reducing it**

Hasan (2006) expressed that in modern times Awqaf provide shelters, deliver water to a locality, and supplying foods to children, etc.

Bello (2009) asserted that to combat poverty and enhance welfare in the society the institutions of Zakah and Waqf are among several instruments instituted by Islam. Waqf provides the material infrastructure and creates a source of revenue for use in, social welfare enhancing activities both at family, community and state levels.

Abattouy and Al-Hassani (n.d) narrated that in the Islamic history, the institution of Waqf to a great extent had been relied upon for the provision of necessary goods and

services for the comprehensive development of the community, ranging from various social institutions such as hospitals and schools to religious objects such as mosques, and welfare schemes like highway facilities and water supply. When Ibn Battuta visited Damascus, he was surprised by the wealth and variety of local Awqafs. Then there were endowments (Awqaf, Zakah) for paving and improvement of the streets. There were endowments also for supplying wedding outfits to girls of poor families unable to provide them and others for the freeing of prisoners. There were endowments for giving food, clothing, and the expenses of conveyance for travelers as well. Abattouy and Al-Hassani (n.d.) asserted that, in the Muslim community endowments as ongoing charity in the field of social welfare played a large role and importance of this role has been increased by the fact that the issues of social welfare did not have a specific state policy in, as was the case in the whole pre-contemporary world. This gives explanation of the exceptional development of Waqf institutions, whose impact has widely spread because of the attention of the endowments makers to provide social services on a large scale, by taking care of the sick the poor, and the Sufis, as well as providing them with accommodation, salaries, providing care for orphans and the wayfarers, and providing public water fountains. Thanks to endowments because due to Waqf institutions, public fountains flourished in Islamic locations. In the past obtaining fresh water was one of the hardest tasks, and bringing fresh water became one of the important tasks that endowers provided by erecting fountains everywhere inside cities, for providing drinking water to the needy usually near the mosques. Some models of public fountains through endowments included the construction of the wells, ponds, and springs for providing water for drinking and irrigation, in different regions and on the roads.

Frenkel (2009) quoted that there is long list of institutions depended on endowments that accommodated students, teachers, and Sufis. Examples of this development can be seen in remote places such as Gaza, Hisn al-Akrad, and Hamah. Endowments providing drinking water to passersby were even wider in scope. Sultans and commanders built several water fountains (called **Sabil**) in Cairo. Al-Nahir Muhammad, Barsbay, constructed additional water fountains in Cairo by waqf. Amir Sayf al-Din Qaraqaja al-Hasani (d. 1449) founded waqfiyah that contains clauses concerning a sabil (drinking water supply on road) and payment to a water bearer (saqi). In Jerusalem a sabil was incorporated into the Aashtamuriyah. Qaytbay restored a sabil in the courtyard of the Dome of the Rock in 1482. Every Muslim that entered the Haram had used this sabil. The endowment of caravanserais (hotels/motels) for the benefit of travelers fulfilled a similar social function. Awqaf also contributed to the general welfare of the Muslim community by financing the renovation of fortifications and walls (for protection and security), construction of bridges, and the ransoming of Muslims held in captivity by pirates (fakk al-asir).

### **Poverty Problem No. 7.**

#### **Deficient Social Relations, Poor Social and Cultural Life and Waqf Contribution in reducing it**

Zuki (2012) wrote that the waqf has very rich historical role because of playing an essential part in developing various aspects of the society and the economy.

It is pertinent to quote Abattouy and Al-Hassani (n.d.) once again who narrated that in fact the main objective of Awqaf, is to reduce poverty by helping and supporting the needy and the poor. The Waqf went beyond meeting the immediate needs of the poor to provide means for the long-term amelioration of the deprived by providing them with the tools for earning income and climbing to higher social status. Waqf took charge of the elderly and handicapped. The study of Waqf deeds showed the great effort devoted to madrasas (schools), which were centres of both social life and learning. Waqf with capital investment was directed towards supporting the needy and poor from a scale of individual charity to a scale of social civic institution. Abattouy and Al-Hassani (n.d.) asserted that, in the Muslim community endowments as ongoing charity in the field of social welfare played a large role and importance of this role has been increased by the fact that the issues of social welfare did not have a specific state policy in, as was the case in the whole pre-contemporary world. When famous traveller Ibn Battuta visited Damascus, he was surprised by the wealth and variety of local Awqafs. There were endowments for supplying wedding outfits to girls of poor families unable to provide them and others for the freeing of prisoners. There were endowments for travellers, for giving them food, clothing, and the expenses of conveyance. Then there were endowments for the improvement and paving of the streets. Abattouy and Al-Hassani (n.d.) narrated that the Waqf institution to a great extent in the Islamic history, had been relied-upon for the provision of goods and services necessary for the comprehensive development of the community, ranging from various social institutions such as schools and hospitals to religious objects such as mosques, and welfare schemes like water supply and highway facilities.

Hamouche (2007) mentioned endowments foundations founded as a conjugation of religious recommendations with social and historical circumstances. For example in Algiers the Andalusian community foundation, was established in response to the massive migration of Muslims during the Reconquesta from Spain, to accommodate refugees and provide them with first aid. The foundation seemed to alive in 1830, i.e. after three centuries of the tragedy, as it had a total of 96 properties among which 56 were houses in addition to an educational complex that was established in 1623. Habus (waqf) in old cities covered a myriad of municipal services (education, health, social welfare) and utilities (traffic system, potable water, defense). Most infrastructure (canals, streets, aqueducts) and public facilities (hospitals, schools, mosques, public baths, cemeteries) relied in their municipal management on Habus funds. Habus also played besides providing urban societies with services, a crucial role in the physical development of cities. Most historical buildings initially erected by rulers, high officers and notables, survived nowadays due to Habus system. There were some form of buildings complexes of 'Habus' combining religious, social and economic facilities like schools, hospitals, khans (guest houses), qaysariyyas and markets, creating urban nodes in the city that marked its physical structure.

Bello (2009) asserted that to combat poverty and enhance welfare in the society the institutions of Zakah and Waqf are among several instruments instituted by Islam. Waqf provides the material infrastructure and creates a source of revenue for use in, social welfare enhancing activities both at family, community and state levels.

Frenkel (2009) quoted that the list of endowments depended institutions that accommodated students, teachers, and Sufis is long. Their donors took great pains in specifying the distribution of clothing, food, and expenses that the Sufis and their shaykhs were to receive. The endowment of caravanserais for the benefit of travelers fulfilled a similar social function.

Zuki (2012) highlighted referring several studies that Waqf offered the opportunity to provide welfare services without involvement of the state because the waqf sector, was instrumental in the delivery of public goods, but cost nothing to governments. The key role of the waqf in providing public services in fact caused significant reductions in government expenditure and borrowing, which led to a reduction in the tax burden on the public increasing the savings potential, to be spent on private investment and growth. Results were the development of an active civil society, assisting in reducing inequality in society by redistribution of resources. Thus, in the Muslim world in addition to socio-economic roles, the waqf system played a big role in the development of a civil-political culture.

Cizakca (1998) and Abattouy and Al-Hassani (n.d.) wrote that from the Atlantic to the Pacific, all over the vast Islamic world, Awqaf system for centuries have financed and maintained magnificent works of architecture as well as myriad of services vitally important for the society.

Mannan (2005) also asserted that the Waqf-fund helped to establish the Center for Decorative Arts and contributed immensely toward the growth of Islamic architecture especially in the construction of mosques, schools and hospitals particularly during the Abbasid's period. In fact "functions, schools, hospitals, hostels, street fountains, shops, caravanserais, baths, even warehouses acquired great facades and decoration with the use of the most sophisticated and latest techniques of construction, for example the spectacular caravanserais of Anatolia in the thirteenth century. The reasons for this development are to be sought in a number of religious and social characteristics of the Muslim world such as the importance of 'work' is next to faith giving particular stress to social activities.

## CONCLUSION

In the above quoted literature some poverty dimensions have been highlighted and also the dimension-wise role Islamic waqf played in reduction of poverty. This was story of past but Islamic waqf can be used to reduce poverty even in modern times. Therefore Bello (2009) suggested that the institution of Waqf according to its past history can be used for poor sections of the society by mobilising additional resources to address socio-economic issues like: (a) Education, (b) Health care, (c) Skills and micro entrepreneurial development, and (d) Water and sanitation facilities in rural areas. Awqaf can also maintain a fund, properly invested, and utilised during famine and other crisis to help extreme poor to survive the crisis. Awqaf can help people in the context of countries with extreme poverty, facing starvation, death and diseases. In the contemporary socio-economic set-up the institution of Waqf should be seen as an additional source to support the program relating to poverty alleviation. For example White (2006) and Chepkwony (2008) mentioned that in Dhaka city (Bangladesh) Baitul Mukarram shopping complex finances a large auditorium for many sorts of activities a publication house, mosque, and

provides employment to a large number of people. Some of these waqf-financed establishments are for general welfare while others are meant for the poor alone, helping directly the poor by financing their expenses. For example, waqf for health, education, orphans, and also some physical facilities, which are important in the poverty-alleviation programs. In Bangladesh there are 8000 awqaf properties and 123000 mosques built on Awqaf lands. Hasan (2006) and Zuki (2012) also stated that, in modern times Awqaf provide as a part of the voluntary sector, certain welfare enhancing services to the society financed through the investment of the allocated resources e.g. shelters, delivering water to a locality, and supplying foods to children, etc. Thus Chepkwony (2008) asserted that owing to potential role of waqf in socio-economic development, and poverty alleviation many countries have established departments for public administration of waqf estates. Some countries have even started ministries to deal with waqf properties. Zuki (2012) argued that the waqf sector can be one of the best instruments for wealth redistribution between the rich and the poor and also managing it to decrease socio-economic disparities.

In Pakistan Awqaf properties are very rare and difficult to find. Only evacuee properties and few newly established trusts (though present concept of trust is not true waqf) are available. If well off people establish awqaf for poor people catering educational, health care and other basic needs then it would be a great service in this temporal world and also would be rewarded in the world after death. Government also has evacuee properties and if they are also managed like awqaf and their usufructs are passed on to poor segment of society then it would be an effective step in poverty reduction.

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## Inclusive Growth with Zakat

MUHAMMAD MAZHAR IQBAL

### 1. INTRODUCTION

Zakat is an annual religious levy that is collected from rich Muslims and its proceeds are disbursed among poor people of the society. It has many spiritual and social merits. For example, it purifies the hearts of zakat-givers as they give away a part of their wealth, one of the most precious things in their lives, seeking the pleasure of God without requiring any worldly gains whatsoever. It bridges the social gap between ‘haves’ and ‘have-nots.’ This study analyses, however, only economic consequences of Zakat for economic growth. They cannot be appreciated duly unless one understands the following concepts of modern economics; various theories of consumption, aggregate demand, stagnation thesis, consumption puzzle, marginal productivity of capital and Kuznets curve.

In classical economics, consumption is a negative function and saving is a positive function of interest rate while investment is a negative function of interest rate. As a result, at equilibrium interest rate in a closed economy, investment is always equal to saving. In other words, the issue of persistent deficient aggregate demand does not arise in classical framework. Therefore, occurrence and longevity of Great Depression became a puzzle for classical economists as they could not explain it. At that juncture, Keynes (1936) propounded an alternative theory that the main determinant of consumption and saving is current income, not interest rate. An important feature of Keynesian consumption function known as absolute income hypothesis (AIH) is that average propensity to consume decreases as income increases.<sup>1</sup>

An important implication of AIH is the ‘paradox of thrift’ or stagnation thesis. It states that as an economy grows over time, its overall average propensity to consume falls and thus the problem of deficient aggregate demand emerges.<sup>2</sup> Consequently, a downturn follows every spell of economic growth. It means that income distribution is relevant for economic growth. For illustration, consider two economies having exactly the same average per capita GDP but one is divided into two classes of ‘haves’ and ‘have-nots’ and the other has perfect equality. According to AIH, higher saving rate of the rich class in the former economy implies greater investment and economic growth in that economy. Therefore, a natural policy implication to accelerate economic growth is to

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<sup>1</sup>See Keynes (1936), Schifferes (2008) and Mankiw (2006).

<sup>2</sup>See Schifferes (2008).

create a class of rich businessmen by granting them investment subsidies, tax holidays and easy credit. As a matter of fact, many governments of the world actually adopted this policy. Supporters of this viewpoint contend that accelerated growth of a country also has the 'trickle down' effect for the poor as additional investment creates jobs and employment opportunities for them. As a result, their economic conditions also improve though their relative position compared with the rich class or income inequality in the country may worsen over time. However, an adverse consequence of having a class system in a society is that if richness and hence investment of upper class keeps on increasing, then excess capacity and deficient aggregate demand appear simultaneously in the economy which earmark a downturn in the economy.

Subsequent empirical researches mostly using cross-sectional and household data verified AIH. However, Kuznets' seminal study which used time series and aggregate data refuted AIH.<sup>3</sup> Kuznets concluded that  $\alpha$  is constant in the long run. These contradictory findings presented the consumption puzzle as to why  $\alpha$  of low-income households is greater than that of high-income households in the short run and as to why  $\alpha$  remains constant at aggregate level as GDP of a country increases over time. Friedman (1957) and Modigliani (1966) though resolved this puzzle to a great extent by propounding permanent income hypothesis (PIH) and relative income hypothesis (RIH) respectively, yet the debate on relevance of income distribution for economic growth, at least in the short run, has not ended.

Currently, on one side are mainstream economists who do not brush away AIH but still see little relevance of income distribution for economic growth. They are of the view that any deficiency in aggregate demand can be made up through alternative methods. Their viewpoint is generally known as 'Washington Consensus' that particularly emphasises five key policies; trade liberalisation and export-led growth, financial market liberalisation and financial capital mobility, fiscal and monetary austerity, privatisation, and labour market flexibility. A natural consequence of these policies is worsening of income distribution.<sup>4</sup> On the other side are new Keynesian economists who still accord much importance to income distribution for economic growth.<sup>5</sup> In their view, an equitable income distribution is extremely important to forestall any deficiency in aggregate demand or to avoid possibility of stagnation thesis in the long run. However, they are not so strict against an inequitable functional distribution of income that is between capitalists and wage earners as they are against an inequitable income distribution within wage earners that is between managers and production workers or between supervisory and non-supervisory staff. The reason is that any deterioration in functional distribution only disturbs the composition of GDP as a decrease in wages causes a fall in consumption while an increase in profits causes a rise in investment. On the contrary, any deterioration in income distribution within workers curtails aggregate consumption without causing a matching increase in investment. Therefore, they recommend income redistribution mainly within working class.

In line with classical thinking, another seminal study by Kuznets (1955) mitigated the importance of any scheme of income redistribution in a decentralised economy. He

<sup>3</sup>See Kuznets (1946) and Mankiw (2006).

<sup>4</sup>See Palley (2002b).

<sup>5</sup>See Palley (2001, 2002a, 2002b).

explored the historical evolution of income distribution and per capita output. He concluded that income distribution deteriorates as per capita output of a low-income country increases but after achieving a certain level of development, then income inequality starts smoothing out with further increases in per capita output. That is Kuznets' curve which shows the relationship between economic growth and income distribution is of inverse 'U' shape. Various reasons have been offered to justify this particular shape of Kuznets' curve. For example, one argument is that a stagnant or slow-growing agrarian economy in which wages as well as wage differentials are low starts growing fast when a small fraction of workers move to manufacturing sector in which wages are usually higher than those in agriculture sector due to greater capital intensity and wage differential are also higher due to the requirement of both skilled and unskilled workers. This process of transformation continues to generate higher growth rate but worsening income inequality unless majority of workers move to well-paying manufacturing sector and shortage of skilled workers is also made up over time. As soon as the economy is transformed from a predominantly agrarian economy to a predominantly industrial one, then further increases in per capita output generate equitable distribution of income.<sup>6</sup>

Aghion and Bolton (1994) gave another explanation. At early stages of economic growth, capital is owned mostly by the rich. Therefore, they get richer and richer by appropriating scarcity rent. However, after achieving a certain level of growth, capital accumulation abounds and scarcity-rent for capital disappears; then economic growth induces income equality. Perotti (1993) emphasised the political process for inverse U shape of Kuznets' curve. In his view, poor workers who are in majority at early stages of development take some time to mend the system in favour of subsidised loaning to them, thus promoting further growth along with a decrease in income inequality. The essence of all these explanations is that income distribution improves in the due course of development without requiring any deliberate effort of income redistribution on the part of government.

However, in the last quarter of twentieth century, it was noticed that many developing countries particularly Asian tigers experienced phenomenal growth without damaging their income distribution as suggested by Kuznets' curve. Moreover, many developed countries particularly USA which had been experiencing improvement in their income distribution since the end of World War II, have started experiencing worsening of their income distribution since 1970s.<sup>7</sup> These anomalies have casted doubts about universality of Kuznets' theory and thus have reinvigorated curiosity of academia to reassess the importance of income redistribution for economic activity at all stages of development of a country.

With this background knowledge, it may be argued that Islamic economics not only sides with those economists who favour an equitable income distribution within wage earners but it also accords even greater importance to equitable size and functional distributions. Any worsening of size and functional distributions though may not disturb aggregate demand in the short run, as argued, yet it certainly holds back economic growth because marginal productivity of capital falls as capital concentrates in few hands. Zakat

<sup>6</sup>See Ahluwalia, *et al.* (1979).

<sup>7</sup>See Piketty and Saez (2003), and Saez and Zucman (2014).

is imposed on a wage earner whose saving exceeds a certain amount called nisab and also on a capitalist whose asset holding exceeds nisab. It means that imposition of Zakat, long before Economics was introduced as a separate discipline of knowledge, not only endorsed the Keynesian concept of equitable distribution of income to foreclose any possibility of deficient aggregate demand but it also visualised the detrimental effect of wealth concentration in few hands for economic growth of an economy. The objective of this research is to highlight important features of zakat and to investigate through a simulation model the major concern of mainstream economists that any effort to redistribute income at an early stage of development jeopardises economic growth.

The scheme of this paper is that Section 2 presents theoretical background to appreciate economic significance of zakat that is normally interpreted merely a form of worship to God. Section 3 highlights important features of zakat to qualify it as an ideal tool for income redistribution. Section 4 presents a simulation model that compares economic growth with and without zakat. The last section is reserved for conclusion and policy implications, if any.

## **2. THEORETICAL BACKGROUND**

For a long time after the emergence of Economics as a separate discipline of knowledge, Say's law remained the dominant theory to explain aggregate consumption behaviour and output of a country. It can simply be stated as supply creates its own demand or a "general glut" (the term used in Say's time for a widespread excess of supply over demand) cannot occur. If certain goods remain unsold, it is because other goods which can be sold immediately are not produced in the country. Technically it implies that the equilibrating variable for both saving and investment is interest rate. Therefore, it is not possible in a market economy to have deficient aggregate demand and unemployment for a long time. Along with Adam Smith's theory of 'invisible hand', Say's law has been the other important doctrine used to support the laissez-faire belief that a capitalist economy naturally tends toward full employment without any government intervention. However, longevity and severity of Great Depression cast doubts about validity of this view. Classical economists could not offer any appealing reason to justify Great Depression which created a theoretical vacuum in this otherwise growing discipline of knowledge.<sup>8</sup>

At that point, Keynes (1936) conjectured a new consumption theory that was appealing psychologically but was not tested empirically before its statement. In his theory known as absolute income hypothesis (AIH), current income is the main determinant of consumption. Although Keynes admitted that interest rate can influence consumption as a matter of theory, yet he concluded on the basis of experience that influence of interest rate on individual consumption in the short run is secondary and relatively unimportant. Keynes contemplated a consumption function based on introspection and casual observations. It has two main features; marginal propensity to consume (mpc) is less than one and average propensity to consume falls as income rises. The second feature which is more relevant for this research can also be interpreted as consumption is the function of the poor and saving is the function of the rich.

<sup>8</sup>See Mankiw (2006).

Subsequently, many empirical researches conducted on cross-sectional micro data on consumption found that households with higher income saved a larger fraction of their income which confirmed Keynes idea that  $apc$  falls as income rises. However, two events discredited Keynes' consumption function a great deal. One was that due to voluminous increase in defense expenditures of the US government during World War II, GDP increased significantly. Therefore, assuming a significant fall in government expenditures after the war and a decrease in overall  $apc$  in the country due to high growth during war years, many economists predicted secular stagnation or emergence of deficient aggregate demand after the war. But contrary to this prediction, it did not happen to occur. The other is that Kuznets (1946) analysed almost a century-long aggregate data on consumption and concluded that  $apc$  was remarkably stable from decade to decade, despite large increases in per capita GDP over that period. This contradiction in Keynesian consumption theory and empirical findings of Kuznets presented the consumption puzzle which could not be resolved by professional economists for some time. Finally, Friedman (1957) and Modigliani (1966) gave respectively permanent income hypothesis (PIH) and life-cycle hypothesis (LCH) which justified falling  $apc$  in the short run and almost constant  $apc$  in the long run. It means that these consumption hypotheses did not discredit Keynesian consumption theory completely. Therefore, the debate about relevance of income distribution for economic activity has not ended yet.

Although AIH affirms the role of income distribution for economic growth, yet somewhat contradictory policy implications are drawn from it. On one side, it is argued that economic growth in a developing country can start only if its government encourages income inequality by providing investment incentives and tax holidays to business community. Supporters of this view further argue that a sustained increase in investment by rich people of the country has some 'trickle down' effect for poor people as well. As investment increases, they get well-paid jobs. As a result, their absolute poverty decreases and their economic conditions improve though their relative poverty may worsen over this period. On the other side is the stagnation thesis; as per capita output in a country grows over time, households consume a smaller and smaller fraction of their incomes or overall  $apc$  in the country falls. Consequently aggregate consumption may not be sufficient to absorb all output that is generated from profitable investment projects. As a result, on one hand, excess capacity on the supply side of the economy starts increasing and, on the other hand, aggregate demand on the demand side of the economy starts squeezing that threatens economic downturn.<sup>9</sup>

Another seminal study by Kuznets (1955) concluded that the relationship between economic growth and income inequality if plotted on a graph looks like inverse 'U'. That is, at initial stages of economic growth, income inequality worsens and after achieving a certain benchmark of economic growth, income inequality starts improving without any deliberate effort of income redistribution on the part of government. Many economists believe that the benchmark growth rate is achieved when a basically agrarian economy is transformed into an industrial one.<sup>10</sup> Kuznets' findings, in fact, mitigated the importance of stagnation thesis and left no room for any deliberate governmental effort to redistribute income from the rich to the poor.

<sup>9</sup>See Wikipedia (not dated) for excess capacity.

<sup>10</sup>See Acemoglu and Robinson (2002).

Although stagnation thesis sounds good theoretically, yet it has not occurred, so far, in any developed country as feared. Actually there are various government options and uncontrollable economic events which can postpone it for a long time. One such option is an increase in budget deficit either through an increase in government expenditures or through a cut in taxes. It raises aggregate demand that may counter any fall in aggregate demand due to falling overall apc in the country. Another option is an expansionary monetary policy that mostly results in an increase in bank lending to households, businessmen and corporate sector that may cover up any deficiency in aggregate consumption due to falling apc. Yet another option is initiation of an export promotion scheme as an increase in a country's exports offsets any deficiency in aggregate demand domestically. One such uncontrollable economic event is onset of a boom either in stock market or in real estate market or in both. It raises the value of wealth of ongoing businesses and households which, in turn, pushes up their investment and consumption demands. Another such event is that households change their preferences; they start consuming more and saving less. It also adds to aggregate demand of a country.<sup>11</sup>

All these options have been exercised and events have occurred, so far, either one after the other or in some combination or all together in many countries particularly in USA. Therefore, USA that is the citadel of capitalism has never experienced the brunt of stagnation thesis in its true form except in Great Depression. However, two developments, the widening income inequality in USA in the last three decades in face of continuous economic growth and sluggish economic recovery after the global financial crisis in 2007-08 have drawn the attention of academia again toward stagnation thesis. These developments have brought home two ideas which Keynesian consumption function implies; income distribution has serious consequences for economic growth and income distribution gets worse in a decentralised economy as it grows over time.

Having understood the relevance of income distribution for economic growth in conventional economics, one can appreciate that zakat, which was introduced for a primitive Muslim society fourteen centuries ago, has economic significance for a well-functioning capitalistic system like the current one. Zakat not only affirms that equitable distribution of income is congenial for economic growth but it also gives the details of an effective scheme of redistribution. That is, it specifies the period after which a deliberate redistribution scheme by the state has to be implemented and it also specifies the minimum redistribution rate for each type of assets. It may also be argued that in Islamic economics, an equitable income distribution and alleviation of poverty takes precedence over economic growth as zakat is imposed even if there is no growth in the economy.

### 3. BASIC FEATURES OF ZAKAT<sup>12</sup>

- (i) *State Tax*: Zakat is one of the five pillars of Islam. It is enjoined upon Muslims like an act of worship. However, in economic terminology, it can be translated as a wealth tax that is collected annually by the state from the wealth of a Muslim provided that it exceeds a certain limit called nisab. Zakat

<sup>11</sup>See Palley (2002a, 2002b).

<sup>12</sup>See Moududi (1990) and Shafi (1963).

proceeds are expended for the benefit of the poor. If the state does not collect zakat, then a rich Muslim is obligated to pay it directly to the poor.

- (ii) *Items Subject to Zakat:* Zakat is unanimously levied on gold, silver, cash or bank deposits, pasturing cattle, agricultural produce, mines and treasure troves. Regarding business assets and property held for commercial purposes, there are two opinions. One is that zakat is levied on their value. The other view which is supported by majority of Muslim jurists is that it is levied on the income generated from them. According to majority view, intermediate goods used for production of final goods like tools and machinery, and animals used for agriculture are not subject to zakat. Any property and durable goods possessed for personal use like dwelling houses, furniture and fixture, clothing, household utensils, books are exempted from zakat irrespective of their value.
- (iii) *Nisab or Exemption Limit:* The nisab is fixed in terms of gold, 7.5 tola equal to approximately 84 grams, and in terms of silver, 52.5 tola equal to approximately 612 grams. In case of cash and bank deposits, it is equivalent to the value of 84 grams of gold or the value of 612 grams of silver whichever is less. The nisab for agricultural produce is 5 wasaq equal to approximately 948 kilo grams and for pasturing cattle it depends upon the type of cattle. For example, in case of goats and sheep, it is 40 heads and in case of cows and buffalos, it is 30 heads.
- (iv) *Rate of Zakat:* Zakat rate is not the same for all zakatable items. It is 2.5 percent for gold, silver, cash and bank deposits. It ranges from 1 to 2.5 percent for pasturing cattle. It is 5 percent on the produce of irrigated land and 10 percent on the produce of non-irrigated land. It is 20 percent on treasure troves.
- (v) *Observable and Non-Observable Wealth:* Observable wealth like pasturing cattle and agricultural produce cannot be easily hidden whereas non-observable wealth like gold, silver and cash can easily be hidden from the state to avoid zakat. Therefore, Muslim jurists suggest that the state should collect zakat on observable wealth compulsorily even by force, if necessary, whereas state should leave payment of zakat on non-observable items upon the will of their holders.
- (vi) *Usage of Zakat Proceeds:* Zakat revenue can be spent only on 8 heads mentioned in Quran; poor, needy, state officials appointed for collection and disbursement of zakat, those whose hearts are to be made inclined and polite toward Islam, ransoming of captives, debtors, way farers and in the way of God. Currently fourth and fifth heads are not much relevant. Regarding the remaining heads except the thirds one, Muslim jurists have agreed unanimously that the poor should be given preference.
- (vii) *Miscellaneous:* Zakat is imposed if a Muslim possesses a zakatable item exceeding its nisab for the whole year. Zakat is calculated on the average or year-end value irrespective of fluctuations in its value over the year. If the quantity or number of one zakatable item possessed by a Muslim falls short of its nisab but their sum exceeds the nisab, then the person is liable to pay zakat. For illustration, a Muslim having 20 grams of gold, 20 sheep and 15 cows has to pay zakat. Zakat may be paid in kind or in equivalent cash on a single day or

over a period of time. It may be spent on a single head or on some of them or on all of them proportionately or discretionally. Zakat is preferably given in the possession of its recipient and is not donated to an institution from which a zakat recipient derives some benefits. The amount of zakat paid to a recipient should neither be less than a full day's normal meals, nor be greater than the value of nisab.

It is evident from basic features of zakat that it is levied on idle wealth whether inherited or self-accumulated, which has the potential to grow over time. The rate of zakat on a wealth item depends on the extent to which its growth depends on nature. For example, rate of zakat is minimum on pasturing cattle and maximum on non-irrigated land and treasure troves. Its beneficiaries are mostly down trodden people of the society. With these characteristics, zakat can be claimed as an ideal mechanism to discourage concentration of wealth in few hands and an ideal tool to redistribute income from the rich to the poor.

#### 4. ECONOMIC GROWTH WITH AND WITHOUT ZAKAT

For the following simulation, first of all population has to be divided into three groups; the rich class in which each member has idle saving or owns wealth in excess of the nisab, the middle class in which each member has idle saving or owns wealth that is less than the nisab and the poor class in which each member has little savings or lives below the poverty line. Zakat is imposed on the rich and its proceeds are disbursed among the poor. The middle class neither pays zakat nor receives it. Then capital stock of each class has to be approximated in order to determine aggregate supply of output in the country. For this purpose, Horrod-Domer growth model or a fixed output capital ratio has been used.<sup>13</sup> However, keeping in line with decreasing marginal productivity of capital, the output capital ratio for capital stock of rich class has been assumed the lowest and that for capital stock of the poor class the highest. With regard to functional distribution of income, it is assumed that a big part of output generated from capital stock of each class is retained by it in the form of profits. It is also assumed that wage earners of a lower class get a part of output generated from capital stock of a higher class in the form of wages but not the vice versa.<sup>14</sup> Capital stock of each class has been augmented by its annual saving and in accordance with AIH, saving rate for the rich class has been assumed the highest and that for the poor class the lowest. The simulation has been carried out just for 8 years because the difference in growth rate of per capita income without and with zakat becomes quite vivid over this period.

More specifically, to divide population into three classes, data on idle savings and capital stock is required that is not reported as such in any data source. Therefore, data from HIES 2011-12 reproduced in Table 1 and estimates of poverty line have been used for this purpose.

<sup>13</sup>For more details, see Ahluwalia, *et al.* (1979), Arif (1979), Chenery and Ahluwalia (1975) and Dagdeviren, *et al.* (2000).

<sup>14</sup>It is assumed to keep the simulation simple; otherwise there is no theoretical support in its favour.

Table 1

*Household Size and Saving, and Monthly Per Capita Income by Quintiles 2011-12*

Quintile	Income	Expenditures	Size	Per Capita	
	(Rs)	(Rs)		Income (Rs)	Saving (Rs)
Bottom	13307	13123	8.16	1631	184
2nd	16815	16413	7.40	2272	402
3rd	19928	18901	6.77	2944	1027
4th	24531	21741	5.96	4116	2790
Top	43858	34774	4.84	9062	9984

Source: HIES 2011-12; Tables 2.2 and 12.

The estimated poverty line on the basis of average calorie consumption per adult is taken from Jamal (2013) this is Rs 2013 per month for the year 2010-11. The estimated inflation rate for 2011-12 is taken from economic Pakistan Economic Survey 2011-12 that is 10.8 percent. Hence, the poverty line for 2011-12 comes out Rs 2230 per month that is very close to average monthly per capita income of second quintile in table 1 above. Therefore the bottom and second quintiles have been assumed to represent the poor class in our simulation. The nisab for cash holdings and bank deposits is the price of 84 gm gold or 514 gm silver whichever is less. It comes out very close to annual household saving of the top quintile. Therefore, the top quintile of population represents the rich class in our simulation. Capital stock for each class has been approximated from household saving as given in Table 1; it is 12 times the annual saving of each class. As a result, five quintiles in Table 1 are reduced to three classes in Table 2.

Table 2

*Household Size and Saving, and Annual Per Capita Income by Class 2011-12*

Class	Income	Expenditures	Size	Per Capita	
	(Rs)	(Rs)		Income (Rs)	Saving (Rs)
Poor	180732	177216	7.78	23418	3516
Middle	266754	243852	6.365	42360	22902
Rich	526296	417288	4.84	108744	119808

Source: HIES 2011-12; Tables 2.2 and 12 and calculations by the author.

To reflect the fact that marginal productivity of capital falls and excess capacity increases as capital accumulation of a class increases, the output capital ratios for capital stocks of the poor, middle and rich classes in the first year of simulation have been assumed as 0.7, 0.55 and 0.45 respectively. In every subsequent year, the output capital ratio of a class falls by the formula:

$$a_{p(t+1)} = a_{pt} + [(a_{mt} - a_{pt})(hy_{p(t+1)} - hy_{p1}) / (hy_{mt} - hy_{p1})]$$

where  $a$  denotes output capital ratio and  $hy$  denotes household income; the first subscript denotes the class such as  $p$  for the poor and  $m$  for the middle class and the second subscript  $t$  denotes the current period and  $t+1$  denotes the subsequent period.

Regarding the distribution of output produced, it is assumed that the poor class receives all the output generated from its capital stock in the form of wages and profits. In addition, the poor class receives 20 percent and 12 percent of the outputs of middle and rich classes as wages. The middle class retains 80 percent of its output as wages and profits and also receives 6 percent of the output generated from the capital stock of rich class as wages. The proportion of wages from the output of rich class going to the poor class has been kept higher than that going to the middle class because capital stock of middle class is good enough to absorb most of the wage earners of its class. The rich class retains 82 percent of its output as wages and profits. These figures have been chosen though arbitrarily, yet the resulting growth rate in per capita income comes out very close to the actual one that is in the range of 4 to 6 percent without zakat. The initial capital stock of each class increases in every subsequent year by its annual savings.

Since it is evident from Table 2 that average family size of a household falls as its income rises and average saving rate of a household rises as its income rises, therefore the family size of a class in our simulation decreases yearly by the formula:

$$fs_{p(t+1)} = fs_{pt} + [(fs_{mt} - fs_{pt})(hy_{p(t+1)} - hy_{p1}) / (hy_{mt} - hy_{p1})]$$

where  $fs$  denotes family size and  $hy$  denotes household income; the first subscript denotes the class and the second subscript denotes the period. For the first year of our simulation, family size of each class is exactly the one given in Table 1. For the rich class, the minimum household size has been assumed to be 4 and annual maximum household income to be Rs 800000. Similarly the saving rate of a class denoted by  $hs$  increases yearly by the formula:

$$hs_{p(t+1)} = hs_{pt} + [(hs_{mt} - hs_{pt})(hy_{p(t+1)} - hy_{p1}) / (hy_{mt} - hy_{p1})]$$

For the first year of our simulation, saving rate of the poor, middle and rich class is 1.9, 8.6 and 22.8 percent respectively as calculated from the data on household income and expenditures in Table 2. The maximum saving rate for the rich class has been assumed to be 30 percent arbitrarily.

The results of our simulation are presented in Table 3. The upper part of the table shows per capita income for each class in a conventional economy in which zakat is not introduced, whereas the lower part shows the results when 2.5 percent of household income of the rich class is transferred to that of the poor class.<sup>15</sup>

As the comparison of the last row of each portion in Table 3 shows that growth rate with zakat for each year of simulation is slightly greater than that without zakat. The reason is that the pronounced negative effect of zakat in the form of reduction in overall saving rate is offset by two least discussed positive effects; an increase in overall productivity of capital and a fall in overall household size. Indeed, overall saving rate falls as income of the rich class which has the highest saving rate is transferred to the poor class which has the lowest saving rate in the economy but overall productivity of the capital in the country increases because, after payment of zakat, saving and thus addition

<sup>15</sup>As mentioned above in section 3(ii) that there is difference of opinion about application of zakat on business assets or capital stock of a person. One view is that it is levied on the value of capital stock and the other view is that it is levied on the income generated from the capital stock. We have adopted the second view which is supported by majority of Muslim jurists.

Table 3

*Per Capita Annual Income Without and With Zakat*

Class\Year	1	2	3	4	5	6	7	8	
<b>Without Zakat</b>	Poor	23418	26255	28278	30456	33304	36537	40505	45195
	Middle	42360	44668	47149	49773	52836	56194	60017	64311
	Rich	108744	109903	122096	130705	142237	153602	166503	179987
	Average	48060	50350	54590	58232	62903	67813	73509	79800
	Growth		4.76	8.42	6.67	8.02	7.80	8.40	8.36
<b>With Zakat</b>	Poor	23418	28859	31304	34031	37730	41887	47069	53186
	Middle	42360	44668	47215	49798	52879	56226	60053	64345
	Rich	108744	106260	119173	126747	137898	148503	160735	173417
	Average	48060	50663	55242	58881	63823	68946	74995.8	81695.9
	Growth		5.42	9.04	7.59	8.39	8.03	8.78	8.93

Source: Calculations by the author.

to existing capital stock of the rich class which has the lowest output capital ratio and which is usually subject to excess capacity decreases whereas, after receiving zakat, saving and thus addition to existing capital stock of the poor class which has the highest output capital ratio and which is hardly subject to excess capacity increases. The negative relationship between household income and family size as is evident from HIES data given in table 1 further enhances economic relevance of zakat. An increase in family income of the poor class due to zakat helps them control their family size and thus raise their per capita income. Consequently saving and capital formation of the poor class also increases.

## 5. CONCLUSION

In Economics, the original view about functioning of markets was that supply creates its own demand or persistent unemployment cannot exist in a country. This view, however, could not explain severe unemployment during Great Depression and thus lost its allure. Keynes gave the alternative view that aggregate demand plays the dominant role in determination of a country's output and the main determinant of consumption is current income. The main feature of Keynes' consumption function, AIH, is that  $apc$  falls or  $aps$  rises as income rises. It indicated that income distribution is relevant for aggregate economic activity in an economy. However, contradictory policy implications are drawn from AIH. One is that a developing country can grow fast if its income distribution is tilted toward the business class. This policy ultimately helps the poor too; the channel is that an increase in investment by the rich creates jobs for the poor. The other is that worsening income inequality leads the economy to stagnate because of falling aggregate demand and increasing excess capacity. Many researchers on the basis of cross-sectional household data confirmed AIH. However, Kuznets on the basis of time series aggregate data concluded that  $apc$  remains constant as GDP of a country increases year after year. Indirectly, it revived the classical view that income distribution does not matter for economic activity and growth in the long run.

The subsequent theories of consumption, particularly PIH and LCH, reconciled findings of both cross-sectional micro data and time series aggregate data implying that Keynesian consumption function better explains short term consumption behaviour and classical view better explains long term consumption behaviour of individuals.

Meanwhile, Kuznets discovered in his later study that income distribution worsens at initial stages of economic development but improves automatically at later stages without requiring any deliberate income redistribution scheme from the government. This finding further minimized the Keynesian stance that income distribution matters for economic growth.

After these theories, one implication of Keynesian Economics that aggregate demand matters more in determination of equilibrium output was remembered very well but its other implication that an equitable income distribution is inevitable to ensure sustainable growth in aggregate demand was almost forgotten by academia in general and by policy makers in particular. Since then, many governments of market economies have used extensive demand management policies both fiscal and monetary and implemented export-promotion schemes to boost aggregate demand. On the contrary, they have hardly introduced any income redistribution scheme in their respective countries. Therefore, stagnation thesis with all its theoretical elegance has not been taken seriously so far.

However, incidence of recent global financial crisis, sluggish growth since its ending and worsening income distribution in last few decades in many market economies along with rising per capita income particularly in USA have brought the debate about stagnation thesis to limelight again. The attitude is, however, cautious as currently only inequitable income distribution within wage earners is targeted and no issue is taken with worsening of functional income distribution that is between capitalists and wage earners. In other words, the issue of excess capacity that is most probably an outcome of worsening size and functional distributions of income has not been paid due attention yet.

After browsing the main arguments regarding the logic of income distribution for economic activity in conventional economics, one can understand very well the theory behind the institution of zakat in Islamic framework. It endorses Keynesian standpoint that an equitable income distribution is a prerequisite for smooth expansion of aggregate demand and thus for sustainable economic growth in an economy. Furthermore, zakat being a tax on idle savings and capital assets highlights the fact that marginal productivity of capital decreases as it concentrates in few hands. Zakat also lays down the details of an effective mechanism of income redistribution. To investigate implications of zakat for economic growth, a simulation model about functioning of a market economy has been carried out. It incorporates three important functions of income. One is that  $aps$  increases as income rises; it is verified by HIES data used for this simulation. The other is that  $aps$  or capital concentration increases as income increases which, in turn, causes a decrease in marginal productivity of capital; it is not supported by the data used for this simulation but having similarity with the law of diminishing marginal utility of a commodity and being vivid from excess capacity in big firms, it sounds good. The last one is that family size is a negative function of income; it is also evident from the data used for this simulation. In literature, the first of these three functions is given more attention whereas the last two are neglected somewhat.

The results of our simulation that gives equal importance to all three functions clearly indicate that zakat is not detrimental but congenial for economic growth. They confirm that an expected decrease in aggregate savings and thus in capital stock due to any income redistribution scheme has been exaggerated whereas its positive effects on productivity of capital and on family size have been ignored to a great extent. Our results

therefore suggest that proper implementation of zakat, on one side, may minimise the need of discretionary demand management policies without ruling them out completely and, on the other side, may take care of the problem of excess capacity in an economy.

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## **Welfare Potential of Zakat: An Attempt to Estimate Economy wide Zakat Collection in Pakistan**

SALMAN AHMED SHAIKH

### **1. INTRODUCTION**

In Pakistan, Naveed and Ali (2012) in a most recent study conclude that as many as 58.7 million people in Pakistan are living in multidimensional poverty with 46 percent of the rural population and 18 percent of the urban households falling below the poverty line. It is natural to ask what the government is doing for these poor people and how much it can expend to end extreme poverty in Pakistan. If we look at the fiscal position of the government, we see that Pakistan has a very low tax to GDP ratio, i.e. 9 percent. As a result of low tax to GDP ratio and high current expenditure, the government is suffering from a large budget deficit. Often, the development spending is curtailed to contain the large budget deficit due to high non-discretionary current expenditures in debt servicing and security expenditure.

Expenditure on health and education is not even 5 percent of GDP in Pakistan. Due to such a low expenditure on developing human capital and maintaining health of the masses, poor people remain uneducated and unhealthy and hence they find it very difficult to get out of the poverty trap.

After deregulation of the banking sector in the 90s, a lot of commercial banks started operations in the private sector. But, their outreach is very low in rural areas where most of the poverty exists. Microfinance penetration is also very low in Pakistan. According to Pakistan Bureau of Statistics, 2.35 million people out of 58.7 million poor people are served with Microfinance. It shows that only 4 percent of the potential target market is currently served with Microfinance. Hence, there is a need to mobilise more resources to end extreme poverty in Pakistan. If we compute the crude poverty gap by multiplying the number of estimated poor people in Pakistan with the minimum annual income required to qualify as a non-poor according to dollar a day poverty line, we see that Pakistan requires around Rs 2,142.5 billion or approximately 7 percent of GDP to have zero poverty. However, this crude measure is unrealistic since it assumes that every poor person has zero income. But, this crude measure gives us an approximate conservative requirement of funds to end poverty in Pakistan.

In this paper, we discuss how the institution of Zakat can help in generating development funds and contribute in reducing poverty. We estimate the potential aggregate Zakat collectible in Pakistan economy and compare it with the poverty gap.

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The analysis will show the potential of the institution of Zakat to contribute in ending extreme poverty in Pakistan.

We proceed as follows. In Section 2, we present brief review of theoretical and empirical literature on Zakat. In Section 3, we present the effects of Zakat on wealth redistribution. In Section 4, we discuss issues in the estimation of Zakat. In Section 5, we present the estimation results. Finally, in Section 6, we discuss the economic effects of the institution of Zakat on business cycle stabilisation, tax rate smoothing, market competitiveness and the flow of investment.

## 2. BRIEF LITERATURE REVIEW

Zakat is an important institution in an Islamic economic framework for poverty alleviation and economic welfare. In Islam, Zakat is a religious obligation to pay a part of wealth and production to the government. As per Islamic injunctions, the government has to spend the Zakat funds on specified heads mentioned in Chapter Tauba, verse 60. Wahid (1986) explains that Zakat is a compulsory payment on the part of Muslims as a share to the poor, having a wide variety of economic and social ramifications.

In its economic character, Zakat is a combination of a net worth levy and a production levy. In early empirical literature on welfare potential of Infaq to alleviate poverty in Pakistan, Malik, *et al.* (1994) use micro data to establish that Infaq does have significant impact on reducing poverty gap. In a recent empirical study for OIC countries, Shirazi and Amin (2009) estimate the resources required for poverty elimination under US \$1.25 a day and US \$2.0 a day respectively. Their estimates for Pakistan suggest that Pakistan needs 1 percent of GDP for poverty elimination under US \$1.25 a day and needs 6.77 percent of GDP for poverty elimination under US \$2 a day. For Pakistan, Kahf (1989) use different Zakat categories and according to his estimate, Zakat collection can be between 1.6 percent of GDP to 4.4 percent of GDP.

In a more recent study, Azam, *et al.* (2014) in an empirical study for Pakistan establish that Zakat significantly enhances the welfare of the households. M. Akram and Afzal (2014) in an empirical study for Pakistan argue that Zakat disbursement among the poor, needy, destitute, orphans and widows has played a significant role in poverty alleviation. Their results show that there is an inverse relationship between poverty and Zakat disbursement both in the short run and in the long run.

In another empirical study for Bangladesh, Hassan and Jauanyed (2007) estimate that Zakat funds can replace the government budgetary expenditures ranging from 21 percent of Annual Development Plan (ADP) in 1983-84 to 43 percent of ADP in 2004-2005. For Malaysia, Sadeq (1996) finds that about 73 percent of the estimated potential Zakat collection will be needed annually to change the status of hard-core households to a status of non-poor households in Malaysia. Ibrahim (2006) contends in an empirical study for Malaysia that Zakat distribution reduces income inequality. His analysis reveals that Zakat distribution reduces poverty incidence, reduces the extent of poverty and lessens the severity of poverty. Firdaus, *et al.* (2012) estimate the potential of Zakat in Indonesia by surveying 345 households. Their results show that Zakat collection could reach 3.4 percent of Indonesia's GDP.

Some studies also show the comparative potential of Zakat as a superior tool for poverty alleviation. Debnath, *et al.* (2013) assess the effectiveness of Zakat as an

alternative to microcredit in alleviating poverty in Bangladesh. Through the Propensity Score Matching (PSM) techniques, the study reveals that the impact of Zakat scheme has proven greater than the microcredit programs. Besides that, the study also highlights that Zakat scheme significantly increases both income and expenditure of the recipients in comparison to the microcredit programs.

Some studies like Nadzri, *et al.* (2012) recommend integrating the various poverty alleviation and redistribution tools for creating synergies. The effectiveness of Zakat institutions may improve by collaborating with other institutions such as Microfinance institutions. Shirazi (2014) suggests that the institutions of Zakat and Waqf need to be integrated into the poverty reduction strategy of the IDB member countries. The proceeds of these institutions should be made as part of their pro-poor budgetary expenditures. Hassan (2010) suggests a model which combines Islamic Microfinance with two traditional Islamic tools of poverty alleviation such as Zakat and Waqf in an institutional setup. Hassan (2010) argues that the poor borrowers will have less debt burden as their capital investments will be partly met by funds from Zakat that does not require any repayment.

The institution of Zakat is very dynamic and flexible. In Umer (rta) and Abu Bakar (rta) period of government, Zakat was collected by the government. But, in Usman (rta) period, people were allowed to pay Zakat privately [Kuran (2003)]. Horses were exempted from Zakat in Prophet's time, but, Umer (rta) brought them in the Zakat net in His period. Similarly, Mahmud (2001) argues that the institution of Zakat is flexible to a certain degree as Umer (rta) levied Zakat on horses and skins and at the time when Arab was hit with a drought and famine, he exempted poor from Zakat and suspended Zakat from the rich. Usman (rta) also levied Zakat on the production in forests which was not the case in the earlier period [Nadvi (1996)]. Hence, a policy maker in a modern economy can use this institution flexibly to maximise the welfare benefits of the Zakat system.

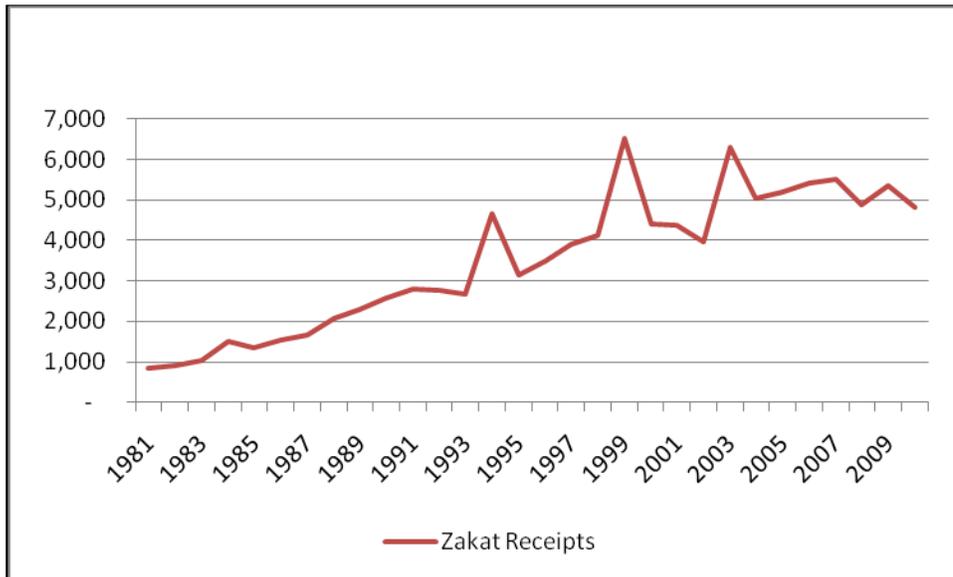
Nevertheless, Zakat is not collected by the government nowadays in most countries and is not considered a compulsory payment to the government [Powell (2009)]. Abu Bakar, *et al.* (2007) argue that there may be lack of proper implementation of Zakat in Muslim countries which limits the success of the noble aims of Zakat. Yusoff (2011) urges that every Muslim country must organise Zakat collection and Zakat spending in the most effective and efficient manner. Azam, *et al.* (2014) also suggest that there is a need to institutionalise the Zakat collection system to increase the overall Zakat collection.

One of the potential reasons for this state of affairs is that the mainstream Islamic scholarship allows taxes to be levied other than Zakat for mobilising public finance. Maududi (1970) argues that Zakat is a religious obligation and is not a substitute of tax. Taxes other than Zakat can be imposed in an Islamic economy if these taxes are levied by the legislative council and used for public welfare. He contends that the taxes discouraged in Ahadith are those which were imposed by the autocratic kings for their own lavish consumption and this kind of usurpation of public property was discouraged in Islam.

Apart from weak administration and implementation of Zakat system, another reason why Zakat collection is low at the central level in Pakistan is that there is a big and

growing trust deficit between the central government and the people. This trust deficit is reflected in the meager Zakat collection at the government level. As can be seen from Figure 1, Zakat collection and its disbursement is very low in Pakistan at the government level.

**Fig. 1. Zakat Receipts (in Million Rs)**



Source: Pakistan Bureau of Statistics.

In this study, we attempt to estimate potential Zakat collection at the economy wide level to explore the welfare potential of the institution of Zakat.

### 3. MATHEMATICAL COMPUTATION OF ZAKAT

In this section, we present a simple mathematical representation of the effects of Zakat on wealth redistribution. To begin with, we can represent lifetime wealth Zakat function for an individual 'i' as:

$$Z_i = \sum_{t=1}^n 0.025 (NZW_t)$$

Here,

$Z_i$  is Zakat liability of an individual 'i'.

Time period 't' runs from t=1 (current time period) to 'n' (terminal point of life).

$NZW_t$  represents net Zakat wealth. It is computed as  $(W_t - N_t)$ .

Where  $W_t$  is the gross amount of wealth and  $N_t$  is the value of Nisaab amount.

Nisaab is the minimum threshold level of wealth which is not subject to Zakat.

Zakat function of an economy for a particular year can be represented as:

$$Z_T = \sum_{i=1}^n 0.025 (NZW_i)$$

For a particular individual 'i', net Zakat wealth at a point in time is given by:

$$W_t = I_t - 0.025(NZW_{t-1}) + W_{t-1} - C_t$$

Here,

$I_t$  is the income of individual 'i' in time period 't'.

$NZW_{t-1}$  is the base of wealth that will be used for Zakat deduction.

$W_{t-1}$  is the wealth of individual 'i' in the previous time period.

$C_t$  is the consumption in time period 't'.

Simplifying the above equation, we get:

$$W_t = I_t - 0.025(W_{t-1} - N_{t-1}) + W_{t-1} - C_t$$

$$W_t = I_t - 0.025W_{t-1} + W_{t-1} + 0.025N_{t-1} - C_t$$

$$W_t = I_t + 0.975W_{t-1} + 0.025N_{t-1} - C_t$$

Expanding it iteratively forward, we get

$$W_{t+1} = I_{t+1} + W_t - 0.025(W_t - N_t) - C_{t+1}$$

$$W_{t+1} = I_{t+1} + 0.975W_t + 0.025N_t - C_{t+1}$$

$$W_{t+1} = I_{t+1} + 0.975(I_t + 0.975W_{t-1} + 0.025N_{t-1} - C_t) + 0.025N_t - C_{t+1}$$

$$W_{t+1} = I_{t+1} + 0.975I_t + 0.950625W_{t-1} + 0.024375N_{t-1} + 0.025N_t - 0.975C_t - C_{t+1}$$

It can be seen that the wealth function will diminish wealth overtime and overall wealth can only increase with increase in income, labor plus non-labor.

#### 4. ISSUES IN THE ESTIMATION OF ZAKAT

Shirazi and Amin (2009) argue that since there is no agreement among the scholars on the new wealth that may be brought under the Zakat net, there is an urgent need for the general agreement on the definition of the items, which may be taken as Zakatable items. This requires Ijmah of the ulama and other contemporary scholars on the issue.

On the need for extending the Zakat net by including all forms of wealth and produce, Qardawi (1999, p. 333) applies the methodology of qiyas (analogical reasoning) and reasons that the emerging and increasing types of wealth in the modern times such as bank deposits and financial securities like shares and bonds are also Zakatable [Qaradawi (1999)]. Abu Bakar, *et al.* (2007) also suggest that the 'illah' for Zakatability should no longer be productive property, but any property which is in excess of one's personal use.

That is why; wealth or assets subject to Zakat should include cash in hand or at bank, gold and silver, held-for trade inventory, real estate purchased for the purpose of resale and all types of financial investments in stocks, bonds, debentures, national saving schemes and mutual funds.

Likewise, production is not limited to agriculture nowadays. The major part of production comes from industries as well as services sector. Therefore, income from the industrial production could also be taxed just like agriculture. Services income could also be taxed on the same principle.

To summarize, Zakat should be levied as per the ceiling rates defined for each category of wealth or production. The classification is as follows:

- 2.5 percent on cash, wholesale value of held for trade inventory and wealth in excess of need. It is payable once a year at a particular set date.
- 5 percent on production value or any other income earning activity using both labour and capital. It is charged at the completion of the production process or realisation of income. Modern day analogous extension could be to use that to collect Zakat from manufacturing and service industries.
- 10 percent on production or any other income earning activity using either labour or capital. It is charged at the completion of the production process or realisation of income. Modern day analogous extension could be to use that to collect Zakat from income of self-employed practitioners, like lawyers, doctors, consultants, teachers or engineers. It could also include income from such sources where only capital is invested like equity investments in stocks, mutual funds and Real Estate Investment Trusts (REITs) etc.
- 20 percent on production using neither labour nor capital. This is applicable on treasure or any other natural gift obtained without using labour or capital. Modern day analogous extension could be to use that to collect Zakat from royalty income etc.

The derivation for production tax comes from the fact that the rain-fed lands were subject to a 10 percent production tax whereas, the irrigated land (which had to be provided with capital) were subject to a 5 percent production tax in Prophet's time.

Next, we discuss another important question that whether the investment in financial instruments shall be subject to wealth Zakat on total investment value or only the income from such financial investments shall be subject to income Zakat. Khan (2005) contends that investment in stocks should be interpreted as any other investment with some means of earning income. Investment in a stock is a means of earning dividend income or capital gains. Just like means of production/income are exempted from Zakat, investment in stocks should be exempted from wealth Zakat. Therefore, any income arising from investment in stocks must be subject to income Zakat. Similarly, this argument could be extended to introduce income Zakat on mutual funds, investment in National Savings Schemes (NSS), debentures, bonds etc. Furthermore, if a real estate is leased, the real estate becomes the means of earning rent for the owner. Hence, income Zakat could also be introduced on rental income.

However, if employees or directors are given bonuses in the form of stock ownership, they will have to pay 5 percent Zakat on income from investment in stocks. It is due to the fact that in this case, the participation in the business venture is not only by way of providing capital, but also by providing labour. One crucial advantage to this is that the directors will be willing to make the company grow and own its stock so as to benefit not only from dividend/capital gains, but also be able to pay less tax on that income i.e., 5 percent rather than 10 percent. This will also solve the agency problem as well in an effective way.

## **5. ESTIMATION OF ZAKAT**

Starting with agriculture, we first present some data that gives us an idea of how much Zakat could be collected both with current level of production and with enhanced

level of production with efficient utilisation of land. It can be seen from the following data that land size of 8.31 million hectares is unutilised cultivable land in Pakistan. Using the principle of “Ahya-al-Muat” (cultivating idle land), we assume that this land shall be fully utilised through suitable land reforms. If agriculture’s share is approximately 21 percent of GDP utilising 22.04 million hectares, an addition in production through utilisation of that idle farm land can be computed assuming constant returns to scale on average.

Table 1

*Land Utilisation (Million Hectares)*

Year	Total Area Cultivated	Cultivable Waste
1991	20.96	8.85
1992	21.06	8.86
1993	21.4	8.83
1994	21.51	8.74
1995	21.55	8.91
1996	21.68	8.87
1997	21.98	9.06
1998	21.96	9.15
1999	21.93	9.23
2000	21.96	9.09
2001	22.13	9.17
2002	22.27	8.95
2003	22.21	8.95
2004	22.12	9.1
2005	22.13	8.94
2006	22.65	8.21
2007	21.88	8.3
2008	21.28	8.18
2009	21.38	8.19
2010	21.4	8.09
2011	22.03	8.98
2012	22.04	8.31
2013	22.04	8.31

Source: Ministry of Food, Agriculture and Livestock.

### 5.1. Calculation of Nisaab for Individuals (Exemption Amount)

In Table 2, we show Nisaab computation. Nisaab amount is computed by taking the market value of 612 grams of silver in Pakistan as on March 18, 2014.

Table 2

*Nisaab Computation*

Price of Silver (10 Grams) in Rs	670
Nisaab of Zakat in Silver (612 Grams) in Rs	41,017

**5.2. Zakat Computation on Gold**

It is difficult to obtain micro data on gold holdings in Pakistan from aggregate indicators. For this reason, we conducted a survey of approximately 100 families in Karachi. Based on the reported asset holdings, we estimate that given a family owns a housing unit with minimum 3 rooms in an urban locality, it will possess on average 200 grams of gold. Most definitely, some families will own more or less than this; but, for Pakistan, this assumption seems to be close to the mean value based on the survey results. With our estimates, we arrive at Rs 2.78 trillion as the Zakatable value of gold in Pakistan as reported in Table 3.

Table 3

*Estimation of Zakat in Gold*

Total Housing Units in Pakistan (Source: WB 2009)	20,480,000
Total Housing Units in Pakistan (2014 Estimated)	22,000,000
Share of Urban Dwellings	32.20%
Share of Houses with Minimum 3 Rooms in Urban Areas	37.95%
Total Houses (Urban) with Minimum 3 Rooms (Source: PBS)	2,688,378
Per Housing Unit Gold Holdings in Grams	200
Amount of Gold in Grams	537,675,600
Price of 1 gram Gold (As on March 18, 2014)	Rs 5,168
Amount of Gold Value (in million Rs)	Rs 2,778,707

**5.3. Zakat Computation on Tradable Inventory**

It is very hard to compute the value of unsold inventory at a particular date. Wholesale and retail trade comprises 17 percent of total national income in Pakistan. Moreover, most of the informal sector is engaged in trading and that contribution does not usually show up in national income accounts.

To get a minimum estimate, we take the head 'change in inventories' from national income accounts. In national income accounting, 'inventory investment' represents value of production in a particular year that remains unsold during that year. It is assumed that the firm has itself purchased unsold inventory from itself. However, that figure in national income accounts gives an estimate of tradable inventory for production that had taken place only in

that year. The actual tradable inventory could be much more than that. In Table 4 as well as in 5, we report the estimation of Zakat on tradable inventory. We apply 2.5 percent rate of Zakat on the estimated value of tradable inventory.

#### **5.4. Zakat Computation on Value of Produce**

If potential Zakat collection is estimated using the classical method in which all liquid holdings like cash, bank deposits, equity investments, mutual fund investments, annuities investments and fixed income securities investments are subject to wealth Zakat, the estimation of Zakat is shown in Table 4. For estimating the value invested in stocks, mutual funds, national saving schemes, we take KSE market capitalisation, Assets Under Management (AUM) of mutual funds and outstanding balance of national saving schemes respectively.

However, if our proposal is applied, the results will be different as reported in Table 5. In our proposal, invested capital will be considered a means of earning income and only income from that invested capital shall be subject to Ushr (i.e. a 10 percent levy).

Likewise, produce from agriculture, industry and services shall also be subject to a 5 percent levy or Ushr. The production from irrigated lands shall be subject to a 5 percent levy. The production from rain-fed lands shall be subject to Ushr (i.e. a 10 percent levy). Since industries (manufacturing as well as services) are both labor and capital intensive, industrial production shall be subject to a 5 percent levy.

#### **5.5. Zakat on Livestock**

There are different rates of Zakat on different types of livestock. But, at least 2.5 percent Zakat is applied on different categories of livestock. Hence, we apply the conservative rate of 2.5 percent on livestock.

#### **5.6. Estimation of Aggregate Zakat**

##### **5.6.1. Classical Method**

In Table 4, we show the computation of aggregate Zakat from the classical method. Data on mutual funds assets is taken from Mutual Funds Association of Pakistan (MUFAP). Data on KSE market capitalisation is taken from Karachi Stock Exchange (KSE). Data on currency in circulation, outstanding volume of NSS, livestock population and agricultural produce is taken from Pakistan Bureau of Statistics (PBS).

Lastly, we add import duty in the estimation of potential source of public revenues. Umar (rta) charged a similar levy on imported goods into the state as was charged by other regions on the exported goods originating from the Islamic state. This method of reciprocal tariffs is analogous to the Most Favoured Nation (MFN) principle in World Trade Organisation (WTO). For potential import duty collection, we use the last reported weighted average import tariff rate in Pakistan, i.e. 9.53 percent.

Table 4

*Estimation of Zakat Based on Classical Approach*

Report Date	Category	Quantity	Amount (Mln Rs)	Zakat Collectible (Mln Rs)
<b>Zakat on Wealth</b>				
	Gold		2,778,707	
End-Jun 2013	Currency in Circulation		1,938,222	
End-Jun 2013	Deposits in Personal Category		3,516,096	
15-Mar-14	KSE Market Capitalisation		6,277,437	
18-Mar-14	Open End Funds		378,187	
18-Mar-14	Closed End Funds		19,894	
18-Mar-14	Pension Schemes		6,275	
End-Jun 2012	NSS		1,676,361	
14-Mar-14	Foreign Exchange Reserves		964,000	
End Jun 2013	Changes in Stocks/Inventories		366,545	
End-Jun 2013	Livestock Value (Cattle at Rs 40,000/Unit)	38,300,000	1,532,000	
End-Jun 2013	Livestock Value (Buffalo at Rs 40,000/Unit)	33,700,000	1,348,000	
End-Jun 2013	Livestock Value (Sheep at Rs 10,000/Unit)	28,800,000	1,152,000	
End-Jun 2013	Livestock Value (Goat at Rs 10,000/Unit)	64,900,000	2,596,000	
End-Jun 2013	Livestock Value (Camel at Rs 40,000/Unit)	1,000,000	40,000	
	Less: Nisaab Amount ( $P_{MNA} \times MNA$ )		492,204	
	Net Amount Subject to Zakat		24,097,521	
	<b>Total Wealth Zakat</b>			602,348
<b>Zakat on Produce</b>				
End-Jun 2013	Produce on Rain-fed Land		780,904	78,090
End-Jun 2013	Produce on Irrigated Land		2,342,711	117,136
	<b>Total Zakat Collection by Classical Method</b>			797,664
End-Jun 2013	Import Duty on Tariff		4,481,560	427,092
	<b>Total Zakat Collection by Classical Method and Import Tariff</b>			1,224,756

**5.6.2. Proposed Method**

In Table 5, we show the computation of aggregate Zakat from the proposed method. In this method, the only change is that income from invested capital in bank accounts, stock market, mutual funds and national savings scheme is subject to Ushr (i.e. a 10 percent levy).

Table 5

*Estimation of Zakat Based on Proposed Approach*

Report Date	Category	Quantity	Amount (Mln Rs)	Zakat Collectible (Mln Rs)
<b>Zakat on Wealth</b>				
Estimated (2014)	Gold		2,778,707	
End-Jun 2013	Currency in Circulation		1,938,222	
14-Mar-14	Foreign Exchange Reserves		964,000	
End Jun 2013	Changes in Stocks/Inventories		366,545	
End-Jun 2013	Livestock Value (Cattle at Rs 40,000/Unit)	38,300,000	1,532,000	
End-Jun 2013	Livestock Value (Buffalo at Rs 40,000/Unit)	33,700,000	1,348,000	
End-Jun 2013	Livestock Value (Sheep at Rs 10,000/Unit)	28,800,000	1,152,000	
End-Jun 2013	Livestock Value (Goat at Rs 10,000/Unit)	64,900,000	2,596,000	
End-Jun 2013	Livestock Value (Camel at Rs 40,000/Unit)	1,000,000	40,000	
	Less: Nisaab Amount ( $P_{MNA} \times MNA$ )		492,204	
	Net Amount Subject to Zakat		12,223,270	
	<b>Total Wealth Zakat</b>			305,582
<b>Zakat on Income/Production</b>				
<b>Ushr</b>				
End-Feb 2014	Deposits in Personal Category		3,516,096	20,956
18-Mar-14	KSE Market Capitalisation		6,557,000	131,140
18-Mar-14	AUM in Open End Funds		378,187	4,916
18-Mar-14	AUM in Closed End Funds		19,894	259
18-Mar-14	AUM in Pension Schemes		6,275	82
End-Jun 2012	Outstanding Amount in NSS		2,011,263	20,113
End-Jun 2013	Produce on Rain-fed Land		780,904	78,090
<b>Production Value / Income Subject to 5%</b>				
End-Jun 2013	Produce on Irrigated Land		2,342,711	117,136
End-Jun 2013	Ushr on Industry		4,605,762	230,288
End-Jun 2013	Ushr on Services		13,054,909	652,745
	<b>Total Zakat Collection</b>			1,561,307
End-Jun 2013	Import Duty on Tariff		4,481,560	427,092
	<b>Total Zakat Collection and Import Tariffs</b>			1,988,399

The weighted average deposit rate of 5.96 percent is used from the data provided by State Bank of Pakistan (SBP) for the period of the study. Hence, we apply Ushr on this average yearly return on bank deposits in the personal category. Average yearly growth in KSE 100 index value has been around 20 percent during 1998-2013. Hence, we apply Ushr on this average yearly return. Since mutual funds try to have diversified portfolio with income and equity financial securities, we apply Ushr on average return on KSE 100 during 1998-2013 and weighted average deposit rate. Lastly, since NSS are usually long term savings instruments, we apply Ushr on an average mean return of 10 percent on NSS securities.

To deduct the Nisaab amount at the aggregate level, we have to make an estimate of how many people have the wealth from various sources mentioned above exceeding Nisaab amount. We take a conservative route to assume that people in the top income quintile of the labor force will have wealth exceeding Nisaab amount. If we assume that top 20 percent people in the labor force have the wealth exceeding Nisaab amount; then:

$P_{MNA}$  = Number of people in the labor force x 20 percent

$P_{MNA}$  = 60,000,000 x 20 percent

$P_{MNA}$  = 12,000,000

MNA = Rs. 41,017 (as calculated above)

From Zakatable assets that are subject to wealth Zakat, we have to deduct the product [ $P_{MNA} \times MNA$ ],

$P_{MNA} \times MNA$  = Rs 492.2 Billion

We make this deduction in the computation of Zakatable value of assets and wealth.

Hence, the total Zakat collection comes to be close to 7 percent of GDP in Pakistan. Since the heads of Zakat include poor and destitute, it will force the government to use this spending on the welfare of the poor masses and by establishing educational and health institutions for the poor in the society. This can help the government to scale up its welfare spending on the poor. If we use the simple methodology adopted by Ahmed (2004), the potential Zakat collection fulfills the need of actual funds required for poverty alleviation. Ahmed (2004) uses a conservative crude measure of poverty gap by multiplying the number of poor people with the average minimum annual income of \$365 or dollar a day per non-poor person. This is a conservative measure since it assumes that poor people have zero annual income [Shirazi and Amin (2009)].

## **6. ECONOMICS OF THE PROPOSED ZAKAT BASED TAXATION SYSTEM**

Adam Smith in his monumental work "*An inquiry into the nature and causes of wealth of nations*" discusses the canons of taxation. The proposed Zakat based taxation system goes very well with Adam Smith's canons of taxation. It has a proportional tax and it does not tax production heavily. It is also simple and certain. It is convenient to collect and more so, because it is a religious obligation than just an involuntary tool for fetching wealth. It only taxes those who have the ability to pay i.e. it does not tax those who do not reach a minimum threshold of wealth in their hands.

On the macroeconomic front, proportional Zakat linked with income acts as an automatic stabiliser. When aggregate personal disposable income increases in economic booms, more Zakat is collected and more amount is available to the government for increasing transfer payments to *Fuqura* (poor and needy), *Masakeen* (extremely poor and needy) and *Gharimeen* (borrowers in trouble). When aggregate personal disposable income decreases in recessions, obligatory Zakat also decreases and thereby providing an automatic relief to the income earners when the incomes decline.

Besides the proportional income levy, Zakat on wealth redistributes wealth and reduces wealth concentration. So, if an economy is in disequilibrium and policies fail to immediately recover and boost incomes, wealth Zakat enables the distributive allocation that works independently of the business cycles and help stabilise the extremes of the business cycles. In this way, wealth Zakat acts as a permanent stabiliser.

When the personal disposable incomes decline in recessions, more people will become eligible for Zakat. Since Zakat is levied on both income and wealth, the

redistribution of wealth will always be functional and operative in an Islamic economy due to wealth Zakat. Transfer payments to the unemployed, poor, needy and debtors will continue even when the economy faces a recession.

Besides this, a consistent and credible low tax rate policy with broader Zakat base will help to minimise distortions, boost aggregate demand, encourage investment by decreasing costs of doing business and this could also simultaneously solve the microeconomic problems of imperfection in markets by increasing competition and reducing market power.

A uniform Zakat levy on wealth and produce can result in tax rate smoothing, stabilisation of business cycle and encourage long term investments and decision making without leaving the long term planner in the private sector to worry about fiscal policy reversals (i.e., Ricardian equivalence).

One possible question may arise here as to how such lenient tax rates would increase substantial public revenue. If the government has a fiscal deficit of 6 percent of GDP when corporate tax rates are 35 percent; then, how can reducing tax rates increase the revenue? The answer to this is given by the Laffer curve. Laffer (2004), a supply side economist, himself noted that Muslim philosopher Ibn Khaldun wrote about it in “The Muqaddimah”.

Higher tax rates discourage entrepreneurship as they decrease the incentive to produce. Lower tax rates encourage entrepreneurship and hence increase the size of the production sector and hence production. With the increase in production, tax revenue in amount increases because of a larger base. Hence, lower tax rates can still ensure high tax to GDP ratio. This is evident from Table 6 which lists countries with corporate tax rates below 20 percent and their tax to GDP ratio.

Table 6

*Corporate Tax Rate and Tax to GDP Ratio*

S. No.	Country	Tax to GDP Ratio	Corporate Tax Rate
1	Chile	17.1%	17%
2	Bulgaria	34.4%	10%
3	Czech Republic	36.3%	21%
4	Georgia	21.7%	15%
5	Greece	33.5%	22%
6	Hong Kong	12.8%	16.5%
7	Hungary	37.3%	16%
8	Iceland	40.4%	18%
9	Ireland	34%	12.5%
10	Kazakhstan	26.8%	15%
11	Netherlands	39.5%	20%
12	Poland	33.8%	19%
13	Romania	28.1%	16%
14	Russia	36.9%	20%
15	Serbia	34.1%	10%
16	Singapore	13%	17%
17	Slovakia	29.5%	19%
18	Switzerland	30.1%	13%-25%
19	Turkey	32.5%	20%
20	Uzbekistan	21%	12%

Source: International Tax and Business Guides- Economic Data – Statistics – Tax – EIU – The Economist.

If this system is enforced with sincerity by the government, along with the commitment of the general public and the public/private sector partnership, this can put an end to extreme poverty in Pakistan.

### 6.1. Effects of Proposed Zakat System on Property Market

In the proposed method, there will be a 10 percent income tax on the gain on sale of a property. If the gain on sale is less than 25 percent, the tax in amount will be more if the property is kept in ownership than when it is sold. This will increase the supply of land that was not presented for sale before. The increase in supply will bring the prices of properties down. Hence, affordable housing and commercial facilities will come in the reach of consumers and commercial enterprises respectively.

A simplified numerical example is presented below:

Property value at $t_0$ : PKR 1,000,000
Property Prices increase at $t_1$ by 10 percent: PKR 1,100,000
If property is kept at $t_1$ , 2.5 percent tax on property : PKR 27,500
If property sold at $t_1$ , 10 percent tax on gain on sale : PKR 10,000
Net Zakat Differential: PKR 17,500

If the property owner does not want to sell the property and wants to use it in the future and also wants to benefit from the fiscal incentive, then he can give the property to someone on rental basis for use. He will retain the ownership, but it will be considered an investment and hence instead of wealth tax, 10 percent income tax will be charged on rental income.

Property value at $t_0$ : PKR 1,000,000
Assume that property is given for use on rental basis @10 percent/year of property value
If property is kept at $t_1$ , 2.5 percent tax on property : PKR 25,000
If property is rented until $t_1$ , 10 percent tax on rent : PKR 10,000
Net Zakat Differential: PKR 15,000

### 6.2. Effects of Proposed Zakat System on Investment

Private sector investors including both local and foreign investors have an essential role to play in achieving the desired growth and development targets in an Islamic economy. The goal is not only to redistribute the pie, but to increase the pie as well. The lenient tax rates will decrease the tax expense of firms and allow them to have more resources for reinvestment and profit distribution among shareholders in the form of dividends. Lenient tax rates could also help in increasing the inflow of FDI.

It can be seen from the illustration presented above that if any form of wealth is put into investment, its nature for fiscal treatment changes and tax saving of at least 2.5 percent results on the gross investment value. For instance, if there is no income on an investment, then still 2.5 percent tax saving results and no income tax is to be paid since there is no income.

### 6.3. Effects of Proposed Zakat System on Capital Markets

In an interest free economy, the savers will have to make a choice between keeping their money idle and pay wealth tax or invest it in some asset or enterprise and pay the tax only on income if it is earned. A simplified numerical example is presented below:

Value of Stock of Company A at $t_0$ : PKR 100
Stock Prices increase at $t_1$ by 10 percent: PKR 110
If no investment in stock or other assets, wealth Zakat will be : PKR 2.75
If stock is owned and sold at $t_1$ , 10 percent tax on gain on sale will be : PKR 1
Net Zakat Differential: PKR 1.75

In the proposed approach, if Return on Investment (RoI) is below 25 percent, less Zakat is to be paid in monetary terms as compared to wealth Zakat in the classical approach. If the shareholder does not want to sell the stock, but still wants to benefit from the fiscal incentive, he can keep the stock in ownership and pay tax only on dividend income. Purchase of stocks for capital gain/dividend will be considered as an investment and hence instead of wealth tax on full investment value, only 10 percent income tax will be charged on actual income earned. A simplified numerical example is presented below:

Value of Stock of Company A at $t_0$ : PKR 100
Company A is profitable and pays 10 percent dividend
If no investment in stock or other assets, wealth Zakat will be : PKR 2.75
If stock is kept in ownership till $t_1$ , 10 percent tax on dividend : PKR 1
Net Zakat Differential: PKR 1.75

If Dividend Yield (DY) is 10 percent, less Zakat is paid in the proposed approach as compared to wealth Zakat in the classical approach. It shows that investment is encouraged rather than keeping idle wealth in an interest free economy in the presence of the institution of Zakat.

## 7. CONCLUSION

Islamic economics literature is rich in describing the welfare potential of Zakat, but very few empirical studies have undertaken the quantitative estimation of potential Zakat collection. In this study, we attempted to estimate potential Zakat collection at the economy wide level to document the welfare potential of the institution of Zakat. In our estimation exercise, we attempted to estimate economy wide Zakat collection by including heads like Zakat on agriculture produce, value of livestock, tradable inventory, currency in circulation, foreign exchange reserves, estimated gold and silver deposits and financial assets like investments in National Savings Scheme (NSS), mutual funds, stock market capitalization, pension schemes and bank deposits. Our estimates suggest that approximately Zakat collection in Pakistan could reach 7 percent of total GDP and is sufficient for covering poverty gap in Pakistan. We also discussed that the institution of

Zakat system can also have positive effects on the flow of investment, promoting entrepreneurship culture and making capital markets and real estate markets more competitive and liquid. At the macroeconomic level, we also discussed the role of institution of Zakat as stabiliser and a countercyclical support mechanism to deal with welfare issues.

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