Indian Journal of Extension Education
Vol.47, No. 1 & 2, 2011 (75-79)

Identifying the Determinants of Poverty in Rural and Urban India

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ABSTRACT

A recent study on poverty highlights serious conceptual anomalies in the measurement of poverty and in selection of variables which can throw more light on contentious issues of deciphering the determinants of poverty. Identification of such variables still remains a challenging task for the researchers and policy makers. in this paper, an attempt is made to identify the factors influencing determination of poverty in rural and urban settings using logit model. Further marginal effects and elasticities were estimated which provided better interpretation of economic variables. The findings explicitly provide insights about the direction and magnitude of the impact of variables on the incidence of poverty. It was found that the proportion of children in the household appeared to be the foremost factor in augmenting poverty; however this may be due to the causative effect on poverty itself. Moreover, infrastructure and occupational variables were found to be more. Influencing factors in decreasing poverty in rural and urban India, respectively. The study' confers that the household specific variables were having pronounced influence on poverty as compared to state specific variables. The study advocated the need to implement the family planning programmes, targeting literacy campaigns in an effective way and enhancing minimum wages coupled with better infrastructure for improved livelihood and reduced poverty.

South Asia is home to the largest number of poor in the world, and India accounts for the largest percentage of the region's share. In India, poverty reduction has been a major goal of development policy since independence and the achievement of a minimum standard of living for all within a reasonable period has been the implicit or explicit objective of all development programmes. This was sought to be achieved by attaining higher growth-raising through the purchasing power of the poor with the endowment of land and non-land assets and generating employment opportunities and through public intervention for consumption smoothening by undertaking large scale food for work programmes. The long-term performance of the Indian economy with respect to poverty reduction has been mixed as is evident from the fact that absolute number of persons below poverty line has actually increased. However, there has been a sustained reduction in poverty since the 1970s. Rural poverty declined from 55.7 percent in 1974 to 37.4 percent in 1991, while urban poverty fell from almost 48 percent to 33.2 percent during the same period, with the major proportion or this decline occurring between 1978 and 1987. As per the latest estimates (1999-2000), poverty in India had declined to 27.1 percent in rural areas with a national figure of 26 percent.

Even with the latest estimates, India remains the epicentre of poverty, both within South Asia and in the world, with as many as 259 million people below the national poverty line. In terms of the international poverty line of per capita income of US$ I per day (measured at 1993 Purchasing Power Parity exchange rates), there

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are 358 million poor in India. Instead, if we use the norm of US$ 2 per day, almost 80 percent of India's vast population is below poverty line, (World Bank, 2003).

Many recent studies on poverty highlighted serious conceptual anomalies in measurement of poverty (Sen, 1981) and the variables which throw more light on the relative poverty (feel for deprivation) gained prominence instead of conventional notion of inability of a person to meet the hypothetically stipulated recommended food intake as diet prescribed by Indian Council for Medical Research for different category of people. Identification or such deprivation related variables still remain a challenging task for the academicians.

This paper is an attempt to identify the factors influencing poverty in rural and urban regions of India using sophisticated research tools in the field of discrete choice model involving both continuous and dummy explanatory variables. The findings of the paper will be useful for planners and policy makers for evolving strategies to alleviate poverty and also for researchers to further use these variables for poverty analysis.

METHODOLOGY

Poverty is determined from per capita expenditure of the household based on the state specific poverty line as per the Planning Commission guidelines (Govt. Of India, 2001). The poverty was coded in the form of binary variable with 0 and 1 as above and below poverty lines respectively. For explaining such binary response variable, discrete choice models like logit, probit, etc. are generally used. Logit and Probit models are based on logistic and normal distribution respectively. The logistic distribution is similar to the normal except in the tails, which are considerably heavier. Hence, for intermediate values, both the models tend to provide similar probabilities. The main advantage of these models is that their prediction of probabilities always lies between zero and one, thus avoid nonsense prediction for binary variable, as they are based on proper continuous distribution function. The choice between these two models seems not to make much difference in most applications. However, in this study we have used Logit, based on S-shaped logistic distribution, which is considered to be more consistent with the underlying theory of qualitative choice variable. The predicted probability from a binary choice model is given by *equation below*

$$P\left[y \middle| x_1, x_2, \ldots x_k\right] = F\left(\sum_{i=1}^{k} \beta_i x_i\right)$$

where y is a choice variable viz. poverty in our study, X_1, X_2, ..., Xk are k explanatory variables such as P_child, Edu, Rur_tel, etc. and /B1,/B2, ...B_i, are parameter estimates and F is an assumed cumulative distribution function.

If we consider F as the cumulative distribution function of logistic distribution, then the above probability model provides the Logit model. The distribution function is given by *equation below*

$$P\left[Y = 1 \middle| x_1, x_2, \ldots x_k\right] = \left[1 + \exp\left(-\sum_{i=1}^{k} \beta_i x_i\right)\right]^{-1}$$

The coefficients of the Logit model were estimated using maximum likelihood method by employing Fisher's scoring optimization technique. For Logit model, marginal effects (a common terminology for econometric analysis) are non linear functions of the parameter estimates and the levels of the explanatory variables so they cannot generally be inferred directly from the parameter estimates.

The marginal effect or slope of the Ith explanatory variable on the response probability is obtained from *equation below*

$$\partial P\left[Y = 1 \middle| x_1, x_2, \ldots, x_k\right] \Big/ \partial x_i = \left[\exp\left(-\sum_{i=1}^{k} \beta_i x_i\right) \Big/ \left[1 + \exp\left(-\sum_{i=1}^{k} \beta_i x_i\right)\right]^2\right] \beta_i$$

The above expression clearly indicates that a parameter estimates is translated into marginal effect by a scale factor. For this study, scale factor has been evaluated at every observation and then taking the average for computing marginal effect. The same formulae for computing marginal effect can not be straight way applied for the effect of a change in a dummy variable as the above derivative is with respect to small change while change in case of a dummy variable refers change of state. Thus, the appropriate marginal effect for a binary independent variable, say d; is given by (refer Greene, 2003) *equation below*

Marginal effect =

$$\text{Prob}\left[Y = 1 \middle| \bar{x}_1, \bar{x}_2, \ldots, \bar{x}_{k-1}, d = 1\right] - \text{Prob}\left[Y = 1 \middle| \bar{x}_1, \bar{x}_2, \ldots, \bar{x}_{k-1}, d = 0\right]$$

Where X> 1, X> 2, ... X> K-1,denotes the means of all other variables excluding 'I'dummy variables in the model. Finally, elasticity (percentage change in the probability of response variable due to one percent change in the explanatory variable) for the Ith explanatory

variables has been computed using partial derivative as *equation below*

$$\frac{\partial P\left[Y=1\middle|x_1,x_2,\ldots,x_k\right]}{\partial x_i}\times\frac{x_i}{P\left[Y=1\middle|x_1,x_2,\ldots,x_k\right]}$$

The analysis was done for rural and urban datasets separately. All the above computations have been performed by writing programmes in SAS software. We have used PROC QLIM (Qualitative and Limited dependent variable Model) for our analysis.

RESULTS AND DISCUSSION

The state-specific poverty lines (Rs per capita per month) in 1999-2000 for rural region ranged between Rs 262.94 in Andhra Pradesh and Rs. 374.79 in Kerala; and for urban region, it varied from Rs 343.99 in Assam to Rs. 539.71 in Maharashtra.

The characteristics of the selected data are presented in the Table-1. It showed that there exists clear divide between urban and rural regions in respect of all variables selected. The per capita expenditure in urban areas was about 77 per cent more than that of rural area, while household size and proportion of children in the household were considerably higher in rural areas. The higher standard deviation of these variables also shows that there were considerably large variations within the societies. The teledensity variable which shows the availability of telephone per 1000 persons was very high for urban regions. It amply demonstrates the developmental disparity between urban and rural regions of India.

Table 1: Descriptive statistics pertaining to rural and urban areas in India

Variable	Rural		Urban		Pooled	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
MPCE (Rs)	562	227	997	161	737	197
Hhdsz (No.)	5.27	2.78	4.60	2.45	5.00	2.69
P _child (%)	0.32	0.23	0.25	0.13	0.29	0.18
Land (Ha)	1.19	0.85	-	-	1.19	0.85
Teledensity (N0.)	1.74	-	28.25	-	9.35	-

Keeping this in view, Logit model was employed to identify the important factors that can indicate incidence of poverty in rural and urban India. The results of the analysis for rural areas (Table-2) indicated that all selected variables exhibited significant impact on the poverty incidence. The sign of the estimated coefficient which provides the direction of the effect of a change in the explanatory variable on the dependent variable was as anticipated a priori.

The estimated coefficients (beta) for variables such as household size, proportion of children and agricultural labourer had positive sign which shows that they are increasing the incidence of poverty. While other variables like maximum education in the family, land holding, proportion of irrigated land, rural teledensity, self employment in agriculture as well as in non-agricultural activities had negative sign indicating that these variables are instrumental in alleviating poverty. The results also indicated that larger the family size, higher the probability of the household being poor. Similarly, more proportion of children in the family also pushed the household towards poverty, as the proportion of dependent members increased in the family. The strict enforcement of Child Labour (Prohibition) Act is likely to further accentuate this problem unless the elders are not given the opportunity for gainful employment. It was also indicated that owning land improves the chance of moving out of poverty. The negative coefficient of education confirmed that investment for improving the quality of human capital would contribute positively to poverty alleviation by upgrading labour skills.

Among occupational variables, AL exhibited positive sign while the SENA a negative. These indicated that household having main occupation as agricultural labourer are more likely to remain below poverty line than those who are self employed either in agriculture or in non-agriculture activities. This may be due to very low wage levels and seasonal employment pattern prevailing for agriculture occupation. The National Rural Employment

Guarantee Scheme is a step in the right direction in alleviating poverty especially among agricultural and other unskilled labourers in rural India. The variable SEA implied that in the existing environment, though it worked against poverty, its scope for horizontal expansion is not very high as indicated by its low marginal effect (-0.01). The high marginal effect corresponding to variable P _child (0.293) indicated that it mitigates the positive effects of other variables responsible for reducing the poverty. The magnitude of marginal effect of Rur_tel (-0.045), a proxy variable for infrastructural development, revealed that investment in infrastructure development plays a major role in alleviation of poverty.

Table 2: Estimates of the Logit model on determinants of poverty in Rural India

Variables	Estimates effects	Standard errors	Marginal effects	Marginal (corrected for dummy)	Elasticities
Intercept	-1.087	0.051			
Hhdsz	0.192**	0.005	0.025	0.025	0.180
P child	2.224*·*	0.054	0.293	0.293	0.126
Edu	-0.173**	0.004	-0.023	-0.023	-0.191
Land	-0.257**	0.011	-0.034	-0.034	-0.055
Rur_tel	-0.344**	0.009	-0.045	-0.045	-0.124
P_irrg	-0.0l3**	0.001	-0.002	-0.002	-0.091
Al	0.666**	0.034	0.088	0.092	-
SEA	-0.099**	0.037	-0.0l3	-0.010	-
SENA	-0.167**	0.041	-0.022	-0.017	-

* * All estimates are significant at 0.01 probability level

Similarly, in urban India, variables such as Hhdsz, P _child, Edu, Urb_tel, SE, SAL, LAB (occupational variable) were considered to find out the factors affecting the probability of an individual being poor. Table-3 depicted estimates of the Logit model on determinants of urban poverty in India. From the analysis, it was observed that all the selected variables in the model were highly significant. Like rural poverty, the probability of incidence of poverty in urban area is high in larger households and family having more number of children as indicated by the positive coefficient of Hhdsz and P child variables in the model. However, the high marginal effect indicated that unit change in household size yielded more probability of being poor in urban area in comparison to rural area while the converse is true for variable representing the proportion of children.

Table 3: estimate of the logit model on determinants of poverty in urban India

Variables	Estimates	Standard errors	Marginal effects	Marginal (corrected for dummy) effects	Elasticities
Intercept	-1.692	0.072	-	-	-
Hhdsz	0.300**	0.006	0.033	0.033	0.192
P_child	1.920**	0.066	0.209	0.209	0.068
Edu	-0.273**	0.006	-0.030	-0.030	-0.317
Urb_tel	0.003**	0.001	0.0002	0.0002	0.014
SE	-0.136*	0.058	-0.015	-0.014	- -
SAL	-0.413**	0.060	-0.045	-0.037	-
SENA	0.914**	0.061	0.099	0.133	-

** and * indicate statistical significance at 0.01 and 0.05 probability level, respectively

Furthermore, education contributed more towards poverty alleviation in urban areas as compared to rural area. This implies easy availability of as well as access to more gainful employment opportunities for educated persons in urban area. Keeping in view the large family size in rural areas and increasing pressure of labour migration from rural to urban areas calls for creation of more avenues for employment creation mainly towards agriculture- based and infrastructure stocks in the rural region. Among occupational variables, households having regular earnings were more likely to push the household above poverty line while casual labour job relatively increased the probability of being poor due to seasonal pattern of employment as well as low wage rate received by these categories of households. It can be observed from the corresponding figure of marginal effects that the impact of casual labour occupation (0.133) is much more than that of salaried type of employed (-0.037) salaried or casual labour in influencing poverty as under these groups mainly those households come which have small petty shops/vendors. On the other hand, in contrast to rural areas, marginal effect of the macro-variable like teledensity (Urb_tel) indicated that infrastructure development at the state level does not contribute much in reducing poverty as poverty is household rather than macro feature.

CONCLUSIONS

Logit model using the variables related to household and state features was employed to identify the factors influencing poverty status in rural and urban India. Family size particularly the high proportion of children in the household appeared to be one of strongest factors in contributing to poverty, while the variables like infrastructure and occupation were found to be important in decreasing poverty in rural and urban India, respectively.

Keeping this in view, it is suggested that besides the positive action from the government to reduce the population growth in weaker sections t hrough free and employment oriented education and better implementation of family planning programmes for the economically weaker sections of the populace, especially in rural areas; intensive and diversified farming systems strategy and augmentation of agri-based enterprises, particularly in areas of processing and value-addition need to be emphasized to address the problems of poverty. As education was found to be next best option to alleviate poverty in both rural and urban areas, it is desirable to promote functional literacy and vocational education programmes to facilitate acquisition of newer knowledge and skills for better employment. Creation of modem infrastructure facilitating technology dissemination, transport, marketing, storage and value addition, credit and entrepreneurial support systems in rural areas will further provide boost to poverty alleviation endeavours.

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