Incidence, Profile and Economic Determinants of Poverty in Pakistan: HIES 2005-06

Abstract

- This study estimates the incidence, profile and economic determinants of poverty in Pakistan using the HIES data2005-06.
- The results show that headcount ratio was about 23 percent in Pakistan.
- Poverty incidence was more than double in rural area as compared to urban area.

Continue…

- Decomposition of poverty into socio-economic characteristics depicts that poverty is higher in those households whose heads are illiterate or have never attended school.
- It decreases as the level of education increases.
- It is positively related with the dependency ratio.
- It is higher in those households who have no access to basic facilities-electricity, gas and telephone.

Continue…

- It is the highest in those households whose head's employment status, sector and occupation is sharecropper, construction and elementary, respectively.
- Household size is higher in poor families.
- The results of OLS multiple regression model depict that the poverty incidence is inversely related with age, education and owned land; while it is positively associated with household size.

Continue…

- Households who receive foreign remittances or have sewing machine or live stock experience less poverty incidence than those who do not receive or have.
- At a policy level it is suggested that more investment and development should be focused in agrobased industries. Live stock development can give impetus to the poverty reduction derive.
- Free education for those who are unable to afford the expenses, with special attention to vocational education should be provided.

Continue…

- Broad-based overseas employment strategy should be designed.
- Family planning should be promoted especially in poor families.
- Land reforms should be implemented in letter and spirit.

Continue…

- **Key words:** Poverty incidence; Dependency ratio; Education; Foreign remittances; Sewing machine; Employment sector; Occupation; Employment status; Pakistan

Introductlon

- Reducing poverty has been the main objective of policy makers, yet it has attracted more attention since the Millennium Development Goals (MDGs) have been adopted.
- For the reduction of poverty, its proper estimation is required.
- Though there are a lot of studies in Pakistan, yet they define poverty line in different ways and cover different time periods.

- Some studies (Naseem, 1973; Mujahid, 1978; Malik, 1988; Malik, 1991; Ali & Tahir, 1999; Cheema, 2001; Anwar & Qureshi, 2002; FBS., 2001 & 2003; Saboor, 2004; Jamal, 2005; Kakwani, 2006) employ *Food Energy Intake* (FEI) approach while
- the others (Gazdar *et al.* , 1994; Ali, 1995; Qureshi & Arif, 2001; World Bank, 2002, 2004 & 2006) use the Cost of Basic Needs (CBN) Approach as a yardstick to estimate poverty.

- Some studies (Qureshi & Arif, 2001; Anwer, 2006) estimate separate poverty lines for separate HIES data while
- the others (Nasim, 1973; Alauddine, 1975; Malik, 1991; FBS, 2001 & 2003; Anwar & Qureshi, 2002; World Bank., 2002, 2004 & 2006; Kakwani, 2006) adjust the poverty line by a price index.

- Of the studies which adjust the poverty line by price index, some studies (Malik, 1988; Kemal & Amjad, 1997; Ali & Tahir, 1999;FBS., 2001 & 2003; Anwar & Qureshi, 2002) adjust it by using CPI,
- but some studies (World Bank, 2002, 2004 & 2006; Kakwani, 2006; Jan *et al.,* 2008) does the same byTPI.
- These two price indices have their own merits and demerits.

- No doubt the CPI is estimated for majority of items, yet it covers only urban areas but not rural areas.
- Whereas the TPI is concerned, though it is estimated for both rural and urban areas, but it covers only food and fuel items but not non-food and non-fuel items.

- Thus,there is need of an index (i.e. composite price index) to be used to inflate or deflate the poverty line that covers both rural and urban areas as well as majority of items.
- Thus this study uses the composite price index to adjust the poverty line over time.
- Not only its proper estimation is necessary, but it is also essential to know what the characteristics of the poor and what the determinants of poverty are.

- As far as the determinants of poverty is concerned, there is common exercise to estimate the categorical regressions like Logit and Probit models to find the poverty determinants (Qureshi & Arif, 2001; Geda *et al.*, 2005; Moke *et al.*, 2007; Bhaumik *et al.*, 2006; Chaudhry, 2009; Hashmi, 2008; Sikander & Ahmed, 2008; Siddiqui, 2009; Achia *et al.* , 2010; Apata *et al.* , 2010).
  While estimating the categorical regressions, income or consumption of household is assumed to be not available.

- It is acted as if it is only known whether the household is
  poor or not, that is depicted by categorical variable that
  takes the value 0 if the household is not poor and 1 if the household is poor (World Bank., 2002).
- Categorical regressions have a problem that estimates are sensitive to specification error. Probit models have problem that the parameters are biased if the distribution is not normal.
  More generally the model does not use all information available because it collapses income or consumption into a binary variable.

- It does not imply that categorical regressions should never be used.
- Categorical regressions have better predictive power for classifying household as poor or not poor (World Bank., 2002).
- Thus the alternative is to use full information available for the dependent variable (welfare indicator) and to estimate a regression of log on the indicator (World Bank, 2002).

- Jamal (2005) estimated the OLS regression to find the determinants
  of poverty using HIES data 2001-02.
- Whereas Jan et al, 2008 did the same to find the poverty determinants in the agriculture sector in Pakistan using the HIES data forthe same year.
- There is no study in Pakistan to find the poverty determinants of poverty using HIES data 2005-06 either employing categorical regressions or OLS regressions.

- Some recent examples of such studies using OLS regressions are Fagernäs and Wallace (2003), Alber and Collado (2004), Andesson *et al.* (2006),Baumik et al. (2006), Esanov (2006), Amendola and Vecchi (2008), and Akerele and Adewuyi (2011), Sakuhunni *et al.* (2011).

DAtA And MEtHodoLoGY

- data
- This study utilizes the Household Income and Expenditure Survey (HIES) data for the year 2005-06 collected by Federal Bureau of Statistics (FBS) Pakistan.
- Sample size determined by FBS is representative at national and provincial level with urban/rural break up.
- The detail of households covered is reported in the Table 1

- **Table 1**
  Household Covered by Region in Pakistan
  Region
  Sample size (Number of Households)

	Rural	Urban	Overall
Punjab	3890	2788	6678
Sindh	2104	1664	3768
NWFP	1899	1049	2948
Baluchistan	1310	733	2043
Pakistan	9203	6234	15437

  Source: Household Income and Expenditure Survey, 2005-06

Methodology

- **3.1 Poverty line**
- First of all, this study estimated poverty line by running a log-log ordinary least squares regression on first three quintiles using the HIES data 1998-99 that is given as under:
- $\ln(Y) = a + b^* \ln(X) + e$
- Where
- Y=per adult equivalent consumption expenditure per month (food + non food)
- X=per adult equivalent calorie intake per day.
- Now this study thinks it is necessary to explain the above mentioned model.
- Firstly, this study throws light on why consumption expenditure was taken as a welfare indicator and how the per adult equivalent expenditure(Y) is estimated.

- **Consumption Expenditure As A Welfare Indicator**
- The question arises what indicator is used to measure the welfare.
- The consumption and income are, generally considered two best candidates for the indicator of welfare.
- The consumption expenditure was taken as an indicator of welfare for 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.

- **Selection of Items to be Included in the Consumption Aggregate**
- Consumption expenditures on all items consumed regardless of whether they were purchased or produced by own or got as assistance or gifts were added up to calculate monthly expenditure.
- Expenditures on fines, property and house taxes were not included.

- **Adjustment of Household Consumption Expenditure**
- Household expenditure is given in the household income and expenditure survey.
- Different households differ in size and composition. One household may include more adult male members and the other may include more female members while still the other household may include more children.
- To find the welfare at the level of individual, it is essential to adjust the consumption expenditure of the household according to the composition and size of the household.

- Following World Bank (2002) and FBS (2001) this study used equivalent scales which gave weight 0.8 to individuals who are less than 18 years old and 1 to individuals who are equal to or greater than 18 years old to reach per adult equivalent so that the expenditures of households be divided by this per adult equivalent and in this way true welfare levels of individuals were ascertained.

- **Adjustment of Prices**
- Household income and expenditure surveys take time of more or less a year for their completion, so the different prices are faced by different households living at different regions during the period of a survey.
- So it is essential to make adjustment in the consumption expenditure for these price differences.

- The spatial price index called Paache price index at the primary sampling unit level was calculated using the median unit prices obtained from household surveys in order to remove price differences between urban and rural areas and among provinces and across the year.
- The same price index was used by (World Bank, 2002) and (FBS, 2001).

- Paache price Index was estimated as under:

$$\mathrm{P}_i^p = \left[\sum_i^n w_{ik} \left(\frac{p_{ik}}{p_{0k}} \right)^{-1} \right]^{-1}$$

- Where
- W_{ik} shows the share of budget spent on k item in primary sampling unit i. P_{ik} denotes the median price of k item in primary sampling unit i. P_{0k} denotes the median price of k item at the national level.

- **Conversion of Quantities into Calories**
- Quantities consumed of food items obtained from the household income and expenditure surveys were converted into calories by using conversion factor.
- Requirements of calories are not the same for adults and children as well as males and females.
- Adults require more calories than females and children, while children need fewer calories than even female adults.

- So it needs to adjust the household size keeping in view age and sex of the members of the household.
- This study adjusted the household size using the nutrient based equivalent scales (1985), developed by panning commission, Government of Pakistan.
- Calories per adult equivalent were obtained by dividing the total calories consumed by the household by the so adjusted size of household.

- **Updating Poverty Line**
- The main purpose of employing the absolute poverty line approach is that any contraction or expansion can be calculated against a fixed target.
- This means that poverty line measured under this approach should be consistent and remain unchanged over time.
- A poverty profile is said to be inconsistent if out of two households having the same living standard but living in different places, one is regarded as poor, while the other as non-poor (Ravallion and Bidani, 1994).
-

- Consistency means that the welfare of each individual must be estimated against the same bench mark.
- For a poverty line to remain unchanged over time, it implies that poverty line should not change over time but only up to changes in prices.
- This means that poverty line should be adjusted by a suitable price index so that comparable poverty estimates over time can be obtained (Cheema, 2005; Kakwani, 2006; Jan,et al., 2008).

- Absolute poverty line can be updated in two ways:
- **Updating Poverty Line by an Appropriate Price Index**
- Poverty line calculated for the base year is updated using consumer price index or by employing Tornqvist price index (TPI) or by the combination of the both.

- These methods allow for changes in prices whereas the consumption basket associated with poverty line in the base year is kept constant.
- The poverty line remains constant over time and hence, poverty estimates are constant and comparable over time.
- Consumer price index and Tornqvist price index have some advantages and disadvantages.

- The main advantage of consumer price index based 1990-91 is that it collects prices for 460 food as well as non-food items and the consumer price index based 2000-01 does the same for 375 items (food and non-food) regularly.
- One limitation of CPI is that it covers thirty five cities only.
- Since a large proportion of population of Pakistan is living in the rural areas, non-availability of the data on rural prices is likely to introduce bias in calculating true inflation rate which is the representative of the whole Pakistan.

- The other way to calculate the inflation rate between two surveys is the Tornqvist price index (TPI).
- HIES surveys provide information on quantities and expenditure for majority of food items and a number of non-food items.
- Using this information, inflation rate between two surveys is calculated.

- Its advantages include: (i) it uses unit prices for both rural and urban areas which are obtained by dividing the values of items by their quantities, (ii) the unit prices are the households' actual transactions.
- Its drawback is that the HIES surveys do not provide information on quantities for a number of non-food items.
- If such part of non-food items is ignored for the calculation of inflation rate, this would be a great biasness.

- The best way to estimate inflation rate between two surveys of households is one that covers both rural and urban areas as well as large number of items.
- In other words composite price index which is the combination of consumer price index and Tornqvist price index is estimated.
- As the HIES surveys provide enough information on food and fuel items, so Tornqvist price index will be estimated for these items.

- For non-food and non-fuel items, consumer price index estimated by Federal Bureau of statistics, government of Pakistan on monthly basis will be utilized.
- This methodology has been used in Bangladesh by World Bank.

- **Estimating a New Poverty Line for a New Year**
- It is very common in Pakistan to compute fresh poverty line for each survey.
- Under this method poverty line for the base year is not updated by the inflation rate between two survey periods.
- Rather, a new poverty line is computed from the recent available data set.

- This method allows for variations in prices as well as in the contents of consumption basket.
- The fresh poverty line would not be constant over time and hence, poverty estimates would not be comparable and consistent over time.

- However, there are situations where new poverty line has to be calculated.
- The new poverty line is suggested only when price structure has changed significantly as a result of introduction of dramatic changes in the economy such as sudden liberalization of the economy.
- A new poverty line is also suggested when questionnaires in two different years are sharply different (Cheema, 2005).

- This study updated the poverty line by the Composite Price Index which is the combination of consumer price index (non-food and non-fuel items) calculated by Federal Bureau of Statistics, government of Pakistan and Tornqvist Price Index (TPI) (food and fuel items) calculated by the author from the surveys data.
- This study used the group weights of commodities and services in developing a Composite Price Index (Government of Pakistan, 2009).

- Tornqvist Price Index was estimated as under

$$\ln \mathrm{P}_{10} = \sum_{k=1}^{n} \frac{w_{1k} + w_{0k}}{2} \ln\left(\frac{p_{1k}}{p_{0k}}\right)$$

- Where
- W_{1k} and w_{0k} are budget shares of items between the two periods
- And p_{1k} and p_{0k} are price in two periods.

- **3 Poverty Indices**
- This study estimated three measures of poverty namely, headcount ratio, poverty gap and squared poverty gap. These are given below:
- **3.3.1 Headcount Ratio**
- Headcount Index calculates the proportion of population whose consumption is below the poverty line z:
- $$H = \frac{q}{\mathrm{N}}$$
- H = Headcount index
- q = number of poor
- N= size of the population
-

- **Advantages**:
- It is sensitive to number of poor.
- It is direct and easy to calculate.
- It is most widely used poverty measure.
- **Disadvantages**
- It does not satisfy the axiom of monotonicity e.g., it remains constant when the welfare of a poor person changes if he/she still remains under the poverty line.
- It does not meet the transfer axiom e.g., it remains unchanged when the income of a poor is transferred to other poor, relatively better off, but he/she still is under the poverty line.

- **Poverty Gap**
- It measures the average distance between income/expenditure of the poor and the poverty line, expressed as a percentage of the poverty line. It depicts the depth of poverty. It is estimated as under:

$$PG = \frac{1}{n}\sum_{i=1}^{q}\left[\frac{z - y_i}{z}\right]$$

- Where y_i denotes the individual i's income and the sum is taken only over those people whom incomes are less than the poverty line.
- **Advantages**
- It is sensitive to the number of poor.
- It meets the axiom of monotonicity.
- **Disadvantages**
- It does not satisfy the axiom of transfer e.g., poverty gap is not affected by a transfer of income from a poor person to another poor person, relatively better off, who still is under the poverty line.

- **Squared Poverty Gap (SPG)**
- Poverty gap calculates the distance that poor people fall from the poverty line, while the squared poverty gap considers the square of that distance. It depicts the severity of poverty:

$$SQP = \frac{1}{n}\sum_{i=1}^{q}\left[\frac{z - y_i}{z}\right]^2$$

- **Advantages**
- It meets the axiom of monotonicity.
- It also satisfies the axiom of transfer

- **Axioms to be fulfilled by the Measure of Poverty to be a Suitable Measure**
- A measure of poverty must satisfy the following axioms defined by Sen (1976 and 1979) to be a suitable measure:
- **Monotonic Axiom**
- Other things remaining the constant, a decrease in income of a poor under the poverty line must raise the measure of poverty.
- **Scale Invariance Axiom**
- If the incomes of all are multiplied by the same positive number the measure of poverty should remain the unchanged.
-

- **Focus Axiom**
- The position of the poor is dependent on the position of the only poor. The poverty measure remains unchanged to the changes in income for the non-poor.
- **Transfer Axiom**
- Other things remaining the constant, when the income is transferred from a poor to other person, relatively better off, poverty measure must rise.

- **Determinants of Poverty**
- There is common exercise to estimate the categorical regressions like logit and probit models to find the poverty determinants.
- When estimating the categorical regressions, income or consumption of household is assumed to be not available.
- It is acted as if it is only known whether the household is poor or not, that is depicted by categorical variable that takes the value 0 if the household is not poor and 1 if the household is poor (World Bank, 2002).

- If the error term is assumed to have normal distribution, the probit model is calculated.
- But under the hypothesis of logistic distribution for the error term, the logit model is calculated. Categorical regressions have a problem that estimates are sensitive to specification error.
- Probit models have problem that the parameters are biased if the distribution is not normal.
-

- More generally the model does not use all information available because it collapses income or consumption into a binary variable.
- It does not imply that categorical regressions should never be used. Categorical regressions have better predictive power for classifying household as poor or not poor (World Bank, 2002).

- 2002).
- The alternative is to use full information available for the dependent variable (welfare indicator) and to estimate a regression of log on the indicator (World Bank, 2002).
- So this study used linear regressions to find the poverty determinant.
- Linear regressions of logarithm on per adult equivalent consumption expenditure were estimated on the following variables:

$$\ln(\exp) = \beta_0 + \beta_1 \ln(HS) + \beta_2 FR + + \beta_3 Edu\,HH + \beta_4 Age\,HH + \beta_5 Age^2 HH$$
$$+ \beta_6 lstk + \beta_7 SM + \beta_8 Land + \beta_9 Land^2 + e$$
$$H_0 : \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8 = \beta_9 = 0$$
$$H_1 : \beta_1 = \beta_5 = \beta_9 < 0$$
and
$$H_1 : \beta_2 = \beta_3 = \beta_4 = \beta_6 = \beta_7 = \beta_8 > 0$$

- Where HS stands for household size
- FR stands for foreign remittances
- EDUHH stands for Education level of head of household
- AgeHH stands for age of head of household
- Age^2 HH stands for age squared of head of household
- Lstk stands for live stock
- SM stands for Sewing machine