Impact of Agricultural Land Inequality on Human Development in Punjab (Pakistan)

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Abstract

Inequality of income, wealth and assets has important implications for different socioeconomic outcomes. This study investigates the impact of agricultural land inequality on human development across the districts of Punjab (Pakistan). Human Development Index (HDI) and Non-income Human Development Index (NIHDI) have been used as proxy for human development. Agriculture land inequality, HDI and NIHDI have been calculated by utilizing data of four waves of Multiple Indicators Cluster Survey. By using fixed effect model for the period of 2003-2014, we have found that agricultural land inequality has negative and significant relationship with human development across the districts of Punjab. The study suggests redistribution of agricultural land as a strategy to improve the status of human development.

Keywords: Agricultural Land Inequality, Human Development, Punjab, Pakistan

JEL Classification: Q15, O1

1. Introduction

Gross domestic product (GDP) or GDP per capita cannot be considered as a sole determinant of progress of human development in a country. Human development in a society can be affected by number of factors such as choices and preferences of individuals reflected through their consumption pattern and their willingness to invest in education and health and public policy exercised by government. Nonetheless, an increase in human development can be expected to be strongly correlated with an increase in income and wealth of individuals and societies. People living in rich countries, generally, have higher level of education and better health as compared to people of poor countries. Similarly, within a country, affluent individuals are expected to be more educated and healthier than poor. A concave relationship is assumed where income and wealth have positive effects on education and health outcomes and such effects are greater and more pronounced among the poor than the rich (Deaton, 2003). Therefore, redistribution of income and wealth from rich to poor, within countries, or among the countries, will enhance human development (Preston, 1975; Dasgupta and Ray, 1987; Gradstein and Justman, 1997; Easterly, 2001, 2007). Egalitarian societies have more social cohesion, better solidarity, less likelihood of conflict among different ethno-linguistic groups (Deaton, 2003; van staveren and Pervaiz, 2017) better performance in terms of human development (Easterly, 2001) and economic growth (Pervaiz and Chaudhary, 2015). The societies that have more equal distribution of wealth or assets enlarge their citizens' choices by offering more social capital, more public goods and more social support (Wilkinson and Pickett, 2009).

The relationship of distribution of income with different indicators of development has been studied by different researchers (Webb, 1977; Preston, 1975; Lecaillon et al., 1984; Dasgupta and Ray, 1987; Adelmon and Robinson, 1988; Ravallion,, 1997; Deaton, 2003; Easterly, 2001; 2007). But the relationship of inequality of assets or wealth with human development has not been much explored in literature. The studies which have tried to explore this relationship have often relied upon the data of income inequality as a proxy for wealth inequality (Bénabou, 1996). However inequality of wealth and assets can plausibly be more relevant in exploring such relationship than the inequality of consumption or income (Ravallion, 2012). According to Avery and Elliehausen (1986) wealth is even more unequally distributed than income globally. To support their argument, they provided a comparison of wealth and

income distribution according to which, the share of wealth of the top one percent of wealth owners was estimated to be 38.9 percent, while the share of the top one percent of income recipients was estimated to be 16.4 percent. The top quintile of wealth holders owned almost 85 percent of total household wealth, and the top quintile of income recipients received just over 50 percent of total family income.

A skewed distribution of wealth or assets can deteriorate the free market system which can be dangerous for human wellbeing of a society (Smith, 1776). It is observed that owning assets improves household's productivity and capability which can be helpful to increase economic development (Deere and Doss, 2006). Asset inequality reduces human development and enhances human development inequalities among different regions (Schneider, 2004). Human development disparity among the regions may create a severe type of rivalry and distrust among the different regions of a country which can be dangerous for social cohesion (Pervaiz and Chaudhary, 2010). Existing literature has started discussion on how asset inequality is harmful for capital accumulation and economic growth. First, it is identified that inequality of assets produce social and political instability, which weakens motivations to save and invest. Second, it reduces human capital accumulation by damaging the poor section of the society. Finally, inequality generates socio-political instability which puts pressure on governments to redistribute wealth which can reduce economic growth by reducing incentive to invest (Benabou, 1996). A lower economic growth can further lead to the retardation of human development. This observation has justified that it is needed to estimate empirical implications of asset inequality for human development.

Present study has investigated the impact of agricultural land inequality on human development. Distribution of agricultural land has significant role in the development of economies (Stigler, 1965; Tawney, 1932 and Breman, 1983). The countries where agricultural land inequality has been reduced through land reform programs have higher economic development as compared with those countries which have not initiated such reforms. Japan, South Korea and Taiwan are among the famous examples of the countries which can be placed in the category of the countries which implemented such reforms whereas some of Latin American and south Asian countries like Pakistan can be placed in the category which have not undergone

land reforms and therefore have lower economic development (Adelman, 1979; Alesina and Rodrik, 1994). However, the hypothesis that land inequality is harmful for human development of a society is rarely tested empirically. We have used Panel data from 2003 to 2014 for all districts of Punjab to test this hypothesis.

2. Literature Review

The implications of income inequality have been studied extensively in economic literature. Income inequality can retard human development through its effects on economic growth. It lowers down the potential of economies to grow (Alesina and Rodrik, 1994; Perotti, 1996; Alesina and Perotti, 1996; Dahlby and Ferede, 2013; Piketty, 2014) through different channels. These channels include liquidity constraint of the poor (Galor and Zeira, 1993), a rise in demand for distribution (Alesina and Rodrik, 1994), a rise in social conflict (Alesina and Perotti, 1996; Rodrik, 1999), deterioration in human capital accumulation (Acemoglu and Robinson 2000; Bourgignon and Verdier 2000; Easterly, 2001) deterioration in the quality of institutions (Easterly et al., 2006) and corrosion of social cohesion (Kawachi and Kennedy, 1997; Kawachi et al. 1997). In the presence of high income inequality and poor economic growth, incomes of masses would be lower and they will be bound to spend less on education and health.

Alesina and Rodrik (1994) and Persson and Tabellini (1994) suggest that, there will be high demand for redistribution in unequal societies. But higher redistributive taxation will have damaging effects on economic growth by lowering down the incentives for investment in physical and human capital. Alesina and Perotti (1994) have also found the empirical evidence of the positive effect of improved wealth distribution on political stability, domestic demand and economic growth rates. Birdsall et al. (1995) suggest a negative relationship between income inequality and economic growth for a sample of East Asian economies. Alesina and Perotti (1996) describe that inequality can create unrest and conflict in the society which will hinder economic growth. Perotti (1996) also provides strong empirical support between income distribution and sociopolitical instability. Excessive inequality can create divisions in the society and unrest among the labourers due to which demand for redistribution of income, assets and resources will be made and in turn, it will hinder investment and economic growth (Benhabib and Rustichini, 1996). According to Barro (1999) inequality-growth relationship is contextual

specific. Inequality retards growth rates in poor countries and encourages growth in rich countries.

Apart from economic growth, income inequality also appears to be correlated with poor democracy and poor provision of public education. It is also related with higher crime rates (Fajnzylber et al. 2000) which can retard economic growth by creating unrest in the society. On the other hand, fair income distribution leads to improved nutrition, more employment and greater output growth. Inequality leads to political instability which further damages institutional arrangements. Bad quality of institutions and political instability retards the economic growth and development. Schultz (1988), Becker and Chiswick (1966), Psacharopoulos (1977) and Gregorio and Lee (2002) found a negative association of income inequality with human capital (Galor and Zeira, 1993; Perotti, 1996; Galor and Moav, 2006; Galor et al. 2006).

Income inequality is also associated with high school dropout rates, less public spending on education and low literacy rates (Kaplan et al., 1996). Income inequality can result elite dominance in the society. The ruling oligarchy would resist mass spread of education because they feel threatened that more educated people are more likely to demand their political rights and redistribution of income (Bourguignon and Verdier, 2000; Rajan and Zingales 2006). Thus investment in the education of masses would remain low (Acemoglu and Robinson, 2000).

Tsai et al. (2004) studied the relationship of income inequality and social infrastructure with economic development acros the developing countries of the world. The study concluded that social infrastructure had strong positive relationship whereas income inequality had negative association with economic development. Those countries which were more efficient in social infrastructure and had equality in income had better economic development as compared to other countries.

Galor and Zeira (1993) postulate that poor are liquidity-constrained from accumulating human capital; higher inequality implies a greater share of population will be liquidity constrained and thus the society accumulates less human capital. The negative effects of inequality on different developmental outcomes including education and health have also been documented by some other researchers. Easterly (2001), for example, argues that more egalitarian societies with less ethnic diversity (which he terms as middle class consensus) have better education, better health, better infrastructure, better economic policies, less political

instability, less civil war, more safe ethnic minorities, more social modernization and more democracy. Income inequality may also cause education inequality (Chani et al., 2012) which would restrain common people's access to education and eventually human capital formation might remain low. On the other hand, equality may alleviate adverse effects of credit constraints on human capital accumulation (Galor and Maov, 2004). Similarly, inequality of asset and wealth reduces human capital (Pickett and Wilkinson, 2015; Cesarini, Lindqvist, Östling and Wallace, 2016; Karagiannaki, 2017; Ward and Viner, 2017).

3. Theoretical Framework, Methodology and Data

An overview of existing literature shows that inequality can be an important predictor of different economic and development outcomes. Social inequality harms development and has inimical effect on society (Marx, 1867). "No society can surely be flourishing and happy, of which the far greater part of the members are poor and miserable" (Smith, 1776). Asset inequality has negative effects on the level of education and economic growth in developing economies (Deininger and Squire, 1998. Variation in the degree of land ownerships depicts the variation in human capital (Sokolof and Engerman, 2000). Micro level studies indicate that distribution of assets matter more as compared to the distribution of income and ownership of assets is the key predictor of household welfare (Oswald 1997; Bardhan et al. 2000).

Inequality of agricultural land can have retarding effects on human development particularly in developing economies like Pakistan where land distribution is not merely about the distribution of assets but also indicates the distribution of political power. A skewed distribution of agricultural land strengthens elite dominance in the society who would oppose mass spread of education and public policies would be formulated to benefit elites (Galor and Zeira, 1993; Galor and Moav, 2006). Present study has investigated the impact of agricultural land inequality on human development across the districts of Punjab (Pakistan) by using the following econometric models. HDI and NIHDI have been used as proxies of human development in our models.

$$HDI_{it} = \alpha_1 + \beta_1 LINQ_{it} + \beta_2 SI_{it} + \beta_3 TFR_{it} + \beta_4 UNP_{it} + e_{it} \quad (1)$$

$$NIHDI_{it} = \alpha_1 + \beta_1 LINQ_{it} + \beta_2 SI_{it} + \beta_3 TFR_{it} + \beta_4 UNP_{it} + e_{it} \quad (2)$$

Where

HDI= Human Development Index

NIHDI= Non Income Human Development Index

LINQ= Agricultural Land Inequality

SI= Social Infrastructure

FR= Fertility Rate

UNP= Unemployment Rate

e= Error Term

i= Number of Cross Sections (1, 2'……' 34)

t= Time Period (2003' ……' 2014)

We have used panel data framework for investigating the impact of agricultural land inequality on human development across thirty four districts of Punjab (Pakistan). We have used panel fixed effect model because it is considered as an appropriate approach in case of existence of heterogeneity and structural characteristics diversity across cross-sectional units. In fixed effects model, intercept term is treated as cross-sectional specific and slope is assumed to be constant across all cross sections (Gujrati, 2009). The Haussmann test has been applied to decide about the suitability of the usage of fixed effect model. HDI and NIHDI have been used as dependent variables alternatively as proxies of human development in two different models. Agricultural Land Inequality, Social Infrastructre, Fertility Rate and Unemployment Rate have been used as independent variables. Data used in this study is for the period of 2003-2014 which has been extracted from four waves of Multiple Indicators Cluster Survey, Pakistan Social and Living Standard Measurements Survey and Punjab Development Statistics. A brief description of the variables used in this study is as given below

3.1 Human Development Index (HDI)

We have constructed human development index (HDI) for the period of 2003 to 2014 for thirty four districts of Punjab. HDI introduced by United Nations Development Program (UNDP, 1990) in its first human development report is a better measure of human development due to holistic approach used in its construction. The index measures the degree of development by using three basic elements of human development: a long and healthy life, access to knowledge and decent standard of living. HDI is the geometric mean of three normalized sub-indices

measuring the improvements in above mentioned three dimension (UNDP, 2011). These three sub-indices are termed as income index, education index and health index. Income index measures achievements in decent standard of living, education index measures achievements in access to knowledge and health index measures achievements in the objective of long and health life. Equation 3 describes the construction of HDI with the help of its three sub-indices.

$$\text{HDI} = (\text{Income Index}.\,\text{Education Index}.\,\text{Health Index})^{1/3} \quad (3)$$

A brief description of the construction of three sub-indices i.e. income index, education index and health index is as given below.

3.1.1. Income Index

For the construction of income index, we have calculated per capita income for all districts of Punjab by using household data from different waves of Multiple Indicator Cluster Survey (MICS). The calculated per capita income has then been converted in to purchasing power parity (PPP$). An income per capita of $100 and $75,000 have been set as a minimum and maximum goal posts to calculate income index by using the following formula given in equation 4

Income Index (INI) = (ln (actual) – ln (minimum)/ ln (maximum) – ln (minimum) (4)

3.1.2. Education Index

Education index has been constructed with the help of two of its sub-indices termed as mean years of schooling index and adult literacy index. Education index is the summation of these indices whereby two third of the weight has been assigned to mean years of schooling index and one third weight has been assigned to adult literacy index. For the construction of mean years of schooling index, mean years of schooling of population aged 15 years and above has been used. Adult literacy rate index has been constructed by using literacy rate of age 15 years and above. 100 percent is considered as maximum and 0 percent as minimum goal post for the construction of adult literacy index. For mean years of schooling 0 is used as minimum and 15 is considered as maximum (UNDP, 2015). Education index has been obtained by combining

these two indices by assigning two-third weight to mean years of schooling index and one-third weight to combine enrollment index. Equation (5), equation (6) and equation (7) explain the mechanism involved in the construction of education index.

Mean Years of Schooling Index (MYSI) = actual – minimum/maximum – minimum (5)

Adult Literacy Index (ALI) = actual – minimum /maximum–minimum (6)

Education Index (EDI) = 2/3 (MYSI) + 1/3 (ALI) (7)

3.1.3. Health Index

Anand and Sen (1994) suggest that child mortality (i.e. additive inverse of child survival rate) and life expectancy are suitable proxies for health because both present a comprehensive picture of health in any society. Because of unavailability of district specific data for life expectancy, we used under five survival rate and immunization rate in construction of health index.

Two sub-indices termed as child survival index (CSI) and immunization index (IMI) have been constructed which have been further used for the construction of health index (HI). In the construction of CSI and IMI, 100 percent is considered as maximum goal post and 0 percent as minimum goal post. HI has been constructed by combining IMI and CSI. 70 percent weight has been to CSI and 30 percent weight to IMI because child survival rate is more representative measure of health condition of a society as compared to immunization rates. It is an outcome of different health related activities and facilities. Equation (8), equation (9) and equation (10) explain the methodology of calculating health index.

Child Survival Index (CSI) = actual – minimum / maximum – minimum (8)

Immunization Index (IMI) = actual – minimum / maximum – minimum (9)

Health Index (HI) = 0.7 (CSI) + 0.3 (IMI) (10)

3.2.Non Income Human Development Index

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. The construction of NIHDI is given below;

NIHDI = (1/2 Health + 1/2 Education) (11)

3.3.Agricultural Land Inequality

Agricultural land inequality has been calculated for each of the thirty four districts of Punjab by applying Gini Index on individual land holdings.

3.4.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 can be 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 centers, basic health units, sub-health centers) 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.

3.5.Fertility

Fertility has been used as independent variable. Total fertility rate has been used as proxy for fertility.

3.6.Unemployment

District specific unemployment rate of has been used as independent variable in both of our econometric models.

3.7.Data Collection

We have used panel data for thirty-four districts of Punjab for the year of 2003-2014 for present study. The data for HDI, NIHDI, agricultural land holding, total fertility rate, employment rate and social infrastructure have collected from different kind of sources. The data of immunization rate has taken from Pakistan Social and Living Standard Measurements Survey (PSLM, 2003-2014). PSLM (2003 to 2014) survey is conducted by Pakistan Bureau of Statistics (PBS) at district level with 76546 households sample from entire country to achieve Millennium Development Goals. This survey covered 14,549 enumeration blocks and 25,875 villages from Punjab. Data of child survival rate, income, agricultural land, total fertility rate and unemployment rate is collected from Multiple Indicator Cluster Survey (MICS, 2003-2014), which is conducted by Punjab Bureau of Statistics with the collaboration of UNDP and United Nations International Children's Emergency Fund (UNICEF). The data of social infrastructure is arranged from varies issues of Punjab Development Statistics.

4. Empirical Results and Discussion

This study has investigated the impact of agricultural land inequality on human development in Punjab. Two econometric models have been specified by using panel data from 2003 to 2014 for thirty four districts of Punjab, Pakistan. Human development index (HDI) and non-income human development index (NIHDI) have been constructed as proxy for human development. Agricultural land inequality has been calculated by applying Gini Index on individual agricultural land holdings. Empirical results of both econometric models are given in table 1, 2 and 3 respectively;

Table: 1
Findings of Hausman Test

Model	Chi-Sq. Statistic	Prob.
1	35.246702	0.0000
2	49.478131	0.0000

In our case, cross sections have certain features which may be correlated with explanatory variables. Under such conditions, the use of fixed effect approach seems to be more appropriate.

We have also used Hausman test (Hausman, 1978) to identify whether fixed effect model or random effect model is appropriate. Results of the test are reported in table 1 which indicate that fixed effect approach is appropriate in both of our econometric models. Empirical estimates of our fixed effect models are reported in table 2 and 3.

Table: 2
Relationship between Agricultural Land Inequality and Human Development
Fixed Effect Estimates
Dependent Variable: HDI

Independent Variable	Coefficient	Standard Error	t-Statistic	Probability Value
LINQ	-0.022410	0.008420	-2.661490	0.0091
SII	0.028614	0.001040	27.52511	0.0000
TFR	-0.003053	0.001690	-1.806002	0.0740
UNP	0.000535	0.000401	1.332726	0.1857
C	-0.548874	0.040291	-13.62280	0.0000
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared			0.979216	
Adjusted R-squared			0.971369	
F-statistic			124.7875	
Prob. (F-statistic)			0.000000	
N=			408	

Empirical results reported in table 2 show that agricultural land inequality is negatively related with HDI. Social infrastructure has positive and significant relationship with HDI. Total fertility is negatively and significantly and unemployment rate is insignificantly related to HDI. Our variable of agricultural land inequality is negatively associated with human development.

Table: 3
Relationship between Agricultural Land Inequality and Non-Income Human Development
Fixed Effect Estimates
Dependent Variable: NIHDI

Independent Variable	Coefficient	Standard Error	t-Statistic	Probability Value
LINQ	-0.020590	0.011666	-1.764889	0.0807
SII	2.106160	0.144035	14.62259	0.0000
TFR	-0.005080	0.002342	-2.169206	0.0325
UNP	0.000532	0.000556	0.957367	0.3407
C	-0.390163	0.055825	-6.989036	0.0000

Effects Specification	
Cross-section fixed (dummy variables)	
R-squared	0.974964
Adjusted R-squared	0.965512
F-statistic	103.1457
Prob.(F-statistic)	0.000000
N=	408

Empirical findings reported in table 3 postulate that agricultural land inequality is negatively related with NIHDI. Fertility rate has negative and significant association whereas unemployment rate is insignificantly related to NIHDI.

5. Conclusion and Policy Implication

Our empirical findings suggest that land inequality has negative and significant effect on human development. These results are in line with historical experience of the countries of the world which used land reforms programs. The countries where agricultural land inequality has been reduced through their land reform programs have higher economic development as compared with those countries which have not initiated such reforms. Japan, South Korea and Taiwan are among the famous examples of the countries which can be placed in the category of the countries which implemented such reforms whereas some of Latin American and south Asian countries like Pakistan can be placed in the category which have not undergone land reforms and therefore have lower economic development (Adelman, 1979; Alesina and Rodrik, 1994). In the light of our findings, we can suggest redistribution of agricultural land as a strategy to improve the status of human development.

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APENDIX

List of Districts

Attak	Jhang	Narowal
Bahalpur	Kasoor	Okara
Bahawalnagar	Khanewal	Pakpattan
Bhakar	Khushab	Rahim Yar Khan
Chakwal	Lahore	Rajanpur
D G khan	Layyah	Rawalpindi
Faisalabad	Lodhraan	Sahiwal
Gujranwala	Muzafargarh	Sargodha
Gujrat	Mandi bahudin	Sheikhupura
Hafizabad	Mianwali	Sialkot
Jehlum	Multan	TT Singh
	Vehari	