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# Impact of Global Food Price Escalation on Poverty in South Asian Countries

MUHAMMAD ABDULLAH and RUKHSANA KALIM

The objective of this paper is to examine the impact of global food price escalation on poverty in South Asian countries since 1990 to 2011. Panel data procedure has been applied for empirical analysis. Panel unit root tests have been utilised before the application of panel co-integration. Poverty is measured through revealed behaviour approach which is considered better than other approaches, as it is based on the actual consumption made by the households. The present study uses actual average household consumption to measure poverty. Empirical results reveal that global food price escalation and per capita income positively and significantly affect average household consumption, which is the clear indication of poverty decline. International oil prices and interest rate significantly but negatively affect the average household consumption in South Asian countries. Findings of this study will be helpful for formulating effective public policies for poverty reduction in the era of trade liberalisation.

*JEL Classification:* E31, F410, I32
*Keywords:* Food Price Escalation, Poverty, Oil Prices, Per Capita Income, South Asia

## 1. INTRODUCTION

Poor sections of the society are severely affected by higher food prices because they spend a large share of their incomes on food. The situation becomes more severe in poor and developing countries because a major portion of population is living near or below the poverty line in these countries. Higher prices of food items lower the purchasing power of people. They have to alter their spending from other necessities like education and health towards food which confines their earning opportunities in future life. Not only more people are trapped in poverty but the poverty gap is also augmented [Ivanic and Martin (2008) and Chaudhry and Chaudhry (2008)].

International institutions estimates reveal that food inflation increased the number of poor people around the globe. After the 2008 food crises, more than 75 million additional people became under the trap of food insecurity [FAO (2008)]. According to the World Bank (2008) estimates, 105 million more people are facing the problem of extreme poverty. Many countries are facing adverse macroeconomic consequences as a result of global food price escalation and international commodity prices. Higher inflation rates, loss of domestic and foreign revenues, deficit in trade and budgets and slower

Muhammad Abdullah <mabdullah7586@hotmail.com> is Assistant Professor of Economics, Govt. Post Graduate College, Sahiwal. Rukhsana Kalim <drrukhsana@umt.edu.pk> is Dean, School of Business and Economics, University of Management and Technology (UMT), Lahore.

growth rates, at various degrees across the countries, are the outcomes of hike in international food prices [IMF (2008)].

Higher food prices can be useful for farmers in poor agriculture economies. Higher prices may increase agriculture production resulting in higher incomes. Therefore, incentives should be given to farmers to produce market surplus. Lower agriculture development was the result of week macroeconomic policies and lack of incentives for farmers in the past [World Bank (2007)]. Economic policies of developing countries do not address the problem of poor market integration and transmission of international prices towards domestic prices. These policies may reduce the incentives for agriculture production and development [Manssouri (2009)].

The objective of the paper is to explore the impact of global food price escalation on poverty in South Asian countries. As a customary, the paper is divided into different sections. Section 2 discusses the literature review. Section 3 is devoted to model specification and methodology. Data resources are mentioned in Section 4. Empirical results of the paper are explained in Section 5. Conclusion and some policy implications are presented in Section 6.

## 2. LITERATURE REVIEW

Many researchers have contributed to find the effects of changes in food prices on poverty and inequality. Deaton (1989) studied the different regions of Thailand to find the impact of increase in rice prices. His nonparametric analysis revealed that different groups of society benefited differently from the change in rice prices. Among these groups, middle class producers were benefitted more as compared to small and big land holders.

Ravallion (2000) analysed the impact of agriculture reforms on poor in India to find interrelationship between food inflation, poverty and wages. He documented that in the short run food prices affect adversely. In the long run, food prices are neutral because rural productivity positively affects both producers and the wages of rural workers. Therefore, food prices do not possess any impact on poverty and inequality.

Ivanic and Martin (2008) examined the household data from nine low income countries. They found that the impact of food prices on poverty depends on whether the household is net buyer or net seller of food. They conclude that upsurges in poverty were larger than poverty reduction affects of food price crisis of 2007-2008. There was 4.5 percent increase, on average, in poverty rates in their sample of nine countries. If this rate is applied to all the low income countries, 1.5 million more people will become poor at global level.

Dessus, *et al*. (2008) analysed the data of 73 underdeveloped economies to assess the extra monetary cost of alleviating urban poverty caused by food price shocks since 2005 using change in relative domestic prices of food, households' budget share of food substitution elasticity of food and non-food items for vulnerable poor households and domestic relative prices. They found small extra costs for most countries but it might be more than 3 percent of GDP of most severely affected countries by food price inflation.

Aksoy and Isik-Dikmelik (2008) documented that vulnerability of households, who were net food buyer, was different across the nine countries they examined. The marginal net food buyers (who spent less than 10 percent of their expenditure on food)

were less affected by food price shocks. The households who spent more than 30 percent of their total expenditure on food were severely affected, for example in Bangladesh almost 20 percent of net food buyers were vulnerable. They also found that most of net buyers of food were labourers and small businessmen in rural areas.

Wodon and Zaman (2010), focusing on Sub-Saharan Africa, estimated that the poverty headcount ratio increased, on average, between 2.2 and 4.1 percentage points in rural areas and between 3.7 and 5.2 percentage points urban areas. The impact was larger on poverty gap. They estimated the impact of fifty percent rise in the prices of food items like flour, bread, rice, milk, vegetable oil and sugar usually imported in Western and Central African countries from global market.

De Janvry and Sadoulet (2010) examined the possible impact of increase in cereals and edible oils prices on different households (by income) in India. Their result reveals that large farmers as a group (with minimum one hectare of land) will gain, but 59 percent of them will lose. There were 77 percent rural households, both farmers and non-farmers among the overall affected households because of increase in the prices of cereals and edible oils.

Zezza, *et al*. (2008) find that most households in rural areas are net food buyers. The households having more land and using fertilisers and pesticides, get benefits from the increase in food prices. They conclude that most of the rural households are vulnerable to increase in staple prices because they are net buyers of food. In all countries, increase in food prices resulted in welfare loss of rural households. Poor households in Viet Nam did not face any welfare loss because major proportion of these poor households was net sellers of food.

Chaudhry and Chaudhry (2008) found that impact of increase in food prices on poverty levels in Pakistan is considerably greater than those of energy price increases. Rural people were affected more as compared to urban people because of food price inflation. They concluded that 20 percent increase in food prices would result in an 8 percent augmentation in the poverty head count.

## 3. THEORITICAL FRAMEWORK

### 3.1. Meaning of Poverty

A large variety of poverty concepts has been presented by researches and social scientists. The main objective of these concepts is to cover the multiple aspects and circumstances of lives of poor people living in different regions of the world. Variations in poverty concepts are based on the choice of poverty dimensions and their relative importance. Despite this there are some common understandings of poverty. Deprivation of some material necessities like food and shelter along with basic facilities like health and education is considered the indication of poverty. This deprivation is commonly measured by the shortfall in consumption expenditures or in real income. This approach is called money-metric measure of poverty and is adopted by many economists [Atkinson (1987) and Ravallion (1992)].

Moreover, some welfare economists have used some non-monetary proxies to measure household welfare. They constructed the asset indexes based on the variety of assets (for example, land, livestock, jewellery and housing durables) under ownership of

households [Filmer and Pritchett (1998); Montgomery, *et al.* (2000) and Sahn and Stifel (2000)]. Sen (1985, 1999) presented the person's capabilities approach to measure his/her well-being. Capabilities mean the functioning of having freedom, self-esteem, dignity and autonomy along with ability to contribute abundantly in economic social activities.

### 3.2. Measurement of Poverty

Different methodologies have been adopted to measure poverty according to the national and political requirements and targets in different countries. At macro level, two approaches are followed to measure income poverty. These are Absolute and Relative Poverty. Absolute poverty explains the proportion of population living below the minimum living standard (poverty line). The poverty line is established on the basis of nutritional requirements along with some other necessary goods. Relative poverty measure is used to compare the poor sections of population with their well to do counterparts with respect to income quintiles or deciles. Choice between these two measures depends on priorities given to living standards shortfalls or to the degree of inequality as an indication of poverty. In Less Developed Counties (LDCs), absolute measure is considered a better method to measure because average income is very low in these countries. Therefore, the development planners put emphasis on the reduction of absolute poverty because of the urgencies of malnutrition and starvation [Jamal (2002)].

Poverty can also be judged from objective and subjective point of view. In objective approach, normative measures are involved for the judgment and reduction in poverty. Majority of economist have been using this approach for poverty measurement and its cure. The subjective perspective of poverty analyses the preferences and wishes of people about the goods and services of their use. Many shortcomings and limitations are realised associated with the indicators used to measure subjective poverty. Recently, International community and institutions are showing keen interest in the subjective measure of poverty [Jamal (2002)].

'Poverty Line' is a popular yard stick to differentiate between poor and non-poor. This line is derived on the basis of minimum level of necessities available to a person for being poor or non-poor. There are two methods to translate this minimum level into necessities, although both are controversial. In many LDCs, food sufficiency (adequate calories) is used as criterion of poverty. But it is very difficult to generalise the minimum calories requirement because these requirements vary from person to person with respect to age, sex, working and living conditions. It captures only on aspect of human life. The other criterion to assess poverty is the cost of a minimum bundle of basic needs required by a household. Although it is not easy to interpret minimum bundle of basic needs. Ahmad (1993) and Gazdar, *et al.* (1994), among others, used this criteria to study poverty levels in Pakistan. Although, Sen (1999) approach is very useful to understand the characteristics of person's welfare, yet it makes the understanding and operationalisation of poverty reduction more complex and difficult.

The World Development Report (1990) introduced a 'dollar-a-day' poverty line to measure the poverty reduction at global level. This line was constructed to measure per capita household expenditures on Purchasing Power Parity (PPP) in 1985 prices. There are many shortcomings associated with 'dollar-a-day' poverty line. This line does not consider the differences of cost of living between the rural and urban people in a country

as well as regional and continental differences. It does not take into account the depth and severity of poverty incidence. Therefore, a poverty line should represent the national and country specific characteristics for effective policy implications to achieve the targets of poverty reduction.

Minimum calories approach explains only one aspect of poverty. Basic needs criteria and social status is criticised because these are subjective and arbitrary. Revealed behaviour approach is considered better because it is based on the actual consumption made by the households. This study uses actual average consumption to measure the impact of global food price escalation on poverty in South Asian countries. Many studies have used per capita consumption as proxy of poverty reduction [for example, Quartey (2005); Odhiambo (2009) and Ho and Odhiambo (2011)].

It is generally conceived that inflation worsens the poor's life. But researchers are unable to settle the stable relationship between inflation and poverty. Same is the case for the relationship between food inflation and poverty. Urban households are net food purchasers. They are severely affected as compared to their rural counterparts who are net food producers. Same situation have to face net food importing countries [Wodon and Zaman (2008)].

On the other hand, higher food prices definitely raise the incomes of food producers in rural areas. Small land holders, livestock owners and vegetables and fruit producers get benefits from higher food prices. Non-food producers might be able to receive better prices because of alternative use of land for food production resulting in decrease of supply of non-food and cash crops. Thus incomes of both groups increase because of greater economic activity and 'trickle down' effects. Rural workers are also compensated with higher wages (both in real and monetary terms) in this situation. Higher wages in rural areas affect rural-urban migration decisions. Rural migrants return to their countryside homes. This may have positive impact on the wages of urban poor. Improvement in rural and agriculture sector economic activities results in development of industrial and services sectors because output of these sectors are used as inputs in agriculture sector and vice versa. Thus incomes of masses will rise and poverty might tend to decrease [Deaton (1989) and Wash (2012)].

## 4. METHODOLOGY

Having discussion on literature and drawing upon the theoretical frame work following model has been employed in this paper to measure the impact of global food price escalation on poverty in south Asian countries:

$$PCP = f(Y, Z) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (1)$$

Where $PCP$ is Private/household Consumption Per capita, $Y$ represents households' income and $Z$ is a set of other factors which determine the household consumption expenditures. These factors may include substitution effects and uncertainties. Interest rate is widely used to measure the substitution effect of household consumption expenditures. To measure uncertainties unemployment rate and inflation are the suitable proxies [Davidson, *et al.* (1978); Davidson and Hendry (1981) and Blinder and Deaton (1985)].

One of the main objectives of this study is to find the impact of global food price inflation on poverty in South Asian countries, therefore, according to the nature of our study the above model can be written as follows:

$$PCP = f(GFI, OILP, IRATE, Y) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (2)$$

Where $PCP$ = Private Consumption Per Capita.
$GFI$ = Global food price inflation.
$OILP$ = Oil Prices.
$IRATE$ = Interest rate,
$Y$ = Per Capita GDP.

### 4.1. Panel Data Methodology

To analyse the impact of global food price escalation on poverty of South Asian countries is one of the major objectives of the study. Panel data methodology will be applied for this purpose. This methodology has many advantages over time series and cross-section data. It takes into account the individual heterogeneity (among individuals, firms and countries). It gives more information, more degrees of freedom and efficiency. Problem of multi-collinearity among the variables is also minimised. We can study more complicated models and minimise the bias by using large number of individuals, firms and countries [Baltagi (1995)]. Equation (2) is transformed for the analysis as follows:

$$LPCP_{it} = \beta_0 + \beta_1 LGFPI_{it} + \beta_3 LOILP_t + \beta_3 LPGDP_{it} + \beta_4 LIRATE ++ \varepsilon_{it} \quad \ldots \quad (3)$$

Where

$LPCP_{it}$ = Log of Private Consumption Per capita (measured by household consumption per capita at constant 2005 US$) for country $i$ at time $t$.
$LPGDP_{it}$ = Log of per capita GDP of country i at time t.
$LIRATE_{it}$ = Lending interest rate for country i at time t.
$LGFPI_t$ = Global food price inflation (FAO food price index).
$LOILP_t$ = World Oil Prices (average spot price of Brent, Dubai and West Texas Intermediate, equally weighed).
$\varepsilon_{it}$ = identically and independently distributed error term.

### 4.2. Unit Root Tests with Structural Break and Panel Unit Root Tests

Time series data may be stationary with structural breaks and outliers. Commonly used unit root tests are biased towards the non-rejection of null hypothesis of non-stationary because of structural breaks [Perron (1989)]. Perron (1989) proposed that dummy variables should be incorporated in the ADF to control one exogenous structural break.

However, in the contemporary times, the use of panel unit root tests is also common in economic empirical analysis. It is assumed that all series or a major part of all series across the cross section is stationary. Use of these tests is important to avoid the misleading results from a spurious regression. It is also argued that power of these tests increases if the cross sectional dimension of data is included. Different panel unit root tests [Im, Pesaran, and Shin (2003); Levin, Lin, and Chu (2002) and Fisher-type tests using ADF and PP tests Choi (2001)] have been applied to obtain reliable results of data.

### 4.3. Fixed Effect and Random Effect Models

Fixed Effects Model (FEM) and Random Effect Model (REM) or Error Component Method (ECM) are two popular methods used for panel data analysis. If there is heterogeneity in cross sectional characteristics and individual effects are correlated with explanatory variables, FEM model is considered better for estimation. Dummy variables are used to capture the cross sectional effects. Therefore, FEM is also known as least-squares dummy variable (LSDV) model. Random Effect Model (REM) or Error Component Method (ECM) is better to apply when the individual intercept is randomly taken from a larger population of cross sections. This method is suitable when intercept is un-correlated with independent variables. In this model no dummies are required to capture the individual characteristics of cross sections, therefore it is efficient in losing degrees of freedom as compared to FEM. We have also used the dynamic model of least squares (DOLS) to check the robustness of results.

### 4.4. Panel Dynamic Ordinary Least Squares (DOLS) Method

Panel dynamic ordinary least squares (DOLS) method of Saikkonen (1991) and Stock and Watson (1993) is commonly used for analysis and hypotheses testing when there is a co-integrating vector in panel data. Usefulness of DOLS for heterogeneous panel, in the presence of fixed effects in co-integration regression, is well documented by Kao and Chiang (2000). DOLS technique also has been utilised in this paper.

## 5. DATA SOURCES

For empirical analysis, data from 1990 to 2011 of variables used in this study are collected from international sources for South Asian countries. Annual FAO-Food Price Index (2002-2004=100) is used as proxy of global food price inflation (GFPI). Data of this variable is extracted from the official website of Food and Agriculture Organisation of United Nation. Data of Crude oil prices (average spot price of Brent, Dubai and West Texas Intermediate, equally weighed) is collected from World Bank's official website. Data of Private Consumption Per capita (PCP) (measured by household/private consumption per capita at constant 2005 US$), Lending interest Rate (LIRATE) and per capita GDP (PGDP) for all South Asian countries has been taken from World Development Indicators (WDI) online database by World Bank (2013). All variables are used in their natural log form except LIRATE.

## 6. RESULTS AND DISCUSSION

### 6.1. Correlation and Covariance Analysis

Correlation and covariance analysis is considered a good start to determine the degree and direction of any relation between the variables. It is obvious from the Table 1 that LHCP is positively and strongly related with LGFPI, LOILP, LINTRATE and LPCGDP. We can further verify this correlation by observing the trend of these variables from the Figure 1, followed by the Table 1.

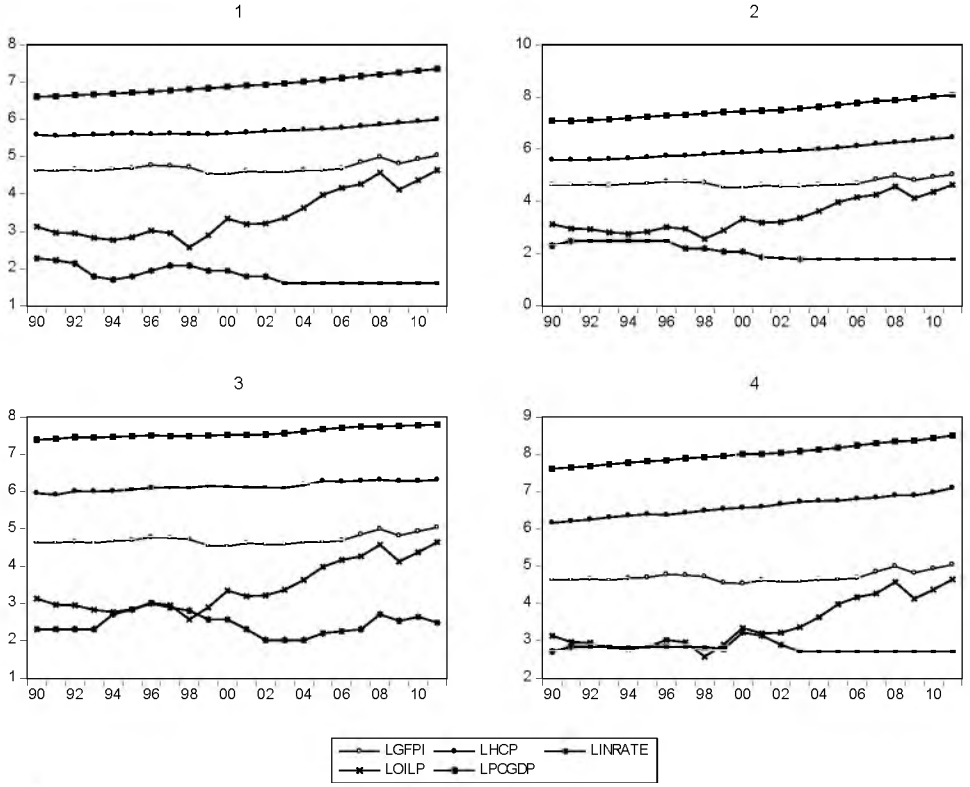
Table1

*Correlation and Covariance Analysis*

| Covariance<br>Correlation | LHCP | LGFPI | LOILP | LINRATE | LPCGDP |
|---|---|---|---|---|---|
| LHCP | 0.150207 | | | | |
| | 1.000000 | | | | |
| LGFPI | 0.017348 | 0.018597 | | | |
| | 0.328239 | 1.000000 | | | |
| LOILP | 0.111064 | 0.060406 | 0.406987 | | |
| | 0.449199 | 0.694340 | 1.000000 | | |
| LINRATE | 0.096991 | -0.004234 | -0.078388 | 0.199744 | |
| | 0.559950 | -0.069476 | -0.274932 | 1.000000 | |
| LPCGDP | 0.169655 | 0.020699 | 0.134590 | 0.105041 | 0.209483 |
| | 0.956416 | 0.331636 | 0.460946 | 0.513506 | 1.000000 |

*Source:*Authors' calculations.

**Fig. 1.Trend Analysis of Variable Used in this Study**




In Figure 1, 1,2,3,4 represent the economies of Bangladesh, India, Pakistan and Sri Lanka respectively.

### 6.2. Stationarity of Data

Following Perron (1989), break point ADF of unit root is applied on 14 individual time series (of panel member countries) used in the study detect break point and outliers. Results of break point ADF of unit root test are portrayed in Table 1. Majority of time series have unit root and non-stationary at level. Only four series (LINRATE of Bangladesh, Pakistan and Sri Lanka, LPCGDP for Pakistan) are stationary at level.

Panel unit root tests are still commonly used in panel data estimation. Different panel unit root tests are applied to check the stationarity of the panel data used in our study [Im, Pesaran, and Shin (1997) Levin, Lin, and Chu (2002), Fisher-type tests using ADF and PP tests]. The results of these tests are reported in Table 2. All variables (except LIRATE) are used in natural log form.

Table2

*Results of ADF Break Point Unit Root Test*

| | | ADF test stat. with Trend and Intercept | | Break Dates | |
|---|---|---|---|---|---|
| Country | Series | At level | At First Difference | At level | At First Difference |
| Bangladesh | LPCP | -1.2193 (0.99) | -7.0321(<0.01) * | 2006 | 1999 |
| | LPCGDP | -3.3385 (0.7833) | -5.4115 (<0.01) * | 2005 | 2004 |
| | LINRATE | -8.0883 (<0.01) * | - | 2002 | - |
| India | LPCP | -2.3218 (0.99) | -4.991(0.0340) ** | 2006 | 2004 |
| | LPCGDP | -2.8612 (0.9447) | -7.2740 (<0.01) * | 1997 | 2002 |
| | LINRATE | -3.4685 (0.7114) | -6.2071 (<0.01) * | 1998 | 2003 |
| Pakistan | LPCP | -4.4502(0.1495) | -7.1400(<0.01) * | 1999 | 2005 |
| | LPCGDP | -5.2808 (<0.01) * | - | 2009 | - |
| | LINRATE | -5.8607 (<0.01) * | - | 2001 | - |
| Sri Lanka | LPCP | -3.6952 (0.5672) | -4.5718(0.0357) ** | 2009 | 2010 |
| | LPCGDP | -1.5515 (>0.99) | -4.6623 (0.0854) *** | 1999 | 2002 |
| | LINRATE | -5.9197 (<0.01) * | - | - | |
| Global | LGFPI | -3.9148 (0.4263) | -4.79321(0.0603) *** | 1998 | 1998 |
| | LOILP | -3.6099 (0.6233) | -6.5927(<0.01) * | 2004 | 2008 |

Vogelsang's (2003) asymptotic *p*-values are in parenthesis.
*, **, *** denotes rejection of null hypothesis non-stationarity at 1 percent, 5 percent, and 10 percent level of significance respectively.

The results show that data on poverty (LPCP) is non-stationary at level but stationary at first difference and data of global food inflation (LGFI) is also non-stationary at level but stationary at first difference according to all four test statistics. Levin, Lin and Chu (LLC) test statistics reveal that oil prices (LOILP) are stationary at level while rest of the statistics indicate the presence of unit root in the data. At first difference, oil prices become stationary at 1 percent level of significance according to all four test statistics. Lending interest rate (LIRATE) and per capita GDP (LPCGDP) showed the same results. Both are non-stationary and have unit roots at level and become stationary at first difference at 1 percent significance level as indicated by the all test statistics [Im, Pesaran, and Shin (1997); Levin, Lin, and Chu (2002) and Fisher-type tests using ADF and PP tests].

Table 3

*Results of Panel Unit Root Test*
(At level with Individual Intercept)

| Variable | Levin, Lin & Chu t | Im, Pesaran and Shin W-stat | ADF-Fisher Chi-square | PP - Fisher Chi-square |
|---|---|---|---|---|
| $LPCP_{it}$ | 4.52004 | 5.73267 | 1.35865 | 0.45451 |
| | (1.000) | (1.0000) | (0.9948) | (0.9999) |
| $D(LPCP)_{it}$ | 1.36018*** | -2.11298** | 18.9985** | 30.3945** |
| | (0.0869) | (0.0173) | (0.0149) | (0.0002) |
| $LGFPI_t$ | 2.41086 | 2.28845 | 1.03514 | 0.81867 |
| | (0.9920) | (0.9889) | (0.9980) | ( 0.9992) |
| $D(LGFPI)_t$ | -7.73331* | -6.08219* | 45.6928* | 45.6122* |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| $LOILP_t$ | -3.34216* | -0.17069 | 6.58290 | 11.5238 |
| | (0.0004) | (0.4322) | (0.5822) | (0.1737) |
| D(LOILP)t | -6.37770* | -4.95804* | 38.1359* | 49.7841* |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| $LINRATE_{it}$ | -0.88351 | -0.82291 | 10.9345 | 8.49481 |
| | (0.1885) | (0.2053) | ( 0.2054) | ( 0.3867) |
| $D(LINRATE)_{it}$ | -5.61578* | -6.54706* | 49.6684* | 44.6359* |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| $LPCGDP_{it}$ | 10.4239 | 10.3269 | 0.12876 | 0.08621 |
| | (1.000) | (1.000) | (1.000) | (1.000) |
| $D(LPCGDP)_{it}$ | -4.38865* | -3.54689* | 27.0615* | 27.1074* |
| | (0.0000) | (0.0002) | (0.0007) | (0.0007) |

*Source:* authors' calculations.
*, **, *** Denotes rejection of null hypothesis non-stationarity at 1 percent, 5 percent, and 10 percent level of significance respectively.

### 6.3. Panel Co-integration

Panel unit root tests' result presented in Table 5.1 show that all the variables of our interest are non-stationary and have the problem of unit root at level form. All of them become stationary at their first differences and have I (1) order of integration. Therefore, application of panel co-integration methodology is suitable for our model. Panel co-integration methods are very popular among the researchers these days. With the growing availability of time series data for many countries, use of panel co-integration methods, to discover the long run relationship, are adopted by a number of researchers in the field of economics. Pedroni's (2004) co-integration methodology has been applied in this study. Pedroni (2004) proposed seven test statistics to check the long run relationship. Four test statistics (Panel v-Statistic, Panel rho-Statistic, Panel PP-Statistic and Panel ADF-Statistic) are used to check the null of no co-integration for whole panel (within dimension). Results of these are shown in Table 3(A). We reject the null of no co-nitegration on the basis of Panel PP-Statistic and Panel ADF-Statistic at 5 percent and 1 percent level of significance respectively when we include intercept and trend in the model.

Table 4(A)

*Padroni Panel Cointegration Results*
(Statistic within-dimension)

| Without Trend | | | | |
|---|---|---|---|---|
| Test Statistic | | | Weighted | |
| | Statistic | Prob. | Statistic | Prob. |
| Panel v-Statistic | -0.304324 | 0.6196 | -0.359041 | 0.6402 |
| Panel rho-Statistic | 0.685853 | 0.7536 | 0.770347 | 0.7795 |
| Panel PP-Statistic | -0.880208 | 0.1894 | -1.327365 | 0.0922 |
| Panel ADF-Statistic | -1.483961 | 0.0689 | -2.399655* | 0.0082 |
| With Intercept and Trend | | | | |
| Test Statistic | | | Weighted | |
| | Statistic | Prob. | Statistic | Prob. |
| Panel v-Statistic | -1.216969 | 0.8882 | -1.344343 | 0.9106 |
| Panel rho-Statistic | 1.605308 | 0.9458 | 1.645539 | 0.9501 |
| Panel PP-Statistic | -1.939847** | 0.0262 | -2.113501** | 0.0173 |
| PanelADF Statistic | -2.499526* | 0.0062 | -3.091995* | 0.0010 |

*Note:* * and ** denotes rejection of null hypothesis at 1 percent and 5 percent significance level respectively.

Results of three statistics (Group rho-Statistic, Group PP-Statistic and Group ADF-Statistic) are portrayed in Table 3 (B) for Between-dimension. These results explain the rejection of null hypothesis of no co-integration on the basis of Group PP-Statistic and Group ADF-Statistic at 1 percent significance level. It is concluded on basis of Pedroni (2004) methodology that long run relationship exists among the variables used in this paper.

Table 4(B)

*Padroni Panel Cointegration Results*
(Statistic between-dimension)

| | Without Trend | | With Intercept and Trend | |
|---|---|---|---|---|
| Test Statistic | Statistic | Prob. | Statistic | Prob. |
| Group rho-Statistic | 1.653063 | 0.9508 | 2.475480 | 0.9933 |
| Group PP-Statistic | -2.571120 | 0.0051* | -3.480400 | 0.0003* |
| Group ADFStatistic | -2.877596 | 0.0020* | -3.526626 | 0.0002* |

*Note:* * and ** denotes rejection of null hypothesis at 1 percent and 5 percent significance level respectively.

### 6.5. The Hausman Test Results

We have employed Hausman (1978) test for model selection between Fixed Effects Model (FEM) and Random Effect Model (REM in our study. Results of this test are presented in Table 4.

Table 5

*Hausman Test Results*

| Test Summary | Chi-Sq. Statistic | Chi-Sq. d.f | Probability |
|---|---|---|---|
| Period specific | 10.78* | 2 | 0.0046 |

*Denotes rejection of null hypothesis of no difference in using FEM or REM at 1 percent level of significance.

The null hypothesis of no difference between FEM and REM is rejected on the basis of the results displayed in Table 4 because the Chi-Sq. Statistic (10.78) with probability of (0.0046) is significant at 1 percent level. Therefore we have used Fixed Effects Model (FEM) to explore the impact of global food price inflation and other variables in the model on poverty in South Asian Countries. Hausman test results are certainly believable because South Asian Countries (cross-section) have different characteristics with respect to area, the size of population, and economic performance. For example, India's population is more than the collective population of all other countries of the region (sample).

### 6.6. Model Estimation

On the basis of Hausman's (1978) test results, we have used FEM in this study. For empirical analysis, panel generalised least square method (EGLS) with cross-specific fixed effects has been applied. White cross-section has been used for heterosckedasticity correction. All variables in equation (5) are used in their natural log form except Lending Interest Rate (LINRTE). Results of model are displayed in the next Table 5.

Table 6

*Results of Regression Model*

| Dependent Variable = $LPCP_{it}$ | | | |
|---|---|---|---|
| Variable Name | Coefficient | T-Statistic | Probability |
| Constant | -0.310530 | -2.913774 | 0.0046 |
| $LGFPI_t$ | 0.048718 | 2.122176 | 0.0369 |
| $LOILP_t$ | -0.012312 | -2.311914 | 0.0234 |
| $LPCGDP_{it}$ | 0.832295 | 65.89442 | 0.0000 |
| $LINRATE_{it}$ | -0.002511 | -2.395679 | 0.0189 |
| F-Statistic= 2356.448 Probability = 0.000 | $R^2$= 0.99 | Jerque-Bera=3.844 Probability=0.146 | |

*Note:* * and ** denotes 1per cent and 5 percent significance level respectively.

The results displayed in Table 5 show that Global Food Price Inflation ($LGFPI_t$) is positively and significantly affecting the Private Per Capita Consumption ($LPCP_{it}$), used as proxy of poverty, in South Asian countries. One percentage point increase in Global Food Price Inflation brings 0.05 percent increase in ($LPCP_{it}$) of South Asian countries. It is clear indication of positive impact of international food inflation towards Private Per Capita Consumption. As a result, poverty tends to decrease in the South Asian region. Although the coefficient value of Private Per Capita Consumption (0.045) it might be justified that there are many other internal and household factors which affect Private Per Capita Consumption.

Impact of international oil prices is also statistically significant and negative for real Private Per Capita Consumption of South Asian countries. One percent increase in international oil prices results in 0.01 percent decrease in Private Per Capita Consumption of South Asian countries in real terms. Oil is basic energy source for agricultural, industrial and transport sectors in the whole economies of South Asian countries. Because of increase in oil prices, production cost of all commodity rises leading to

increase in commodity prices. Therefore, real Private Per Capita Consumption will decrease and poverty level will rise.

Per capita GDP (LPCGDP) is positively and significantly affecting the real Private Per Capita Consumption of South Asian countries. One percent increment in Per capita GDP increases the real Private Per Capita Consumption of South Asian countries by 0.83 percent. Increase in real Private Per Capita Consumption will definitely decrease the poverty in this region.

Interest Rate (LIRATE) showed negative and significant impact on real Private Per Capita Consumption in South Asian countries. One percentage point increase in interest rate results in 0.0025 decrease in real private per capita consumption. It is justifiable that that there is positive relation between interest rate and savings. Therefore, increase in saving decreases real Private Per Capita Consumption.

Model is well fitted as F-Statistic (2356.45) is significant and probability is (0000). Jerque-Bera statistic is 3.844 with probability (0.146), which indicates that residuals of our model are normally distributed.

### 6.7. Panel Dynamic Ordinary Least Squares (DOLS) Method

Panel Dynamic Ordinary Least Squares (DOLS) has also been applied for checking the robustness of results. The results are presented in Table 6.

Table 7

*Panel Dynamic Least Squares (DOLS) Model*

| Dependent Variable = $LPCP_{it}$ | | | |
|---|---|---|---|
| Variable Name | Coefficient | T-Statistic | Probability |
| $LGFPI_t$ | 0.290692 | 2.189372** | 0.0385 |
| $LOILP_t$ | 0.007794 | 0.202987 | 0.8409 |
| $LPCGDP_{it}$ | 0.669196 | 7.356933* | 0.0000 |
| $LINRATE_{it}$ | -0.121685 | -1.445174 | 0.1613 |
| | | Jerque-Bera=3.592 | |
| $R^2$= 0.99 | | Probability=0.166 | |

*Note:* * and ** denotes 1per cent and 5 percent significance level respectively.

The results presented in Table 6 show that Global Food Price Inflation ($LGFPI_t$) and per capita GDP (LPCGDP) are positively and significantly affecting the real Private Per Capita Consumption ($LPCP_{it}$), used as proxy of poverty in South Asian countries. One percentage point increase in Global Food Price Inflation results in 0.29 percent increase in ($LPCP_{it}$) of South Asian countries. As a result, poverty tends to decrease in the South Asian region. Real private per capita consumption of South Asian countries increases 0.67 per cent as a result of one percent increment in per capita GDP. Increase in real Private per capita consumption will definitely decrease the poverty in this region. However, Oil ($LOILP_t$) prices and Lending Interest Rate ($LIRATE_{it}$) remained statistically insignificant for real Private Per Capita Consumption ($LPCP_{it}$).

## 7. CONCLUSION

This study has examined the impact of global food price inflation on Private Per Capita Consumption used as proxy of poverty in South Asian countries for the period 1990 to 2011 by applying panel data methodology.

First of all we checked stationarity of data by using panel unit root tests like Im, Pesaran, and Shin (1997), Levin, Lin and Chu (2002), Fisher-type tests using ADF and PP tests [Maddala and Wu (1999)]. All variables have the unit root problems and become stationary at their first differences and have integrating order I(1) according to all panel unit root tests mentioned earlier. After confirming the order of integration of variables, which is I(1), we have applied two panel cointegration techniques (Fisher-Johansen and Pedroni) to find the long run relationship among the variables used in our study. Both methodologies confirmed existence of long run relationship. Panel data methodology is applied to find long run coefficients. Hausman (1978) test results helped us to use FEM for estimation. Panel estimated generalised least square method (EGLS) with cross-specific fixed effects has been applied for empirical analysis. White cross-section has been used for Heterosckedasticity correction. Panel Dynamic Ordinary Least Squares (DOLS) has also been applied to check the robustness of results.

External factors like global food price inflation and oil prices showed the significant relation with Private Per Capita Consumption used as proxy of poverty in South Asian countries. It is justifiable because most of the South Asian Countries are agricultural based. Two third of their population living in rural areas depends on agricultural products for their livelihood and employment. Any increase in global food prices and transmitted to local food prices might increase their incomes from food crops, dairy products and livestock. Incomes of cash crop producers will also rise because of competitive use of land and labour. Oil prices are negatively related to real Private Per Capita Consumption. It is because most of South Asian countries had to liberalise their economies after the application of WTO regime. Per Capita GDP is also positively and significantly related to real Private Per Capita Consumption of South Asian countries. Interest Rate (LIRATE) showed negative and significant impact on real Private Per Capita Consumption in South Asian countries because of positive relation between saving and interest rate. The empirical results proved the view [Borio and Filardo (2007) and Crowley (2010)] that external factors should be given importance while studying the economic relation between different variables. Values of F-Statistic and R-square confirmed that model was well fitted. Jerque-Bera statistic proved normality of residuals in the model.

### 7.1. Policy Implications

Impact of global food price escalation positively and significantly affected the private consumption per capita which is used as proxy of poverty in South Asian countries in present study. It indicates that poverty tends to decrease (because of increase in private consumption per capita) as a result of global food price inflation in long run. Trickle down effects, within agriculture sector and between other sectors and areas (rural-urban), will contribute in improving incomes and consumption of masses. Government should take full advantage of this situation by reconsidering its trade, developmental and agriculture policies. Trade barriers should be minimised by reducing export duties on

food and agriculture products. Import duties should also be eliminated or decreased to the lowest level on equipment, machinery and chemicals used in agriculture sector. More percentage of national and provincial budgets should be allocated for infrastructure and social services in rural areas.

Market imperfections and perishable nature of food products are two basic problems by food producers with small land holdings. Role of middle man is very critical in lowering their profits. They are helpless to sell their products at lower than competition prices, even sometime without meeting the production cost. Therefore, procurement/ support price policies should be continued to avoid the major negative supply shock at the time of next harvest. At the same time financial institutions should be perused to make arrangements in time and access-able agriculture loans for small farmers. New land reforms and rearrangements of small and scattered pieces of land will be in rising agriculture production. In this sector, subsidies on inputs should continue till the maturity of competitive nature at global level. Buffer stock of food grains under government control will work as safeguard against supply short falls and rising food prices. As an immediate measure, assistance to most vulnerable can provided from this stock.

Although, global food prices seem to reduce poverty by increasing the per capita household consumption, yet there will be a vulnerable group of population. Social safety nets measures should be continued purposefully. There are different types of these measures, for example, cash transfers, universal food subsidies and payments for social assistance. These measures are already being practiced in Bangladesh, India, Nepal, Pakistan and Sri Lanka. But efficiency might be increased by solving the issues of corruption and fiscal costs associated with these programs. Monitoring and evaluation will improve the capacity of targeted delivering of social safety nets. Governments have to design long term policies for sustainable development and employment surety for reducing poverty. Public expenditures should be allocated for physical and social infrastructure to enhance agriculture productivity. Effective and solid regional cooperation is very crucial for future polices to overcome food security issues and less agriculture productivity in South Asian countries.

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