Demographic Analysis of Poverty: Rural-Urban Nexus

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Abstract

Poverty is a multidimensional conception and usually it is defined by focusing narrowly on income poverty or broadly by including lack of access to opportunities for raising standards of living. Strategies aimed at poverty reduction need to identify factors that are strongly associated with poverty and agreeable to modification by policy. This study uses integrated Household Survey (2009-10) data collected by Federal Bureau of Statistics Pakistan to examine probable determinants of poverty status, employing Bivariate models. In general, this study tries to seek in depth knowledge of the key factors like demographic factors and human capital variables that account for poverty differentials in Pakistan and craft a difference in rural-urban poverty concentration. The demographic variables show significant impact on poverty status of the household, especially dependency ratio, sex of the head of the household, family type and household size. These all are found to be of supreme important in defining poverty with feeble discrepancy in rural and urban region.. The educational attainment of the head of the household is found to be very important factor that is associated with poverty. If policy makers target the education of head of household in order to get rid of this evil vicious circle of poverty then it might be establish more effective, powerful and sustainable tool.

Keywords; Poverty Status, Demographic variables, Human capital variables, Poverty Differentials

1. Introduction

Poverty refers to either lack of command over commodities in general or inability to obtain a specific type of consumption (food, clothing, housing etc.) deemed essential to constitute a reasonable standard of living in a society. Living standard is not determined by income and consumption alone, but non-economic aspects such as life expectancy, mortality, access to clean drinking water, education, health, sanitation, electricity and security are also important measures of well being. Critical variables that contribute to improve living standards are health facilities, drinking water, sanitation facilities, and availability of public utilities etc.

In developing countries nutrition and health is common problem which get severity in case of poverty. This situation provokes a vicious circle of low productivity, low wages, malnutrition, ill-health and low working capacity. The interaction between poor health and working conditions and poverty determines a distinctive morbidity-mortality pattern among poor community, which is due to the combination of malnutrition.

The eradication of poverty has been a subject of debate in world for decades, yet it was in recent years that seriousness of the situation was realized globally and specific efforts were taken in this direction. In the same way reducing poverty has the remained main objective of the policy makers in Pakistan. The living conditions of Pakistan's poor and poverty alleviation have gained more importance since the adoption of Millennium Development goals (MDGs).

The existing work on poverty in Pakistan shows that a large number of efforts have been made to estimate the rate of poverty in Pakistan during the last two decades. However, this study is not concerned with the measurement of poverty rather this focuses on the dynamics and determinants of poverty which categorize the entire population into different classes/bands like non-poor, transitory poor and extremely poor. It employs Bivariate Logit models using Pakistan Household Integrated Survey (2009-10) conducted by Federal Bureau of Statistics Pakistan to identify the factors like Demographic and Human capital variables, which strongly effect the household or individual's likelihood

of entering or exiting poverty status.

Overall, this study aims to examine the impact of factors related to Demographic structure of Households that account for poverty differentials in Pakistan specifically in rural and urban region.

2. Review of Literature

The review of different studies in which poverty nexus is explored with different perspectives is presented in the subsequent section. In general, these studies have used different methodologies, including ordinary least squares regression where the dependent variable is continuous, logistic regression where the dependent variable is binary and quantile regression where the dependent variable is income.

The effects of different economic and demographic variables on the probability of a household being in poverty in Costa Rica was analayzed by Rodriguez and Smith (1994)they used a logistic regression model to estimate. The authors found that the probability of being in poverty is higher, the lower the level of education and the higher the child dependency ratio, as well as for families living in rural areas.

There is considerable evidence of a strong negative correlation between household size and consumption (or income) per person in developing countries. The poor devote a high share of their income to goods such as food, tap water, cooking utensils, firewood and housing etc. Ravallion and Lanjouw (1995) test the robustness of the relationship between poverty and household size using Pakistan Integrated Household Survey (PIHS) and results confirm the negative relationship between household size and poverty, as the size of household increases the probability of being poor will increase.

McCulloch and Baulch (1998) have investigated poverty dynamics in rural Pakistan using a unique five-year panel data set from the second half of the 1980s. Their results confirm that while the incidence of income poverty in the panel is high, with between one-fifth and one-third of households in any year having incomes below the poverty line, turnover amongst the poor is also rapid. Conventional poverty status (Logit) regressions show that the probability of a household being in poverty is increased by its household size, the dependency ratio and district of residence but decreased by secondary education, land, the value of livestock and other assets owned. The age and sex of the household head together with basic education did not, however, alter a household's poverty status. This study also investigates which household characteristics and geographic variables were associated with the probabilities of entering or exiting poverty using a partial likelihood proportional hazards model. Household size was found to increase the probability of entering poverty and decrease the probability of exiting poverty. This effect is consistent with the effect of this variable in standard poverty status regressions. However, neither the dependency ratio not district dummies, which were important in the poverty status regressions, have much impact on the probability of entry and exit from poverty.

The DOGEV is an attractive model from the class of discrete choice models for modeling determinants of poverty across poverty categories (absolute poor, moderate poor) which was applied by Fissuh and Harris (2005) for micro level data from Eritrea Household Income and Expenditure Survey 1996-97 to examine the determinants of poverty in Eritrea.Household size defined by adult equivalent units has a significant negative effect on the welfare status of a household. The size of the effect of household size on poverty is not the same across the categories. Age of household head was not found to be significant in linear terms in all poverty outcomes. However, the coefficient of age squared was found to be negative and significant in the moderate poor category only. Even though education is negatively correlated with poverty, basic education does not suffice. This indicates that education is not sufficient condition to escape from poverty but there are other factors, which affect poverty of a household in conjunction with education. The coefficient of schooling is higher (absolute terms) in the absolute poor category than in the other categories. The probability of a household being non-poor is a concave function of the number of employed persons per household. Besides, regional unemployment rate was found to be positively associated with poverty.

The determinants of poverty in Uganda by using logistic regression model was examined by Adebua, et al (2002).This study shows that household with better educated heads are less likely to be poor and large households

are more likely to be poor. This confirms that the larger the household size, the poorer the household is. This is because the large number of household members would likely be children who are unproductive and yet they take a big proportion of household income in terms of schooling requirement, medical attention, food and clothing.

The studies reviewed above has analyzed the different determinants of poverty applying different methodologies A review of the existing work on poverty shows that a large number of attempts have been made to estimate the incidence of poverty all over the world during the last two decades. However, in this study we focused on the dynamics and determinants of poverty which categorize the entire population into different classes/bands like non-poor, transitory poor and extremely poor, we are interested to estimate the effect of demographic and human capital variables on the bands of poor for rural and urban region separately; this is novelty of this study.

3. Plan of Study

Modeling poverty is art which changes shape having same meaning. There are basically two approaches in modeling determinants of poverty.[1] The first approach is based on the regression of consumption expenditure per adult equivalent against potential explanatory variables.

The second approach is to model poverty by employing a discrete choice model. The practice of discrete choice models in the analysis of determinants of poverty has been popular approach. The discrete choice model has a number of attractive features in comparison to the regression approach. The regression approach unlike the discrete choice models does not give probabilistic estimates for the classification of the sample into different poverty categories. In a sense we cannot make probability statements about the effect of the variables on the poverty status of our economic agents.

The discrete choice analysis proceeds by employing binary logit or probit model to estimate the probability of a household being poor conditional upon some characteristics. In some cases the households are divided into more than two categories and then employ multinomial logit model or ordered logit model is used to identify the factors which affect the probability a household being poor conditional upon a set of characteristics.

The approach we will follow intends to investigate the determinants affecting the probability of being non-poor, transitory poor or extreme poor. In this study we will use the Bivariate logit model.

3.1 Bivariate Logit Model

We assumed that the probability of being in a particular poverty category is determined by an underlying response variable that captures the true economic status of an individual. In the case of a binary poverty status (i.e., being poor or non-poor), let the underlying response variable Y^* be defined by the regression relationship.

$$y_i^* = \sum X_i{}^{'} \beta' + u_i \qquad \text{.................. (1)}$$

Where $\quad \beta' = [\beta_1, \beta_2, \dots, \beta_k]$ and $\quad X_i{}^{'} = [1, X_{i2}, X_{i3}, \dots, X_{ik}]$

In equation (1) Y^* is a latent variable and defined as

Y =1 if   y* >0   and

Y= 0   otherwise   ……………… (2)

From equation (1) and equation (2) we can derive the following expressions.

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[1] See Harris and Fissuh (2005)

$$\Pr ob(y_i = 1) = \Pr ob\left(u_i > -\sum x_i \beta\right)$$

$$= 1 - F\left(-\sum x_i \beta\right) \qquad \ldots\ldots\ldots\ldots\ldots\ldots (3)$$

Where F is the cumulative distribution function for u_i and

$$\Pr ob(y_i = 0) = F\left(-\sum x_i \beta\right)$$

The likelihood function can be given by,

$$L = \prod_{y_i=0} \left[F\left(-\sum X_i^{'} \beta\right) \right] \prod_{y_i=1} \left[1 - F\left(-\sum X_i^{'} \beta\right) \right] \qquad \ldots\ldots\ldots\ldots (4a)$$

This can be written as

$$L = \prod_{y_i=1} \left[F\left(-\sum X_i^{'} \beta\right) \right]^{1-y_i} \left[1 - F\left(-\sum X_i^{'} \beta\right) \right]^{y_i} \qquad \ldots\ldots\ldots\ldots\ldots (4b)$$

The functional form imposed on F in equation (4) depends on the assumption made about u_i in equation (1). The cumulative normal and logistic distributions are very close to each other. Thus using one or other will basically lead to some results (Maddala1983).

We have specified the logit model for this study by assuming a logistic cumulative distribution of u_i in F (in equation (4a) and (4b)). The relevant logistic expressions are,

$$1 - F\left(-\sum X_i^{'} \beta\right) = \frac{e^{\sum X_i^{'} \beta}}{1 + e^{\sum X_i^{'} \beta}} \qquad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (5a)$$

$$F\left(-\sum X_i^{'} \beta\right) = \frac{1}{1 + e^{\sum X_i^{'} \beta}} \qquad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (5b)$$

X_i are the characteristics of the households/individuals and β_i the coefficients for the respective variable in the logit regression.

Having estimated equation (4) with Maximum Likelihood (ML) technique equation (5a) basically gives us the probability of being poor (prob (Yi=1)) and equation (5b) the probability of being non-poor (prob (X_i=0))

Ordered logit Model

Assuming three poverty categories (1, 2 and 3 and associated probabilities P1, P2 and P3), an individual would fall in category 3 if $u < \beta^{'} x$, in category 2 if $\beta^{'} x < u < \beta^{'} x + \alpha$ and in category 1 if $u > \beta^{'} x + \alpha$ where $\alpha > 0$ and u is the error term in the underlining response model (see Equation 1). These relationships may be given by.

$$P_3 = F(\hat{a} x_i^{'})$$

$$P_2 = F(\hat{a} x_i^{'} + \alpha) - F(\hat{a} x_i^{'}) \qquad \ldots\ldots\ldots\ldots\ldots\ldots(6)$$

$$P_1 = 1 - F(\hat{a} x_i^{'} + \alpha)$$

Where the distribution F is logistic in the ordered logit model. This can easily be generalized for *m* categories (see Maddala 1983). Assuming the underlying response model is given by

$$y_i = \hat{a}x_i' + u_i \qquad\qquad ……………..\ (7)$$

We can define a set of ordinal variables as:

$$Z_{ij} = 1 \qquad\qquad \text{If } y_i \text{ falls in the jth category}$$

$$Z_{ij} = 0 \qquad\qquad \text{Otherwise} \qquad\qquad (i=1, 2… n; j=1, 2… m)$$

$$prob(Z_{ij} = 1) = \Phi(\alpha_j - \beta'x_i) - \Phi(\alpha_{j-1} - \beta'x_i) \qquad …. (8)$$

Where Φ is the cumulative logistic distribution and the $\alpha_j's$ are the equivalents of the αs in equation (6). The likelihood and log-likelihood functions for the model can be given by equations (9) and (10) respectively, as:

$$L = \prod_{i=1}^{n}\prod_{j=1}^{m}[\Phi(\alpha_j - \beta'x_i) - \Phi(\alpha_{j-1} - \beta'x_i)]^{Z_{ij}} \qquad …….. (9)$$

$$L^* = \log L = \sum_{i=1}^{n}\sum_{j=1}^{k} Z_{ij} \log \Phi[(\alpha_j - \beta'x_i) - \Phi(\alpha_{j-1} - \beta'x_i)] \qquad ……. (10)$$

Equation (10) can be maximized in the usual way, and can be solved iteratively by numerical methods, to yield maximum likelihood estimates of the model (see Maddala 1983).

3.1.1 Data Sources

The analysis in this study is based on micro data taken from the Pakistan Integrated Household Survey (PIHS 2009-10) Household Integrated Survey (HIES 2009-10). These household surveys is conducted by the Federal Bureau of Statistics provide comprehensive information about household consumption expenditure, income and different socio-economic indicators that are essential for poverty analysis. The sample size of these household surveys is substantial enough to allow representative estimates. The total sample considered here comprises of 15000 households.

3.1.2 Construction of Variables

This study uses consumption as a welfare and poverty status indicator instead of Income   because consumption measures welfare achievement and exhibit less seasonal variability moreover people willingly mention their consumption pattern rather than income. This study defines poor as population living on less than $1.25 a day at 2005 international prices.   That is 1.25US dollar per day= Rs 3375 per capita per month is required to get out of poverty line. The headcount ratio, i.e. proportion of poor households among total households is used as a measure of poverty. We categorized dependent variable into three mutually exclusive categories. We assume that a typical household belongs to one of three mutually exclusive categories.

Table 1

Definitions of Dependent Variable

Variable	Definition
Dependent variable	
1-Extremely poor	1. Extremely poor households are that whose per capita per month expenditure are less than 0.5 of poverty line.
2-Transitory poor	2-Transitory poor households are those who's per capita per month expenditure lies between the "0.75 of line.
3-Non-poor	3-Non-poor households are that whose per capita per month expenditure is above the poverty line.

Table 2

Definition of Explanatory Variables

VARIABLE	**DEFINITION**
Age of head of household	Age of head of household is measured in complete years and is treated as a continuous variable.
Female–male ratio.	To see the impact of gender composition in a household on poverty status, the total number of females to total number of males in a household is treated as female-male ratio and it is used a continuous variable in the model.
Dependency ratio.	The dependency ratio is defined as the ratio of number of members (<18 years and >64 years) to household size and treated as continuous variable.
Family type.	The family type is entered in to the model as a binary variable, representing nuclear and joint family. Nuclear family consists of parents and unmarried children.
Household size.	The sum of household members in a household is called household size and it is treated as a continuous variable.
Sex of head of household.	The sex of household head has been taken as a binary variable as, HH_SEX =1, if head of the household is male=0, otherwise
Head work or not:	To see the role of household head's work in effecting poverty status, we use the head's work as a binary variable. HH_WRK= 1, if household head does any work for wages. =0, otherwise.

Educational status of head**:**	EDU2 = 1, if household head has primary education.
	    = 0, otherwise.
	EDU3 = 1, if household head has higher secondary education.
	    = 0, otherwise.
	EDU4 = 1, if household head has college education.
	    = 0, otherwise.
	EDU5 = 1, if household head has higher education.
	    = 0, otherwise.
	The base category for these variables will be no formal education of the household head.

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4. Empirical Findings

4.1 Bivariate Logit Model

In this model the dependent variable is categorized as poor and non-poor and the model is estimated by using Maximum Likelihood Technique. Result in Table 3 is for Bivariate Logit model where poverty is dependent variable and the estimate are taken for rural and urban region.

Table 3

Logit Model- Dependent Variable is Poverty

Variable	URBAN REGION	RURAL REGION
Demographic variables	**Marginal Effects**	**Marginal Effects**
Sex of head of household	-.0241** (0.06)	-.1914* (0.00)
Age of head of household	-.0007* (0.00)	-.0028* (0.00)
Household size	.0347* (0.00)	.0679* (0.00)
Female-male ratio	.0012 (0.54)	.0333*** (0.09)
Family type	-.1221* (0.00)	-.1919* (0.00)
Dependency ratio	.1281* (0.00)	.2872* (0.00)
Human capital & Work Status Variables		
Education of household head; 1-5 years	-.0125* (0.00)	-.0657* (0.00)
Education of household head; 6-10 years	-.0297* (0.00)	-.1094* (0.00)
Education of household head; 11-14 years	-.0571 * (0.00)	-.1819* (0.00)
Education of household head; 16 years…	-.0561 * (0.00)	-.2261* (0.00)
Head work for income	-.0129 (0.12)	-.0712* (0.00)
Log likelihood	-1593.68	-2127.01

In general, the results demonstrate that the factors strongly associated with poverty status like (level of education, household size, dependency ratio, age of head of household, sex of the head, family type are the same in both rural and urban areas. However the marginal effects associated with these regresses are larger in rural areas. In urban region the variable "**female-male ratio**" has insignificant impact on poverty status of a household. While the variable "sex of the head of household " has significant impact on poverty status of household but its effect on the poverty status is minute (3% more likelihood to be non poor) as compared to rural region, this shows that in urban areas female participation in labor force is high and there is low female dependency ratio. This means that women help their family members in earning activities and driving out from poverty status while in rural region both variables significantly impact on poverty status of a household. The results indicate that there is 1% less likelihood to be non-poor if the female-male ratio is higher as compared to those households where the female male ratio is less and there is 19% more likelihood to be non-poor if the head of household is male as compared to those households where the head of household is female in rural region.

Regarding the effect of "**household size**" estimates indicate that there is 3% and 7% less probability to be non-poor, if other things are kept constant in urban and rural area respectively. The variable" dependency ratio" shows that there is positively correlation between poverty status and dependency ratio. The estimated coefficients show that there is 13% and 29% less likelihood to be non- poor in urban and rural area respectively. **"Family type"** indicates that nuclear families are12% and19% more probable to be non-poor as compared to those households, which have joint family system in urban and rural areas respectively. The "**age of the head of household**" has minor effect on poverty status in both urban and rural areas. As the result shows that there is 0.1% and 0.3% more probability to be in non-poor category in urban and rural areas.Raising the level of head's education has a clear effect on reducing the probability of poverty in both areas. The probability of poverty drops by increasingly larger percentage as the level of Education rises from one level to next. The effect is more pronounced in rural areas. As in rural area there is 6%, 11%, 18% and 23% more likelihood to be non-poor if the head of the household has primary, higher secondary, college and higher education respectively as compared to those households in which household head has no formal education status. While in urban area there is 1%, 3%, 6% and 6% more likelihood to be non-poor, if the head of household has primary, secondary, college and higher education respectively.

The variable" head work" shows negative impact on poverty status but this variable has no significant impact on poverty status in urban area but in rural area if the household head work there is 7% more likelihood that household fall in non-poor category as compared to other households where household heads don't work for earnings.

4.2 Ordered Poverty Status

We have ordered the sample into three mutually exclusive categories: non-poor (category0), transitory poor (category1) and extremely poor (category2), with household in category 2 being most affected by poverty. The estimated coefficients and marginal effects are given in Table-4 for rural and urban region separately.

Almost all the demographic variables are statistically significant in both rural and urban region except "female –male" ratio in urban region and the marginal effects of these variables are larger in rural region which indicate that the demographic variable s are more prominent element of poverty. For urban region the estimated coefficient of the sex of the head of household indicate that there is 2% and0.4% more probability to move from transitory poor and extreme poor category to non-poor category respectively, if the head of the household is male as compare to those household in which head is female. While in rural region results show that it is 18% and 6% more likely to be non-poor as compared to transitory poor and extreme poor category respectively, if the head of the household is male. The variable female male ratio show that is has no significant impact on urban region but in rural region it is 1% and 0 .9% less likely to be non-poor in transitory poor and extreme poor category respectively.

The variable age of the head of household has significant impact on poverty status of the household in different categories of poverty but this effect is not prominent in both regions. Results show that it is .1% and .01% more probable to be non poor as compared to transitory poor and extreme poor category respectively if the age of the head of the household increase in urban region, while in rural region there is0 .2% and0 .1% more Likelihood to be

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non-poor as compared to transitory poor and extreme poor category respectively. The size of the household shows that there is 1% and 3% less likelihood to be non-poor in transitory poor and extreme poor category respectively in urban region while in rural region it is 5% and 3% less likely to be non-poor in transitory poor and extreme poor category if the size of household increase.   **Table 4**

Odered logit Model-Dependent Variable Poverty

Variable	URBAN REGION		RURAL REGION	
Demographic variables	Transitory	Extreme	Transitory	Extreme
Sex of head of household	-.0205**	-.0043**	-.1878*	-.0556*
Age of head of household	-0.0106*	-.0001*	-.0020*	-.0009*
Household size	.0123*	-.0325*	.0513*	.0336*
Female-male ratio	.0017	.0004	.0058	.0025
Family type	-.0179*	-.0388*	-.0715*	.0299*
Dependency ratio	.0889*	.0187*	.2741*	.1192*
Human Capital & Work Status Variables				
Education of household head; 1-5 years	-.0091***	-.0019***	-.0477*	-.0195*
Education of household head; 6-10 years	-.0250*	-.0052*	-.0797*	-.0315*
Education of household head; 11-14 years	-.0471 *	-.0096*	-.1320*	-.0464*
Education of household head; 16 years-AB	-.0458 *	-.0092*	-.1721*	-.0560*
Head work for income	-.0121**	-.0026**	-.0451*	-.0211*
Log likelihood	-2028.897		-3198.01	

The estimated coefficient of "family type" in urban region shows that nuclear families are 2% and 4% more likely to be non-poor as compared to joint families in transitory poor and extreme poor category respectively. And in rural region nuclear families are 7% and 3% more probable to be non-poor as compared to joint family system in transitory poor and extreme poor category respectively.

The results indicate that the "dependency ratio" is most strong demographic variable in rural and urban region. The estimated coefficient shows that there is 9% and 2% less likelihood to be non poor in transitory poor and extreme poor category respectively in urban region if there is high dependency ratio in a household and in rural region it is 27% and 12% less likely to be non poor in transitory poor and extreme poor category respectively if there is high dependency ratio in a household.

The estimated coefficient of education of head of household in both rural and urban regions are statistically significant and show strong impact on poverty status of household in transitory and extreme poor categories. Results also show that education variable is a more crucial determinant of poverty in rural region. It is clear from results that as the level of schooling increase the probability of transforming the transitory poor and extreme poor household in to non- poor category increases.

The estimated coefficient of education dummies in both urban and rural region show that there is more likelihood to be non-poor if the household head has primary, higher secondary, college and university education as compared to those households in which head has no formal education status in transitory poor and extremely poor category respectively. This shows that education increase the stock of human capital, which in turns increase labour productivity and wages. Since labour is the most important asset of the poor increasing the education of the poor will tend to reduce poverty. The variable "head work" also shows significant impact on poverty status of household in both rural and urban region. The results show that in urban region if the head of the household work for income, there is 1% and .3% more likelihood to be non-poor in transitory poor and extreme poor category respectively, as compared to those household in which head don't work for income .In rural region this impact is stronger.   The estimated coefficient show that it is 5% and 2% more likely to be non-poor, if the head work for income as compared to those households in which head don't work for income in transitory poor and extreme poor category respectively.

Conclusion

The objective of this study is to measure and analyze the Demographic and Human Capital variables effects on poverty discrepancy in Pakistan for rural and urban region.

All the demographic variables show significant impact on poverty status of the household, especially dependency ratio, sex of the head of the household, family type and household size are found to be of paramount importance in reducing poverty particularly in transitory poor category.

Having a large household is generally correlated with poverty status. This is because the larger the number of household member would likely to be children, who take a big proportion of household income in terms of school requirements, medical attention, food and clothing. While a high dependency ratio decreases earning potential in relation to needs and therefore increase the risk of poverty (Lipton 1983).

The educational attainment of the head of the household is found to be the most important factor that is associated with poverty in rural as well as urban region. Lack of education is a factor that accounts for a higher probability of being poor. Thus promotion of education is a central factor in addressing problems of transitory and extreme poverty. This indicate that education is vital for boosting the productivity of the human factor and making people more aware of opportunities for earning a living and there is generalized evidence in household surveys and censuses that education is positively correlated with earnings [Schultz (1988); Psacharopoulous (1985); Blaug (1976)].Based on our results, the following policy implications are derived from this study which is expected to contribute to the poverty reduction strategy being pursued by Pakistan:

- The educational attainment of the head of the household is found to be most important factor associated with poverty. Thus promotion of education is central in addressing problems of transitory and extreme poverty.

- Relating to the above point, the importance of female education in poverty reduction should be noted. We have found that female- headed household are more likely to be poor than household of which the head is a

male and that female education plays a key role in reducing poverty. Thus promoting female education should be an important element of poverty reduction polices. Because there is evidence that female education and fertility are negatively correlated, such policies have an impact on household size and dependency ratios, which are important determinants of poverty. Thus investing in female education would indeed be productivity enhancing and poverty reducing.

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