CPRC-IIPA WORKING PAPER

Dynamics of Chronic Poverty: Variations in Factors Influencing Entry and Exit of Chronic Poor

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Working Paper 39

Chronic Poverty Research Centre

Indian Institute of Public Administration

Abstract

India experienced high economic growth in the 1990s. Some earlier studies, which attempted to identify the influence of growth on poverty dynamics in the country by including growth variables among the factors affecting the incidence of and transition from poverty, concluded that growth is not uniformly associated with poverty reduction. While panel household data was used to identify the factors influencing the incidence and mobility of poverty, the changes in the influence of these factors over time were not analysed. This paper examines whether there has been change in the influence of factors such as village level infrastructure, household size and composition, and economic growth on poverty dynamics in different periods of time. The impact of a number of factors changes over time implying that the strategies for poverty reduction would have to take into account the changing economic environment**.** The paper further presents an analysis of the pattern of per capita expenditure over time for the same set households in order to analyse the implications of these trends on poverty reduction.

Key words:.

Chronic poverty, consumption inequality, determinants of poverty dynamics.

Acknowledgements

The authors would like to acknowledge the permission provided by NCAER to use the panel data for this research. Dr. Hari Nagarajan at NCAER provided the critical support to our efforts to understand the data. Finally we are very grateful to Professor Aasha Kapur Mehta at IIPA for her constant encouragement and support in bringing this work to this stage.

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Contents

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1 Introduction

Poverty can be 'transitory' or 'chronic'. Transitory poor are the people who remain poor for a short duration and then move out of poverty. Chronic poverty describes people who are poor for significant periods of their lives, who may pass their poverty onto their children, and for whom finding exit routes from poverty is difficult. Severity of poverty on the other hand is a description of the degree of poverty. There has been considerable overlap between severe and chronic poverty during the period 1970-71 to 1981-82 (Shepherd and Mehta 2006). Why do households remain poor for long periods of time? Bhide and Mehta (2004 and 2005) used household panel data for 3,239 households at three points of time i.e. 1970-71, 1981-82 and 1998-99, to determine the incidence and mobility of poverty and the factors that affect this. They examined the patterns and movement of rural households across poverty groupings over a period of three decades and found that there is significant incidence of chronic poverty in rural India (Bhide and Mehta 2005). However, the incidence of chronic poverty declined from 28.4 per cent (in 1970-71 to 1981-82) to 24.27 per cent (in 1981-82 to 1998-99).

India experienced high economic growth in the 1990s. In order to identify the influence of growth on poverty dynamics in the country, Bhide and Mehta (2008) extended their earlier analysis to include growth variables among the factors affecting the incidence of and transition from poverty. They conclude that growth is not uniformly associated with poverty reduction.

While panel data was used to identify the factors influencing the incidence and mobility of poverty in the papers mentioned above, the changes in the influence of these factors over time were not analysed. This paper presents this additional analysis based on panel data for the three periods for the same set of 3,239 households. The paper further presents an analysis of growth rate of per capita expenditure for the same set households to analyse the extent of consumption growth, which is also an indicator of poverty reduction for

rural India. The factors affecting the growth rate of per capita expenditure are also important determinants of poverty reduction. The paper adopts the probit model for analysing the incidence of poverty, pooled probit model for mobility of poverty and GLS for analyzing the per capita expenditure growth rate.

2 Dynamics of Poverty

2.1 The Sample Surveys: 1970-71, 1981-82 and 1998-99

The present analysis is based on the data collected by NCAER through household surveys conducted in three rounds in 1970-71, 1981-82 and 1998-99. The sample survey was conducted in 250 villages spread over most of the major states of India. The initial sample of 1970-71 was probabilistic and the later surveys attempted to track the same set of households. The survey tracked only the male line of households with the following features: a) the head of the household in 1970-71 was alive (in 1981-82) and the household was intact; b) the head of the household was alive, but all the members of the household had not stayed together; and c) the head of the household in 1970-71 was dead (in 1981-82) but the rest of the household was intact. The third round covered all the households surveyed in 1981 that were still residing in the village and the procedure for selection was the same as that adopted in 1981-82. For the analysis the final data set of 3,239 households was established by tracing the households backwards from 1998-99 and the splits in the households were replicated in the older data (Bhide and Mehta, 2005).

The survey includes information on a number of variables including characteristics of households like age distribution of the household, literacy and occupation levels of household members, health status and socio-economic characteristics, possession of income earning assets, land ownership and cultivation and details of consumption expenditure. The village characteristics are also available in the form of population and access to infrastructure.

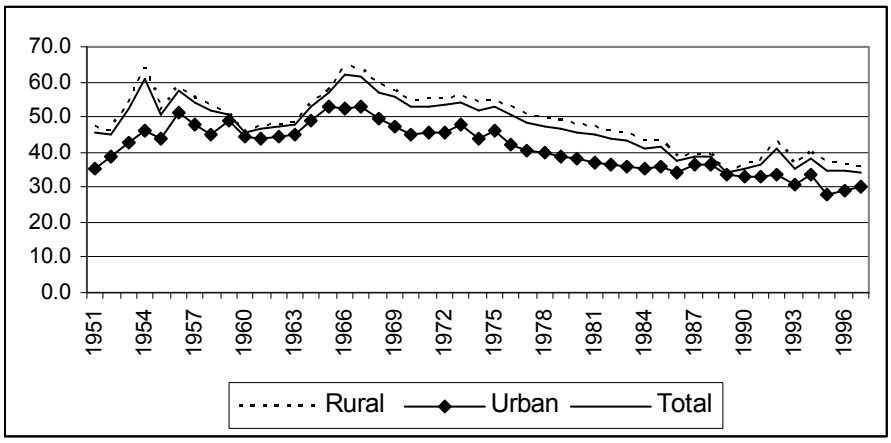
To classify the households as poor and non-poor, we have used the available information on household consumption expenditure and the official poverty line at the state level. The Planning Commission's estimate of poverty line for the year 1980-81 is adjusted by the Consumer Price Index for Agricultural Labour (CPI-AL) to arrive at the poverty line at 1981-82 prices. The CPI-AL is also used to express the total consumption expenditures of the households in 1970-71 and 1998-99 at 1981-82 prices. The data has been supplemented by

selected village and district level characteristics. Information on the village and district level variables has been compiled from a number of data sources (Bhide and Mehta, 2008).

2.2 Trends in Incidence of Rural Poverty

As noted earlier, the panel data analysed in the paper refers to three years: 1970-71, 1981-82 and 1998-99. The survey was done in a panel of villages across the country at three points in time. In order to provide the context, the estimated trends in a few economic indicators pertaining to this period are briefly reviewed below. Trends in estimates of incidence of poverty based on data provided by National Sample Surveys are summarised in Datt (1998) and Jha (2002) and illustrated in Figure 2.1.

Figure 2.1 Incidence of Poverty in India: Head Count Ratio (%)



Source: Datt (1998) and Jha (2002). Trends for the intermediate years for which data are not available are based on linear interpolation.

From 1960 until 1966 there was a sharp rise in the incidence of poverty in rural as well as urban areas. From 1966 onwards, there was a gradual decline in rural poverty. Thus, the first year of the panel survey coincided with the period when incidence of poverty was beginning to decline. Incidence of poverty was still at a high level of about 55 per cent of the population in the rural areas in 1970. The period from 1970 to 1981 saw a steady decline in poverty. In 1983, the incidence of poverty was estimated to be 45 per cent of the rural population. The incidence of poverty worsened during the period 1990-1994 when the HCR increased and then declined subsequently. Briefly, the first survey was carried out at a time when the incidence of rural poverty was beginning to decline after a phase of rising HCR. The second survey (1981) was conducted during a period when there was a steady decline in HCR in the rural areas. The final survey (1998-99) was carried out at a time when a period of

worsening of poverty was followed by a declining trend. Thus, all the three surveys were conducted in the context of declining incidence of rural poverty. However, as shown in Table 2.1 below, the rate of decline in poverty was faster during the first inter-survey period (1970-81) as compared to the second inter-survey period (1981-1997).

Table 2.1 Trends in Selected Indicators of Economic Environment and Poverty

Period	Annual Average Rate of Growth (%) in Per Capita GDP from				Rate of Inflation (%)	Rate of change in the Incidence of Poverty (Percentage points per year)		
	Agriculture & allied sectors	Industry	Services	Total	CPI-AL	Rural	Urban	Total
1960-1969	-0.39	4.11	2.64	1.33	6.36	0.67	-0.29	0.48
1970-1980	-0.54	1.74	2.20	0.89	7.60	-0.86	-0.35	-0.79
1981-1997	2.00	4.47	4.52	3.64	8.50	-0.32	-0.33	-0.32

Note: For Incidence of Poverty, we have used the estimates for 1963, 1973 and 1993, respectively for the three periods used in the table. The data sources are Reserve Bank of India (2005) for GDP and Consumer Price Index for Agricultural Labour (CPI-AL), and Datt (1998) and Jha (2002) for the Head Count Ratios.

While the incidence of rural poverty declined at the aggregate level, the annual average rate of growth of per capita output or per capita GDP at constant prices from agriculture and allied sectors actually declined during 1970-1980 (Table 2.1). The non-agricultural sector registered a small increase in output during the period. However, during the second inter-survey period, output of the agricultural sector increased by 2 per cent per year and the non-agricultural sector's output rose at twice this rate.

The consumer prices in the rural areas (Consumer Price Index for Agricultural Labour, CPI-AL) increased at a faster rate in the second period as compared to the first. Since the poor are dependent on agriculture for their livelihood, agricultural growth is important for reducing poverty. On the other hand, higher prices of purchased products imply a decrease in their purchasing power and hence can raise incidence of poverty. Therefore trends in the incidence of poverty are influenced by both growth and inflation rates.

The dynamics of income growth in rural areas are influenced by a number of other factors such as household characteristics, characteristics of the village and the overall environment for economic growth. In this paper, we have examined the influence of the various factors on the incidence and dynamics of rural poverty with a focus on how this influence is changing over time.

2.3 Incidence and Mobility of Poverty

The incidence of poverty can be described at two levels of intensity: moderate poverty and severe poverty. The cut-off for classification of households into these categories is the monthly consumption expenditure corresponding to the official estimate of the poverty line (PL). The households with monthly consumption expenditure between 75 per cent of the PL and the PL are called 'moderately poor' while those with monthly per capita expenditure less than even 75 per cent of PL are termed 'severely poor'.

An important limitation of the data used in the analysis here as well as in the previous applications is that the households may not remain 'representative' of the entire population in rural India after the first round or wave of the survey if the situation in the rural economy across the country changes significantly. However, because of its spread across the country the sample still captures a large enough canvass of rural India.

Broad trends derived from the sample are illustrated in Table 2.2[1]. The period from 1970 to 1981 was better for poverty reduction than the later period of 1981 to 1998 in the sense that the rate of poverty reduction was faster. Within the sample, incidence of poverty declined, as the number of severely poor fell from 913 (in 1970-71) to 742 (1981-82) and then to 713 (1998-99). The number of moderately poor households increased in the second period (1981-82 to 1998-99) after a decline during 1970 to 1981. Movement out of poverty was higher in the first period. The households exiting moderate and severe poverty were larger in number for the period 1970 to 1981 than for the second period. The number of people entering the moderately poor group was also higher during the second period than during the first period, although over a longer intervening period. There has been a small decline in the number of households slipping from moderate to severe poverty in the second period than in the first.

Table 2.2: Trends in Poverty Status of Panel Households

Status of households	Period	Number of Households	% of Households with access to	SC hhds as	ST hhds as % of total

[1] The estimates presented here vary from those presented in an earlier paper (Bhide and Mehta, 2005) because of the difference in the number of households used in the panel. As we have used a smaller subset of the original panel because of the requirements of analysis presented later in this paper, the two estimates vary. However, the trends on the dynamics of poverty presented in both the papers are the same. The mobility of households across poverty categories presented here is also partial and a fuller account of dynamics is presented in the transition matrix in Tables 2.4-2.6.

			Own House	Livestock Income	Irrigated Land	% of total	
Severely Poor	**1970-71**	913	98.69	63.42	20.37	19.50	9.53
	1981-82	742	98.11	76.82	30.05	16.58	7.95
	1998-99	713	98.88	61.29	44.04	16.83	6.87
Moderately Poor	**1970-71**	715	98.46	78.04	36.92	11.19	5.59
	1981-82	563	98.76	78.51	46.89	14.21	7.28
	1998-99	664	99.40	66.42	44.28	12.50	7.08
Non – Poor	**1970-71**	1611	99.38	88.89	57.42	5.71	3.85
	1981-82	1934	98.66	88.83	58.63	7.60	4.60
	1998-99	1862	99.62	64.72	46.51	7.89	4.99
Exit from Severe Poverty	**1970 - 81**	362	98.62	68.78	26.80	16.85	10.77
	1981 - 98	287	97.91	80.84	33.10	14.29	9.06
Exit from Moderate Poverty	**1970 - 81**	389	99.74	82.26	42.42	7.46	2.83
	1981 - 98	281	98.58	80.78	51.96	11.03	7.47
Shift from Moderate to Severe Poverty	**1970 - 81**	173	97.69	78.61	25.43	17.34	9.83
	1981 - 98	168	98.21	72.62	41.07	19.05	5.36
Entry into Moderate Poverty	**1970 - 81**	241	100.00	90.87	52.28	7.88	1.24
	1981 - 98	354	97.46	87.85	55.37	9.32	6.21

Note: hhds= households

These trends do not seem to be sharply different from what has been observed in the national sample surveys. As shown in Table 2.1, the decline in the incidence of poverty was faster in the period corresponding to 1970-81 than in the second period (1981-97).

The characteristics of households associated with the different levels of poverty provide interesting information. For example, just the 'ownership' of the house is not likely to be a major differentiator of poor and non-poor. Although a larger proportion of non-poor households have 'own house' as compared to the severely poor in all the three 'waves' of panel, in 1981-81, moderately poor have a slightly higher proportion of households owning a house than the non-poor (Table 2.2). In this characterisation we have not distinguished between type of house and its value for different households. Access to livestock income, on the other hand appears to be a significant differentiator between the poor and non-poor. A relatively larger proportion of households who escaped from severe poverty had income from livestock as compared to the overall proportion of severely poor with livestock. Greater access to irrigated land is also associated with reduction in the incidence of poverty. Socially backward classes, SC and ST are proportionately greater in number among the poor than among the non-poor. The exit rates also appear to be lower for SC and ST than for the others.

The data therefore, provide important insights into the pattern of changes in poverty status across different types of households.

The data can also be examined to understand the trends in overall measures of poverty for the population represented by the panel. Table 2.3 provides the Foster-Greere-Thorbecke measures of poverty to describe the extent of poverty amongst the rural households surveyed. These indices are generally used for country level data for the overall progress in poverty alleviation. The FGT poverty measure for the population is defined as:

$$P_\alpha = \int_0^q \left(\frac{z - y}{z} \right)^\alpha \, dy$$

where y is real monthly per capita expenditure and z is the poverty line.

The basic measure is the Head Count Ratio (HCR; $\alpha = 0$) which gives the proportion of population below the poverty line. An increase in this implies a worsening of the situation. The Poverty Gap Index (PGI; $\alpha = 1$) measures the depth of poverty based on the aggregate poverty deficit of the poor relative to the poverty line. A decline here reflects an improvement in the situation. The Squared Poverty Gap Index (SPGI; $\alpha = 2$) reflects the changes in severity of poverty as it gives higher weightage to larger poverty gap. These measures calculated from the present survey data are much higher than the national level estimates, as given by Angus Deaton and Jean Dreze (2002), Sundaram and Tendulkar (2003) and Raghbendra Jha (2003). Nonetheless, the results show that the depth and the severity of the poverty declined from 1970 to 1998 with a greater fall in the period 1970 to 1981 than in 1981 to 1998. The head count ratio in the panel actually increased in the second period, although this is due to the larger number of transient poor during this year. The decline in depth and severity of poverty were also estimated to have declined in roughly the same periods by Jha (2003) also.

Table 2.3: Foster – Greer – Thorbecke Measures of Poverty

Years	HCR	PGI	SPGI
1970 – 71	0.5026	0.1537	0.0657
1981 – 82	0.4029	0.1192	0.0487
1998 – 99	0.4251	0.1157	0.0438

HCR = Head Count Ratio
PGI = Poverty Gap Index
SPGI = Squared Poverty Gap Index

2.4 Transition Matrix

A unique contribution of panel data is the information it provides on poverty dynamics. The movement of the households into and out of the poverty can be captured through a transition matrix of such movements. Tables 2.4 to 2.6 provide the rates of movement of households across different categories of poverty status. Consider the following trends:

- A higher proportion of severely poor remained severely poor between 1970 and 1981 as compared to the period between1981 and 1998.
- Entry into poverty is higher for the latter period as 44% of moderately non-poor and 28% of non poor fall into lower expenditure categories between 1981 and 1998 whereas the corresponding figures for 1970 and 1981 are 39% and 22%, respectively.
- From 1970 to 1998, 57% of moderately poor and 44% of severely poor households moved out of poverty but 43% of moderately non poor and 31% of non poor moved down in the expenditure categories.
- Though some of the poverty is transitory in nature, the problem of chronic poverty is significant as 56% of severely poor either remain poor or become poor again, after a period of transitorily moving above poverty line, even after 28 years (1970 to 1998). 43% of moderately poor either have the same status or become severely poor over the same period[2].

Table 2.4: Transition Matrix of Poverty from 1970 to 1981 (%)

		1981				
1970		SP	MP	MNP	NP	Total
	SP	41.84	18.51	15.77	23.88	100
	MP	24.20	21.40	20.84	33.57	100
	MNP	18.46	18.26	16.80	46.47	100
	NP	8.68	13.55	17.27	60.50	100

Note: SP – Severely Poor, MP – Moderately Poor, MNP – Moderately Non Poor, NP – Non Poor

Table 2.5: Transition Matrix of Poverty from 1981 to 1998 (%)

		1998				
1981		SP	MP	MNP	NP	Total
	SP	34.91	26.42	18.60	20.08	100
	MP	29.84	20.25	20.96	28.95	100
	MNP	20.04	24.43	16.34	39.19	100
	NP	12.60	15.75	15.16	56.48	100

[2] The status of the households during the inter-survey period is not recorded in the surveys. To this extent, the data does not accurately capture the status of households with respect to poverty throughout the period 1970 to 1998.

Table 2.6: Transition Matrix of Poverty from 1970 to 1998 (%)

		1998				
		SP	**MP**	**MNP**	**NP**	**Total**
1970	**SP**	30.34	26.07	16.54	27.05	100
	MP	22.52	20.14	18.74	38.60	100
	MNP	23.86	19.29	18.67	38.17	100
	NP	14.17	16.74	16.03	53.06	100

The pattern of changes can be looked at in a more aggregated manner in terms of changes taking place across poor and non-poor categories. Is it harder to reduce poverty as incidence of poverty declines? In other words, as the incidence of poverty reduces, is further reduction difficult to achieve? This is what is now termed as the problem of 'hard core' poverty. We present the nature of changes taking place in the poverty scenario over the period 1970 to 1998 as captured by the present panel in Tables 2.7 to 2.12 below.

Tables 2.7 to 2.12 show that the incidence of chronic poverty in the panel, defined as percentage of households remaining poor in consecutive survey rounds, has declined from 27.06 per cent in 1970-1981 to 22.8 per cent during 1981-1998. However, some of the households that had escaped poverty during 1970-81 slipped back into poverty during 1981-1998 as the percentage of households who were poor in both 1970 and 1998 increased to 25.3 as compared to the 22.8 per cent chronic poor during 1981-98. In other words, not all the exit from poverty is 'permanent'. In fact 13.21 per cent of households who were non-poor in 1970 became poor in 1981. The percentage is even higher for the next period as 19.8 per cent of households who were non-poor in 1981 became poor in 1998.

However, given the difference in time duration in the two time periods that we have between the three surveys rounds, the slower rate of decline in the incidence of poverty is evident. Between 1970 and 1981, a period of 11 years, 46.1 per cent of the poor became non-poor. However, between 1981 and 1998, a period of 17 years, only 43.5 per cent of poor became non-poor. The point that it may be harder to reduce poverty as the overall poverty incidence declines is illustrated by this pattern.

Table 2.7. Distribution of Panel Households (%): 1970 and 1981

Poverty Status		1981		
		P	NP	Total
1970	P	27.08	23.19	50.26
	NP	13.21	36.52	49.74
	Total	40.29	59.71	100.00

Table 2.8 Distribution of Panel Households (%): 1981 and 1998

Poverty Status		1998		
		P	NP	Total
1981	P	22.8	17.5	40.29
	NP	19.8	40.0	59.71
	Total	42.51	57.49	100.00

Table 2.9 Distribution of Panel Households (%): 1970 and 1998

Poverty Status		1998		
		P	NP	Total
1970	P	25.3	24.9	50.26
	NP	17.2	32.5	49.74
	Total	42.51	57.49	100.00

Table 2.10 Transition of Panel Households (%): 1970 to 1981

Poverty Status		1981		
		P	NP	Total
1970	P	53.9	46.1	100.0
	NP	26.6	73.4	100.0
	Total	53.9	46.1	100.0

Table 2.11 Transition of Panel Households (%): 1981 to 1998

Poverty Status		1998		
		P	NP	Total
1981	P	56.5	43.5	100.0
	NP	33.1	66.9	100.0
	Total	56.5	43.5	100.0

Table 2.12 Transition of Panel Households (%): 1970 to 1998

Poverty Status		1998		
		P	NP	Total
1970	P	50.4	49.6	100.0
	NP	30.1	69.9	100.0
	Total	50.4	49.6	100.0

2.5 Dynamics of Consumption Expenditure and Poverty Reduction

The above analysis has dealt with the incidence of poverty and the movement of households into and out of the poverty in discrete categories of poverty status. We attempt a separate analysis of per capita monthly expenditure to gain further insights into the nature of changes in income in rural India. At this stage we point to the broad trends in consumption expenditure as captured in the present panel data. Table 2.13 below illustrates the patterns of changes in consumption expenditures of the households at different average levels of expenditure.

The monthly expenditure of the households available from the survey data is divided by household size and deflated by the corresponding state level CPI-AL to arrive at the real monthly per capita expenditure of the households in the survey. The households are arranged in increasing order of their real per capita monthly expenditure to divide them into deciles. It can be seen from Tables 2.13 and 2.14 below that lower deciles have higher annual average growth rate of per capita expenditure, more so for the period 1970-71 to 1981-82. The upper deciles (VI to X) experience negative rate of growth with lower growth for the period 1981-82 to 1998-99. This is important, as higher growth rate of lower deciles would help them push out of poverty. There were larger increases for lower deciles and decreases for higher deciles, in the growth rate of expenditure, in the first period. The first period thus led to more equitable distribution of consumption. This is also reflected in pattern of annual rate of growth of average monthly real per capita expenditure of each decile (Table 2.15).

Table 2.13: Average annual rate of growth of per capita expenditure between 1970 - 1981(%)

Deciles*	Mean	Standard Deviation	Coefficient of Variation
I	7.02	4.59	0.65
II	3.19	4.27	1.34
III	2.84	4.62	1.63
IV	1.65	4.44	2.69
V	1.97	4.30	2.18
VI	0.88	4.49	5.10
VII	0.25	4.88	19.51
VIII	-0.98	4.39	-4.48
IX	-1.62	5.52	-3.41
X	-4.51	6.06	-1.34

* Deciles are created by arranging the data in increasing order of real per capita monthly expenditure of households in 1970-71.

Table 2.14: Average annual rate of growth of per capita expenditure between 1981 – 1998 (%)

Deciles*	Mean	Standard Deviation	Coefficient of Variation
I	3.82	3.77	0.99
II	2.20	2.66	1.21
III	1.36	3.03	2.23
IV	0.62	2.89	4.66
V	0.14	2.93	20.94
VI	-0.34	2.78	-8.18
VII	-0.48	3.02	-6.30
VIII	-1.23	3.10	-2.52
IX	-1.88	3.37	-1.79
X	-3.22	3.25	-1.01

* Deciles are created by arranging the data in increasing order of real per capita monthly expenditure of households in 1981-82.

Table 2.15: Average Annual Rate of Growth of Per Capita Expenditure (%)

Deciles*	1970 – 1981	1981 – 1998
I	7.67	4.17
II	4.06	2.79
III	3.91	2.15
IV	2.65	1.34
V	2.90	0.86
VI	1.85	0.31
VII	1.44	0.30
VIII	-0.03	-0.40
IX	0.09	-0.95
X	-3.53	-2.85

* Deciles are created by arranging the data in increasing order of real per capita monthly expenditure of households in 1970-71 and 1981-82 respectively.

NSS data (Sen and Himanshu, 2004) reveals that the 1990s saw large increases in consumption by the relatively rich. There was a nearly 20% increase in consumption spending for the top rural quintile. But the picture is very different for the bottom 80% of the rural population. Real per capita consumption of this vast majority of Indians increased at 1 to 1.5 per cent per annum during the 1970s and 1980s. Their consumption during the 1990s was lower in most years compared to 1989-90, and the maximum attained since then (in 1999-2001) was only about 3 per cent higher. They thus conclude that economic inequality increased sharply during the 1990s in all its aspects and, as a result, poverty reduction deteriorated markedly despite higher growth.

Table 2.16: Fractile Specific Annual Rate of Growth in Real MPCE: Rural

Years	Bottom 40%	Next 40%	Top 20%
1977-78 to 1987-88	1.43	1.16	0.01
1983 to 1993-94	1.01	0.54	0.39
1986-87 to 1995-96	1.54	0.67	0.65
1987-88 to 1999-00	0.78	0.73	1.41
1989-90 to 2000-01	0.21	0.24	1.76

Note: The deflator used is the NAS deflator for private consumption expenditure.

Source: Reproduced from Sen and Himanshu (2004)

The two sets of results, i.e., using the panel data as in the present study and using independent surveys for different years as in the Sen and Himnashu (2004) study show that there may be significant effects of transitory movements of households across consumption categories. Bhattacharya (2001), using the NSS data, reports an increase in the Lorenz ratio and almost stable share of the bottom 50% of rural households between 1970-71 and 1983, while the Lorenz ratio drops between 1983 and 1999-2000 and the share of the bottom 50% households in total expenditure increases. Thus, while the panel data clearly shows faster rise in per capita expenditure for the lower deciles than the upper deciles the pattern emerging from the independent survey rounds varies across the years. These differences would have to be kept in view while drawing inferences from the findings.

The share of total monthly real expenditure of each decile in the total expenditure of the panel households surveyed in the present study is given in Tables 2.17 and 2.18. If we keep the households fixed according to 1970-71 order of monthly real per capita expenditure, the share of the lowest decile in total expenditure of the whole sample increases from 0.038 in 1970-71 to 0.067 in 1981-82 and reaches 0.072 in 1998-99. However for the upper decile the proportion falls from 0.197 to 0.129 and 0.122 respectively. For the VIII and IX deciles, the proportion increases in the period 1981-82 to 1998-99. This clearly reflects the potential for movement of households across consumption categories in all expenditure brackets. Though the movement is towards equality, the inequality amongst the households persists, as the gap between lower (less than one percent share for the lowest decile) and higher deciles (more than 12 percent share in consumption expenditure for the highest decile) is still large.[3]

[3] Since urban households are not included, this is only a partial reflection of the extent of inequality for the economy as a whole. We should also note that analysis here is based on unweighted data.

Table 2.17: Proportion of Various Deciles in Total Expenditure

Deciles*	1970 – 71	1981 – 82	1998 – 99
I	0.038	0.067	0.072
II	0.050	0.072	0.081
III	0.067	0.087	0.086
IV	0.081	0.085	0.089
V	0.088	0.106	0.098
VI	0.098	0.104	0.106
VII	0.103	0.104	0.103
VIII	0.124	0.115	0.122
IX	0.155	0.130	0.122
X	0.197	0.129	0.122

* Deciles are created by arranging the data in increasing order of real per capita monthly expenditure of households in 1970-71.

If we categorize according to expenditure deciles for each time period i.e. we arrange the households according to that period's per capita expenditure levels and then calculate their shares in total expenditure, it would show changes in the status of poverty and inequality over time. We find that when we carry out this exercise there are changes in the pattern of inequality over the period of 28 years. Over the 28 year period from 1970 to 1998, the lowest decile's share increases from 3.8% to 6%. But, for the highest decile also, it increases marginally from 19.7% to 19.9% (after a decline to 18.2% in 1981-82). The fall in inequality is more conspicuous in terms of increases in the share of lower expenditure deciles, than with regard to the decline in the share of upper deciles. The expenditure share of the lowest 20% of the households increases from 8.8% in 1970-71 to 13% in 1998-99 and the top 20% falls from 35.2% to 32.8% for the same period.

The findings above clearly show a tendency for households with lower per capita consumption expenditures to experience faster growth over time than households with higher per capita expenditure. What explains this tendency towards reduction in inequality in expenditure in the panel data? Is it because of the many changes taking place in the economy including various welfare programs in place? It would be relevant to examine if the convergence holds even after accounting for some of the factors that influence consumption expenditures. We provide such an analysis in section IV.

Table 2.18: Proportion of Deciles in Total Expenditure.

Deciles*	1970 – 71	1981 - 82	1998 – 99
I	0.038	0.046	0.060
II	0.050	0.060	0.072
III	0.061	0.071	0.081
IV	0.081	0.078	0.079

V	0.088	0.092	0.084
VI	0.098	0.105	0.090
VII	0.103	0.120	0.099
VIII	0.124	0.119	0.107
IX	0.155	0.127	0.129
X	0.197	0.182	0.199

* Deciles are created by arranging the data in increasing order of real per capita monthly expenditure of households in 1970-71, 1981-82 and 1998-99 independently of other survey year.

3 Analysing Incidence and Mobility of Poverty: Variations in the Determinants over Time

3.1 Data and Methodology

This study uses the household panel survey data collected by NCAER. The longitudinal data is collected through household surveys conducted in three rounds during the years 1970-71 (ARIS), 1981-82 (REDS) and 1998-99. We have used 3,239 households in the panel. The description of the sample and the construction of data are explained in detail in Bhide and Mehta (2005). A more recent paper by Bhide and Mehta (2008) extends the earlier analysis by assessing the influence of economic growth on poverty dynamics.

In the present study, we use the panel data framework for analysing the changes over time that influence various factors determining the incidence and mobility of poverty. The analysis pertains to two periods, 1970 to 1981 and 1981 to 1998. The dependent variable in the panel - probit model is a binary choice variable y_{it} = 1 if the event occurs and 0 otherwise for individual i at time t. The model we have applied is given in equation (1) below.

$$\Pr(y_{it} = 1) = \alpha + a_1X_{1it} + a_2X_{2it} + a_3X_{3it} + \ldots\ldots\ldots + a_kX_{kit} + u_{it} \qquad (1)$$

Where y = 1 for poverty status household and 0 for non-poor household.
X_{1it} …… X_{kit} are the factors influencing the poverty incidence, where 'i' refers to households and 't' refers to time. Pr is probability of y.

Most of the panel data applications utilize a one-way error component model for the disturbances, with

$$u_{it} = \mu_i + \nu_{it}$$

where μ_i denotes the unobservable individual specific effect and ν_{it} denotes the remainder disturbance (Baltagi 2001).

Use of random effects model is common when the data set has large N and relatively small T because fixed effects *probit* model in such cases may lead to inconsistent estimates. For the random effects probit model, MLE (maximum likelihood estimator) yields consistent and efficient estimators (Baltagi, 2001). Following this practice, in the present study, we adopt random effects model for the panel probit regression for the incidence of poverty.

The household level factors are the size of households (number of household members) and the composition in terms of percentage of children and females in the household; the assets of the household such as own house, livestock, land and irrigated land; and social caste groupings, whether belonging to scheduled castes and scheduled tribes or not. The village level factors are level of infrastructure (an index based on access to roads, phone, school, health facility, village level worker, post office and market for produce); village population and growth rate of real income and per capita real income of the sample village. The district level variables are percentage of urban population in total population and growth rate of crop output of the district of the sample household. The definitions of these variables are given in Appendix I.

The intercept dummy and slope dummies for all the independent variables are incorporated in the model for assessing the significance of the change in the coefficient of each factor in the next period.

3.2 Factors Affecting the Incidence of Poverty

The results of the random effects panel probit regression for incidence of two types of poverty are given in Appendix II. The panel results confirm the findings of the earlier study (Bhide and Mehta, 2008) where a simple probit model was applied. The factors found to be significant in differentiating moderately poor from non-poor are livestock, level of village level infrastructure, irrigation, land holding, village population and proportion of urban population in the district. This would suggest that income from farm produce is important for households to be non-poor while access to markets either for non-farm employment or market for the farm produce may be of equal importance. The factors found to be significant in increasing the probability of moderate poverty are household size, percentage of children

in the household and social background given by the SC and ST status. Caste status plays an important role in explaining the incidence of poverty, the coefficient being high for both the variables viz. SC and ST. None of the three economic growth variables were found to be significant in influencing incidence of poverty. In other words variation in growth rates of agricultural output experienced at the district level in the previous period is not strong enough to influence the probability of a household being moderately poor or non-poor.

The results do not vary much for the severely poor households except that growth variables have a poverty increasing effect in the first period (1971-81) and a poverty reducing effect in the second period (1981-99). The percentage of female population in the household has a poverty reducing effect. This factor was not significant for moderately poor households. This might reflect the fact that female participation in the labour force is necessary for the severely poor households to earn sustenance and this also helps them escape from severe poverty. The adverse effect of growth on incidence of severe poverty may again reflect the fact that there are barriers that prevent the transmission of growth effect to the poor. The change in the direction of impact in the second period suggests that these barriers could be overcome.

3.3 Changes in Determinants of Poverty over Time

The change in the impact of different variables on the incidence of poverty from the first period to the second period is captured by incorporating 'slope dummies' in the panel regression framework.

The results for moderate poverty indicate that there is a reduction, over the two periods of the survey, in the impact of some factors on the probability that a household is moderately poor as compared to being non-poor (Table 3.1). In the case of moderate poverty, the poverty reducing impact of village population (proxy for size of village), possession of livestock and access to land, decreased during the second period as compared to the first period. In the case of all other variables under consideration, their impact on incidence of poverty or probability of a household being moderately poor or non-poor does not change over time.

Table 3.1 Variations in Factors Influencing Incidence of Poverty

Sl No.	Variable	SP	MP
Interrupters (Poverty reducing effects)			
1	Village infrastructure	√ Effect reduced	√
2	Village population	√ Effect reduced	√ Effect reduced
3	% Urban population in district	√	√
4	Livestock	√ Effect reduced	√ Effect reduced
5	Irrigation	√ Effect reduced	√
6	Land	√ Effect increased	√ Effect reduced
7	% Females	√ Effect reduced	
Maintainers (Persisting poverty)			
1	Household size	√ Effect increased	√
2	SC status	√ Effect increased	√
3	ST status	√	√
4	% Children	√	√
5	% Females		√
6	Village level income growth	√ Turns interrupter	

Note: If a variable is significant in the first period (1981-82) at probability level of 0.1 or less, it is indicated by '√'. If there is no change in the impact between two periods (the second period being 1998-99) no further information is provided. If there is a statistically significant change in the impact of the variable in the second period, the change is indicated. If the variable is significant only in the second period, we have mentioned "significant' in the relevant cases. The detailed estimates are in Appendix I and II.

The direction of impact of the variables on the probability of being moderately poor or non-poor is intuitive in the case of village infrastructure, village population, urban neighbourhood and the three physical assets. All these variables are associated with a reduction in the probability of household being moderately poor.

The household size, percentage of females in the household and percentage of children in the household increase the probability of the household being moderately poor in both the periods under consideration. Social backwardness (SC or SC status) increases the probability of the household being moderately poor.

The findings in the case of incidence of severe poverty show that in nine out of 13 variables the impact is significantly different in the second period as compared to the first. However, only in one of the cases does the direction of the impact change between the two periods. While village level income growth increased the probability of a household being severely poor in 1981, it reduced the probability of a household being severely poor in 1998.

Among the remaining factors, all except land become less effective in reducing poverty in 1998 as compared to 1981. Access to land continues to be an important

determinant of the incidence of poverty. Social class is an important determinant of the probability of a household being severely poor. An SC or ST household, keeping all other factors the same, has the same probability of being poor in both the periods considered. In the case of SC households the probability of being severely poor increased in the second period.

There are studies which show that over a period of time land becomes insignificant in explaining poverty as non-farm income increases in the rural areas. For Tamil Nadu, Kajisa and Palanichamy (2006) have observed a sharp increase in non-farm income since mid 1990s, which also transformed the roles of physical and human capital through the course of development. However, in the present study access to land is a critical differentiator between poor and non-poor. While the importance of non-farm income may be increasing for the rural households, access to land appears to be making a much greater impact on their poverty status.

Cherdchuchai and Otsuka (2006) show that for Thai villages, household size is important for poverty reduction only in 2004 but not in the early period of 1987. Their results indicate the rise in returns to the "quantity" of human capital over time. This was due to the expansion of non-farm labour market that increased the employment opportunities. In the present study household size is positively related to both moderate and severe poverty. In other words, the larger the household, keeping all other factors the same, the greater the probability that it will be poor. This effect increases in the second period i.e. even in the 1990s the increase in employment opportunities in rural areas was inadequate to push more households above poverty line.

We must point out that while some of the factors may be associated with higher incidence of poverty, they may not necessarily be associated with the persistence of poverty. In other words, a characteristic that is associated with poverty at a given point of time may help in enabling exit from poverty over time. That is why an examination of dynamics of poverty becomes relevant.

3.4 Factors Affecting the Mobility: Entry and Exit of Poor

Entry into poverty is defined as a) entry into moderate poverty and b) shift from moderate to severe poverty, for the two periods from 1970-71 to 1981-82 and from 1981-82

to 1998-99. The dependent variable is discrete, represented by a binary choice variable y = 1 if a) a household enters into moderate poverty and b) if a moderately poor household becomes severely poor in the following period; and 0 otherwise. Exit from poverty is defined by a) Exit from Severe Poverty and b) Exit from Moderate Poverty. These are again the discrete variables, as explained above. The estimating model is equation (1) but the description of the data (given below) reveals a non-panel nature of this data. Hence, the pooled probit regression model is estimated. The results for entry and exit models are provided in Appendix III and IV respectively.

Table 3.2: Description of Dependent Variables: Mobility of Poverty

Variable	No. Of Observations	No. of Common Households (in two time periods)
Entry into Moderate Poverty	3072	1046
Shift from Moderate to Severe Poverty	608	73
Exit from Moderate Poverty	957	Nil
Exit from Severe Poverty	1290	270

The factors leading to exit from both severe and moderate poverty are infrastructure level of the village, percentage of urban population in the district, household size, land and irrigated land. The percentage of urban population in the district reflects alternative opportunities available in the neighbourhood area of the village which helps people in moving out of poverty, which is also complemented by the availability of infrastructure like roads, schools, and health facilities.

The backward social class status does not significantly reduce exit from severe poverty but makes it difficult for the moderately poor to exit from poverty. The other asset considered here, ownership of house, is not a significant determinant of exit from poverty.

The important correlates reducing the movement into both types of poverty i.e. moderate and severe poverty, are infrastructure, irrigation, village population, percentage of children and household size. The estimated regression models are presented in Appendix III and IV.

3.5 Changes in Factors Affecting the Income Mobility over Time

The results for exit from poverty indicate that the impact of different variables varies over time in only a few of the cases. In the case of exit from SP, in two of the cases the change is so much as to change the direction of impact itself. The household size and percentage of children in the household act as interrupters of poverty during the period 1970-1981 but become 'maintainers' of poverty in the subsequent period. In one case, village level income growth turns out to be an interrupter only in the second period and not in the first.

Table 3.3. Variations in Factors Influencing Exit from Poverty

Sl No.	Variable	SP → NP	MP → NP
Interrupters (Poverty reducing)			
1	Village infrastructure	√	√ Effect reduced
2	Household size	√ Turns driver	
3	% Urban population in district	√	
4	% Females		√
5	% Children	√ Turns driver	
6	Land	√ Effect reduced	√ Effect reduced
7	Irrigation		√
8	Time	√	Not used
9	Village level income growth	Significant	
Maintainers (persisting poverty)			
1	SC status		√ Effect reduced
2	ST status		√ Effect reduced

Note: If a variable is significant in the first period (1970-81) at probability level of 0.1 or less, it is indicated by '√'. If there is no change in the impact between two periods (1981-1999 being the second period) no further information is provided. If there is a statistically significant change in the impact of the variable in the second period, the change is indicated. If the variable is significant only in the second period, we have mentioned "significant' in the relevant cases. Estimation results are in Appendix III.

In most cases, the impact of interrupters as well as maintainers is reduced over time. Even the impact of access to land as an 'interrupter' of poverty reduces over time-presumably because the size of holdings themselves is getting smaller. The impact of village level infrastructure and urban neighbourhood (percentage of urban population in the total population of the district) has the same effect as an 'interrupter' of severe poverty in both the periods.

The impact of one of the most persistent maintainers of poverty, namely social backwardness is seen to decline in the second period of the study. Is education or access to health services making a difference to the poor so that they are able to exit from poverty? The results here suggest that the probability of their exit from poverty improved slightly during 1981-98 as compared to 1970-81.

Among access to three physical assets considered, viz., land, livestock or housing, only land is significant in increasing the probability of exit from SP or MP in both the periods. At the household level, larger household size does not remain an 'interrupter' in the second period indicating it is more important for households to improve the quality of their human resources to move out of poverty. The declining effect of caste as a maintainer of poverty is an indicator of the changes that may be taking place with respect to quality of human resources at the household level.

The results also suggest that there is a general tendency towards exit from SP as indicated by the significance of the 'time' variable.

The probability of entry into severe poverty from moderately poor status is reduced by factors like ownership of house and livestock and percentage of urban population in the district in the period of 1981-1998. The probability of entry into moderate poverty from non-poor status is reduced by access to irrigation, percentage of urban population of the district and household size.

The results on the variations in the impact of variables on entry into poverty over time are summarized in Table 3.4 below.

Table 3.4 Variations in Factors Influencing Entry into Poverty

Sl No.	Variable	NP → MP	MP → SP
Interrupters (Poverty reducing)			
1	Village infrastructure	√ No change	√ Effect reduced
2	Household size	√ Turns driver	
3	Village population		√ No change
4	% Children		√ Turns driver
5	% Urban population in district		Significant
6	House		Significant
7	Livestock		Significant
8	Irrigation		√ No change
Drivers (leading to poverty)			
1	SC status	√	
2	% Urban population in district	Significant	
3	District level agricultural growth	Significant	
4	% females in household	Significant	

Note: If a variable is significant in the first period (1970-81) at probability level of 0.1 or less, it is indicated by '√'. If there is no change in the impact between two periods (1981-1999 being the second period) no further information is provided. If there is a statistically significant change in the impact of the variable in the second period, the change is indicated. If the variable is significant only in the second period, we have mentioned "significant' in the relevant cases. Estimation results are in Appendix IV.

The key findings for directional impacts of the correlates of poverty dynamics are as follows: access to land, more so to irrigated land, reduces the likelihood of incidence of poverty and increases the probability of exit from poverty. Villages with better infrastructure and located in districts with larger percentage of urban population have greater probability of poverty reduction.

No uniform conclusion can be drawn for the size of the households and their demographic composition. Scheduled caste status increases the probability of falling into moderate poverty and is also significant in reducing the probability of exit from poverty. However, caste status is not a determinant of movement into severe poverty or exit from it.

4 Poverty Dynamics: Growth of Consumption Expenditure

4.1 Data and Methodology

In the previous section the emphasis was on identifying the determinants of incidence and dynamics of poverty and changes in these influences over time. These factors were identified based on categorization of households into groups based on different expenditure levels. The pattern of growth of per capita expenditure of different decile groups suggested faster increase in expenditure for households in lower expenditure categories as compared to the decline in the levels of consumption in the higher decile categories. The faster growth of expenditure at lower levels of expenditure as compared to higher expenditure groups would suggest that the income earning opportunities for the poor have improved significantly whereas income levels of the better off households have not increased. This growth pattern may also have been influenced by welfare programs or the emergence of new livelihood opportunities which supplemented the consumption or income of the relatively low income households. Reduction in the land holding size or productivity improvement that is insufficient to offset the decline in the size of land holdings may be one factor that led to lower consumption levels for the households in the upper expenditure classes. How robust is the inequality-reducing pattern of expenditure growth? The inequality reducing pattern of growth clearly indicates a tendency towards poverty reduction as the now poor households would see their expenditures rising relatively faster.

To examine the nature of growth in per capita expenditure we regressed the annualized real per capita expenditure growth of the panel households between two consecutive survey periods on their lagged per capita consumption expenditure and a number of factors that may influence the consumption expenditure level of the household.

In other words, if we account for all the other factors that influence growth of consumption expenditure, would the previous period's expenditure level still influence the consumption expenditure in the current period? A positive relationship between the lagged expenditure level and the growth rate of current expenditure would indicate an inequality reducing growth pattern and a positive relationship would indicate an inequality increasing pattern of growth. It is also possible that the relationship is not uniform across different income levels. In this section we present the estimated relationship between the growth rate of consumption expenditure and lagged level of consumption of the panel households.

In the regression model that we utilize here, the dependent variable is the annualized growth rate of real monthly per capita expenditure of the households. From the household survey data for three periods: 1970-71, 1981-82 and 1998-99, the annual growth rate is calculated for the period 1970 to 1981 and 1981 to 1998, which is the dependent variable in the panel regression of 3239 households for two periods. The independent variables are the initial conditions or the levels of factors in the base year.

The regression is of the form:

$y_{it} = \alpha + X'_{it}\beta + u_{it}$ $\quad i = 1,\ldots\ldots ,N; \quad t = 1,\ldots\ldots, T$

Where i denotes household and t denotes time. α is scalar, β is $K \times 1$ and X_{it} is the matrix of observations on K explanatory variables. The model utilizes a one-way error component structure for the disturbances: $u_{it} = \mu_i + v_{it}$ where μ_i denotes the unobservable individual specific effect and v_{it} denotes the remainder disturbance. The unobservable individual effect (μ_i) can be assumed as group specific constant term (fixed effects model) or group specific disturbance (random effects model).

An inevitable question is - whether to choose a fixed effect or random effect model? A critical assumption in the error component regression model is that $E(u_{it} \mid X_{it}) = 0$. This is important given that disturbances contain individual invariant effects (μ_i) which are unobserved and may be correlated with the X_{it}. Generally, the preference of the past studies is

towards fixed effects because it produces consistent estimates even if X_{it} and μ_i are correlated. The random effects estimators are biased and inconsistent in this case. If they are not correlated the random effects will produce efficient estimates. So the question is whether $Cov(\mu_i, X_{it}) = 0$. Hausman Test is applied to examine this question.

$H_0 : Cov(\mu_i, X_{it}) = 0$

$H_A : Cov(\mu_i, X_{it}) \neq 0.$

If the null hypothesis is rejected i.e. time invariant unobservable effects and other explanatory variables are correlated then fixed effects model should be preferred and otherwise random effects model should be preferred.

The results in the present case led to the rejection of the null hypothesis and fixed effects model is, therefore, the appropriate model. The regression model has variables that are time invariant and exogenous for e.g. SC and ST. In a fixed effects model these variables are "swept away" by the within estimator of the coefficients on the time varying covariates (Oaxaca and Geisler 2003). It is possible to identify and consistently estimate the effects of the time invariant regressors through two – stage procedure given by Hausman and Taylor (1981). The primary focus is that μ_i and X_{it} are correlated (as given by the Hausman specification test); least squares (OLS) and generalized least squares (GLS) yield biased and inconsistent estimates of the parameters. The traditional technique to overcome this problem is to eliminate the individual effects in the sample by transforming the data into deviations from individual means and getting OLS estimates on the transformed data (known as "within-groups" or "fixed effects" estimators). But it has two important defects: (1) all time – invariant variables are eliminated by the transformation so their parameters cannot be estimated, and (2) under certain circumstances, the within-groups estimator is not fully efficient since it ignores variation across individuals in the sample (Hausman and Taylor, 1981). The first problem is generally the more serious since in some applications, interest is in assessing the unknown coefficients of the time-invariant variables. In our case also, as explained in the previous section, social class status is an important determinant of poverty and hence, cannot be ignored in the model.

The Hausman-Taylor two stage least squares method assumes the correlation between the explanatory variables and the unobservable individual effects. But if we also assume that

certain variables are uncorrelated with μ_i, then conditions may hold such that all the parameters may be consistently and efficiently estimated. The columns of X_{it} which are uncorrelated by μ_i can serve two functions: (i) using deviations from individual means, they produce unbiased estimates of β's, and (ii) using the individual means, they provide valid instruments for the time-invariant variables that are correlated with μ_i. The point of caution is to correctly choose the columns of X, which are uncorrelated with μ_i. A necessary condition to implement this method is that the number of elements of X_i that are uncorrelated with μi must be greater than the number of time invariant variables that are correlated with μi.

The random effects model is:

$$y_{it} = X_{1it}\beta_1 + X_{2it}\beta_2 + Z_{1i}\delta_1 + Z_{2i}\delta_2 + \mu_i + \varepsilon_{it} \qquad (1)$$

where

X_{1it} is a $1 \times k_1$ vector of observations on exogenous, time-varying variables assumed to be uncorrelated with μ_i and ε_{it};

X_{2it} is a $1 \times k_2$ vector of observations on endogenous, time-varying variables assumed to be (possibly) correlated with μ_i but orthogonal to ε_{it};

Z_{1i} is a $1 \times g_2$ vector of observations on exogenous, time-invariant variables assumed to be uncorrelated with μ_i and ε_{it};

Z_{2i} is a $1 \times g_2$ vector of observations on endogenous, time-invariant variables assumed to be (possibly) correlated with μ_i but orthogonal to ε_{it};

μ_i is the unobserved, panel-level random effect that is assumed to have zero mean, finite variance σ^2_μ, and to be independently and identically distributed (i.i.d) over the panels;

ε_{it} is the idiosyncratic error that is assumed to have zero mean, finite variance σ^2_ε, and to be i.i.d. over all the observations in the data;

β_1, β_2, δ_1 and δ_2 are $k_1 \times 1$, $k_2 \times 1$, $g_1 \times 1$ and $g_2 \times 1$ coefficient vectors, respectively; and

$i = 1, \ldots.., n$, where n is the number of panels in the sample and, for each i, $t = 1, \ldots.., T_i$.

The within estimator is a consistent estimator for β_1 and β_2. Using these estimates, the within-residuals ($\hat{d}_i$) can be obtained. The estimates of δ_1 and δ_2, called $\hat{\delta}_{1IV}$ and $\hat{\delta}_{2IV}$, are obtained by regressing the within-residuals on Z_{1i} and Z_{2i}, using X_{1it} and Z_{1i} as instruments. These estimates are then used to obtain set of within and overall residuals. These two sets of

residuals can be used to estimate the variance components to perform a GLS transformation on each of the variables.

4.2 Pattern of Growth of Consumption Expenditures

The independent variables (see Appendix I) in our specification are as follows:

(a) Time - Varying Exogenous Variables are index of village level infrastructure, percentage of urban population in the district, village population, percentage of children in the household, percentage of female population in the household, household size and the three measures of growth rate- village level, per capita village level and district level.

(b) Time - Varying Endogenous Variables are real monthly per capita expenditure of the households with a lag of one period and the assets of the household like own house, livestock, land and irrigated land.

(c) The Time - Invariant Exogenous Variables are the social caste groupings, whether belonging to scheduled castes and scheduled tribes.

Two specifications of the model are considered in the paper. One is where the independent variable (previous period's real monthly per capita expenditure of the households) is specified in its absolute level. The second is where we introduce non-linear effects of the per capita expenditure in the base year by introducing the square of the previous period's real monthly per capita expenditure of the households in the model. The results of Hausman- Taylor Two Stage Least Squares are presented in Table V.1 and V.2 respectively of Appendix V.

The regression model essentially captures the impact of various independent variables on the growth of real per capita expenditure of a household. The lagged expenditure level captures the impact of the initial level of expenditure and hence the tendency towards acceleration or deceleration in expenditure level.

Among the six models presented in Appendix V, the estimates in Appendix V.2 capture the non-linear relationship between current and lagged consumption expenditure. The non-linear specification provides the same type of impact of selected variables on the level of consumption as the linear specification in most cases.

The estimated models presented in Appendix V.1 indicate a negative relationship between the lagged level of consumption expenditure on the growth of expenditure even when we account for a large number of other explanatory variables. In other words, lower expenditure (income) households experienced faster growth in consumption than the higher expenditure households.

Table 3.5 Variations in Factors Influencing Growth of Consumption Expenditure

Sl No.	Variable	Model A	Model B
Interrupters (Poverty reducing)			
1	Village infrastructure	√ Effect reduced	√
2	Village population	√ Effect reduced	
3	% Urban population in district	√	√ Effect greater
4	Household size	√	√
5	% Females	√ Turns driver	Significant
6	% Children	√ Effect reduced	
7	District level agricultural growth	√ Turns driver	√ Turns driver
8	Time	√	√
9	Square of initial consumption		√ Effect reduced
Drivers (leading to poverty)			
1	SC status	√ Effect greater	√ Effect greater
2	ST status	√ Effect greater	√ Effect greater
3	Initial consumption	√ Effect greater	√ Effect greater
4	House	Significant	Significant
5	Livestock	√ Effect reduced	√ Turns interrupter
6	Irrigation	Significant	Significant
7	Land	√ Effect reduced	√ Turns marginally interrupter

Note: If a variable is significant in the first period (1970-81) at probability level of 0.1 or less, it is indicated by '√'. If there is no change in the impact between two periods (1981-1999 being the second period) no further information is provided. If there is a statistically significant change in the impact of the variable in the second period, the change is indicated. If the variable is significant only in the second period, we have mentioned "significant' in the relevant cases. Estimation results are in Appendix V.1-V.2.

The results presented in Appendix V.2 show that this pattern does not hold at relatively high levels of expenditure. At higher levels of per capita expenditure, the households experience faster increase levels of per capita consumption over time as compared to immediately lower consumption groups. The pattern, therefore, is one of differential rates of increase across expenditure levels. The pattern also suggests that severely poor households (lowest expenditure levels) may improve their economic status while the households in the intermediate categories of expenditure may slip back into poverty unless there are other compensating factors. The households at high levels of expenditure will remain non-poor as the tendency there is for consumption levels to keep rising over time.

5. Concluding Remarks

The paper has examined variations over time in the factors influencing incidence and dynamics of poverty using a national rural panel household data set based on household surveys conducted in three rounds in the years 1970, 1981 and 1998. The paper has also examined whether the pattern of growth in consumption expenditure reflects trends in poverty.

An important trend emerging from the panel data was the slower rate of decline in rural poverty in the second period of the survey as compared to the first. This was also the pattern indicated by the national surveys of consumption expenditure. The slower decline in poverty has occurred even though the rate of economic growth was faster during the second period. Economic growth alone, therefore, has not been adequate to ensure faster poverty reduction during this period.

Analysis of panel data has indicated the importance of several factors in influencing poverty dynamics. The positive impact of village level infrastructure, rural-urban linkages (as reflected in larger urban population in the district) and size of village has been estimated in nearly all the analyses of incidence and mobility provided in this paper. The role of physical assets such as land and livestock in reducing the probability of a household being poor is prominent. However, as an 'interrupter of poverty', land is important in improving the probability of escape from poverty while livestock is significant in reducing the probability of entry into severe poverty from moderate poverty. The household characteristics such as household size and its composition are significant in discriminating between poor and non-poor.

The results from the analysis of determinants of growth of household consumption expenditure show that the growth rate of consumption expenditure of the poorer households is greater than that for households with higher levels of consumption. While this reflects the general trends from the panel data, the relationship holds even when we account for a number of other factors that influence the growth rate of consumption. Even in the case of growth of consumption expenditure, the role of village level infrastructure and rural-urban linkage

emerge as significant interrupters of poverty because of their positive impact on growth of consumption expenditure.

The analysis of growth of consumption expenditures strongly brings out the role of factors that are not associated with physical assets in increasing consumption expenditures or reducing poverty. Access to physical assets does increase the level of consumption expenditure as the analysis of incidence and mobility patterns show. But for growth in consumption expenditures over time, improvement in the productivity of physical assets would be crucial and not just access to them. In this sense, the role of factors not associated with physical assets has been highlighted.

The impact of a number of factors changes over time implying that the strategies for poverty reduction would have to take into account the changing economic environment. For example, the analysis shows that the poverty reducing impact of several variables decreased over time. The overall trend of slower rate of decline in poverty points to this result also. In some cases the factors that were poverty interrupters turn out to be poverty maintainers or 'drivers' in the second period. These patterns of variations in the impact of major instruments of poverty reduction show that for sustained reduction in poverty, the strategies will have to take into account the changing economic conditions in which the households operate.

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Appendix I: Definition of Variables Used in the Various Regression Analyses

Variables	Definition of Variables
House	Dummy variable with value = 1 if the household owns a house and = 0 otherwise.
Livestock	Dummy variable with value = 1 if the household has own livestock and = 0 otherwise.
Infra	Index of infrastructure at the village level. *
Irrig	Dummy variable with value = 1 if the household has irrigated cultivable land and = 0 otherwise.
Pupop	Percentage of urban population in the district.
Villpop	Population of the village.
Land	Acres of land owned by the household.
Pchild	Percentage of children (less than 14 years of age) in the household.
Pfemale	Percentage of females in the household.
Hhdsize	Number of members in the household.
SC	Dummy variable with value = 1 if the household belongs to scheduled castes and = 0 otherwise.
ST	Dummy variable with value = 1 if the household belongs to scheduled caste and = 0 otherwise.
Vgr	Annual growth rate of income of the village for the periods 1970-1981 and 1981-98.
Pvgr	Annual growth rate of per capita income of the village for the periods 1970-1981 and 1981-98.
Distgr	Annual growth rate of crop output of the district for the periods 1970-81 and 1981-98.
D-time$	Dummy for the time period with value = 1 for 1998 and = 0 for 1981.
Prevconsexp	Real monthly per capita expenditure of the households with a lag of one period.
$Prevconsexp^2$	Square of real monthly per capita expenditure of the households with a lag of one period.

* The items included are roads, phone, school, health facility, village level worker (agricultural extension), post office and market for produce. Index is the sum of scores for the presence (=1) of the above services in the village.

$ This pattern of identification with 'D-' is used to indicate the slope dummy for the other variables also.

Appendix II. Factors Influencing Incidence of Poverty

Table II.1 Determinants of Moderate Poverty

Dependent variable for the probit model: =1 if the household is moderately poor, =0 otherwise

No. of observations = 4953, No. of groups = 2968

	Model 1			Model 2			Model 3	
Independent Variables	**Coefficient**	**p Value**		**Coefficient**	**p Value**		**Coefficient**	**P Value**
House	0.297929	0.280		0.294217	0.286		0.293409	0.290
Livestock	-0.518833	0.000		-0.518981	0.000		-0.519282	0.000
Infra	-0.111841	0.000		-0.111023	0.000		-0.111638	0.000
Irrig	-0.219678	0.001		-0.226015	0.001		-0.230721	0.001
Pupop	-0.005784	0.033		-0.005951	0.028		-0.006235	0.021
Villpop	-0.000025	0.027		-0.000025	0.026		-0.000025	0.032
Land	-0.000693	0.000		-0.000694	0.000		-0.000694	0.000
Pchild	0.005539	0.001		0.005604	0.001		0.005688	0.001
Pfemale	-0.002784	0.166		-0.002904	0.148		-0.003130	0.119
Hhdsize	0.079804	0.000		0.080025	0.000		0.079185	0.000
SC	0.263102	0.003		0.264881	0.003		0.268700	0.003
ST	0.690151	0.000		0.688422	0.000		0.683060	0.000
Vgr	0.001429	0.108						
Pvgr				0.001100	0.235			
Distgr							-0.004394	0.512
D-time	-0.346039	0.508		-0.348149	0.504		-0.329877	0.527
D-house	-0.631657	0.194		-0.623996	0.199		-0.636118	0.193
D-livestock	0.479950	0.000		0.482586	0.000		0.454537	0.000
D-infra	-0.014627	0.581		-0.015410	0.560		-0.019161	0.471
D-irrig	0.129584	0.165		0.131099	0.160		0.118860	0.203
D-pupop	0.005248	0.131		0.005359	0.124		0.004940	0.156
D-villpop	0.000032	0.012		0.000032	0.013		0.000035	0.007
D-land	-0.047516	0.000		-0.047393	0.000		-0.048709	0.000
D-pchild	0.001555	0.489		0.001484	0.509		0.001284	0.568
D-pfemale	0.004559	0.092		0.004695	0.083		0.005146	0.057
D-hhdsize	0.057699	0.000		0.057589	0.000		0.059927	0.000
D-sc	0.134607	0.284		0.130435	0.299		0.138860	0.270
D-st	-0.169863	0.440		-0.173027	0.431		-0.193700	0.378
D-vgr	-0.001710	0.163						
D-pvgr				-0.001562	0.142			
D-distgr							0.031991	0.002
Constant	-0.409810	0.179		-0.415211	0.174		-0.427744	0.162
Wald Test- Chi2 (27)	518.66	0.000		518.90	0.000		504.05	0.000

Model 1, Model 2 and Model 3 are distinguished by the use of alternative economic growth variables among the independent variables.

Table II.2 Determinants of Severe Poverty

Dependent variable for the probit model: =1 if the household is severely poor, =0 otherwise

No. of observations = 5182, No. of groups = 3114

	Model 1			Model 2			Model 3	
Independent Variables	**Coefficient**	**p Value**		**Coefficient**	**p Value**		**Coefficient**	**P Value**
House	0.101956	0.700		0.093580	0.724		0.026397	0.921
Livestock	-0.442274	0.000		-0.437718	0.000		-0.434877	0.000
Infra	-0.233163	0.000		-0.230344	0.000		-0.224471	0.000
Irrig	-0.668696	0.000		-0.675557	0.000		-0.677667	0.000
Pupop	-0.018689	0.000		0.019027	0.000		-0.019590	0.000
Villpop	-0.000030	0.020		-0.000032	0.014		-0.000027	0.038
Land	-0.001588	0.000		-0.001595	0.000		-0.001602	0.000
Pchild	0.015690	0.000		0.015818	0.000		0.016092	0.000
Pfemale	-0.004405	0.057		-0.004548	0.050		-0.004864	0.035
Hhdsize	0.133758	0.000		0.134270	0.000		0.130433	0.000
SC	0.238744	0.014		0.236448	0.015		0.222763	0.021
ST	0.914766	0.000		0.911599	0.000		0.861742	0.000
Vgr	0.003324	0.000						
Pvgr				0.002873	0.001			
Distgr							0.000090	0.990
D-time	-0.793460	0.132		-0.757306	0.148		-0.603464	0.247
D-house	-1.015139	0.031		-1.003742	0.033		-0.975172	0.039
D-livestock	0.302926	0.020		0.300542	0.021		0.267627	0.039
D-infra	0.095810	0.002		0.092779	0.003		0.080123	0.009
D-irrig	0.703018	0.000		0.702449	0.000		0.705180	0.000
D-pupop	-0.002719	0.535		-0.002494	0.570		-0.002838	0.520
D-villpop	0.000025	0.088		0.000026	0.077		0.000027	0.063
D-land	-0.137955	0.000		-0.137548	0.000		-0.142093	0.000
D-pchild	-0.000572	0.828		0.000669	0.800		-0.001188	0.651
D-pfemale	0.008434	0.010		0.008650	0.009		0.009250	0.005
D-hhdsize	0.109739	0.000		0.109090	0.000		0.115859	0.000
D-sc	0.355696	0.010		0.355420	0.010		0.404517	0.003
D-st	0.088412	0.691		0.084715	0.704		0.195403	0.428
D-vgr	-0.006075	0.000						
D-pvgr				-0.005556	0.000			
D-distgr							0.032386	0.009
Constant	0.111620	0.718		0.102536	0.740		0.072569	0.813
Wald Test- Chi2 (27)	677.64	0.000		678.99	0.000		669.36	0.000

Model 1, Model 2 and Model 3 are distinguished by the use of alternative economic growth variables among the independent variables.

Appendix III. Factors Influencing Entry into Poverty

Table III.1 Determinants of Entry into Moderate Poverty

Dependent variable for the probit model: =1 if non-poor household falls into moderate poverty, =0 otherwise

No. of observations = 3072

Independent Variables	Model 1		Model 2		Model 3	
	Coefficient	p Value	Coefficient	p Value	Coefficient	p Value
House	-0.116465	0.729	-0.064833	0.847	-0.026466	0.938
Livestock	0.169949	0.233	0.168946	0.236	0.174441	0.221
Infra	-0.159109	0.000	-0.161529	0.000	-0.157449	0.000
Irrig	-0.304130	0.001	-0.312368	0.001	-0.300831	0.001
Pupop	-0.006222	0.116	-0.006404	0.107	-0.006103	0.124
Villpop	-0.000017	0.414	-0.000014	0.487	-0.000017	0.403
Land	0.000004	0.999	-0.000046	0.995	-0.000046	0.995
Pchild	0.002781	0.209	0.002879	0.193	0.002882	0.193
Pfemale	0.003210	0.214	0.003295	0.202	0.003280	0.204
Hhdsize	-0.024251	0.070	-0.024590	0.066	-0.023769	0.074
SC	0.271890	0.059	0.269420	0.061	0.273018	0.058
ST	0.169431	0.679	0.156354	0.703	0.174113	0.670
Vgr	-0.000164	0.889				
Pvgr			-0.000785	0.517		
Distgr					0.000754	0.932
D-house	-0.408794	0.178	-0.452425	0.133	-0.447395	0.138
D-livestock	-0.270243	0.150	-0.266950	0.155	-0.282900	0.133
D-infra	0.036336	0.403	0.038576	0.375	0.038007	0.382
D-irrig	0.204785	0.092	0.208065	0.086	0.184206	0.125
D-pupop	0.010698	0.032	0.010822	0.030	0.008365	0.097
D-villpop	0.000017	0.469	0.000014	0.550	0.000021	0.371
D-land	-0.000253	0.970	-0.000207	0.976	-0.000213	0.975
D-pchild	0.002083	0.489	0.001977	0.511	0.001510	0.617
D-pfemale	0.004858	0.159	0.004852	0.160	0.004610	0.183
D-hhdsize	0.046208	0.007	0.046173	0.007	0.043774	0.010
D-sc	0.223921	0.231	0.225897	0.227	0.220019	0.240
D-st	0.801000	0.102	0.797048	0.104	0.753703	0.123
D-vgr	0.001233	0.442				
D-pvgr			0.000594	0.676		
D-distgr					0.029744	0.024
Constant	-0.499867	0.092	-0.577511	0.049	-0.606801	0.039
LR Chi2 (26)	177.00	0.000	176.54	0.000	185.64	0.000
Pseudo R2	0.0586		0.0585		0.0615	

Model 1, Model 2 and Model 3 are distinguished by the use of alternative economic growth variables among the independent variables.

Table III.2 Determinants of Fall from Moderate to Severe Poverty

Dependent variable for the probit model: =1 if moderately poor household falls into severe poverty, =0 otherwise

No. of observations = 608

Independent Variables	Model 1		Model 2		Model 3	
	Coefficient	p Value	Coefficient	p Value	Coefficient	p Value
House	-0.041765	0.921	-0.061952	0.883	-0.011110	0.979
Livestock	0.321774	0.102	0.317417	0.107	0.320584	0.104
Infra	-0.217534	0.001	-0.219746	0.001	-0.219259	0.001
Irrig	-0.496506	0.006	-0.500821	0.005	-0.498520	0.006
Pupop	-0.004858	0.485	-0.005036	0.470	-0.004733	0.499
Villpop	-0.000086	0.067	-0.000082	0.081	-0.000086	0.067
Land	-0.004616	0.858	-0.004899	0.850	-0.004802	0.853
Pchild	-0.011291	0.008	-0.011298	0.008	-0.011050	0.010
Pfemale	-0.007218	0.101	-0.007326	0.096	-0.007069	0.108
Hhdsize	-0.028041	0.298	-0.028940	0.284	-0.026664	0.324
SC	0.120426	0.546	0.124539	0.532	0.126928	0.524
ST	0.405973	0.178	0.392759	0.192	0.396078	0.191
Vgr	0.000039	0.986				
Pvgr			-0.000777	0.727		
Distgr					-0.003574	0.833
D-incomerent	-1.202763	0.050	-1.262041	0.037	-1.482873	0.015
D-livestock	-0.691820	0.018	-0.716064	0.014	-0.705100	0.016
D-infra	0.188063	0.029	0.190746	0.026	0.211291	0.015
D-irrig	0.406001	0.107	0.413663	0.101	0.385883	0.126
D-pupop	-0.018280	0.062	-0.018484	0.060	-0.017084	0.085
D-villpop	0.000097	0.108	0.000097	0.112	0.000082	0.170
D-land	0.004352	0.866	0.004646	0.857	0.004595	0.859
D-pchild	0.016312	0.007	0.016161	0.008	0.016140	0.008
D-pfemale	0.015431	0.025	0.015731	0.023	0.014240	0.038
D-hhdsize	0.056492	0.138	0.059240	0.121	0.053258	0.167
D-sc	-0.191452	0.511	-0.201854	0.487	-0.281157	0.327
D-st	0.338757	0.447	0.354654	0.425	0.206112	0.637
D-vgr	0.005748	0.170				
D-pvgr			0.005763	0.127		
D-distgr					0.006879	0.792
Constant	1.800441	0.002	1.799106	0.002	1.749311	0.003
LR Chi2 (26)	80.96	0.000	81.19	0.000	78.40	0.000
Pseudo R2	0.0971		0.0974		0.094	

Model 1, Model 2 and Model 3 are distinguished by the use of alternative economic growth variables among the independent variables.

Appendix IV. Determinants of Exit from Poverty

Table IV.1 Determinants of Exit from Severe Poverty

Dependent variable for the probit model: =1 if severely poor household become non-poor, =0 otherwise
No. of observations = 1290

Variables	Model 1		Model 2		Model 3	
	Coefficient	p Value	Coefficient	p Value	Coefficient	p Value
House	-0.088076	0.829	-0.065591	0.871	-0.084695	0.834
Livestock	0.170011	0.149	0.175223	0.136	0.174758	0.137
Infra	0.193256	0.000	0.190710	0.000	0.206838	0.000
Irrig	0.202879	0.148	0.192605	0.170	0.210151	0.135
Pupop	0.025848	0.000	0.026002	0.000	0.024066	0.000
Villpop	0.000015	0.474	0.000016	0.441	0.000018	0.392
Land	0.114773	0.000	0.117070	0.000	0.120088	0.000
Pchild	0.004619	0.103	0.004735	0.094	0.004761	0.093
Pfemale	-0.003119	0.310	-0.003061	0.319	-0.002567	0.405
Hhdsize	0.050451	0.007	0.051047	0.006	0.050196	0.007
SC	0.031735	0.806	0.040668	0.752	0.054558	0.672
ST	-0.254994	0.139	-0.240531	0.164	-0.188272	0.283
Vgr	-0.001025	0.316				
Pvgr			-0.000207	0.849		
Distgr					0.016532	0.113
D-time	1.691716	0.025	1.618638	0.032	1.521540	0.042
D-house	-0.286116	0.648	-0.272273	0.664	-0.153792	0.805
D-livestock	0.210886	0.261	0.188184	0.317	0.168071	0.372
D-infra	-0.085132	0.169	-0.081927	0.187	-0.092658	0.141
D-irrig	0.000353	0.999	0.029517	0.880	-0.093209	0.629
D-pupop	0.009561	0.252	0.009567	0.253	0.007002	0.415
D-villpop	-0.000019	0.531	-0.000016	0.601	-0.000027	0.375
D-land	-0.113900	0.000	-0.116197	0.000	-0.119112	0.000
D-pchild	-0.012347	0.006	-0.012773	0.004	-0.011292	0.010
D-pfemale	-0.000923	0.861	-0.001263	0.811	-0.002739	0.604
D-hhdsize	-0.069599	0.004	-0.069764	0.004	-0.076857	0.001
D-sc	-0.069521	0.731	-0.050611	0.803	-0.154045	0.444
D-st	-0.048891	0.850	-0.030519	0.907	-0.227356	0.381
D-vgr	0.006216	0.001				
D-pvgr			0.005097	0.007		
D-distgr					0.015791	0.434
Constant	-1.620954	0.001	-1.634356	0.001	-1.683614	0.001
LR Chi2 (27)	228.23	0.000	234.96	0.000	220.20	0.000
Pseudo R2	0.1276		0.1314		0.1231	

Model 1, Model 2 and Model 3 are distinguished by the use of alternative economic growth variables among the independent variables.

Table IV.2 Determinants of Exit from Moderate Poverty

Dependent variable for the probit model: =1 if moderately poor household becomes non-poor, =0 otherwise
No. of observations = 957

Independent Variables	Model 1		Model 2		Model 3	
	Coefficient	p Value	Coefficient	p Value	Coefficient	p Value
House	0.469808	0.325	0.524338	0.269	0.484683	0.311
Livestock	-0.070157	0.678	-0.048120	0.777	-0.092473	0.582
Infra	0.236741	0.000	0.235826	0.000	0.252729	0.000
Irrig	0.388343	0.006	0.406450	0.004	0.353792	0.012
Pupop	0.001733	0.753	0.002151	0.697	0.001211	0.825
Villpop	0.000034	0.385	0.000028	0.465	0.000038	0.319
Land	0.058245	0.006	0.057469	0.007	0.059176	0.005
Pchild	-0.003381	0.306	-0.003174	0.337	-0.002982	0.368
Pfemale	0.006924	0.065	0.007068	0.060	0.006881	0.067
Hhdsize	-0.004520	0.818	-0.003357	0.864	-0.004343	0.824
SC	-0.566913	0.001	-0.564108	0.001	-0.561302	0.001
ST	-1.213291	0.000	-1.178548	0.000	-1.291008	0.000
Vgr	0.002051	0.216				
Pvgr			0.003415	0.055		
Distgr					0.018734	0.176
D-house	0.374997	0.418	0.359712	0.434	0.269733	0.552
D-livestock	-0.031280	0.903	-0.068810	0.79	0.002075	0.994
D-infra	-0.117912	0.100	-0.120488	0.094	-0.130085	0.073
D-irrig	-0.076784	0.710	-0.073936	0.722	-0.073168	0.721
D-pupop	0.006320	0.446	0.005694	0.494	0.008967	0.285
D-villpop	-0.000069	0.147	-0.000059	0.214	-0.000083	0.080
D-land	-0.058316	0.006	-0.057548	0.006	-0.059257	0.005
D-pchild	0.002959	0.557	0.002533	0.616	0.002929	0.561
D-pfemale	-0.010486	0.066	-0.010252	0.073	-0.009839	0.085
D-hhdsize	0.035102	0.245	0.033453	0.269	0.040739	0.175
D-sc	0.462574	0.063	0.447867	0.073	0.437561	0.079
D-st	1.111697	0.018	1.096932	0.020	1.159992	0.013
D-vgr	0.001654	0.582				
D-pvgr			0.000881	0.773		
D-distgr					-0.046120	0.042
Constant	-0.586358	0.231	-0.622926	0.201	-0.770423	0.120
LR Chi2 (26)	134.57	0.000	139.28	0.000	134.47	0.000
Pseudo R2	0.1151		0.1191		0.1150	

Model 1, Model 2 and Model 3 are distinguished by the use of alternative economic growth variables among the independent variables.

Appendix V. Factors Influencing Growth of Household Expenditure

Table V.1 Linear Effect of Initial Per Capita Consumption Expenditure

Dependent variable: Per capita consumption expenditure of the household
No. of observations = 6478, No. of groups = 3239

Independent Variables	Model 1		Model 2		Model 3	
	Coefficient	P Value	Coefficient	P Value	Coefficient	P Value
TV Exogenous Variables						
Infra	0.468071	0.000	0.472181	0.000	0.493832	0.000
Pupop	0.026628	0.001	0.027731	0.001	0.025983	0.001
Villpop	0.000184	0.000	0.000178	0.000	0.000190	0.000
Pchild	0.012796	0.002	0.012879	0.002	0.012698	0.002
Pfemale	0.006953	0.148	0.006886	0.151	0.007919	0.099
Hhdsize	0.155435	0.000	0.158602	0.000	0.148781	0.000
vgr1_81_99	-0.000191	0.925				
pgr1_81_99			0.003385	0.110		
dgr82_99					0.044998	0.005
D-time	5.983323	0.000	5.915333	0.000	5.727850	0.000
D-infra	-0.185206	0.008	-0.185379	0.008	-0.209293	0.003
D-pupop	-0.000691	0.935	-0.001781	0.834	0.010233	0.237
D-villpop	-0.000076	0.031	-0.000067	0.057	-0.000098	0.005
D-pchild	-0.012409	0.036	-0.012614	0.033	-0.011676	0.049
D-pfemale	-0.032248	0.000	-0.032330	0.000	-0.031647	0.000
D-hhdsize	-0.051126	0.080	-0.056675	0.053	-0.040488	0.165
D-sc	-1.165381	0.000	-1.160261	0.000	-1.179326	0.000
D-st	-1.216828	0.003	-1.255821	0.002	-1.361780	0.001
D-vgr1_81_99	0.004853	0.131				
D-pgr1_81_99			0.000456	0.863		
D-dgr82_99					-0.152966	0.000
TV Endogenous Variables						
Prevconsexp	-0.058662	0.000	-0.058734	0.000	-0.059737	0.000
Incomerent	0.667034	0.433	0.724952	0.394	0.650035	0.443
Livestock	-0.924674	0.000	-0.891341	0.000	-0.919491	0.000
Irrig	0.134154	0.535	0.148975	0.490	0.098624	0.646
Land	-0.074363	0.000	-0.073931	0.000	-0.067572	0.000
D-prevconsexp	-0.009648	0.000	-0.009662	0.000	-0.009194	0.000
D-incomerent	-2.183962	0.043	-2.264002	0.036	-2.241708	0.037
D-livestock	0.655433	0.037	0.608957	0.053	0.775676	0.013
D-irrig	-0.582861	0.011	-0.590262	0.010	-0.575361	0.011
D-land	0.073385	0.000	0.072965	0.000	0.066622	0.000
TI Exogenous						
SC	-0.887664	0.001	-0.885862	0.001	-0.926332	0.001
ST	-1.271866	0.002	-1.216489	0.004	-1.244786	0.003
Constant	3.092199	0.001	3.121147	0.001	3.048309	0.002
Wald Test- Chi2 (29)	5159.80	0.000	5179.44	0.000	5235.11	0.000

TV: Time-Varying, TI: Time-Invariant

Model 1, Model 2 and Model 3 are distinguished by the use of alternative economic growth variables among the independent variables.

Table V.2 Non-linear Effect of Initial Per Capita Consumption Expenditure

Dependent variable: Per capita consumption expenditure of the household
No. of observations = 6478, No. of groups = 3239

Independent Variables	Model 1		Model 2		Model 3	
	Coefficient	P Value	Coefficient	p Value	Coefficient	p Value
TV Exogenous						
Infra	0.362756	0.000	0.365626	0.000	0.397765	0.000
Pupop	0.024355	0.001	0.024790	0.001	0.024352	0.001
Villpop	0.000215	0.000	0.000213	0.000	0.000215	0.000
Pchild	0.006637	0.071	0.006744	0.067	0.006873	0.060
Pfemale	-0.000690	0.871	-0.000845	0.843	0.000395	0.926
Hhdsize	0.070471	0.001	0.073885	0.000	0.065930	0.001
vgr1_81_99	-0.004492	0.013				
pgr1_81_99			-0.001557	0.408		
dgr82_99					0.048874	0.001
D-time	4.730885	0.000	4.706517	0.000	4.590280	0.000
D-infra	-0.017866	0.765	-0.015512	0.795	-0.045288	0.451
D-pupop	0.004849	0.499	0.004178	0.560	0.014153	0.052
D-villpop	-0.000028	0.352	-0.000023	0.448	-0.000043	0.147
D-pchild	-0.013146	0.012	-0.013348	0.011	-0.012752	0.015
D-pfemale	-0.020276	0.002	-0.020360	0.002	-0.020421	0.002
D-hhdsize	-0.046404	0.067	-0.051235	0.044	-0.040292	0.111
D-sc	-0.972158	0.000	-0.968420	0.000	-0.992979	0.000
D-st	-0.969568	0.005	-0.998856	0.003	-1.184473	0.000
D-vgr1_81_99	0.008656	0.003				
D-pgr1_81_99			0.005200	0.029		
D-dgr82_99					-0.149285	0.000
TV Endogenous						
Prevconsexp	-0.113357	0.000	-0.113061	0.000	-0.114148	0.000
prevconsexp^2	0.0001139	0.000	0.000113	0.000	0.000114	0.000
Incomerent	0.307482	0.663	0.344286	0.626	0.334978	0.633
Livestock	-0.426713	0.035	-0.406816	0.044	-0.392834	0.050
Irrig	0.090169	0.620	0.093750	0.606	0.097554	0.589
Land	-0.058857	0.000	-0.059100	0.000	-0.051965	0.000
D-prevconsexp	-0.012976	0.000	-0.013477	0.000	-0.012895	0.000
D-prevconsexp2	-0.000028	0.000	-0.000027	0.000	-0.000028	0.000
D-incomerent	-1.375866	0.125	-1.443218	0.108	-1.541766	0.084
D-livestock	0.412309	0.116	0.381065	0.146	0.506307	0.052
D-irrig	-0.285369	0.137	-0.292593	0.127	-0.315513	0.095
D-land	0.058832	0.000	0.059075	0.000	0.051976	0.000
TI Exogenous						
SC	-1.582831	0.000	-1.584609	0.000	-1.612537	0.000
ST	-2.688158	0.000	-2.643641	0.000	-2.573640	0.000
Constant	8.204731	0.000	8.233332	0.000	8.175493	0.000
Wald Test- Chi2 (31)	9170.29	0.000	9189.51	0.000	9324.36	0.000

TV: Time-Varying, TI: Time-Invariant

Model 1, Model 2 and Model 3 are distinguished by the use of alternative economic growth variables among the independent variables.