

Estimating the Role of Prices towards Poverty in Pakistan

Ahmed Raza Cheema*, Rehmat Ullah Awan, Adeel Saleem and Faiza Athar

University of Sargodha, Pakistan

*E-mail: cheemaahmed_raza@yahoo.com

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Abstract

This study investigates the effects of prices on poverty by applying the methodology of Son and Kakwani (2006) using the two data sets of Pakistan Living Standard Measurement Survey (PSLM) of 2007-08 and 2010-11 in Pakistan. The study calculates three poverty measures such as headcount ratio, poverty gap, and severity of poverty. The study also estimates the price elasticities of poverty for two commodities groups such as food and fuel. The study decomposes the price elasticity of poverty measures into two components; income component and distribution component. The study also estimates pro-poor price index (PPPI) for all the poverty measures. The results show that there is reduction in poverty from 16 % in 2007-08 to 12 % in 2010-11. The results reveal that food price elasticity of poverty is greater than fuel price elasticity of poverty. The income as well as distribution components contribute to increase poverty, but income component contributes more than the redistribution one towards increase in poverty. The results also disclose that the increases in the prices of both commodities hurt the poor more than the non-poor. The increase in price of food commodities disturbs the poor more than the increase in prices of fuel commodities during 2007-08 and 2010-11. The government should compensate the poor and give some subsidies regarding food.

Keywords: Poverty, prices, food, fuel, income component, distribution component, price pro-poor growth index, Pakistan

Introduction

Poverty has been very concerning problem for the world since a long time. Poverty pronounces deprivation in well-being, and comprises many dimensions. It includes low incomes and the inability to acquire the basic goods and services necessary for survival with dignity. Poverty also encompasses low level of health and education, poor access to clean water and sanitation, inadequate physical security, lack of voices, insufficient capacity and opportunity to better one's life (World Bank, 2011). In simple words, poverty means the lack of human needs, like food, water, air, and all other basic needs.

Poverty affects individuals as well as society in very bad manners and it can be said that poverty is the mother of all human rights violations. To secure the human rights and increase the living standard of poor people, World Bank proposed a charter called as MDGs in 2000. In this charter eight goals were set to achieve them till 2015. To half poverty till 2015 is one of these objectives. So poverty reduction becomes the main objective of policy makers and social scientists. In this regard, there is need to find out the factors affecting poverty. The growth and income redistribution are considered more important ones. But little attention has been given about the role of prices towards poverty especially in Pakistan. The poverty level is significantly affected by changes in prices of commodities. The poor people consume their income differently on necessities of life from non-poor people. So the consumption pattern of the poor is different from the rich each other (Arrow, 1958). It has been explored that the poor people spend more proportion of their income on the basic needs of life like food, whereas the rich one more on luxurious goods than amenities implying as income

increases, the share of income spent on basic needs of life decreases (Engle, 1857). So if the prices of basic need change, the poor are affected differently from the non-poor.

To find out the impact of prices of commodities on poverty, many researchers addressed this topic such as Son and Kakwani (2006). The study introduced the method to find the role of prices of goods towards poverty. This technique was followed by Some studies like Akande, et al (2009) in Nigeria and Iman et al (2010) in Indonesia. But unfortunately these studies have been done by international researchers. As far as Pakistan is concerned, a little effort has been made to apply this technique. Thus this study applies this technique to estimate the role of prices to poverty by using the two Pakistan Social Living Standard and Measurement Surveys (PSLM) data sets for the years 2007-08 and 2010-11.

The rest of the study is divided in the following way. The literature review is discussed in section two. The data and methodology are presented in section three. The results are explained in the section four. The conclusion of study and policy recommendation based on results estimates are given in the section five.

Review of Literature

The review of literature is very important component in research field and this study provides the theoretical framework for understanding the research analysis. There is a vast literature on measuring poverty in Pakistan. Many researchers have done a lot of studies regarding poverty analysis. These studies are not on the same track but are different by their nature of problems. The studies used the definition of poverty in their analysis by different ways. The units of analysis used in the estimations are also different. The time periods which they covered in the analysis are again dissimilar. The price indices which were used to adjust the poverty lines are again dissimilar. The huge body of literature suggested different aspects of poverty analysis. In Pakistan various studies have been done to estimate the changes in poverty through decomposition. The literature on decomposition techniques revealed that these studies decomposed the change in poverty into growth and redistribution components. But there is little evidence about estimating the role of prices towards poverty in Pakistan. For this purpose, the study applied the technique of decomposition of poverty (Kakwani & Son, 2006) for two data sets (i.e., 2007-08 and 2010-11).

The review of literature of the study has two sections. The section 2.1 deals with review of literature on poverty. The section 2.2 discusses with review of literature on decomposition techniques.

Review of Literature on Poverty

The poverty analysis is the basis for the welfare evaluation of country. The poverty is concerning problem for any country. For the evaluating of welfare, there is need to estimate the poverty level of nation. There are a lot of studies conducted to measure poverty. In these studies, poverty lines and poverty measures were estimated. Some of them are given below.

Naseem (1973) measured the trend in poverty measures such as headcount ratio in Pakistan. The study used the data sets of Household Income and Expenditure Survey (HIES) for the periods years- of 1963-64, 1966-67, 1968-69 and 1970-71. For the estimations of poverty, the welfare indicator of households was represented by their consumption expenditure. The study used two arbitrary poverty lines i.e. high and low for regional level poverty comparison. The expenditure of households was inflated/deflated by applying the use of the group specific Laspeyeres price index. The results of the study revealed that no systematic trend in poverty was found, when high poverty line was followed. The results revealed that there was no systematic trend in poverty following high poverty line, but was decreasing trend in it following lower poverty line. But when lower poverty line was

followed, the decreasing trend was found for rural areas from 1963-64 to 1969-70. The similar decreasing trend was also found for urban ones.

Alauddin (1975) estimated headcount index for the analysis of poverty in Pakistan. The study used data sets of HIES of for years 1963-64, 1966-67, 1969-70 and 1971-72. The study estimated four poverty lines for the analysis. Both consumption expenditure and income were taken as a welfare indicator. The expenditure and income of household were inflated/deflated with use of by using the group specific Fisher price index. The results of study revealed that with the use of any poverty lines, there was no regular trend in the poverty regardless of any poverty line.

Mujahid (1978) criticized on the methodology which was used for the estimation of poverty when data sets of HIES were used for the estimations. According to the study, household size should be considered in the analysis of poverty along with the estimation of household's income. The study used HIES data sets for the periods: 1963-64, 1966-67 and 1969-70 for estimation of two poverty lines for poverty analysis. The units of analysis in the study were household and individual. The results showed that the trend of poverty at rural level displayed systematic trend. It increased in first period and decreased in other periods. But poverty decreased in all periods at urban level. The study also found a negative relationship between the size of household and income per capita.

Kruijk and Leeuwen (1985) observed the trends in poverty measures such as headcount index, poverty gap ratio and squared poverty gap ratio. The study used two data sets of HIES of 1969-70 and 1970. The unit of analysis of the study was household level. The study used arbitrary poverty line of Rs. 233 for 1969-70 for poverty estimations. The results of the study explored that estimates at regional as well as national levels showed decreasing trend in all poverty measures.

Ahmed and Ludlow (1989) investigated about the movements in poverty level in Pakistan. These movements in poverty level were estimated with the estimation of headcount and Sen Index. The household and individual were regarded as a unit of analysis for poverty estimation in the study. The study used four arbitrary poverty lines for analysis. These poverty lines grouped into four categories i.e. low, medium, medium-high and high. The study used gross domestic product deflator to deflate the poverty lines. The data sets of HIES for two years 1979 and 1984-85 were used in the study for the estimations. At household as well as individual level, the magnitude of poverty decreased in both periods. The same reduction of magnitude was also found in Sen Index.

Kakwani (1990) estimated the FGT poverty measures such as head count ratio, poverty gap index and squared poverty index and Watt index to measure the poverty level of Cote d'Ivoire. The study used the data set of Living Standard Measurement Survey (LSMS) of Cote d'Ivoire of 1985. The standard errors of estimates were also estimated in the study. The results discovered that female headed households have less poverty than male headed households. According to the study, a negative association existed between poverty and the size of household. The heads of households have larger age over 65 get more chance to fall in poverty according to the results of study.

Zaidi (1992) estimated the head-count ratio for the poverty analysis in Pakistan. The study used relative poverty line for the year of 1984-85. At 75 percentage of the national average, the relative poverty line was fixed. So study estimated consumption poverty line of Rs. 255 and income poverty line of Rs. 276 for the estimation of poverty measures. According to the results of estimates following the expenditure poverty line 39 percentage of population are poor. With use of income poverty line, 43 percentage of population are poor. So it means that with the use of income poverty line higher poverty was found in the study. The comparison at provincial level showed that higher magnitude of head-count ratio was found for Baluchistan. The head-count ratio of 45.3 percent revealed that Baluchistan was most poor province of Pakistan than the other provinces. The study also discovered the reasons of higher poverty i.e. household size greater and the head of household has

no or little education. The households are relative poor whose income based on agriculture earnings and semi-agriculture earnings. The households have higher number of poor whose income based on mining, construction and manufacturing earnings, according to the results of estimations.

Ali (1995) estimated the poverty measures in context of Pakistan. The study used the data set of HIES for the year 1990-91 to estimate the poverty line. The study estimated the poverty line by adopting the Cost of Basic Needs approach and Extended Linear Expenditure System. Two poverty lines were used for estimations. One was food poverty line of Rs. 191 and the other was total poverty line of Rs. 347. Following total poverty line 47 percentage of population was declared as poor. And following food poverty line 10 percentage of population was regarded as poor. The results of study revealed that when total poverty line was used for analysis, then underestimation was found in the estimates of poverty measures. And when food poverty line was used in analysis over estimation was found in poverty estimates.

Amjad and Kamal (1997) estimated the headcount index for Pakistan. The study used CPI to adjust the poverty line which introduced by Malik (1988). The adjusted poverty line of 1984-85 was used to study the poverty of Pakistan. The methodology of estimating headcount index was the same for the years 1987-99, 1990-91 and 1992-93. According to the results of estimations, increasing trend in poverty was found in all periods.

McCulloch (2000) estimated all poverty measures such as head count ratio, poverty gap index and squared poverty gap ratio for Zambia. The study used the Cost of Basic Needs approach for the estimation of poverty line. For proxy of welfare indicator, the study used consumption expenditure of households. The study used the equivalence scales which were introduced by Latham (1965). The FGT poverty measures were estimated in the study. According to study, between 1991 and 1996 all poverty measures increased and from 1996 to 1998 all poverty measures declined.

Federal Bureau of Statistics (2001) observed the trends in poverty in context of Pakistan. The study used the data of HIES from 1992-93 to 1998-99. The Calorie based approach was employed in the study. The study considered the difference in prices among several regions of Pakistan with the use of Paache price index. The poverty line was updated by the use of CPI. According to the study, a rising trend was found in Pakistan from 1992-93 to 1993-94 in FGT poverty measures. From 1993-94 to 1996-97, there was declining trend in poverty measures. After these periods, from 1996-97 to 1998-99 there was again a rising trend in poverty. So the estimates of poverty showed no orderly trends. The comparison of poverty was done at regional as well as provincial level. The comparison at regional level showed that highest number of poor lived in rural areas than urban. The provincial level poverty comparison revealed that NWFP is the most poor province in Pakistan from 1992-93 to 1998-99. Sindh had little poverty level than the others from 1992-93 to 1996-97, but in 1998-98 poverty was low in Baluchistan.

Haq (2001) estimated the poverty of Pakistan by using the data set of HIES of 1996-97. The study selected the consumption expenditure of households as the proxy of welfare. The study estimated headcount ratio, the poverty gap index and the squared poverty gap index to compute the poverty level in Pakistan. The comparison of poverty was done at many different groups of livelihood. The results of comparison at dissimilar groups of livelihood showed that agriculture group of earning had high number of poor. According to the study, the bottom 20 percent of population consumed only 10.5 percent as expenditure share and the 20 percent of population consumed 37.2 percent expenditure.

Qureshi and Arif (2001) calculated head count ratio with the use of the Cost of Basic Needs approach. The study used two datasets from two sources. The data set of HIES 1993-94 and Pakistan Social Economics Survey (PSES) 1998-99 were used in the analysis of the study. The study included farm status and socio-economic groups to examine the determinants of poverty. The study

used logistic regression to estimate the determinants of poverty. According to the results of head-count ratio, 36.6 percent of population of Pakistan was poor. The comparison of poverty at regional level showed that 40.3 percent poor lived in rural areas and 33.0 percent poor lived in urban areas. The results of logistic regression revealed that there was a positive relationship between poverty and large household size. The results also revealed that education attainment and less dependency ratio will reduce the risk of poverty.

Anwar and Qureshi (2002) examined the trend in poverty for Pakistan. The study used the two data sets of HIES of 1998-99 and 2001-02. Anwar (1996, 1998, and 1999) estimated poverty line with the use of data of HIES for the year 1990-91 so inflated version of Anwar's poverty line used in the study for estimations. Two inflated poverty lines were used in the study for the year 1998-99 and 2001-02. The study selected the proxy of welfare indicator shown by consumption expenditure. The study considered price difference prevailing in different regions of Pakistan in estimations with the use of price indices which were estimated by FBS (2001). The study estimated per adult equivalent with use of equivalence scales of planning commission introduced by Government of Pakistan (1985). The calorie based approach used 2250 calories of per adult requirement to estimate poverty line for estimations. In all periods, an increasing trend was found according to the estimates of poverty in the study.

Federal Bureau of Statistics (2003) calculated poverty measures for analysis of poverty in Pakistan. The study used the official poverty line of Rs. 670 per capita per month. The consumer price index was employed in analysis to update the poverty line. The results of poverty measures showed that between the periods of 1998-99 and 2001-02 increasing trend was found in all poverty measures.

Assadzadeh and Paul (2004) estimated poverty measures for three consecutive periods 1983, 1988 and 1993 in Iran. The study used household level data for the analysis. The data was taken out from Household income and expenditure surveys of Iran of 1983, 1988 and 1993. The study employed the Cost of Basic Needs Approach to estimate the poverty line. According to the comparison at regional level of poverty indices, the increasing trend in poverty measures was observed at urban level by 40 percent. The poverty level decreased at rural level from 1983 to 1993.

Saboor (2004) estimated FGT poverty measures, Sen and Watts Index for rural Pakistan. The study employed the Calorie Based Approach to calculate poverty line. The results of FGT poverty measures showed that a systematic trend in all poverty measures was found. Like from 1990-91 to 1993-94 a rising trend was found in head count ratio and after this period a decreasing trend was found in head count ratio from 1993-94 to 1996-97. Between the 1998-99 and 2001-02 a rising trend was again found in head-count ratio. The other indices of poverty showed the same trend like the trend in head-count ratio.

Sharma (2004) examined the trends in the head count ratio in Fiji islands. The study used the data sets of HIES from 1977 to 1990-91 to examine the trends in the Headcount ratio. According to the results of study, there was an increasing trend from 15 percent to 24 percent in poverty head-count ratio. According to study's estimates, the poverty and inequality level of economy rose due to the low income growth of economy. The poverty level of household depends on the profession of house head. The households encountered with more poverty if the earnings of their heads based on the earnings from agriculture and semi-agriculture.

Jamal (2005) estimated the FGT poverty measures in context of Pakistan. The study used Calorie Based Approach to estimate the poverty line of 2001-02. The study used the data set of HIES 2001-02. The estimates of FGT poverty measures revealed that 35 percent of population is poor living in rural areas and 30 percent of population as poor living in urban areas. The study also

estimated the reasons of poverty prevailing in rural and urban areas through correlation. The study found that education level of household head and dependency ratio of household are the main reasons of poverty in rural areas.

Bhaumik et al. (2006) estimated head count ratio and poverty gap index in the context of Kosovo. The study also estimated the determinants of poverty by using Probit and Tobit models. The study used the data of living standard measurement survey (LSMS) 2001. The estimates of head-count ratio and poverty gap index revealed that there was less poverty in Albanians than Serbs. The results of Probit and Tobit model revealed that education is very important determinant of reducing poverty.

Esanov (2006) analyzed the trends in poverty and inequality from 2001 to 2004 in context of Kazakhstan. The study also estimated the determinants of expenditure by using Ordinary Least Square method (OLS). For the analysis of trend in poverty, the study calculated the FGT poverty measures named as head-count ratio, poverty gap index and squared poverty gap index. The welfare of households was shown by their consumption expenditure. The estimates of all poverty measures showed a decreasing trend from 2001 to 2004. The results of OLS revealed that the household head education, number of household, location of residence and age of household members are the most important determinants of poverty.

Jan et al. (2008) found the trends in poverty in context of Pakistan. The study used the data sets of HIES from 2001-02 to 2004-05 to estimate the trends in poverty. The Calorie Based approach used to estimate the trends in poverty in Pakistan. The poverty line was updated with the use of the Tornqvist Price Index. The results of poverty estimates revealed that under estimation was found in the estimates of poverty which were calculated from the data of PSLM 2004-05 and these estimates were calculated by Government of Pakistan. The main reason behind this under estimation is that Government used CPI to update the base poverty line for poverty line 2004-05. So according to study the estimates provided by government were under estimated and actually poverty decreased by only half of it.

Ali (2009) explored the trends in poverty and inequality for rural areas of Pakistan. The study used the data sets of PSLM for the years 1998-99, 2001-02, and 2004-05. According to the estimates of study, between the periods of 1998-99 and 2001-02, the increasing trend was found in poverty estimates. From the periods 2001-02 to 2004-05 the decreasing trend was found in the estimates of poverty.

Ali et al. (2010) examined the trend in poverty at divisional level for rural areas of Pakistan. The study used the data sets of HIES from the periods 1998-99 to 2004-05. The study examined the level of poverty through poverty head count ratio. According to poverty estimates at regional level, there was two times higher poverty in rural areas than urban areas.

Cheema and Sial (2010) estimated the poverty and inequality for Pakistan. The study used the data sets of HIES for the years 1992-93, 1993-94, 1996-97, 1998-99, 2001-02, 2004-05 and 2005-06. The study considered the difference in prices in different regions of Pakistan with the use of Paasche Price Index (PPI). The study used the equivalence scales following the World Bank (2002) and used in FBS (2001) to consider the difference of structure in households. The study estimated FGT poverty measures to examine the poverty level of Pakistan. According to the study, an increasing trend was found in poverty estimates in all periods except 1993-94 and 1996-97 in the nineties. The study also revealed that in all periods the higher number of poor lived in rural areas than urban areas.

According to the review of literature on poverty, so many studies have been found on poverty analysis. But these studies cannot be compared with each other because these studies are different by their nature of problem. The definition of poverty used the in many studies differently in the

analysis of poverty. The units of analysis used in the estimations are different in many studies like household level used as unit of analysis in some studies and individual level used as unit of analysis in others. The time periods which covered in the estimations are different in many studies. The price indices which were used to adjust the poverty lines are unlike in many studies. The poverty bunch mark called as poverty lines which were used in poverty estimation were different in many studies. All these above factors conclude that the comparisons of poverty cannot be made.

Review of Literature on Decomposition Techniques

The reduction of poverty is the main objective of policy makers and welfare government. There are many factors which contribute towards increase or decrease in poverty like growth in income and distribution of income. The effects of these factors were calculated from decomposition techniques. There are many studies which proposed different methodologies of decomposition. Some studies explored the variations in poverty into two components like growth and distribution by using two or more than two data sets. Other studies investigated the effects of factor such as prices towards poverty by using only one data set. Some of them are given below

Kakwani and Subbarao (1990) explored that income growth and income redistribution have impact on poverty. This study estimated the impact of growth on income and redistribution of income on poverty separately through decomposition in context for rural India. The welfare indicator was chosen from the consumption level of households. The proxy of welfare indication was measured by per-capita consumption in the study. The study used the National Sample Survey (NSS) data for the periods 1972-73, 1973-74, 1977-78 and 1983 for estimations. The analysis was done for poor and ultra-poor. The results of inequality suggested that if inequality improved this will be beneficial for ultra-poor than poor and if inequality worsened then ultra-poor will hurt more than the poor. The results on poverty decomposition suggested in the study that the change in income growth and the change in income redistribution affect more on the change in poverty measures than other factors. As results showed that ultra-poor have higher income growth elasticity and income redistribution elasticity so government should concentrated on the welfare of ultra-poor.

Jain and Tendulkar (1990) investigated the change in headcount ratio in context for India. The study investigated the change in headcount index between the periods 1970-71 and 1983. The analysis was done for rural and urban areas too. The change in headcount index was decomposed into two changes, change income growth of households and change in redistribution of income of households. The study used the data of different rounds of NSS. The study also did the inter-state regression analysis to explain the change in poverty with the help of growth in real average per capita total expenditure and base-year headcount ratio and related the residuals from the regression equation to the distribution effect from the decomposition of change in headcount ratio. The results of decomposition of poverty revealed that the income growth has more effect on poverty reduction than redistribution effect in 1970-83. The results of regression analysis stated that if one percent increase in the growth of income then the headcount ratio of rural area decreased by 0.5 to 0.6 percent and for urban area it decreased by 0.3 to 0.4 percent.

Datt and Ravallion (1992) introduced the decomposition technique to examine the change in poverty in context of India and Brazil. The decomposition technique divided the change in poverty into two components one is growth component and the other is redistribution component. The residual term was also included in decomposition method. The time periods covered for Brazil to decompose the poverty change from 1981 to 1998 for India from 1977-78 to 1988. The study revealed that in some periods change in poverty was dominated by growth component and in some period it was dominated by inequality component.

Kakwani (1997) investigated the change in poverty of Thailand from 1988 to 1994 in to two effects income as well as distribution effect. The decomposition technique was followed in this study based on axiomatic approach. The study used four data sets of Socio Economic Survey for the periods of 1988, 1990, 1992 and 1994. The results of study revealed that the welfare level of Thailand and averagely increased in all periods. This increase in welfare level can be shown in the reduction of poverty measures such as head count ratio and poverty gap index. The decomposition revealed that poverty level of Thailand increased in all periods due to positive sign of inequality but in 1992 it decreased. The study also revealed that growth component has less impact on poverty because it gave more benefits to rich than poor.

McCulloch et al. (2000) examined the variations in poverty head count ratio, poverty gap index and squared poverty gap index from 1987 to 1996 through decomposition technique. The estimates of decomposition of head-count ratio revealed that the sign of growth component measured with average expenditure is positive and this positive sign showed that poverty head count ratio increased. The estimates of decomposition of poverty gap and squared poverty gap index showed that the sign of growth component is positive which showed poverty gap as well as squared poverty gap index increased and the negative sign of redistribution component reduced the poverty gap index as well as squared poverty gap.

Assadzadeh and Paul (2004) investigated the change in poverty measures in the context of Iran. The study used the decomposition technique of Datt and Ravallion (1992) from 1983 to 1993 to divide the change in poverty into growth and redistribution components. According to the results of study, for the each sector the sign of redistribution component was positive and this positive sign showed that poverty level in each sectors increased due to increase in inequality. The estimates of decomposition revealed that in rural sector poverty decreased due to negative sign of growth component. But for urban sector, the sign of growth component was positive and this positive sign of growth component showed that poverty level of urban areas increased due to positive sign of growth component.

Dhongde (2004) examined the variations in poverty head-count ratio which decomposed into two effects growth as well as distribution effect. The study used various techniques of decomposition introduced by Kakwani and Subbarao (1990), Jain and Tendulkar (1990), Datt and Ravallion (1992) and Kakwani (1997). The study used the data of rural west Bengal from 1983-84 to 1993-94. The results of decomposition methods of Kakwani and Subbarao (1990) and Kakwani (1997) revealed that the poverty headcount ratio reduced due to inequality decrease. The head count ratio increased throughout the periods due to increase in inequality (Jain & Tendulkar, 1990; Datt & Ravallion, 1992).

The study used the data sets from 1983-84 to 1993-94 and from 1993-94 to 1999-2000 for India to decompose the change in poverty measures into two components i.e. growth component and distribution component. The decomposition technique of Kakwani (1997) was employed for estimations. The estimates of decomposition revealed that the poverty decreased due to increase in growth and poverty increased due to increase in inequality. According to the estimates of decomposition, at regional level the magnitudes of growth are greater than magnitudes of inequality component but in urban areas the magnitude of growth is greater than rural areas.

Esanov (2006) analyzed the trends in poverty and inequality from 2001 to 2004 in context of Kazakhstan. The study also estimated the determinants of expenditure by using OLS regression. The study evaluated the relationship between poverty, inequality and growth. The study used the method of decomposition of Datt and Ravallion (1992). For the analysis of trend in poverty, the study calculated the FGT poverty measures named as head-count ratio, poverty gap index and squared poverty gap index. The welfare of households was shown by their consumption expenditure. The estimates

of all poverty measures showed that a decreasing trend was found from 2001 to 2004. The results of OLS revealed that the household head education, number of household, location of residence and age of household members are the most important determinants of poverty. The results of decomposition revealed that the poverty level decreased due to decrease in inequality and poverty increased due to adverse growth impact.

Anwar (2007) estimated changes in only head count ratio for the periods 1998-99, 2001-02 and 2004-05. The study applied the decomposition technique of Datt and Ravallion (1992). The results of study revealed that due to adverse growth effect poverty increased however poverty decreased due to decrease in inequality.

Cheema and Sial (2010) investigated the contributions of growth and redistribution to changes in poverty in Pakistan. The study applied Datt and Ravallion (1992) and Kakwani (1997) techniques using data from various household surveys conducted by FBS between 1992-93 and 2005-06. The results revealed that the growth and redistribution effects counteracted each other to affect poverty throughout the period except during 1993-94 and 1996-97, where the both effects were negative implying that they reinforced each other to decrease poverty.

The literature on decomposition techniques revealed that these above studies investigated the change in poverty and the pro-poorness of growth. The above studies estimated the relationship between poverty, inequality and growth. The decomposition of poverty and estimation of the pro-poorness of growth more than one data sets used in the analysis. In above studies the effect of price on poverty was not considered in the analysis. Some other studies considered the effect of prices change on poverty indices.

Deaton (1989) examined the effects of rising price of rice on the demand and supply patterns of households. The study used the data of the Socioeconomic Survey of the Whole Kingdom 1981-82. The study examined the effects of rising price of rice on the distribution of real income. For this purpose, the study used non-parametric techniques for regression and density estimation. The variables used in the analysis are consumption level of rice and production level of rice. The analysis was done at regional, geographical, and sectoral level. The location and living standard of household also considered in the analysis. According to the study, the households of all living standards lived in rural areas gained benefits due to increase in price of rice. Based on the importance of rice crop, the estimates of at regional level showed variation. According to the study the households at middle of distribution pattern gained more benefits of rise in price of rice.

Muller (2006) examined the effects on poverty of Rwanda due to change in the spatial mean or spatial variance of price indices. The study estimated this impact with the use of simple statistical tools which based on mean and variance of spatial price indices without making any model regarding the situation of households. The analysis of study based on Watts's poverty measure with log-normality. The equivalence consumption per capita used as the welfare indicator of the analysis. The study used the data from the Rwandan National Budget-Consumption Survey which was conducted by the Government of Rwanda and the French Cooperation and Development Ministry for 1982-83. The estimates for Rwanda stated that seasonal variation was found in price indices and these variations impact on poverty. According to the study, the price indices have larger variations in means and variances of spatial price indices changed in little amount.

Son and Kakwani (2006) measured the impact of price changes on poverty. The study used the data set of Brazilian Family Survey (POF) of period 2002-03. The poverty weights were calculated with the use of unit record data. The institute of Geography and Statistics (IBGE) published monthly prices of commodities which were used in the analysis. In the study, the new price index for the poor (PIP) was also derived to estimate the pro-poorness of the change in prices. The

changes in relative prices are anti-poor in Brazil during the period 1999-2006, according to the estimates of study.

Son and Kakwani (2006b) examined the effects of rise in price of commodities on the distribution of income as well as well-fare of households in Thailand and Korea. For this purpose, the study introduced new methodology. The methodology estimated the satisfactory and un-satisfactory impact on the welfare of the poor due to change in prices of goods. The social cost of living indices are the main feature of the methodology which based on the idea of a social expenditure. There are two types of social welfare functions. Firstly, utilitarian was base of the first class of social cost of living indices which was introduced by Atkinson (1970) and Kakwani (1980) introduced class of social welfare functions which become the basis of the second class of social cost of living indices. The degree of inequality prevailed in the economy was calculated from these indices. The relationship between the relative price change and degree of inequality calculated with the use of this methodology. The study used the data of Socioeconomic Survey (SES) 1990 for Thailand and computed social cost of living indices from 1986 to 1995. For Korea, the study used the data from Family Income and Expenditure Survey (FIES) 1990 and computed social cost of living indices from 1990 to 1999. According to the results of the study, the poor people were effected badly than non-poor due to the price change. The study also revealed that high inequality prevailed in Thailand than Korea.

Thiele et al. (2006) examined the relationship between the changes in prices of coffee and incomes of households in rural areas of Uganda. The three data sets of surveys regarding Uganda were used in the analysis for the periods 1992-93, 1995-96 and 1999-00. The FGT poverty measures were estimated in the study for poverty analysis. The study used pooled data from three surveys. The study used regression analysis for estimations. The variables used in the analysis are consumption expenditure on coffee related variables. According to the study, the correlation between price changes and poverty was not spurious. The estimates of study revealed that the income of households who grow coffee in their farm increased due to increase in price of coffee after 1990. The study also revealed that poverty of coffee grower rural households decreased after decrease in price of coffee after 1995. The study revealed that poverty level of rural areas of Uganda decreased due to increase in price of coffee 1992-95. There is no impact of price change in coffee price on poverty in 1995-00 because price change in coffee dominated by other factors.

Akande et al. (2009) measured the impact of price change on poverty and income distribution in Nigeria. The study used data-intensive approach to calculate the short-run impacts on welfare of households, the methodology based on consumer demand theory. The study estimated head-count ratio, poverty gap index and squared poverty gap index for analysis. The per capita expenditure was picked as the proxy of welfare level. The study used the data sets from the Annual Household Survey from the National Bureau of Statistics from 1980 to 2006. The study examined the effect of changes in commodity prices on poverty with the use of decomposition technique of Son and Kakwani (2006). According to the study, the poor people of Nigeria affected more than non-poor people due to increase in price of commodities. The estimates at regional level also revealed that rural areas of Nigeria suffered higher poverty than urban areas.

Levin (2010) investigated the impact of the recent price increase on maize on Kenyan households. The study used the data set of Kenya Integrated Household Budget Survey (KIHBS) of 2005. The study calculated the Net Benefit Ratios (NBRs) across regions and deciles. The study interpreted the NBR as the elasticity of real income with respect to a maize price change. The study also used Computable General Equilibrium (CGE) to estimate the effect of various shocks that have recently occurred in Kenya. The results of study analyzed that after simulating a 100 percentage in-

crease in maize prices, the headcount ratio in urban areas increased by three to four percentage unit points, depending on the size of windfall gain to producers.

Hasegawa et al. (2011) investigated about the impact of change in prices of farming goods internationally on the poverty and distribution of income in Brazil. The study estimated these impacts with the use of Social Accounting Matrix which was derived from Leontief-Miyazawa type model framework. The 40 agricultural products defined in the Social Accounting Matrix. For the estimation of income of households in Brazil, the study used the data sets from Household Expenditure Surveys (HES) developed by IBGE for the year 1987 and 1995/96. According to the study, if price change of agriculture-goods happened internationally then family farmers will suffer higher drops in production value than commercial farmers in Brazil.

The literature reviews on the decomposition of poverty with respect to price change suggest that prices of goods affect the welfare level of poor. Thus the role of prices of goods towards poverty should be considered. For this purpose the present study follows the technique of Son and Kakwani (2006) to find out the effect of prices of goods on poverty level of Pakistan.

Methodology

The poverty line is used as a threshold in the analysis of poverty. It divides the population into two categories like poor and non-poor. The poverty line defines the minimum income which is required to fulfill the basic needs of humans. The person who has income below the poverty line is poor. If the income is equal or greater than the poverty line, the person is called non-poor. The sum of poor below the poverty line shows the poverty level of a country. There are many factors which affect the income of poor as well as non-poor. The prices of commodities are one of them. The present study finds how price changes affect poverty. The study follows the methodology of decomposition which was introduced by Son and Kakwani (2006). The section 3.1 talks about the nature of data sets which are used in the analysis. The detail of methodology is discussed in the section 3.2.

Data

This study uses the latest available PSLM datasets 2007-08 and 2010-11 for measuring poverty in Pakistan. The data were collected by Pakistan Bureau of Statistics (PBS) through surveys all over the Pakistan. Two-stage stratified sampling design was used for sampling. This survey based on a national sample, covers all urban and rural areas of the four provinces such as Punjab, Sind, Khyber Pakhtunkhwa and Baluchistan in Pakistan. This survey provides detailed information about household demographic characteristic, economic status, income and expenditure at individual and household level. This information is collected through interviews from households selected in sample. The sample size information at national and regional level is given in the Table 1.

Table 1. Information about Sample Size at National and Regional Level

Year	Sample Size at regional and national level		
	Rural	Urban	Pakistan
2007-08	9257	6255	15512
2010-11	9752	6589	16341

Source: PSLM survey 2007-08 and 2010-11

There are 6,255 households from urban areas and 9,257 households from rural areas out of total 15,512 households used as sample in PSLM 2007-08. The number of households increases in PSLM 2010-11, there are 6,589 households from urban areas and 9,752 households from rural areas out of total 16,431 households.

Methodology

The study estimates the FGT poverty measures at Pakistan with urban/rural break up for 2007-08 and 2010-11. The study discusses the FGT poverty measures in detail below.

Poverty Measures

This study used FGT class of poverty measures such as head count ratio, poverty gap, severity of poverty to estimate poverty level of Pakistan. But before estimating poverty, it is necessary to elaborate some basic steps in measuring poverty given by Ravallion (1998). These steps are given below

1. Declare welfare level indicator
2. Selection of poverty line nationally or internationally.
3. Estimation of welfare level indicator statistics.

The well-being level of the country clearly portrays from statistics of poverty. There are many approaches to estimate well-being level of individual. But the literature divided it into two broad categories

1. Welfare approach
2. Non-welfare approach

The welfare approach defines utility as a well-being level of household (Sen, 1979). Utility is measurable by household income and expenditure. The income and expenditure of household act like a proxy of utility. The welfare approach is mostly used in estimation of uni-dimensional poverty.

The non-welfare approach discusses that if a household attains certain level of basic requirements of life like health, shelter, education etc. that household is non-poor. The non-welfare approach is mostly used in estimation of multi-dimensional poverty.

This study uses expenditure of household as welfare level indicator rather than income due to the following reasons. Firstly, consumption is considered a more direct indicator of achievement and fulfillment of basic needs. Secondly, consumption is more easily observable and measurable than income especially in developing countries. Thirdly, according to life cycle theory, individuals want to smooth their consumption during their low and high income years through borrowing and saving. So consumption is considered smoother than income cheema & Sial (2014). This study uses per adult equivalent expenditure to adjust the different composition of households for poverty estimation.

The study used official poverty line of Rs. 1145 and Rs. 1742, respectively for the years 2007-08 and 2010-11. These poverty lines are CPI inflated and per adult equivalent. If the per adult equivalent expenditure of household is less than poverty lines, that household is poor and the household whose expenditure is greater or equal to poverty line is regarded as non-poor those who consumed greater than poverty line is non-poor.

After selecting welfare indicator and poverty line, the next step in poverty estimation is to choose poverty measures. There are huge literatures on poverty measure. The FGT class of poverty measures is commonly suggested by literature. The FGT poverty measures were introduced about 29 years ago, with the passage of time some improvement have been done in these measures but still it is very popularly used in the estimation of poverty. The general mathematical form of FGT poverty measures are is given below.

$$FGT = \frac{1}{N} \sum_{i=1}^H \left(\frac{z - y_i}{z} \right)^\alpha \quad (1)$$

In the equation 1 'z' denotes absolute poverty line, 'y_i' shows income of ith household/ individual. 'N' represents the number of people in a nation. 'H' shows how many poor people are in an

economy. The value of parameter ‘ α ’ in FGT poverty measures is called as “sensitivity” parameter. If the value of “ α ” is low that it shows metric weights given to all household’ income are same in entire statistics. If the value of “ α ” is high, it shows that lowest income households get more weights in FGT measures.

Headcount Index (HCI)

The number of people in percentage below the poverty line show the head count ratio of that country. When $\alpha=0$ in FGT general formula, It will estimate head count index.

$$HCI = \frac{H}{N} \quad (2)$$

The equation 2 shows the mathematical formula to estimate the head count index. When the number of poor divided by the whole population, this estimate the head count index. The headcount ratio has following advantage.

- i. It is easy to understand.
- ii. It is easy to use.
- iii. It has is commonly used in literature.

The headcount ratio has following disadvantage;

- i. It is assumed in estimation of headcount ratio, that all the poor of economy face same situation of well-being. This assumption rejected the inequality of well-being among different individuals.
- ii. HCI does not take into account the intensity of poverty. It means that it ignore the inequality under the poverty line.
- iii. HCI does not show any variation, if incomes of poor under poverty line vary. , head-count index will be unchanged.

Poverty Gap Index(PGI)

PGI defines depicts as how many number of people on average are far away from poverty line. PGI considers the differences of household well-being below the poverty line. The head count index ignores the differences under the poverty line and gives same weights to all poor. But in PGI, it judges inequality among the poor and averagely how far poor from the poverty line.

When $\alpha=1$ in general formula of FGT, it estimates the PGI which is given below:

$$PGI = \frac{1}{N} \sum_{i=1}^H \left(\frac{z - y_i}{z} \right) \quad (3)$$

The equation 3 depicts the mathematical formula to estimate PGI. The PGI has following advantages.

- i. PGI measures average distance of income of poor from poverty line. Policy maker should consider the estimates of poverty gap index when making policy, because Poverty Gap Index show that how many expenditure or income will be required to escape from poverty.

- ii. It is the quality of PGI, it could not estimate, if discontinuity exists in poverty line.

The PGI has following disadvantages;

- i. It calculates average distance below poverty line but not consider severity of poverty among the poor.
- ii. It will remain unchanged by transfer of payment below the poverty line.

Squared Poverty Gap Index (SPGI)

The SPGI is defined as square of the average gap of poor below the poverty line. It then estimates weighted sum of poverty gap. The weights are given to poor accordingly to their gap below

the poverty line. The SPGI calculates approximately the degree of inequality that exists among the poor.

When $\alpha=2$ in the general formula of FGT, it estimates the SGPI is given as below.

$$SPGI = \frac{1}{N} \sum_{i=1}^H \left(\frac{z - y_i}{z} \right)^2 \quad (4)$$

The SGPI has following advantages.

- i. It takes into account inequality that exist in poor
- ii. Policy makers could make effective policies for lessening of poverty, because SPGI target poorer of economy.

The SGPI has following disadvantages.

- i. Theoretically SPGI is very difficult to understand
- ii. If someone estimates SPGI, it will be difficult for him/her to interpret SPGI.

The FGT class of poverty measures is commonly used in literature and policy making because these measures satisfy the axioms introduced by Sen (1976, 1979). The following axioms are given below:

- i. Monotonic Axiom

According to this axiom, reduction of the poor's living standard increases the magnitude of poverty indices, other things remain unchanged.

- ii. Scale Invariance Axiom

According to this axiom, the magnitude of poverty remains the unchanged, if the same positive integer is multiplied to the incomes of all.

- iii. Focus Axiom

Poor are the subject matter of poverty. Poverty indices only discuss and target living standard of poor, it has no concern about non-poor. So if non-poor get some benefits from government or any-other else, the level of poverty of an economy remain ineffective.

- iv. Transfer Axiom

The magnitudes of poverty measure will go up, the other things remaining the unchanged in the economy; if transfer of income from the poor to the relatively better off richer prevail in the economy.

FGT fulfills all the above axioms which make it suitable and popular poverty indices.

Decomposability of FGT Poverty Measure Due to Change in Prices

This study used Son and Kakwani (2006) decomposition technique in which effects of prices change on poverty level are estimated. This technique decomposes the poverty into two components firstly Income component and secondly distribution component. The distribution component represents if prices change what happens in the economy, whether it will be pro-poor or anti-poor for poor. The distribution component is also helpful in derivation of PPPI.

The methodology of poverty decomposition of Kakwani and Son (2006) starts with the estimation of price elasticity of poverty measures like headcount ratio, poverty gap ratio and squared poverty gap.

Assume income of an individual works as a random variable along with the density function $f(x)$ and if poverty line z of that individual, then additive and separable poverty measures could be written as

$$\theta = \int_0^z p(z, x) f(x) dx \quad (5)$$

Here $p(z, x)$ is interpreted as the deprivation suffered by an individual having income x , it adopts zero value when $x \geq z$ and otherwise positive it'll be. It explains that only when individual

suffers the deprivation whenever his or her income is below the poverty line. θ As the poverty measure is showing here the average deprivation which is being suffered by the whole society.

Foster, Greer and Thorbecke's (1984) range of poverty measures are attained if we substitute as $p(x, z) = \left(\frac{z-x}{z}\right)^\alpha$ in (5)

$$\theta_\alpha = \int_0^z \left(\frac{z-x}{z}\right)^\alpha f(x) dx \tag{6}$$

Here α is interpreted as the inequality aversion parameter. If $\alpha = 0$ and $\theta_0 = H$, that is head-count poverty measure. This measure ignores the intensity of poverty suffered by the poor as it gives equal weightage to all poor. Each poor person is given weightage according to his or her shortfall of income from poverty line. This I called the poverty gap ratio. When $\alpha = 2$, each poor individual is given weight which is proportional to squared shortfall of income as compared to poverty line. This measure is called severity of poverty measure.

Price Elasticity of Individual Money Metric Utility

Assume that p is $m \times 1$ price vector in the given base year, in the terminal period it changes to the price vector p^* . Following that, this study aims at knowing how these changes may influence the real income (expenditure) of an individual. To answer this we assume an expenditure function $e(u, p)$, that is required expenditure to achieve u level of utility at p price vector. The change in real income x will be as

$$\Delta x = -[e(u, p^*) - e(u, p)] \tag{7}$$

Using Taylor expansion gives

$$\Delta x = -\sum_{i=1}^m (p_i^* - p_i) q_i(x) = \sum_{i=1}^m \Delta p_i q_i(x) \tag{8}$$

Here $q_i(x) = \frac{\partial e(u, p)}{\partial p_i}$ is demand for i th commodity by the individual having income x .

This equation shows that change in cost of consumption basket due to the change in prices is equal to the change occur in money metric of individual. From (3.8) it's easy to show that elasticity of real money w.r.t i th price of commodity is given by

$$\frac{\partial x}{\partial p_i} \frac{\partial p_i}{\partial x} = -\frac{p_i q_i(x)}{x} = -w_i(x) \tag{9}$$

Here $w_i(x)$ is the budget share of i th commodity at x level of income. It can be interpreted as if price of i th commodity is increased by 1 percent the individual money metric utility x will decrease by $w_i(x)$ percentage. Poverty elasticity with respect to prices will be derived by using this result.

Price Elasticity of Poverty

To begin with, Elasticity of the head-count ratio with respect to the i th price will be derived first. Head count ratio can be written as

$$H = \int_0^z f(x) dx = F(z) \tag{10}$$

Here $F(z)$ is the function for probability distribution, when the income level x is equal to poverty line z .

Assume that u is the level of utility obtained by individual when, income is equal to the poverty line z at price vector p . so, we can write it as

$$z = e(u, p) \tag{11}$$

When differentiating with respect to p_i it'll give

$$\frac{\partial z}{\partial p_i} \frac{p_i}{z} = -\frac{p_i q_i(z)}{z} = -w_i(z) \tag{12}$$

Here $w_i(z)$ is the budget share of commodity at poverty line. While differentiating (3.5) with respect to p_i we have elasticity of head count ratio w.r.t p_i

$$\eta_{Hi} = \frac{\partial H}{\partial p_i} \frac{p_i}{H} = \frac{zf(z)w_i(z)}{H} \tag{13}$$

This elasticity can be interpreted as if the price of i th commodity is increased by 1 percent, the head count ratio will be increase by η_{Hi} percent. If all prices change, then H will change by η_H .

$$\eta_H = \sum_{i=1}^m \eta_{Hi} = \frac{zf(z)}{H} \tag{14}$$

η_H is called the elasticity of head count ratio and measures impact of 1 percent change in all prices on head count ratio.

Now, price elasticity of poverty for entire range of poverty measure defined in (5) is estimated. By differentiating the equation (5) with respect to p_i and then using (12) we have

$$\eta_{\theta i} = \frac{\partial \theta}{\partial p_i} \frac{p_i}{\theta} = -\frac{1}{\theta} \int_0^z \frac{\partial p}{\partial x} x w_i(x) f(x) dx \tag{15}$$

This one has the same interpretation as the elasticity of head count ratio. When the commodity i 's price rises, the θ will rise by $\eta_{\theta i}$ %. When all prices rise by 1 %, θ will rise by η_{θ} where θ is as under:

$$\eta_{\theta} = \sum_{i=1}^m \eta_{\theta i} = -\frac{1}{\theta} \int_0^z \frac{\partial p}{\partial x} x f(x) dx \tag{16}$$

That is total poverty elasticity and m is the total number of commodities. Substituting $P(z, x) = \left(\frac{z-x}{z}\right)^\alpha$ into (15) then poverty elasticity of FGT range of measure is obtained as

$$\eta_{\alpha i} = \frac{\partial \theta_\alpha}{\partial p_i} \frac{p_i}{\theta_\alpha} = \frac{\alpha}{\theta_\alpha} \left[\int_0^z \left[\frac{z-x}{z}\right]^\alpha w_i(x) f(x) dx - \int_0^z \left[\frac{z-x}{z}\right]^\alpha w_i(x) f(x) dx \right] \tag{17}$$

For $\alpha \neq 0$. And summing all over the commodities then total elasticity of FGT measure is as

$$\eta_{\alpha} = \sum_{i=1}^m \eta_{\alpha i} = \frac{\alpha}{\theta_\alpha} [\theta_{\alpha-1} - \theta_\alpha] \tag{18}$$

Measuring the impact of prices on poverty

Since $x=e(u,p)$, poverty measure in equation (5) can be written as

$$\theta(p) = \int_0^z p(z, e(u, p)) de(u, p)$$

Which shows that $\theta(p)$ is a function of price vector p . When the price vector p changes to p^* , the poverty measure $\theta(p)$ will change to $\theta(P^*)$. Accordingly, the proportional change in poverty θ due to change in prices will be given by $\frac{\theta(P^*) - \theta(P)}{\theta(P)}$, which on applying Taylor expansion can be approximated as

$$\frac{\theta(P^*) - \theta(P)}{\theta(P)} = \sum_{i=1}^n \left(\frac{P_i^* - P_i}{P_i} \right) \eta_{\theta i} \tag{19}$$

Where $\eta_{\theta i}$ is the elasticity of θ with respect to the price of the i th commodity as defined in (19). The term on the right hand side of (19) measures the impact of the change in prices on poverty.

How can we measure whether changes in prices are pro poor or anti-poor? To answer this question, we decompose the elasticity $\eta_{\theta i}$ into the sum of two components:

$$\eta_{\theta i} = \bar{w}_i \eta_{\theta i} + (\eta_{\theta i}) - \bar{w}_i \eta_{\theta i} \tag{20}$$

Where

$$\bar{w}_i = \frac{\int_0^\infty x w_i(x) dx}{\int_0^\infty x f(x) dx}$$

is the average budget share of the i th commodity. The first term on the right hand side of the (20) is the income effect of the i th price change, which is always positive. The second term on the right hand side of (20) is the distribution effect of the i th price change, which can be either negative or positive. It is the distribution effect which tells us whether an increase in i th price redistributes income in favor of the poor or the non-poor. If the distribution effect is negative (or positive), the increase in i th price redistributes income in favor of the poor (or non-poor). This leads us to propose a pro-poor price index .

$$\varphi_i = \frac{\eta_{\theta i}}{\bar{w}_i \eta_{\theta}} \quad (21)$$

If φ_i is less than 1, an increase in the i th price hurts the poor proportionally less than the non-poor, that is the price increase in the i th commodity is pro-poor. Similarly, if φ_i is greater than 1, then the i th price increase is anti-poor. Thus, φ_i can be used to analyze how changes in price of different commodities would affect poverty.

To measure the impact of price on poverty, we substitute (20) into (19). This leads to the total effect of the changes in price on poverty which is the sum of two components:

$$\sum_{i=1}^n \left(\frac{P_i^* - P_i}{P_i} \right) \eta_{\theta i} = \sum_{i=1}^n \left(\frac{P_i^* - P_i}{P_i} \right) \bar{w}_i \eta_{\theta} + \sum_{i=1}^n \left(\frac{P_i^* - P_i}{P_i} \right) (\eta_{\theta i} - \bar{w}_i \eta_{\theta}) \quad (22)$$

The first term on the right hand side of (22) measures the impact of price on poverty under a counter-factual situation when all prices had increased at the same rate. The second term on the right hand side of (18) measures the impact of changes in relative prices on poverty. The relative changes in prices are pro-poor (or anti-poor) if the second term on the right hand side of (22) is negative (or positive).

Results and Discussion

Poverty reduction has been the main objective of the policy makers. For this purpose a lot of studies have been conducted in Pakistan which had estimated not only poverty, but also the factors contributing towards it. Some studies decomposed the change in poverty into growth and redistribution components. Some other studies estimated the other determinants of poverty like education, unemployment etc. But a little attention has been paid towards the role of prices in affecting poverty. The present study estimates the poverty level of Pakistan with urban/rural breakup. The study captures the effect of the prices towards poverty by using the methodology of Son and Kakwani (2006) in Pakistan by using the data sets of PSLM for the periods of 2007-08 and 2010-11.

Estimates of Poverty Measures

The study estimates poverty by using FGT class of poverty measures such as head count ratio, poverty gap index and squared poverty gap index. The study discusses the estimates of poverty measures at national with urban/rural break up for 2007-08 and 2010-11 in the next Section.

Poverty Estimates at National and Regional Level

The main objective of poverty reduction policies is to reduce poverty and raise the living standard of poor in the country. For this purpose, the policy makers need to know that how many poor live in the Pakistan and what is the extent of their poverty and where they are exactly living. This study estimates the poverty at national and regional level by using the two year data sets of PSLM 2007-08 and 2010-11. The purpose of using two year data sets is that it will help to analyze the performance of policies imposed by government which aimed to reduce poverty or increase the welfare level of poor. The study uses the official poverty lines which were proposed by the experts of government for the estimations of poverty level. The official poverty lines are respectively, Rs.

1145 and Rs. 1742 for the years 2007-08 and 2010-11. The results of poverty measures are presenting in the Table 2.

Table 2. The Estimates of FGT Poverty Measures at National and Regional Level

Years	2007-08			2010-11		
	Pakistan	Urban	Rural	Pakistan	Urban	Rural
HCI	16	10	22	12.2	7.01	14.93
PG	0.03	0.01	0.04	0.01	0.01	0.00
SPGI	0.01	0.00	0.01	0.00	0.02	0.00

Source: Author's own calculations

The head count index is 16 percent in Pakistan in 2007-08. It is 10 and 22 percent in urban and rural areas in 2007-08 respectively. It can be seen that head count index is greater in rural areas than urban areas. The results are in line with the official estimates of Pakistan and Cheema and Sial (2012). As far as poverty gap and squared poverty gap ratio are concerned, these are 0.03 and 0.01 percent respectively at Pakistan level in 2007-08. The noticeable point is that these poverty measures are also higher in rural areas than urban areas just like head count ratio. The headcount index is 12.2 percent at national level and 7.01 and 14.93 percent for urban and rural areas respectively in 2010-11. The estimates of head count ratio are consistent with the official estimates of government of Pakistan and Cheema and Sial (2014). The head count ratio is also greater in rural areas than urban areas in 2010-11 as in 2007-008. The estimates of poverty gap and squared poverty gap reveal that the relative and sever poverty are higher in urban areas than rural areas in 2010-11. The results of poverty measures of previous year 2007-08 are compared with the results of present year 2010-11. It comes to know that the head count index reduces from 16 to 12.2 percent at Pakistan level. It reduces from 10 to 7 percent at urban level and 22 to 14.93 percent at rural level from 2007-08 to 2010-11. The other poverty measures like poverty gap ratio and squared poverty gap ratio exhibit the same decreasing trend as head count index. The trends of all poverty measures at national level are presented in the Figure 1.

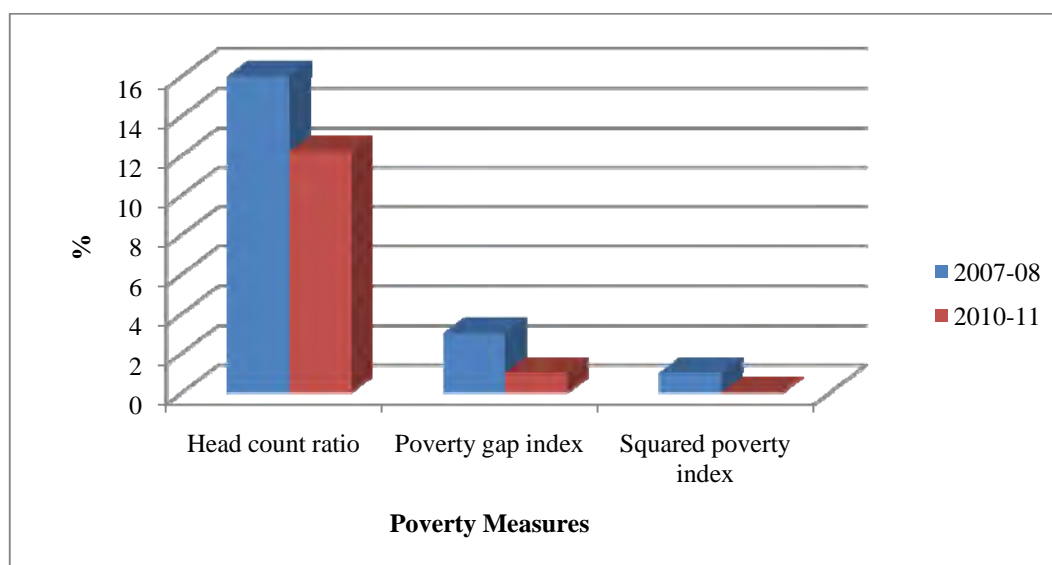


Figure 1 Head-Count Ratio at National Level

Source: Author's own calculations

The Figure 2 shows that poverty head count ratio decreased from 2007-08 to 2010-11. The decreasing trend can be noticed in all poverty measures which depicted that the welfare level of the poor increased in Pakistan.

The trends of head count poverty ratio at urban and rural level are shown in the Figure 2.

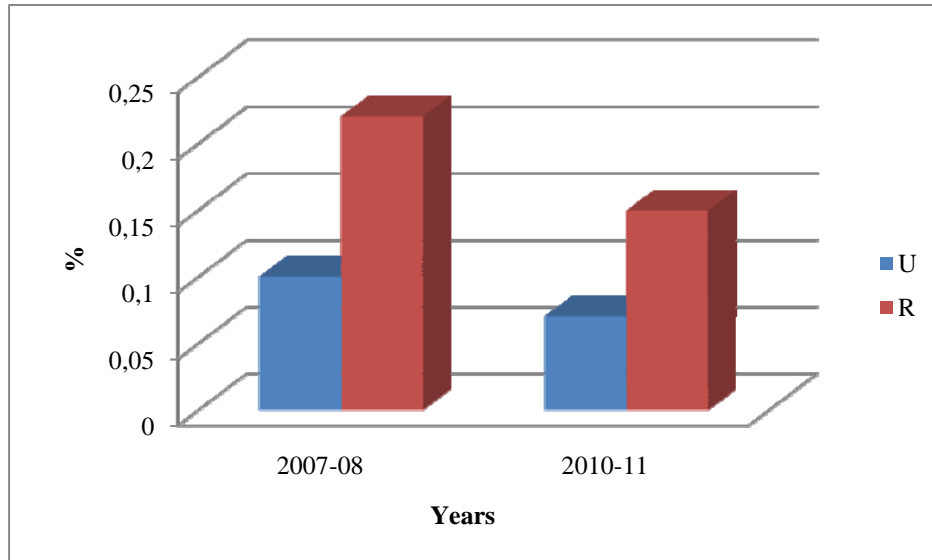


Figure 2 Head-Count Ratio at Regional Level

Source: Author's own calculations

Figure 2 shows that the head count ratio reduces sharply in rural areas than urban areas. The main reason behind this sharp reduction is growth of agriculture sector. According to the Economics Survey of Pakistan 2012-13, the growth rate of agriculture sector was 1.8 percent in 2007-08 which increased to 2.0 percent in 2010-11. The growth rate of important crops, i.e. cotton, sugarcane, rice, maize and wheat, shows negative growth say about -4.1 percent but it improves in 2010-11 by 1.5 percent. The World Bank Development Report 2008 also stated that the growth in agricultural sector increased twice time grater on average and this growth effectively decreased the poverty in rural areas.

The Estimates of Decomposition of Elasticity of Poverty Measures

The study decomposes the price elasticity of all poverty measures into two components named as income and distribution components. The study uses the methodology of Son and Kakwani (2006). The results of decomposition of price elasticity of all poverty measures at national, regional and provincial level for 2007-08 and 2010-11 is presented in Table 3.

The results show that food price elasticity of poverty head count at Pakistan level is 2.05 in 2007-08. It defines that if there is one percent increase in food prices it will increase the head count poverty by 2.05 percent in Pakistan in 2007-08. The income component and distribution component of food price elasticity of head count at Pakistan level is 1.06 and 0.99 percent respectively. The income component of decomposition of food price elasticity of poverty states that if all prices increase by one percent it will contribute the food price elasticity of head count ratio by 1.06 percent. The distribution component of decomposition of food price elasticity of poverty states that if food prices increase by one percent it will contribute the food price elasticity of head count by 0.99 percent. The sign of income component of food price elasticity of head count is positive which is in accordance

with economic theory. It should be positive because if all prices increase, then the real income will decrease and poverty will increase. The sign of distribution component may be positive or negative. The justification behind the positive or negative sign is that the distribution of income has two tails, upper tail and lower tail. If the distribution component shows positive sign, it displays that the increase in food prices affect the poor or lower tail. The distribution gap between upper and lower tail increases due to this inequality of income also increases. It increases the poverty level so the increases in food prices are anti-poor. The distribution component shows negative sign. It shows that the increase in prices hurts rich or upper tail. So the difference between upper tail and lower tail shrinkage and increase in prices termed as pro-poor. The both components of decomposition have positive signs; it shows that both components are contributing towards increase in poverty. But according to the results, income component contribute more towards increase in poverty than distribution component. The fuel price elasticity of head count index is 0.49 in 2007-08 at Pakistan level.

Table 3. The Results of Decomposition of PEPM at National and Regional Level

Poverty Indices	Period/Region	Price Elasticity of Poverty		Income Component		Distribution Component	
		Food	Fuel	Food	Fuel	Food	Fuel
2007-08		Food	Fuel	Food	Fuel	Food	Fuel
HCI	Pakistan	2.05	0.49	1.06	0.32	0.99	0.16
	Rural	2.00	0.47	1.13	0.32	0.87	0.15
	Urban	2.32	0.59	1.06	0.36	1.27	0.23
PGI	Pakistan	2.63	0.60	1.37	0.42	1.30	0.19
	Rural	2.62	0.59	1.47	0.42	1.15	0.17
	Urban	2.97	0.72	1.33	0.46	1.63	0.26
SPGI	Pakistan	3.15	0.69	1.61	0.49	1.54	0.20
	Rural	3.15	0.68	1.76	0.50	1.40	0.18
	Urban	3.14	0.74	1.41	0.48	1.73	0.26
2010-11		Food	Fuel	Food	Fuel	Food	Fuel
HCI	Pakistan	2.59	0.38	1.39	0.22	1.20	0.16
	Rural	2.53	0.36	1.51	0.23	1.02	0.14
	Urban	2.89	0.45	1.32	0.30	1.57	0.27
PGI	Pakistan	3.25	0.47	1.72	0.27	1.50	0.20
	Rural	3.34	0.48	1.99	0.30	1.35	0.19
	Urban	2.76	0.43	1.26	0.28	1.50	0.21
SPGI	Pakistan	3.72	0.54	2.00	0.31	1.72	0.23
	Rural	3.85	0.55	2.30	0.34	1.55	0.21
	Urban	3.14	0.49	1.44	0.25	1.70	0.25

Source: Author's own calculations

The income and distribution component of fuel price elasticity of head count index is 0.32 and 0.16 respectively. The income component is also greater than distribution component in fuel price elasticity like food price elasticity which shows in this case also, income component contribute more in fuel price elasticity than distribution component. But the magnitudes of elasticity of both commodities show this fact that food price elasticity of head count is greater than fuel price elasticity which follows this theory that poor spend income more on food items than the other commodities so the increase in food prices hurt the poor more than increase in prices of other commodities. The price elasticity of other poverty measures like poverty gap and squared poverty gap show the same

trend like price elasticity of head count ratio at Pakistan in 2007-08. The food and fuel price elasticity of head count in 2010-11 is 2.59 and 0.38 respectively at Pakistan level which depicts that one percent increase in food and fuel price will increase the head count index by 2.59 and 0.38 percent respectively. The income component of food and fuel price elasticity is 1.39 and 0.22. The distribution component of food and fuel price elasticity is 1.20 and 0.16. The income component contributes more in price elasticity of both commodities than distribution component in this period also. The signs of both components are positive which show that poverty increase in this period and both components contribute towards it. In this period also, the increases in prices are anti-poor which means that in this period also, the poor suffer more than non-poor. Other poverty measures depict the same story as head count index.

The comparison of both periods of food price elasticity of head count shows that the condition becomes worsen in 2010-11 because the magnitude of food price elasticity of 2010-11 is higher than 2007-08. So the estimates show that in 2010-11, the poor are affected badly by the increase in food prices. But the opposite case show in fuel commodity, the magnitude of fuel price elasticity of head count in 2010-11 is less than 2007-08. It does not mean that prices of fuel decrease in 2010-11. Instead this would happen that increase in prices of food effect on the budget share of fuel which may decrease in 2010-11 so the fuel price elasticity of headcount becomes less in 2010-11. The comparison of elasticity of both commodities at regional level reveals this fact that food and fuel price elasticity of headcount is greater in urban areas than rural areas in both periods because in urban areas food prices are higher than rural areas due to this fact that the people living in rural areas get food at cheap prices because mostly food crops like wheat, rice, maize etc. grow in rural areas. So if food prices increase then the poor living in urban areas hurt more than rural areas. The results of this study are in line with this justification. The magnitudes of food as well as fuel price elasticity increase in poverty gap ratio and squared poverty gap ratio for rural areas both in 2007-08 and 2010-11. The reason behind this increase in poverty gap ratio and squared poverty gap is that the ultra-poor living in rural areas are badly affected due to increase in food prices because that those people who cannot grow the food for themselves. Due to this fact, if prices of food and fuel commodity increase gradually this will trap them in ultra-poorness.

Estimates of Pro-poor Price Index (PPPI)

The study estimates the PPPI through head count ratio, poverty gap index and squared poverty index to check whether the increase in prices of food and fuel commodities are pro-poor or anti-poor in Pakistan. The PPPI is derived from the distribution component of decomposition of price elasticity of poverty. The results of pro-poor index for all poverty measures i.e. headcount, poverty gap and squared poverty gap at national, regional and provincial level in 2007-08 and 2010-11 are presented in Table 4.

The PPPI is derived from the distribution component of decomposition of price elasticity of poverty. The increase in price is pro-poor if the estimates are less than one and otherwise anti-poor if the estimates are higher than one. The pro-poor fuel price index for head count is 1.48, 1.47 and 1.63 percent respectively for Pakistan, rural areas and urban areas in 2007-08. So the increase in prices of both commodities is anti-poor because estimates are higher than one at every level in 2007-08. The results show that increases in prices of both commodities affect badly urban areas than rural areas of Pakistan. The pro-poor food price index for head count is 1.86, 1.68 and 2.19 percent respectively for Pakistan, rural areas and urban areas in 2010-11. For fuel commodities, it is 1.73, 1.62 and 1.95 percent respectively for Pakistan, rural areas and urban areas in 2010-11. The results of PPPI for all poverty measures are higher than one for both commodities so the increase in prices is called as anti-poor at every level of Pakistan in 2010-11.

Table 4. The Estimates of PPPI at Regional and National Level

PPPI at Regional and National Level					
Poverty Indices	Period/ Region	2007-08		2010-11	
		Food	Fuel	Food	Fuel
HCI	Pakistan	1.92	1.48	1.86	1.73
	Rural	1.77	1.47	1.68	1.62
	Urban	2.10	1.63	2.19	1.95
PGI	Pakistan	1.94	1.42	1.86	1.73
	Rural	1.78	1.41	1.68	1.63
	Urban	2.23	1.56	2.19	1.95
SGPI	Pakistan	1.95	1.38	1.86	1.73
	Rural	1.79	1.37	1.68	1.63
	Urban	2.25	1.53	2.18	1.99

Source: Author's own calculations

Conclusion

Poverty is the major concern of problem in developing world. There are many macro as well as micro economic factors which effect poverty and welfare level of poor. The information on these factors should be considered when government wants to impose policies to protect the poor's. The prices of goods are one of the main factors which significantly affect poverty. The researchers explored that if the prices of goods change, this will affect the poor as well as non-poor but depend on their needs and their consumption pattern. It is exposed that the poor consume their income more on necessary commodities than the others. If prices of necessary goods increase, it will shake the welfare level of poor more than non-poor. There is a need to capture the role of prices in effecting poverty. The present study has objective to estimate the role of prices of food and fuel commodities towards poverty of Pakistan.

The study estimates poverty of Pakistan with urban/rural break up through FGT poverty measures. The data used in the estimation are taken from the data sets of PSLM 2007-08 and 2010-11. This survey of PSLM gives detail information on income, expenditure as well as the socio-economic status of households. The study used official poverty lines of Rs. 1145 and Rs. 1742 per capita income of 2007-08 and 2010-11 respectively. Per capita expenditure of households is used as the welfare indicator in poverty analysis. The results of head count ratio at Pakistan level reveal that headcount declined from 17 to 12 percent from 2007-08 to 2010-11. The results of headcount ratio at regional level show that rural areas have higher headcount poverty than urban areas in both periods. But according to the results of head count index at regional level, the poverty headcount decreased in both areas but more in rural areas in 2010-11. The other poverty measures i.e. poverty gap ratio and squared poverty gap ratio exhibited the same trends like headcount ratio.

The study uses the technique of Son and Kakwani (2006) to capture the role of prices in effecting poverty. The price elasticity of poverty is used to consider the role of price of goods toward poverty. The price elasticity of poverty decomposed into two components such as income component and distribution component. The price elasticity of all poverty measures estimated for two commodities i.e. food and fuel. The analysis is done at national, regional and provincial level.

The results of decomposition of price elasticity of all poverty measures show that the food price elasticity is greater than the fuel price one. The results of price elasticity of poverty satisfies the Engle's law which reveals that poor consume more on food than the other commodity. Both components have positive sign which show that income and distribution components contribute to-

wards increase in poverty. But income component contribute more than the distribution one towards poverty. The results of decomposition at national and regional level show that urban areas are affected more due to increase in prices of food and fuel commodities than the rural one. But the results of decomposition of 2010-11 show worsen situation regarding poverty. Because the prices of food and fuel commodities increase more in 2010-11 and this badly hurt poor. The results of decomposition provincial level explore that Punjab is less poor than the other provinces in both periods. The results at provincial level reveal that the poor in KPK and Baluchistan are badly affected by the increase in prices of both commodities in both periods.

The study will help the government to formulate policies regarding subsidies and utilities on food and fuel. But question arises that how government knows that the policy is pro-poor or not. The PPPI estimates that the increase or decrease in price can be pro-poor or not. This index was introduced by Son and Kakwani (2006). The results of pro-poor index discover that in both periods the increase in price of food and fuel is anti-poor at national, regional and provincial level. According to the results of PPPI, the distribution of income is in favor of non-poor rather than the poor in both periods.

Policy Recommendations

The findings of the study will help the government and policy makers in formulating efficient policies to reduce poverty and protect poor from increase in prices. The recent study will also help them in finding the answer of these following questions that how many poor exist in country and what is extent of their poverty and where are they live. For this purpose the study estimated poverty measures at national and regional level by using the data sets of PSLM for 2007-08 and 2010-11.

The present study suggests some following policies which based on the results.

1. The poverty level is higher in rural areas so the government should pay more attention towards rural areas of Pakistan. The effective growth in agricultural sector can efficiently reduce poverty so government should promote the agricultural sector. For this purpose, government should introduce some projects like micro financing, set up of new agro-based industries and give subsidies on fertilizers, high quality seeds etc.

2. The food price elasticity of poverty is greater than the fuel price elasticity. It affects poverty more adversely. The government should decrease the prices of food for the sake of poverty alleviation because poor consumed more on food than fuel. The government should give some subsidies and utilities regarding food. At regional level, the urban areas need attention from government to give subsidies regarding in food case.

3. Increase in fuel prices affects the urban areas badly. The government should consider more these areas and compensate them to protect from poverty.

4. PPPI shows that the poor living in urban areas are badly affected by increase in price. The government should implement some policies to reduce the price of goods and give some subsidies to those who have lower income.

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