**Poverty to Vulnerability in Indian Rural States: An Asset Based Approach**

**Swati Dutta[[1]](#footnote-2)**

**Abstract**

The purpose of this study is to bring in a new area of poverty measurement based on household’s access to basic assets from across Indian States. The major drawback of the usual income based measure of poverty is that it is unable to distinguish between the structural and stochastic nature of poverty. This paper applies the asset based framework to poverty to discover the relationship between structural and stochastic poverty. The paper has used The India Human Development Survey (IHDS) 2005. A three step feasible least square technique is applied to estimate the expected income and variance of income. Finally by using this expected income and variance of income, household’s expected poverty level will be calculated. Further, the multinomial logistic regression has been used to uncover the determinants of the different types of poverty. The results indicate the importance of asset formation for long term poverty reduction. There is a need for targeting pointed policies towards the identified structural chronic poor and structural transient poor as they are the most vulnerable and need asset building in the form of different types of support in-terms of institutional and infrastructural aid. The stochastic transient poor households face sudden negative shocks and require short run support in terms of social security or unemployment benefit scheme

**JEL Classification**: I32, I38, C21, C24, R11, R58

1. **Introduction**

Poverty is mostly measured in terms of income or consumption expenditure. The main reason for selecting income as one of the indicator of poverty is that it gives capability for the people to reach certain standard of living. Moreover, the information on income is easily available and we can easily calculate the number of people whose standard of living is below the pre determined level of income. One of the drawbacks of the income based poverty measures is that, even if we have the panel data set of the same households over a period of time, they are unable to distinguish the causes of poverty if households are experiencing the same unlucky experiences over time or if poverty is a purely transitory phenomenon. Based on the panel data set, income based poverty measurement allows us to identify the households who are always poor, the sometimes poor and the never poor. The households who are always poor are considered as chronically poor while those that are sometimes poor are referred to as transitory poor. However the main disadvantage of the panel data set measurement based on income indicator is, it unable to capture the difference between structural and stochastic nature of poverty. An asset based approach to poverty reduction focuses on assisting the poor to develop their stock of wealth and to use it effectively to achieve sustainable improvements in their lives. Households’ strategically use their assets in the market to generate the required livelihoods. Assets can be either tangible, like land, production units, animals, etc., or they can be non-tangible, like human capital. A household lacking the required assets to convert into income requirements is asset-poor. It is possible for a household to be both income poor as well as asset poor i.e. they are structurally poor. On the contrary if the households obtain a level of income below the income poverty line but their asset based expected level of welfare is above the asset poverty line, we identify those households as stochastic poor.

In essence, vulnerability of a household depends more on the nature of its asset poverty than on the income poverty, because it is the asset poverty that leads to income poverty. The importance of the vulnerability measurement is that it emphasis on the who will likely to be poor in the future.

Unfortunately, work in the area of asset poverty lacks adequate discussion. One of the possible reasons could be that the pro-poor policies in India are designed to make provisions through various programs, whose major objective is to cater to the consumption needs of the poor and not enable the poor to get out of poverty. Hence there has been large focus on identifying those poor whose consumption needs are to be satisfied, but there is hardly any focus on identifying those poor who need enabling requirements, in terms of institutional or infrastructural support, to move out of poverty through self-motivated strategies. Asset based vulnerability measurement will help us to find out the households who will continue to be poor in the future because of lack of assets or whether it is due to bad luck.

The paper is organized as follows. Section 2 deals with literature review on various issues in poverty measurement followed by the theoretical framework. Subsequently it describes the methodology and data sources followed by presentation of the main empirical results. Finally it offers the conclusions.

1. **Literature Review**

Since early 1970s, many of the studies on poverty in India starting with Dandekar and Rath’s pioneering study in 1971 and in Vaidyananthan (1974); have been– using static consumption based poverty measures – giving estimates on the count of poor in India. Ahluwalia (1978) examined the trend in incidence of rural poverty over a period of fourteen years namely 1956-57 to 1973-74, for India as a whole as well as the State level. He adopted the per capita consumption expenditure of Rs 15 per month at 1960-61 rural prices as the poverty line. He calculated the equivalent poverty lines for agricultural labor too. He found a statistical inverse relationship between rural poverty and agricultural output per capita. The Expert Group (1993) of the Planning Commission has accepted the poverty cut off line as Rs. 491(rural) and Rs.571 (urban) at 1973-74 prices anchored on the recommended per capita daily intake of 2400 calories and 2100 calories respectively per annum. The expert group suggested, construction of a state specific poverty line using states specific consumer price index. They found that poverty estimates fall from 36 percent of the population in 1993-94 to nearly 26 percent at the end of the decade 1999-2000. Deaton (2003) has studied the relationship between prices and poverty in India during 1987-2000 using the consumption data from the 43rd , 50th and 55th rounds of NSS and computed for both rural and urban areas of India by taking a range of consumer price indices for 1999-2000 relative to 1993-94 and for 1993-94 relative to 1987-88. The main focus of the study is to explain the methodology for incorporating the change in price index in the poverty line estimation. Panda and Sarangi (2004) has estimated the incidence of tribal poverty in Orissa. They used both the income and food poverty line in their study. They found the incidence of poverty is high with reference to both food and income poverty and is the highest for STs and is lowest for other categories. One common issue in the above mentioned literature is the determination of the poverty line itself (Patnaik 2007). However, in the above mentioned literatures there seems no scope of analyzing the causes of poverty.

The review of various studies on poverty in India has revealed that their major focus has been on the aspect of measurement of poverty based on consumption expenditure. Official estimates of the extent of poverty, i.e. the head count ratio below the official poverty line, have been the subject of much debate. However, the consumption based measures is not very suitable for analyzing the causes of poverty. Additionally, the consumption based measure of poverty is not useful to separate out a stochastic or a temporary nature of poverty from a structural one, which is crucial for target intervention.

One such approach, that is helpful in distinguishing between stochastic and structural nature of poverty, is the asset based poverty measure (Carter and May 1999; Carter and May, 2001) Asset based approach is also helpful for vulnerability measurement as it explain the poverty prospect of the households (Carter and Barrett, 2006).

Chaudhuri, Jalan and Suryahadi (2002) had made the contribution on vulnerability as expected poverty. The merit of this framework is that it can be used for vulnerability measurement from the cross sectional data. They have applied this methodology to cross section data from the Philippines and Indonesia. He found differences between the distribution of vulnerability and poverty across different population characteristics e.g. regions, education level etc. However the framework given by them was based on the income / expenditure based measure. Therefore it was unable to categorize the households under structural and stochastic poor. Distinguishing between structural and stochastic poverty better identifies the causes of poverty and design more effective poverty reduction strategies. Motivated by carter and Barrett (2006) we have extended the asset based approach of poverty to vulnerability measurement by using the expected poverty framework. Under this background the objectives of our paper is that

1. To estimate the vulnerability to poverty for Indian rural States based on the asset based approach
2. To compare the household profile under different poverty category
3. To uncover the determinants of different types of poverty
4. **Theoretical Framework**

Asset Poverty Line ($\overbar{A}$)

Income

h

c

b

l

Income poverty line ($\overbar{y}$)

a

d

g

Asset

  **Figure1: Static Asset Poverty Line (Carter and May1999)**

Asset poverty line is the extension of the income based poverty line. The asset poverty line will help us to distinguish the households between stochastic poor and structural poor. This requires the information on household access to assets and expected level of wellbeing i.e. expected income. In Figure1 the vertical axis measures the income of the household which is the basic money metric measure. According to income poverty line ($\overbar{y})$, household h is identified as poor if $ y\_{h}\leq \overbar{y}$. The horizontal grid line is such income poverty line which indicates the minimum amount of income required that divides the income poor from the income non poor. Assets accessible to households are measured on the horizontal axis. The assets are defined in terms of both tangible (livestock, land, etc.) and intangible assets (social capital and human capital). Vertical grid line indicates the asset poverty line ($\overbar{A}$ ) which divides the asset poor from the asset non poor. Asset poverty line is the level of assets that yields the expected level of income equal to poverty line. The asset poverty line permits us to distinguish two types of poverty. The stochastically poor are households that are observed to be poor based on their realized income ($ y\_{h}\leq \overbar{y}$), but their asset level is above the asset poverty line ($\overbar{A}$ ) i.e. a household observed at point a are stochastically poor. On the other hand the structurally poor households are those whose both income and asset level are below the poverty line i.e. household at point d are structurally poor. It is also noticed that household at point b and c are stochastically non- poor and structurally non- poor households respectively. Households at point b (income non poor but asset poor) will shifted back to point d and will become asset poor. This is known as stochastic transition into poverty. However households at point a can be shifted to point c (because of high returns from assets) and become non poor. This process is known as stochastic transition out of poverty. Alternatively the household that moves from point c to point d would have made a structural transition due to loss of assets.

Now we will modify the basic static poverty line to estimate the vulnerability of the household. For this purposes we will estimate the expected income and variance of income to incorporate the stochastic variation in the household’s income. Suppose level of Asset (A) generates the expected income of $\hat{E}\left(Y\right)$ as shown in figure 2. In the presence of positive shock household’s income will be $\hat{E}\left(Y\right)+\sqrt{\hat{V}(Y)}$ . In the presence of negative shock household’s income will be $\hat{E}\left(Y\right)-\sqrt{\hat{V}(Y)}$. Now household at point c has the income level below the income poverty line. So the household will be expected to be poor. However household income can vary between point d and e. Household income prospect is given by db, poverty prospects of the household is given by ib. The household vulnerability (vh) level is therefore defined by ib/db. Now we will decompose the households under different poverty status followed by Levison et.al. (2011):

1. **Structural -Chronic Poor**:

When household’s highest possible income is below the income poverty line, these household’s are completely vulnerable i.e. they are likely to be structural chronic poor. Household at point e and f belong to this category. Hence they will likely to be poor in the future too. Here vh will be 1.

1. **Structural Transient Poor and Stochastic Transient Poor**:

When the household’s lowest and the highest income prospects are equal to the poverty line, they are expected to be transient poor. Household lies between f and g under this category. Now if their vulnerability level 0.5 ≤ vh <1, they are expected to be structural transient poor. The structural- transient experiences poverty due to insufficient assets. Hence there is more than 50% probability that they will be poorer in the future. The households between f and l are under this category. On the other hand if their vulnerability level 0 < vh < 0.5, they are expected to be stochastic transient poor. Households at point l and g are under this category. Here households are expected to be non poor but because of negative shocks they end up with income below the poverty line in the future.

1. **Stable Non- Poor**:

When the lowest possible income is above the poverty line are expected to be non vulnerable. Therefore they are expected to be non poor in every situation. Households to the right of point g belong to this category. Here vh will be zero.

Asset Poverty Line

$$\hat{E}\left(Y\right)+\sqrt{\hat{V}(Y)}$$

Income (Y)

$$\hat{E}(Y)$$

$$\hat{E}\left(Y\right)-\sqrt{\hat{V}(Y)}$$

e

g

d

 f

l

c

i

Income Poverty Line

b

a

Asset (A)

  **Figure2: Asset Vulnerability framework (Extended from Carter and May1999 paper)**

1. **Methodology**

**4.1 Expected Poverty Decomposition**

Methods which use the cross section data for the estimation of the expected level of income and variance of income, make strong assumptions about the inter-temporal variation of income Chaudhuri et al. (2002) and Christiaensen and Subbarrao (2005), we specify the asset based income equation that allows us to estimate the expected income and variance of income by using three step feasible generalized least square (FGLS) procedure.

$Y\_{is}= \sum\_{j}^{}β\_{j}\left(A\_{ijs}\right)+\sum\_{j}^{}\sum\_{k}^{}β\_{jk}\left(A\_{ijs}\right) \left(A\_{iks}\right)+γ\_{i}H\_{i}+ε\_{is}$ (1)

Yis is per capita adult equivalent income of the household i in the State s. βj is the coefficient of asset j owned by household i in State s. Since returns from an asset also depend on the interaction between assets, there is an asset interaction term included in the model. It also takes into account the rate at which returns from the assets are derived. βjk is the coefficient of asset interaction term. Hi includes household specific demographic characteristics. The first step of 3-FGLS involves ordinary least squares estimation of equation 1 and this yields consistent estimates of the parameters affecting income generation as well as non-independent residuals. The disturbance term capture the idiosyncratic shocks that are responsible for different level of income of the households. In the second step of FGLS technique, the residual square is regressed on the same set of the first step variables. This will give us the consistent estimates of the effect of household’s characteristics on the variance of income. In the last step we will correct the inefficiency of the OLS model by weighting it with the square root of the predicted value of the second step (Christiaensen and Subbarrao, 2005). The vulnerability measure can be done in the following way

$v\_{h}=Pr\left(Y\_{i}\leq z\right)$ = 1 if $\left(\hat{E}\left(Y\right)+\sqrt{\hat{V}(Y)}\right)$ ≤ z (2a)

$v\_{h}=Pr\left(Y\_{i}\leq z\right)=\frac{z-\left[\hat{E}\left(Y\_{i}\right)-\sqrt{\hat{V}\left(Y\_{i}\right)}\right]}{2\sqrt{\hat{V}\left(Y\_{i}\right)}}$ if $ \left(\hat{E}\left(Y\right)-\sqrt{\hat{V}(Y)}\right)$ < z $\left(\hat{E}\left(Y\right)+\sqrt{\hat{V}(Y)}\right)$ (2b)

$v\_{h}=Pr\left(Y\_{i}\leq z\right)$ = 0 if $\left(\hat{E}\left(Y\right)-\sqrt{\hat{V}(Y)}\right)$ ≥ z (2c)

On the basis of above formulation, the paper has decomposed the expected poverty into expected structural chronic poverty, expected structural transient poverty expected stochastic transient poverty and stable non- poor.

**4.2.** **Determinants of Different types of Poverty**

As poverty outcome can only take four distinct values in our framework, it is necessary to use a discrete choice model to analyze the determinants of stochastic poor and structural poor. We use a multinomial logit model for this purpose. The dependent variable of the model can take one of four discrete values indicating the poverty status of a household (structural poor, stochastic poor, stochastic non poor and structural non poor). The explanatory variables are household size, household head (male/ female), age of the household head, years of education of the household head, cast of the household head, proportion of individuals under 15 or over 59 (dependents),land is use for repaying debt, severe health problem etc. The probability (Pr) that a household h is in a particular poverty state j is modeled as a function of explanatory variables Xh is given by 



J = 0 (stable non poor), 1 (structural chronic poor), 2 (structural transient poor), 3 (stochastic transient poor).

J=0 is considered as the base category in the regression based on above equation.

1. **Data**

The paper uses the secondary information mainly from the Indian Human Development Survey (IHDS)[[2]](#footnote-3) for the period 2005. Our analysis is based on the 16 major States in India which consists of 24496 rural households. Components of asset index includes land size, sewing machine, tractor/ thresher, vehicle, livestock, draft animals, poultry, education of household head and assets that are likely to enhance the productivity of the other endowments, such as electricity facility, tube well etc. The squared terms of the several variables are included in order to incorporate the potential diminishing returns on assets. Aside, the paper is also considers the household total income which includes family farm income, agricultural wage, non agricultural wage, salaries and net- business income government benefits. Also the income variable is needed to be scaled in adult equivalence terms to capture the economics of scale among the households (Srivastava and Mohanty 2011). Following Atkinson et. al. (1995) the paper has used OECD modified scale for calculating the per capita adult equivalence income. The official poverty line given by planning commission (2009) is used for income poverty measurement.

1. **Results**
	1. **Household Poverty Decomposition**

Equation 1 is estimated using 3 Step FGLS. Table A1 in the appendix contains the 3-FGLS regression result.[[3]](#footnote-4)The regression co-efficient was significant, and the independent variables explained about 43% of the variation of the scaled income. Among the various assets, land size and its square value has a positive significant impact on the household livelihood with a coefficient of 0.04 and 0.02 respectively. It indicates that as household’s land size increases it has a significant positive impact on the household income relative to poverty line income. This implies an increase in land size has a direct positive increase in the household income.The regression results indicate the importance of livestock for maintaining the household income. Livestock such as sheep and goat generally perceived as easily disposable assets were found to be positively associated with household livelihood. A 1% increase in livestock corresponds to a 0.14% increase in per capita adult equivalent income. It is also noticed that livestock follows an expected pattern of diminishing marginal returns with significant and negative coefficients on the squared terms. Similar to livestock, draft animals and poultry are also considered as disposable assets, and have positive impact on the household livelihood. It is also noticed that draft and poultry also follows diminishing marginal returns with significant and negative coefficients on the squared terms. One of the reasons for the diminishing returns for both livestock as well as draft animals could be the high maintenance cost associated with larger numbers of the same. The interesting observation is that an additional increase in land size yields a higher increase in income for household having draft animals or tractor/ thresher. In other words, there is a positive interaction effect between land size and draft animals, land size and tractor/ thresher. The paper has found that middle to higher secondary education too has a positive significant impact on household income.

We found that sex of the household head is insignificant in household income generating process. The negative and significant coefficient on the number of dependent people in the household indicates widespread unemployment which reduced the per capita availability of income. Household belonging to schedule cast, schedule tribe and other backward cast has very limited assets (Sundaram and Tendulkar 2003; Meenakshi et. al. 2000; Gang et. al. 2008). Therefore household belonging to these casts have negative and significant impact on the household income generating process.

From the expected income and standard deviation of income we have calculated the expected upper bound and lower bound of the income. In the Table A2 in the appendix the paper has reported the descriptive statistics on observed income and expected income. It is noticed that expected income is lower than the observed income. Hence vulnerability to poverty ratio is greater than one which implies that most of the households are vulnerable than poor. It indicates that the households are not only suffering in the present period but also they will continue to be poorer in the future.

Finally we have used the equation 2a to 2c to find out the vulnerability level of the households. On the basis of the vulnerability score we have decomposed the households into expected structural chronic poverty, expected structural transient poverty, expected stochastic transient poverty and stable non-poor (Table 1). At all India level, 12% households are structural chronic poor. This indicates that these 12% households have lack of both income as well as assets. Hence these households will likely to be poor in the future. Another 26% households are structural transient poor. Due to insufficient assets these households may have low expected level of income. Hence there is a more than 50% chance that these set of households will continue to be poor in the future. Further 27% households are stochastic transient poor. They are expected to be non poor but because of negative shock they will end up with poverty. However there is very less probability that these households will continue to be poor in the future. At All India level remaining 35% households have enough assets which brings their lower bound of the expected level of income above the poverty line. Hence they will be stable non-poor.

Like the scenario in the all India level, the paper has also illustrates the State specific scenario in a similar manner. From the State level, we can see that structural chronic poor households are high in Orissa followed by Uttar Pradesh and Bihar. However structural transient poverty is highest in Madhya Pradesh followed by Andhra Pradesh, Assam and Bihar. Further, stochastic transient poverty is highest in Punjab followed by West Bengal and Assam. It is noticed that Kerala was the top most States followed by Himachal Pradesh and Haryana in terms of stable non-poor.

**Table 1: Expected Poverty Decomposition**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| --- | --- | --- | --- | --- | --- | --- |
|  | Expected Structural Chronic Poor | Expected Structural Transient Poor | Expected Stochastic Transient Poor | Stable Non-Poor |  |  |
| Andhra Pradesh | 20% | 24% | 15% | 41% |  |  |
| Assam | 18% | 23% | 20% | 39% |  |  |
| Bihar | 30% | 23% | 14% | 33% |  |  |
| Gujarat | 13% | 20% | 16% | 51% |  |  |
| Haryana | 7% | 18% | 14% | 61% |  |  |
| Himachal Pradesh | 8% | 21% | 8% | 63% |  |  |
| Karnataka | 9% | 22% | 11% | 58% |  |  |
| Kerala | 4% | 10% | 16% | 70% |  |  |
| Madhya Pradesh | 12% | 29% | 18% | 41% |  |  |
| Maharashtra | 19% | 20% | 7% | 54% |  |  |
| Orissa | 35% | 21% | 15% | 29% |  |  |
| Punjab | 12% | 8% | 29% | 51% |  |  |
| Rajasthan | 10% | 19% | 17% | 54% |  |  |
| Tamil Nadu | 12% | 20% | 16% | 52% |  |  |
| Uttar Pradesh | 33% | 13% | 8% | 46% |  |  |
| West Bengal | 17% | 16% | 22% | 45% |  |  |
| National  | 12% | 26% | 27% | 35% |  |  |

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**6.2 Comparison of Household Profile under different Poverty Typology**

Table A3 in the appendix presents the household profile under different poverty types. The figures in this table suggest that structural chronic poor households are at a more disadvantageous position compared with structural transient and stochastic transient households. However stable non-poor households are always in a better off position compared to the other types. Our findings indicate that most of the structural chronic poor and structural transient poor households are from schedule cast, schedule tribe and other backward cast. For example, 56% of the structural chronic poor households are schedule cast where as 80% of stable non-poor households and 36% of stochastic transient poor households are general cast. So it is visible that most of the backward cast households are poor because of lack of assets.

The results also indicate the structural chronic poor and structural transient poor households do not have sufficient land size to maintain their livelihood, probably one of the reasons why they can never come out of poverty. On an average the structural chronic poor household has an average land size of 1.2 acres where as the stable non-poor household and stochastic transient poor household has about 8 acres and 6.5 acres respectively.

It is seen that only 8% of the structural chronic poor households have improved toilet facility whereas 27% of stochastic transient poor households have improved toilet facility. Although among structural transient poor households, only 18% has improved toilet facility but 44% of stable non-poor households have managed to have improved toilet facility. In terms of drinking water facility the same pattern is visible too.

The educational attainment of household head shows that structurally chronic poor households are particularly disadvantaged. On an average, 77% of the structural chronic poor household head are illiterate, only 18% household head have below primary or primary education and only 5% of the household head have middle or high school education. On the other hand 57% of stochastic transient poor household head are illiterate, 21% of the household head have below primary or primary education and only 19% of the households have middle or high education. The stochastic transient poor households fare better than the structural chronic poor, but are nevertheless far behind the stable non-poor households. Among stable non-poor households 28% household head are illiterate, 39% of household head have below primary or primary education, 28% of household head studied middle or higher education and 5% of structural household head had a professional degree.

By comparing the household head occupation, we found that among structural chronic poor, 6% household head is unemployed. Most of the structural chronic poor household head were engaged in the agricultural sector. Although most of the stochastic transient poor, structural transient-poor and stable non-poor household head are engaged in the agricultural sector but a small proportion of household head is engaged in the services sector as a major source of their income.

The figure indicates that most of the poor households mainly took loans for medical purposes. Among structural chronic poor households 42% households took loan for medical purposes, 34% households for consumption purposes, 10% household for education purposes, 7% households for buying land and 5% household for improving house quality. On the other hand, among the stochastic transient poor households 21% have taken loan for medical purposes, 19% for education, 18% for consumption, 12% for business,14% of improving house quality and 10% for buying land.

By comparing the sources of loan, we found that most of the poor households depend on money lenders. It is noticed that 70% of structural chronic poor households depend on money lender. Among structural chronic poor household only 4% households managed to have bank accounts while 13% of stochastic transient poor households have bank accounts. For structural chronic poor households loan from family friends is another popular source of loan.

**6.3 Determinants of Stochastic Poor and Structural Poor**

In India, there is hardly any literature on the determinants of structural and stochastic nature of the poverty. The poverty literature in India suggest that, agricultural production, land ownership, land quality, agricultural wage etc. are responsible for static poverty in Indian rural States (Fan et al., 1999 and Himanshu, 2006). In this paper we have used the multinomial logistic regression to uncover the determinants of the different types of poor.

Table 2 represents the multinomial logistic regression results for the determinants of structural chronic poor, stochastic transient poor, structural transient poor of the population, considering stable non-poor group as a base period. Results from the model indicate that there is no association between sex of the household head with poverty status. It is observed that with increasing age of the household head, the probability of being structural chronic poor and structural transient poor increases.

The result also shows that the number of children (below 15years) in a household increases the probability of being structural chronic poor and structural transient poor. There are two possible reasons for the same. It will reduce the per-capita availability of income of the household and more children will divert the labour from productive economic activity to unproductive ones and therefore lower income and lower asset generation.

Education and skill at the household level are captured by household head’s education. The results show that relative to illiterate household head, secondary and higher education level of the household head exert a significant and decreasing impact of the being any kind of poverty. Higher the education level of the household head, will helps them to get job in the formal sector which will increase their income and will also increase the knowledge of productive asset building and maintaining the asset return. Exposure to media to the household members also indicates that it has a positive impact to reduce any type of poverty in our model. Media like exposure to radio, newspaper facilitate the household to augment their knowledge about productive asset building and uphold the asset return.

It is seen that if a household member has a severe health problem it increases the probability of any kind of poverty.

If the number of unemployed workers and number of adult members are high then the probability of poverty is very high. The result also indicates that the sudden death of the household member increases the probability of being stochastic transient poor. It is noticed that as the number of loan increases it increases the probability of any type of poverty status. However stochastic transient poor households are able to reduce their poverty level by using their land to repay their debt. On the contrary, if the structural chronic poor household and structural transient poor household use their land to repay their debt their poverty level increases as their land size is very small.

**Table 2: Multinomial Logistic Regression: Determinants of Poverty**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Structural Chronic Poor | Stochastic transient | Structural transient |
| Household size | 0.05 | 0.03 | 0.04 |
| Dummy SC | 0.01\* | 0.02 | 0.03\* |
| Dummy ST | 0.02\* | 0.01 | 0.03\*\*\* |
| Dummy OBC | 0.05\*\*\* | 0.06 | 0.05\*\* |
| Dummy for household head is male | 0.01 | 0.02 | 0.01 |
| Age of the household head | 0.02\* | 0.01 | 0.03\*\* |
| Age square of household head | 0.03\*\* | 0.04 | 0.05\*\* |
| No of child under 15  | 0.08\*\* | 0.05 | 0.06\* |
| Dummy for electricity facility | -0.11\* | -0.09\*\* | -0.08\* |
| Maximum year of edu\_male | -0.10\*\* | -0.09\*\* | -0.12\*\* |
| Maximum year of edu\_female  | -0.12\*\*\* | -0.08\*\* | -0.11\*\* |
| Dummy for Unemployed head | 0.13\*\*\* | 0.11\* | 0.12\*\*\* |
| Dummy for household exposure to media | 0.08\*\* | 0.07\* | 0.08\*\*\* |
| Number of adults (above 60 years) | 0.04\*\* | 0.08\*\*\* | 0.09\*\* |
| Dummy for severe health problem  | 0.18\*\* | 0.09\* | 0.19\*\* |
| Sudden death of household member | 0.12 | 0.11\* | 0.09 |
| No of loans household have | 0.05\*\*\* | 0.09\*\*\* | 0.07\*\*\* |
| Land is used for replay debt | 0.13\*\*\* | -0.12\*\* | 0.17\*\*\* |
| Number of Observations | 24496 |
| Pseudo R2 | 0.42 |

Note: \*, \*\*, \*\*\* indicates 1%, 5% and 10% level of significance

1. **Conclusions**

The main crux of the paper is that to reduce poverty more effectively we need a different subset of policy instrument for various classes of poverty as defined in this paper. Although there is substantial literature on poverty reduction in India, both academic and policy makers continue to focus on the consumption expenditure based measures which we think is too broad based and does not decompose the different origins of poverty. There is an urgent need to gain a better understanding of structural and stochastic nature of poverty for focused decomposition of poverty and policy directed towards reducing it in the intended direction. Our paper will help us to predict the future welfare dynamics of the households based on their present asset ownership. The findings illustrate that livestock, agricultural land and literacy level of the household has positive significant impact on the household income generating process. Our result indicates that the structural chronic poor households are more deprived in terms of various indicators like improved drinking water facility, improved toilet facility, ownership of land, access to basic education compared to the other classes of poverty.

 At all India level, 12% households are structural chronic poor, 26% households are structural transient poor, 27% households are stochastic transient poor and remaining 35% households are stable non-poor. The 12 % structural chronic poor households have are income poor as well as asset poor and the most vulnerable in the society. Identifying these people for the food security act or any social security scheme is the first step in reducing their susceptibility to extreme poverty hunger and possible death. However these steps only give them access to income but make them asset vulnerable. The government can allot land to this section of society to build a house or to start economic activities. This can go a long way in reducing their exposure to risk and uncertainty in the present as well as the future. The 26% structural transient poor households has very limited assets which makes their expect income level below the poverty line income. As a result there is high probability is that these households will be more vulnerable in the future. As a first measure they need skill training or ways of maintaining livestock so that they may learn ways of building up assets. There is a need to strengthen the accumulation of productive assets and their productivity by using better technology and improving knowledge. The 27% of the households are stochastic transient. They supposed to be non-poor but because of bad luck or severe illness make them unproductive and retard their income earning. The important policy implication for these set of households is to provide social security or unemployment scheme and give them support to gain their confidence back in their income earnings.

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**Table A1: 3-FGLS for Household Income Generating Process**

**Dependent Variable: Income per Adult Equivalent**

|  |  |  |
| --- | --- | --- |
|  | Coefficient | t statistic |
| Male household head\_d | 0.23 | 1.05 |
| Primary education & below primary education of household head\_d | 0.16\* | 1.69 |
| Middle and higher secondary education of household head\_d | 0.14\*\*\* | 2.97 |
| Degree course of household head\_d | 0.04 | 1.40 |
| Schedule cast\_d | -0.07\* | -1.67 |
| Schedule tribe \_d | -0.01\*\*\* | -2.36 |
| OBC\_d | -0.09\*\*\* | -3.01 |
| Land size | 0.04\*\* | 1.96 |
| Land size square | 0.02\*\*\* | 2.45 |
| Tractor/Thresher\_d | 0.08\*\*\* | 2.56 |
| Tubewell\_d | 0.09\*\*\* | 2.59 |
| Electricity\_d | 0.24\*\*\* | 2.31 |
| Sewing machine\_d | 0.19\*\*\* | 2.40 |
| Vechile\_d | 0.13\*\*\* | 2.21 |
| Poultry numbers | 0.15\*\*\* | 2.84 |
| Draft animals numbers  | 0.15\*\*\* | 2.75 |
| Milch cows numbers | 0.10\*\*\* | 3.01 |
| Other livestock animals numbers | 0.14\*\*\* | 2.98 |
| Poultry numbers square | -0.01\*\* | -1.96 |
| Draft animals numbers square | -0.05\*\* | -1.99 |
| Milch cows numbers square | -0.08\*\* | -1.97 |
| Other livestock animals numbers square | -0.05\*\* | -2.00 |
| Landsize\* Draft animals | 0.38\*\*\* | 3.82 |
| Landsize\*Tractor/Thresher | 0.21\* | 1.75 |
| Non Farm employment\_d | 0.14\*\* | 2.01 |
| Size of household | -0.18 | -1.04 |
| No of dependent person | -0.07\*\*\* | -3.56 |
| Proportion of healthy members | 0.21\* | 1.78 |
| Constant | 0.45\*\*\* | 2.89 |
| No of Observations | 24496 |  |
| R2 | 0.43 |  |

 Note: \*\*\*, \*\* and \* indicates 1%, 5% and 10% level of significance

 d stands for dummy variable

|  |  |  |
| --- | --- | --- |
|  | **Mean** | **Standard Deviation** |
| Observed Income (in Rs) | 1203 | 900 |
| Expected Income (in Rs) | 1126 | 737 |
| Observed Poverty | 0.42 | 0.32 |
| Expected Poverty (vulnerability to Poverty) | 0.52 | 0.37 |
| Expected Vulnerability Level | 0.62 | 0.42 |

**Table A2: Descriptive Statistics**

**Table A3: Household Profile under different Poverty Typology**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Expected Structural Chronic Poor | Expected Structural Transient Poor | Expected Stochastic Transient Poor | Stable Non-Poor |
| Average Household Size | 6.5 | 5.5 | 4.5 | 4 |
| Schedule cast | 56% | 46% | 26% | 10% |
| Schedule tribe | 18% | 21% | 30% | 4% |
| OBC | 10% | 16% | 8% | 6% |
| General cast | 16% | 17% | 36% | 80% |
| Average Land Size | 1.2 acre | 2.2 acre | 6.5 acre | 8 acre |
| % of households have Improved Toilet Facility | 8% | 18% | 27% | 44% |
| % of households have Improved Drinking Water Facility | 25% | 52% | 72% | 88% |
| % of household head illiterate | 77% | 61% | 57% | 28% |
| % of household head has Below primary or primary education | 18% | 22% | 21% | 39% |
| % of household has middle or higher secondary education | 5% | 15% | 19% | 28% |
| % of household head has Profession degree | 0% | 2% | 3% | 5% |
| % of household head unemployed | 6% | 2% | 4% | 0% |
| % of household head in Agriculture  | 94% | 88% | 72% | 65% |
| % of household head are Labours | 0% | 0% | 6% | 10% |
| % of household head in Sales | 0% | 4% | 11% | 4% |
| % of household head in Services | 0% | 6% | 7% | 21% |
| Loan Purpose |  |  |  |  |
| Improving house | 5% | 8% | 14% | 18% |
| Land | 7% | 15% | 10% | 8% |
| Business | 2% | 10% | 18% | 5% |
| Education | 10% | 7% | 19% | 12% |
| Consumption | 34% | 24% | 12% | 6% |
| Medical | 42% | 30% | 21% | 9% |
| No loan | 0% | 6% | 6% | 42% |
| Loan Sources |  |  |  |  |
| Employer | 0% | 3% | 10% | 7% |
| Money Lender | 70% | 63% | 50% | 6% |
| Family Friends | 20% | 16% | 12% | 3% |
| Bank | 4% | 5% | 13% | 32% |
| Other | 6% | 7% | 9% | 10% |
| No loan | 0% | 6% | 6% | 42% |

Source: own calculation from India Human Development survey 2005

1. Doctoral Scholar, IFMR, Chennai. Email: d.swatiest@gmail.com , swati.dutta@ifmr.ac.in [↑](#footnote-ref-2)
2. IHDS is conducted by National Council for Applied Economic Research (NCAER), a well-known applied economics research institution in India [↑](#footnote-ref-3)
3. We have reported only the final step of the FGLS result i.e adjusted by weighting it with the square root of the predicted value of the second step [↑](#footnote-ref-4)