Analysis of Rural Poverty in Pakistan; Bi-Model Estimation of Some Selected Villages

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Abstract

The recognition of the behavior of different determinants of rural poverty enables us to provide an effective and targeted poverty alleviation strategy for rural households. On the basis of primary data of rural households, this study examines the efficiency and impact of different determinants of rural poverty that how they incorporate to push the households toward or away from poverty by changing their earning abilities. The study used primary data to analyze the impact of households, demographic and socio-economic variables on rural poverty. Analysis shows that 36.69 percent people are living below extreme poverty line, 14.93 percent households are ultra poor and 11.04 percent are poor. It also shows that 7.47 households are ultra poor and 12.66 are quasi non-poor while only 17.20 percent households are non-poor. The Study suggests that these determinants play an important role in poverty alleviation and betterment in these determinants can remarkably decrease poverty level in rural areas of Pakistan.

Keywords: Households, Pakistan, Poverty, Rural

I. Introduction

World poverty, initially was not well understood and a general concept was that poor will always be with us. No doubt reality and threat of poverty was pervasive throughout the earlier modern period. A number of studies on the measurement of poverty have been made using variety of variables, definitions and poverty lines. Different studies used different methods, techniques and approaches to establish poverty trends and levels. Poverty is a result of different processes that are social, political and economic in nature so poverty can be assessed by using different approaches to highlight different aspects like population growth, level of education, health, income level and its distribution, geographical location and gender discrimination. These multidimensional features of poverty have made it a global issue and Pakistan in one of those countries which are facing the challenges of poverty reduction.

For the last two decades in Pakistan, poverty has emerged as a core issue on the policy agenda. A number of strategies have been adopted by the government to control poverty but there is no sign of poverty abatement. For the last four decades, number of studies have been carried out to highlight different causes and to suggest the effective policies for poverty alleviation. Most of the studies have used data from Household Income and Expenditure Survey (HIES) collected during the last four decades to estimate the incidence of poverty in Pakistan. Present study focuses on poverty, particularly poverty prevalence in rural areas where majority of people are bearing the burden of this nemesis.

The importance of rural poverty is not always understood because the urban poor are more visible and vocal than rural poor. So the present study is undertaken in the rural areas, where almost one third of population and majority of the poor reside. The paper is divided into five sections in second section we have discussed the review of literature. Third section deals with types and sources of data and methodological issues. The results of estimation are briefly illustrated in the forth section and finally, in section five, we have offered some concluding remarks and policy implementations.

II. Overview of the Studies

Irfan and Amjad (1984) determined the trends of rural poverty in earlier years and described the causes of poverty in 1960s and 1970s through very detailed analysis. Study used Household Income and Expenditure Survey (1979) data and estimated that 2550 calories per day for each adult was a basic minimum level of caloric intake. They concluded that rural poverty had increasing trends in period 1963-70, while decreasing trends in 1969-70. Hagenaars and Klass de Vos's (1988) described variety of poverty definitions. They argue that in poverty research the choice of one specific definition had major consequence on the results. They used eight different definitions of poverty to determine who was poor and concluded that results of poverty percentages according to the various definitions vary widely. Ercelawn (1991) analyzed the regional differences in poverty. On the basis of food and total expenditure norms he defined the poor households as, "*Poor household for which available resources are lesser to obtain required calories intake through prevailing dietary patterns*". Alderman and Garcia's (1993) study was based on field work and explained rural poverty in Pakistan. Study investigated the relationship among calories in take, better nutrition and health. The results suggested that education, health of woman, development in physical and human capital infrastructure and role of government in poverty reduction strategies is very essential.

Adams et al. (1995) examined the sources of income inequality and poverty, and used longitudinal data for analysis. The study concerned with rural areas and major finding of the study was that the non-farm income which emerged as the most important income source of poverty reduction, while on other hand, it was agricultural income which accounted for income inequality in rural Pakistan. Kazi (1995) determined the relationship between poverty and development in rural areas of Pakistan through non-quantitative manner. Study stated that the feudal agrarian structure which generated disparities in access to land and other resources, inadequate provision of social services and lack of physical infrastructure were the key factors of poverty in rural areas. Malik (1996) study made a comparison of village survey results of 1990 with the country level data from Household Income and Expenditure Survey of 1986-7 and concluded that the overall poverty trends in rural areas had fallen.

It was also observed that both intensity of poverty and total poverty declined as land holding size increased. Results of study showed that there was inverse relationship between intensity of poverty and educational attainment and also positive relation between household size and intensity of poverty. Rise in dependency ratios increased the intensity of poverty and there existed inverse relationship between the participation rate and intensity of poverty. Jamal (2003) investigated the changes in poverty and inequality in Pakistan. Study made a comparison of Household Income and Expenditure surveys conducted by Federal Bureau of Statistics during 1987-88 and 1998-99. Analysis showed that overall poverty and inequality had increased during the period of 1987-88 to 1998-99. Gini-coefficient shifted upward from 0.34 to 0.38 and the rise in poverty was the result of low economic growth in rural areas.

Anwar (2005) examined the prevalence of relative poverty by using the data set of Household Integrated Economic Survey (HIES) of 2001-02. This study took into account the differences in food prices between rural and urban areas and used regional price index. It concluded that average food prices were 13 percent higher in urban areas than rural areas. The study suggested that the exemption in sales tax on those products used by poor, imposition of high sales tax on product used by rich, focus on agrarian strategies and intensive employment strategies can lead to higher growth and lower poverty rate in rural Pakistan. Herani et al. (2008) study stated the reasons and effectiveness of poverty reduction strategies in Pakistan. Authors used the secondary data set for analysis and described that so many strategies of poverty reduction have been introduced but unfortunately no one is successful so far. Study suggested that poverty is still a major issue in Pakistan and there is immediate need to revise our policy to make them better targeted in poverty alleviation process.

III. Data and Methodology

A method that distinguishes the poor from the non-poor in a society called the exercise of identification. A very common method of identification is to specify a norm (or set of norm) and classify someone who does not meet the norm may be termed as poor. About hundred years ago, Charles Booth (1889) suggested poverty cut off point in terms of minimum needs and a person who was unable to meet those needs was generally considered as a poor. The most frequently used poverty line was developed by the Social Security Administration (SSA) during the period of 1960s then further adjusted it each year with respect to increase in cost of living. So we can say that the poverty line defines a level of income or consumption required to satisfy a minimum level of consumption, basket of goods and services and if an individual is unable to purchase, will be deemed as 'poor'.

Profile of the study Area

In rural areas, poverty is mostly pronounced with multidimensional aspects which are economic, demographic and social. More importantly, prevalence of poverty in rural areas is substantially higher than the urban areas. In Pakistan, there are many areas where research can be focused to design and implement pro-poor policy to reduce poverty in future. The present study based on a household survey that was conducted in May to June, 2010, for six to eight continuous weeks. The villages under study are approximately sixteen kilometers away from main cities (Murlli Garh, Fateh Pur and Ghardhari wala situated in District Bahawalnager Punjab Pakistan). In each village about two hundred households are residing and fifty percent (approximately) of the total households have been interviewed. Majority of households concerned with agriculture activities and wheat, cotton and rice are their major cash crops. Rest of population concerned with nonfarm activities and in main cities.

Data Sources

Data have been collected from three villages of Punjab province of Pakistan. We have divided each village into two parts, the North (Consisting of approximately 50% of total households) and the South and then interviewed fifty percent from each part. These villages are selected on the basis of distance from main city and every village in our sample is situated at the distance of more than fifteen km from the main city. In these villages, dwellers have multiple attributes. We have obtained information about income, employment, health, education and livelihood activities of the households.

Construction of Variables

Since the term poverty is a complex phenomenon and has multidimensional features, a list of variables is constructed to examine the impact of poverty determinants. The summary of selected variables is presented in Table1.

Table 1: List of Selected Variables for Empirical Analysis

Name of Dependent Variables	
POV	Poverty; poverty line is Rs.944.47 per month per household ($P = 0$; If below poverty line) & ($P = 1$; if per-capita income above Poverty line)
Name of Explanatory Variables	
NEH	Number of Earners in a Households
CSG	School Going Children in a Household (age of 6 to 17 years)
NRH	Number of Room in a House
NMR	Number of Members per Room in each Household it is ratio of Household member living in each room (Total member in a household divided by No of rooms in a house)
HFM	Female Member in a Household (age of 18 years or over)
HMM	Male Member in a Household (age of 18 years or over)
PMI	Per Month Income of Households (Collective income of each household and adjusted by taking average of last 3 months income)
WAT	Source of Drinking Water (access to clean drinking water)

Methodology

According to the basic principles of discrete choice model, econometric modeling consists of confronting alternatives and mutually exclusive situations, being considered as poor or not. So, the observed sample is composed of two categories of households.

Category one consists of those households considered as poor according to certain criterion while second consists of those who are not poor according to that criterion. In present study, the poverty line of Rs.944.47 [Official poverty line calculated by Planning Commission of Pakistan; 2008] is used to select the criterion. With the help of this poverty line observed sample is distributed into two distinct categories.

If the probability of household being poor depends on the set of variables 'X' so we can write it as;

$Prob\ (Y = 1) = f(\beta X')$

$Prob\ (Y = 0) = 1 - f(\beta X')$

According to logistic distribution we have

$$Prob\ (y = 1) = \frac{(e^{\beta X'})}{1 + e^{\beta X'}}$$
$$= A\ (\beta X')$$

Here 'A' presents the logistic cumulative distribution function.

Then probability model is a regression and can be written as;

$$E\left(\frac{y}{x}\right) = 0\left[1 - f(\beta X')\right] + 1[f(\beta X')]$$
$$= [f(\beta X')]$$

To keep the difference in Logit and simple regression model and for more meaningful interpretation we have also calculated our results in term of odds by taking the anti log of various slope coefficients.

$$P_i = E\ (Y = 1|\ X_i\ ) = \frac{1}{1 + e^{-(\beta_1 + \beta_2 X_i)}} \qquad equation \rightarrow (a)$$
$$if \qquad Z_i = \beta_1 + \beta_2 X_i$$

We get cumulative logistic distribution function

Here $Z = $ Range from $-\infty\ to\ +\infty$

$P_i = $ *Range from 0 to 1*

Now Equation (a) can be write as

$$P_i = 1/1 + e^{-zi} = (e^{-zi}/1 + e^{-zi})$$
$$(1 - P_i) = 1/1 + e^{zi} \qquad equation \rightarrow (b)$$

Equation (a) shows P_i is non-linear in β's and also in X.

If P_i is the probability of household being poor and $(1 - P_i)$ is probability of non-poor then by suing equation (a) and equation (b) we get.

$$P_i/(1 - P_i) = \left[1 + e^{Zi}/1 + e^{-Zi}\right] = e^{Zi}$$

Now $P_i/(1 - P_i)$ is simply the odd or odd ratio

As the value of regressand or Logit L_i is

$L_i = ln\ [P_i/(1 - P_i)]$ therefore taking anti log of L_i we get

$$P_i/(1 - P_i) = e^{Zi} = \boldsymbol{d}\ \text{(For odd)}$$

Here Z_i the slope of coefficient X_i $(i = 1, 2, 3, \ldots, n)$

$\boldsymbol{d}$ = odds, present the impact of each individual explanatory variable on dependent Variable if

$(\boldsymbol{d} - 1) \times 100 = \%\ \Delta$ So, it represents the percentage change in odds for a unit increase in the ith regressor.

Model Specification

In a generalized way the multiple regression equation can be stated as follows;

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_n X_n + \mu_i$$

Here 'Y' stands for vector of 'n' observations of dependent (X's) variable and β's is the coefficient vector of X's represents the explanatory variables and 'μ' represent stochastic error term.
Model of the study can be specified as;

$$Pov = f\ (NMR, NEH, CSG, NRH, HFM, HMM, PMI, WAT)$$

Here we will follow bottom up approach to develop the best model in a sense that all coefficients are statistically significant and have right sign on the bases of 'F' and 't' tests (I.S. Chaudhry *et al.* 2012).
We have following three specifications;

$Pov = \alpha_0 + \alpha_1 NMR + \alpha_2 NEH + \alpha_3 CSG + \alpha_4 NRH + \varepsilon_i$ ……… Equ (1)
$Pov = \beta_0 + \beta_1 NEH + \beta_2 CSG + \beta_3 NRH + \beta_4 HFM + \beta_5 HMM + e_i$ ……… Equ (2)
$Pov = \gamma_0 + \gamma_1 CSG + \gamma_2 NRH + \gamma_3 HFM + \gamma_4 HMM + \gamma_5 PMI + \gamma_6 WAT + \mu_i$ ….Equ (3)

IV. Estimation and Results

Table 2 provides the brief summary of poverty levels by distributing the population into various poverty bands (Extremely Poor, Ultra Poor, Poor, Vulnerable Poor, Quasi Non-Poor and Non-Poor). For this purpose we have decomposed our poverty line into six segments and then calculated the status of households in each segment of poverty line.

Table 2: Population under Various Poverty Bands

Poverty line = Rs.944.47		
Poverty Bands	**Range of Bands**	**Population %**
Extremely Poor	<50% that is <Rs.472.23	36.69 %
Ultra Poor	>50%<75% that is RS472.23-Rs.708.35	14.93 %
Poor	>75%<100% that is Rs.708.35- Rs.944.47	11.04 %
Vulnerable Poor	>100%<125% that is Rs.944.47-Rs.1108.59	7.47 %
Quasi Non-Poor	>125%<200% that is Rs.1108.59-Rs.1888.94	12.66 %
Non-Poor	>200% that is Over Rs.1888.94	17.20 %

(Source: Calculation of various poverty bands form survey data)

First column of Table 2 indicates the name of different poverty bands, second column presents the range of each poverty band with respect to poverty line and column third shows the percentage of population falling in different poverty bands. It shows that 36.69 percent of population is living below extreme poverty level i.e. 50 percent below from the specified poverty line. It shows 14.93 percent population is 'ultra poor' that lies in 50 percent to 75 percent of poverty line's range and 11.04 percent lies in 75 percent to 100 percent of poverty line these are transitory poor. Similarly 7.47 percent are vulnerable poor (lie in 100% to 125% of poverty line), transitory non-poor in our analysis. Similarly table shows that 12.66 percent are quasi non-poor (lie in 125% to 200% of poverty line) while only 17.20 percent are non-poor (above 200% of poverty line). So, in Table 2 we have determined the intensity of poverty in different poverty bands and analysis shows that the "extreme poverty" band is most dense than rest of poverty bands. After getting an overview of various poverty bands study examined the effects of different determinants of poverty and for this purpose used the Logit-Model and results are presented in Table 3.

Table 3

Dependent Variable: POV
Total Observations: 250

Independent Variables	Equation 1	Equation 2	Equation 3
C	1.275611	-2.818968	-0.859794
NMR	(-8.838852)*** -6.429315	--	--
NEH	(-1.102290)*** -3.312525	(-1.299514)*** -3.745504	--
CSG	(0.046970)*** 3.169315	(0.524653)*** 3.489355	(2.080247)*** 3.492855
NRH	(1.382572)*** -4.969431	(-0.264455)** 1.875262	(-0.760647)* -1.609359
HFM	--	(0.541219)*** 3.779441	(3.432272)*** 4.179893
HMM	--	(0.871458)*** 6.147368	(3.871647)*** 4.401356
PMI	--	--	(-0.003041)*** -4.683107
WAT	--	--	(-0.78812)* -1.682604
Mc Fadden R-square	0.417033	0.392737	0.882873

Notes: Here the dependent variable is Poverty (POV); poverty line is Rs.944.47 per month per household (P = 0; If below poverty line) & (P = 1; if per-capita income above Poverty line)
*** 1% Level of Significance
** 5% level of Significance
*10% Level of Significance

In first equation we have regressed four variables to examine the living standard of households and how it affected from poverty, i.e., Number of Members per Room in a household (NMR), Number of Rooms in a House (NRH), Number of Earners in a Household (NEH) and the Number of School Going Children (CSG).

Results show negative relationship of dependent variable (POV) with independent variable NMR. It shows that the number of rooms available for living is few for poor household means their living standard is not much adequate. Mostly in villages poor people have not excess earning to save for construction of their houses and even they are bound to live in marsh constructed homes. So from the results we can judge easily that living standard of villagers was not much developed in our observed sample. This negative relationship also shows that in poor households number of members residing in a room is greater than non-poor and one other reason may be due to large family size in rural areas peoples are bound to live in a miserable way.

NRH also has significant coefficient with positive sign which shows that the poor households have few rooms in their homes but it is not always true. This variable directly relates the living standard with poverty but it doesn't take into account the family size of a household so one can say that may be the house was constructed with few rooms due to small family size. Although this variable have significant effect in all three equations but have week information about the living standard of the households. So, NMR is better determinant to examine the living standard of households then NRH.

These result of first two equations shows that the NEH has a significant coefficient with negative sign. Here the negative sign shows that a household with greater number of earning individuals has less probability of being poor if the other factors like family size, income of each earner is considered constant otherwise the results will be misleading because a household with greater earner but with large family size will reduce the per-capita income and a household in spite of more earning members can fall below the poverty line.

Similarly if the combine income or the income of each earner in a household is less as compared to that household with single earner with high income can lead to misconception. The CSG possesses a significant coefficient with positive sign in all three equations which shows that the increase in CSG leads to an increase in estimate Logit (POV) and a household with school going children has greater chances to fall into poverty as compare to those households that have no school going children if all other factor held constant. It doesn't mean that the children should not be sent to school. The school going children have no contribution in earning but their education is the cause of raising the expenses and household's size. So more precisely we can say that among these families with similar earning level if the number of school going children arises then the probability of that family with more school going children will rise to fall below poverty line or families under influence of poverty have less ability to send their children to school. They preferred to engage them in earning activities instead of schooling to cope up with poverty.

In second and third equation, the coefficients of variables, adult Male Member in a Household (HMM) and adult Female Member in a Household (HFM) are statistically significant at 1 percent level with positive signs which state that either increase in males or females increase the probability of a household to fall below poverty line. We can only consider the adult family members from every households but the main objective to classify them into the genders was to highlight the dependency ratio in each gender. Results show that the males have greater influence to raise the dependency ratio than females in rural areas. So the results highlight the culture of rural areas of Pakistan where females mostly attached with local handicraft activities and support their families against poverty.

Access to safe water (WAT) has expected negative relationship with Logit estimate. It shows that the poor households have not ore less access to safe drinking water as compare to non-poor in rural areas. In rural areas mostly diseases emerge due to use of poor quality of water. So this variable indicates that in rural areas households with lower level of income are not able to encompass the basic necessities of life.

V. Conclusion

From the above results, it has been concluded that the poverty has strong influence on living standard of the households in rural areas and peoples are bound to live under miserable conditions. Large household size and limited livelihood activities in rural areas are major causes of poverty prevalence. Study concludes that due to poverty the majority of children are still deprived of basic education and their parents prefer to engage them in earning activities. So this results in rise of child labor in rural areas on one hand and rise in illiteracy on other hand. Study also concludes that in present age the majority of people reside in rural areas has no access to basic necessities of life and still suffering from the problems of poor health.

Study suggests that the control over rapid increase in population particularly in rural areas and awareness about family planning programs is very essential for poverty alleviation. Only the buildings of schools are not enough to improve the basic education in rural areas, government may introduce stipend for children to raise the interest of their parents toward education. Study suggests that the basic health and housing facilities may play an important role in rural poverty alleviation strategies, due to non availability of health facilities in hinter rural areas the infant mortality rate and other health problems are far greater than urban areas. Government may alleviate poverty and can have effective control over diseases by providing better health facilities i.e. basic health centers with efficient staff, installation of water purification plant, introducing flush toilet system and by giving knowledge about basic health related problems to the rural households.

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