

Factors Affecting Poverty Dynamics and Persistence in Uganda

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1. Introduction

Despite the excellent progress made by Uganda in reducing poverty since 1992, there have also been substantial movements both into and out of poverty, and a significant minority of households have been persistently poor (Okidi and McKay, 2003). Two different panel data sets over the 1990s establish the significant extent of persistent or chronic poverty, and show that there is a strong association between poverty persistence and the depth of poverty – in other words many of the persistent poor are also among the poorest of the poor at any point in time. Clearly these households have failed to benefit from Uganda's impressive macroeconomic development over this period. In addition, the most recent estimates for poverty dynamics suggest that up to one third of households moved out of poverty, and a tenth moved into poverty, over an eight year period to 1999.

Given this fact, as well as just focusing on the chronic poor, it is important also to consider how and why some households have been able to escape from poverty, which may help in understanding why the chronic poor have been unable to make this transition. At the same time it is also important to see why some households have bucked the aggregate trend, and fallen into poverty despite not being poor initially.

This paper builds strongly on Okidi's work with different authors exploiting the available panel data sets for Uganda (Deininger and Okidi, 2002; Okidi and McKay, 2003 among others). It also uses primarily the same two nationally representative household panels (1992-1995 and 1992-00), in combination with the results of the two rounds of the Uganda Participatory Poverty Assessment Project (UPPAP), to gain insights on the factors associated with poverty transitions and persistence. The paper is primarily based on both descriptive and econometric analysis of the panel data set.

The paper is structured as follows. Section 2 briefly reviews approaches which have been taken to modelling the factors associated with chronic and transient poverty, poverty transitions and so on to date. Section 3 describes the information sources used, including describing the survey data and the steps involved to establish as reliable a panel data set as possible. This is followed in section 4 by a descriptive analysis of the patterns of poverty discussed according to several different characteristics of the households concerned, and forms the basis for the more detail multivariate econometric analysis in section 5. Section 6 concludes.

2. Modelling the factors associated with chronic and transient poverty

At the outset it is useful to recognise that there are two main methods used to distinguish chronic and transient poverty, the spells approach, which focuses on the number or length of spells in poverty, and the components approach which distinguishes permanent from transient components to well being and identifies the chronically poor as those whose permanent

component falls below the poverty line (Yaqub, 2000; McKay and Lawson, 2003). Which approach is adopted sometimes has implications for how the factors affected with how the factors influencing poverty dynamics are modelled. For example, the spells approach explicitly identifies poverty transitions, while the components approach focuses more on identifying the chronic and transient poor (and based on a concept significantly influenced by the depth of poverty).

In practice a number of different approaches have been adopted to understanding the factors associated with chronic poverty or transient poverty, or with poverty transitions. A straightforward approach is based on descriptive analysis, considering the relevant characteristics of a household at two or more periods in time. As a good example of this, Sen (2003) considers factors associated with poverty dynamics and poverty transitions in a livelihoods framework, and looks at changes in different categories of assets to which a household has access changes over the time period of the poverty transition. In this way he identifies factors which are likely to be important factors behind the observed transitions, even if the relative importance of each cannot be quantified.

Many studies though complement descriptive analysis with an explicitly econometric approach. Thus McCulloch and Baulch (1999) distinguish chronically and transitorily poor households for Pakistan based on the components method. They then model the characteristics associated with being chronically, transitorily or never poor using both an ordered logit model (as they argue that there is a natural ordering of these three) and a multinomial logit model (the latter an approach that has been adopted by several other authors). They argue that the ordered logit approach is good to understand the relative influence of different household characteristics on its poverty status, the multinomial logit approach enables the identification of the characteristics that are more prevalent within each category (McCulloch and Baulch, 1999, p.13).

These approaches can be adopted even when the time dimension of the panel is as short two waves, because it is still possible to identify the chronic and transient poor based on a spells approach. Where by contrast the time dimension of panel data sets are relatively long, it becomes possible instead to model the duration of poverty spells, an approach initially adopted by Bane and Elwood (1986) for the United States. Along similar lines, Baulch and McCulloch (1998) model the probability of entering and exiting from poverty using a proportional hazards model and allowing for censoring based on the same Pakistan data set as in their other study which comprises five years of consecutive panel data. They argue that the factors that are correlates of poverty transitions are often different from those that are correlates of the level of living standards of poverty itself. Such an approach is potentially very informative, given of course a panel data set with several waves.

Still within a spells approach, when the time dimension is shorter it is still possible to model the factors associated with movements into and out of poverty, as for example is considered by Bhide and Mehta (2003) based on a two wave NCAER panel data for India covering the period 1970/71 to 1980/81. For different definitions of poverty, they use probit models to identify the factors affecting whether or not a household is poor in the second wave given its poverty status in the first wave.

Carter and May (1999) also with a two wave panel for Kwa-zulu Natal, South Africa, also focus on movements into and out of poverty, but add an important new dimensions by seeking to distinguish structural and stochastic components to poverty and poverty transitions based on a household's assets. Okrasa (1999) considers the characteristics of the long term poor in Poland, particularly in terms of household asset endowments, and estimates logit equations for both the likelihood that a household is vulnerable and that it is chronically poor (the latter also depending on its vulnerability). Within the components approach to identifying chronic and transient poverty, Jalan and Ravallion (2000) model the factors

associated with each using a censored quantile regression model. They estimate poverty regressions for chronic and transient, and find that there are some significant, and plausible, differences associated with each.

Also of relevance to the issues being discussed here is a series of studies that have modelled income (or consumption) dynamics of households over time, because that of course is what underlies transitions or non-transitions in the corresponding monetary measures of poverty. Recently examples include studies by Dercon (2003) and Fields et al (2001). The latter for example focuses on data from four countries and models based on two wave household panel data sets the factors affecting changes in a consumption-based welfare measure (or its logarithm) in terms of the initial level of this measure (analogous to growth regressions) and a series of initial period household characteristics, and some changes in these household characteristics that can reasonably be considered exogenous. This is potentially a promising approach because it does not depend on the level of any poverty line, the precise level of which is always difficult to establish, so leading to concerns that the results of the poverty focused approaches above might be sensitive to the level at which the poverty line is set.

In practice some of these different approaches complement each other and in this paper we apply different approaches to understand the factors underlying poverty transitions and non-transitions in Uganda. First though we review the available data for this purposes.

3. Data

3.1 Dataset

Ugandan household survey data is relatively rich with there having been two nationally representative household surveys, in 1992 and 1999, in addition to four roughly annual monitoring surveys (1993 to 1996), over the last decade.

Both of the nationally representative surveys, the Integrated Household Survey (IHS) of 1992 and Ugandan National Household Survey (UNHS) 1999/2000 adopted two-stage stratified random sampling methodologies in the collection of a 9,886 and 10,696 household observations, respectively. Both provide a rich source of information on socio economic, crop and community levels data and form the basis of a 2 wave panel (1992-2000) which covers 1398, re-interviewed, households.

In addition to the latest household panel data, the annual monitoring surveys form the basis of some smaller two, three and four wave household panel data sets for Uganda. The panels of most interest for this analysis are those of more than two waves. These are the 1992/3/4 three wave panel which contains 690 households, and the four wave panel which spans 1992/3/4/5 and contains 357 households.

3.2 Data Matching

Given that the main focus of the paper is to follow households throughout several periods and to establish the key propagating factors which cause chronic or transient poverty, it was considered pertinent to firstly match the households across periods. Thus ensuring that the household being analysed are actually the same.

This matching process was undertaken in two stages. Firstly the household head had to be the same in each of the periods covered. Therefore the sex and age, allowing for an appropriate error range in the recording of age and the number of years between the panels¹, of the

¹ An acceptable error range in this instance was considered +/- 7/8 years – in line with what appeared to be a natural structural break in a frequency distribution of age differences, between the two periods.

household head had to be the same in each period. The second stage allowed for changes in the household head to have taken place. For instance it is quite conceivable that the household head may have died and another member of the family had become the new head. Therefore this second stage checked to see if the current household head sex and age was in the household in the previous periods, by cross referencing the age and sex, adopting the same methodology as in the first stage.

Combining both stages of this matching process resulted in household samples outlined in Tables 1 and 2. For the 1992 and 1999 two wave panel, 1105 households were matched and for the three wave 1992/3/4 three wave panel a total of 349 households were matched. Both of these panels form the basis of the empirical work.

3.3 Defining a Poverty Line

When studying the depth or incidence of poverty one of the first issues to confront is how to specify a poverty line. There are broadly two alternatives to doing this. The first, direct approach specifies a poverty line in terms of the minimum actual calorie intake, and if the household calorie intake is less than the required minimum the household is classified as being poor. There are several problems with this approach, but they include that fact that it makes poverty synonymous with malnutrition and few data sets record individual level information on food intake (Gaiha and Deolalikar 1993).

A second approach, which adopts an indirect methodology, uses a poverty line which represents the minimum cost of a nutritionally adequate diet (Gaiha and Deolalikar 1993). Such an approach is the basis of the accepted poverty lines, calculated by Appleton (2001), which have been used for most of the quantitative poverty work on Uganda. These will also be adopted for my analysis. Full technical details regarding derivation can be found in Appleton (2001).

These accepted poverty lines use the expenditure required in order to obtain 3000 calories and to meet non-food requirements. As noted in Appleton (2001) not all individuals will require this amount, therefore equivalence scales are used to account for the lower calorie requirements of lower, for instance, the calorie requirements of children, as estimated by the WHO. These equivalence scales are outlined in appendix Table 13.

3.4 UPPAP

Uganda has undertaken two Participatory Poverty Assessments (PPA1 - 1998/99 and PPA2 - 2002) with the overall aim being to allow the perspectives of poor to be considered in policy formation and thus deepen the understanding of poverty and poverty trends. Both PPAs complement quantitative poverty work by bringing a multidimensional perspective. For example, rather than adopting a quantitative approach to analysing poverty trends through monetary measures, communities structured poverty trend analysis around events that stood out for them, as significant historical happenings.

Both poverty assessments found that groups of people in different areas portrayed quite different poverty trends, relevant to their own history, with PPA2 accentuating this understanding with a focus on specific groups, such as internally displaced persons, agricultural estate workers and urban residents. Overall, there was a consensus that the levels of well being had not regained the standards of the 1970's with poor health and disease, limited access to land, markets and credit, and large families being identified as the main cause of poverty in both PPAs.

For example in the 1992/99 two wave panel the acceptable age range allowed for the 7/8 year gap between the panels and then allowed for an error range in age recording of +7 and -8 years.

Geographically, there were some quite distinct regional variations in how people perceived different characteristics to influence their poverty status. For the Eastern region food security, land defragmentation and the depletion of household assets through cattle rustling were perceived as the major causes of poverty. For both the Western and Northern regions, less predictable weather is seen as a major concern which causes food security issues, in addition to destabilising civil security. Whilst for the central region, population growth has led to a perceived excess demand of government services and subsequent problem of access, in addition to concerns over monetisation.

For the vulnerable groups, lack of land or productive assets and access to social services or support for education and health are commonly perceived as major problems across the groups. More specifically, persons with disabilities further identify the inability to engage in income generation and discrimination both within the household and community as key problems. Perhaps unsurprisingly, orphans identify little support for health and education, living with HIV/AIDS and staying in large families as major factors of vulnerability.

Many factors were identified as causes of movement in to and out of poverty, For households moving further into poverty alcoholism, and polygamy (and insecurity for the North) were the main causes identified in PPA2, although having large families, illness and landlessness were also very influential. There is general support for these causes from PPA1, although the sale of assets and loss of remittances were also highlighted as being significant in the first participatory process. Determinants related to moving out of poverty were; working hard, (which was largely associated with being healthy and therefore able to engage in work, diversify income generation activities and starting a business) and having access to land. Several of these factors were also identified in the first PPA, where investing in farming though land, livestock and remittances was also perceived to be of major importance.

4. Descriptive Trends

In this section we will focus on the key characteristics which, from the descriptive tables contained in both the appendix and main body of text, which appear to be associated with chronic poverty, moving out of poverty, moving into poverty and never being poor.

However, firstly we provide a broader picture of poverty trends within Uganda, and focus on the each of aforementioned poverty categorisations for all the panel data sets for Uganda.

4.1 Poverty trends

Nationally the proportion of the Ugandan population identified as poor fell from 55.7% in 1992 to 35.2% in 1999 (Appleton, 2001), with substantial poverty reduction occurring everywhere in the country except the Northern region. Between 1992/93 and 1994/95 the reduction in the poverty headcount was more modest, falling only from 55.7% to 50.2% over this period.

This though provides no information on the dynamics of poverty change, which requires panel data. The panels of course represent small subsamples of the national surveys, but the poverty incidence figures based on the panel households are broadly similar to the national level figures (Table 1). For the 1992-99 panel, while 48.6% of these households were poor at the beginning of the period, this had fallen to 29.3% by the end. 18.9% of the panel households were chronically poor, that is poor in the two years for which they were surveyed, while 40.9% were non-poor in both periods. The remainder moved into or out of poverty between these years, so indicating substantial mobility: 29.6% of the panel households moved out of poverty, while 10.3% of the panel households slipped in. The other two wave panels

covering pairs of years between 1992 and 1995 also show substantial movements into and out of poverty, though in each case with a substantial minority of households poor in both periods.

This substantial mobility is also confirmed by the three and four wave panels (Table 2), although attention needs to be paid to the small number of observations for the latter. 15.2% Of the households in the three year panel are poor throughout, and this proportion would be larger if it were possible to make adjustments for measurement error in the estimated consumption measures. 44.4% of households in this panel are never poor and 40.4% are in transient poverty.

Both panels then confirm the presence of a substantial number of households in chronic poverty, even ignoring the likelihood that measurement error will lead to this being underestimated. At the same time though there is substantial mobility into and out of poverty, much of which is likely to be genuine reflecting factors such as changes in agricultural fortunes, economic activities or household demographics.

Table 1

Two Wave Panels

% Poor at .. (1)		% Poor in Both Periods (2)	Moving Out of Poverty (3)	Moving into Poverty (4)	% Poor (in at least one period) (5)	% Not Poor (in both periods) (6)	Number of Households (7)
1992	1999						
48.6%	29.3%	18.9%	29.6%	10.3%	58.9%	40.9%	1105
1992	1993						
42.0%	34.2%	24.5%	17.5%	9.6%	51.6%	48.4%	767
1993	1994						
32.9%	35.7%	19.8%	13.0%	15.8%	48.7%	51.3%	474
1994	1995						
37.2%	32.8%	19.2%	17.0%	12.6%	49.8%	48.20%	308
1992	1995						
39.8%	33.9%	19.6%	18.8%	13.2%	53.0%	45.1%	572

Table 2

Three/Four Wave Panels

% Poor at (1)				% Poor in All Periods (2)	% Poor in at least One Period (3)	% Poor in 1 Period Only (4)	% Poor in 2 Period Only (5)	% Poor in 3 Periods (6)	% Not Poor (in all periods) (7)	Number of Households (8)
1992	1993	1994	1995							
48.0%	40.7%	43.5%	-	15.2%	55.6%	22.1%	18.3%	-	44.4%	349
45.3%	43.5%	46.0%	49.7%	10.8%	62.2%	21.6%	14.9%	14.9%	37.8%	148

4.2 Characteristics

Geographical

Table 3 outlines the how chronic, transient is distributed across both rural/urban areas and by region. Most notably we can see that chronic poverty is particularly prevalent in both the Northern region and rural areas of Uganda. For the chronically poor, as a whole, almost one third are from the North. Households in the Northern region also appear less likely to move out of poverty (11%), compared to all regions, however the comparison is particularly stark when compared against the central region which comprises almost one third of households who are moving out of poverty. Households in the north also appear less likely to be never in poverty.

Table 3: Poverty Levels By Region 1992/99

Rural /Urban/Region	Chronic Poor (1)	Moving Out of Poverty (2)	Moving Into Poverty (3)	Never In Poverty (4)	All (5)
By Column					
Urban	8.1%	12.2%	8.8%	21.9%	15.0%
Rural	91.9%	87.8%	91.2%	78.1%	85.0%
Central	23.4%	32.0%	26.3%	37.2%	31.9%
East	19.6%	28.0%	21.9%	19.9%	22.5%
North	30.1%	11.3%	25.4%	6.8%	14.5%
West	26.8%	28.7%	26.3%	36.1%	31.1%
By Row					
Urban	10.6%	23.9%	6.0%	59.1%	
Rural	20.5%	30.7%	11.1%	37.6%	
Central	13.8%	29.7%	8.5%	47.8%	
East	16.4%	36.8%	10.4%	36.2%	
North	38.9%	22.8%	18.1%	20.1%	
West	16.2%	27.2%	8.7%	47.6%	

The second part of Table 3 shows the descriptive data by row, i.e. by each of the rural/urban/region categorisations and accentuates the fact that chronic poverty is particularly prevalent amongst households in the Northern region of Uganda, with almost two in every five households being chronically poor. The other major characteristics appear to be the prevalence of households who move out of poverty, amongst those residing in the Eastern region.

Demographics/Education

As we can see from Table 4, trends in both household composition and size appear quite distinct across different categories of poverty.

Focusing on the two wave panel of 1992/99, we can see that the chronically poor have a high average household size at both the start and end periods (6.24 and 6.7) compared to the overall average household size of 5.48 and 6.07. However, the chronically poor not only have larger sized households but, and perhaps more significantly, they have; larger proportions of dependants to worker ratios (1.52 compared to a national average of 1.38), higher proportions of young dependants (52.2% compared to a national average of 46%) and lower proportions of work aged individuals. Trends which are largely reflected in the three wave panel for 1992/3/4 (right hand side of the table).

For households moving into poverty (column 3) although the household size in 1999 (6.79) is larger than the average (6.07), the composition of workers and young dependants is not significantly different than the national average. However, the changes in the household composition are quite distinct for households moving into poverty. Firstly the average decrease in the proportion of workers in the households (11.1%) is higher than the national average decline (9.4%). Secondly, and perhaps the most important factor, the proportionate increase in young dependants (8%) for households moving into poverty, compared to both the

national average (-0.7%) and all other categories, is extremely large. The result is an average increase in the proportion of dependants within the household of 6.7%, compared to a national average increase of 3.4%.

The aforementioned trends relating to households moving into poverty are less distinct for the three wave panel data set of 1992-94. However, perhaps most noticeable is the relatively large increase in the dependency ratio for household poor in one period only (3.2%) relative to the national average (1.5%). In contrast to households poor for one period only, those poor in two periods only, appear to have predominantly high original dependency levels, rather than high increases in dependency rates

In contrast to both the chronically poor and those moving into poverty Column 2 shows that the households moving out of poverty experience small increases in both household size (7.8%) compared to national increases of 21.5%. Furthermore any decrease in the proportions of work aged individuals are also accompanied by decreases of similar proportions of young dependants.

Regarding education, both the 1992/99 and 1992/3/4 panels show that the number of years of completed primary and secondary education for both the household heads and spouses of chronically poor households is lower than the national average and all other poverty categories. In particular the number of years of completed primary education by the head of households in chronic poverty, in both panels, is one half of the national average.

Table 4: Demographics

	1992/99					1992/3/4					
	Chronic Poor	Moving out of Poverty	Moving into Poverty	Never In Poverty	All	Chronic Poor	Sometimes Poor	Poor in 1 period only	Poor in 2 periods only	Never In Poverty	All
Demographics	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Actual Household Size											
Size of Household at 1992	6.24	5.91	5.06	4.95	5.48	6.52	5.47	4.59	5.67	4.65	5.01
Size of Household at 1999	6.7	5.74	6.79	5.84	6.07	6.90	5.60	4.77	5.52	4.86	5.22
Changes in Household Composition/Size											
Change in proportion of 0-5 year olds in hhold	-8.4%	-5.6%	-3.8%	-6.5%	-6.3%	-0.3%	1.4%	4.2%	-0.5%	-0.5%	0.7%
Change in proportion of 0-14 year olds in hhold	-2.7%	-4.3%	7.9%	0.5%	-0.7%	0.3%	1.4%	1.8%	1.9%	1.3%	1.1%
Change in proportion of >60 year olds in hhold	4.0%	5.9%	-1.2%	4.1%	4.1%	-1.6%	-0.2%	1.4%	-1.0%	0.0%	0.4%
Change in proportion of 15-59 year olds in hhold	-6.1%	-5.9%	-11.1%	-13.0%	-9.4%	-0.9%	0.0%	-1.2%	2.6%	3.6%	1.1%
Change in Dependency Ratio	0.15	0.06	0.37	0.23	0.17	0.04	0.03	-0.01	0.03	0.08	0.03
Change in Proportion of Holds who are dependants	1.5%	1.6%	6.7%	4.6%	3.4%	-1.2%	1.2%	3.2%	0.9%	1.3%	1.5%
Change in HH Size (mean change based s a proportionate change from 1992 HH Size)	+17.1%	+7.4%	+74.5%	+40%	28.7%	14.4%	16.3%	19.2%	14.5%	22.7%	19.2%
Change in PAE HH Size (Mean change based s a proportionate change from 1992 HH Size)	+14.6%	+4.4%	+62.6%	+26.7%	21.5%	11.5%	16.2%	15.1%	16.9%	22.5%	18.4%

Table 5: Education of Household Head and Spouse

	Chronic Poor	Moving out of Poverty	Moving into Poverty	Never In Poverty	All	Chronic Poor	Sometimes Poor	Poor in 1 period only	Poor in 2 periods only	Never In Poverty	All
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(6)	(6)
Education at 1992											
Household Head ('accepted hhold head')											
Average Number of Primary Years Completed	3.47	3.54	3.92	4.51	3.96	4.01	4.32	4.66	4.18	4.99	4.86
Average Number of Secondary Years Completed	0.25	0.41	0.31	0.75	0.50	0.38	0.46	0.66	0.39	0.94	0.87
Spouse Education											
Average Number of Primary Years Completed	1.87	2.65	2.85	3.65	2.90	2.67	3.08	3.46	3.04	4.13	3.86
Average Number of Secondary Years Completed	0.08	0.06	0.19	0.28	0.16	0.00	0.11	0.27	0.04	0.49	0.40

Main Economic Activity

Tables 9 and 10 shows the main activity status of the household head at both the start and end period of the 1992/99 panel and the dynamic movements between activities. The left hand side of each table show the proportions of household in each poverty category and employment activity. The right hand side of show how each activity type is proportionately represented across the poverty states. Overall there appears to be three quite distinct characteristics.

Firstly, for households moving into poverty there is a large transfer between agricultural own account activity to agricultural wage activity (4.4%) compared to all the other levels of poverty, and overall average (0.9%). A fact that is corroborated by the data in rows and columns 8, which shows that more than 40% of the movement to agricultural wage employment occurs in the moving into poverty category.

Secondly, non agricultural own account is particularly common amongst household never in poverty (83%) and those moving out of poverty (12%), compared to only 5% for households in chronic poverty. Suggestive that this type of employment is more secure as an income source, and therefore capacity in helping households avoid long term/poverty.

Thirdly, both the chronically poor and those in descending poverty state have relatively larger proportions (7.7% and 10.1% compared 4.6% and 2.6% for moving out of poverty, never in poverty, respectively) of household heads who have moved form one of the 'main' categories of activity status to the 'other' status, which contained the a combination of unemployed, disabled and heads that are too young to work.

Assets

Table 11, outlines the assets values for some enterprise and luxury good as at 1992 and 1999 and the level of change between the two years.

Comparing actual and percentage land and chicken number increases, over the two periods, there we see from the final rows of columns 1 and 3 that the chronically poor and households moving into poverty experience far lower increases than non poor/moving out of poverty. For example, the average increase in land area for the chronically/descending poor is 0.56 and – 0.05 acres, respectively. This compares with increases of 2.14 and 2.79 acres for households moving out of poverty and never poor. These are therefore suggestive of asset depletion in some cases, in order to avoid moving into or remaining in poverty. However, depletion of key enterprise assets of this nature, will have a long run effect of further restricting poor households movement out of poverty.

5. Econometric Findings

Estimation mehods and approach

The multinomial logit model has been widely used, in recent literature, for analysing the factors affecting the probability that a household is in chronic poverty (as opposed to transient poverty or being non-poor). One of the main advantages of such an approach is ease of specification. The ease of usage partly explains why the model has been chosen so frequently, however the main drawback is that it imposes the property of 'independence of irrelevant alternatives'.² As a consequence if, for example, an alternative choice of poverty is introduced, all the selection probabilities would be reduced proportionately.

² This property is a consequence of the implied assumption of no correlation between the error terms

One alternative to the multinomial logit model would be to use a multinomial probit. This type of specification provides the most general framework for the study of discrete choice models as it allows correlations between all alternatives. However, there is a problem in the dimensionality of the response probabilities and the method is computationally extremely resource intensive.

In practice though using a multinomial logit to model the factors influencing whether a household is in chronic poverty, transient poverty or never poor may suffer from the heterogeneity of the transient poor group. In the case of a two wave panel, as here, the transient poor will include both those that have escaped poverty over the period, and those that have fallen in, and the factors influencing this are likely to be different in each case. A better approach may be to distinguish these two groups as well, so identifying four groups.

Apart from the independence of irrelevant alternatives assumption noted above, a further limitation of the multinomial logit model applied in this way is that the different choices are dynamic in nature. In modelling those that are escaping poverty, households in this group may be affected by two sets of factors: those that made them more likely to be poor in the first place, and those which enabled them to escape from poverty. The first set of factors may be similar to those factors also associated with the chronic poor, and the second set to those associated with the never poor. In other words it may be difficult to distinguish some of the factors that are important for this group from those relevant to the chronic or never poor.

An alternative approach is to recognise the sequential nature of the two factors affecting a household's poverty status (poor or not in the first round, poor or not in the second) is to model each part separately. One straightforward way is by means of a series of related probit models, considering first the factors influencing whether or not a household is poor in the first year, and then distinguishing the poor and the non-poor, for each modelling the factors associated with the same household being poor or not in the second period. The latter part of this thus models among other things the likelihood that a household falls into poverty given that it was non-poor in the first period, or the likelihood it escapes poverty given that it was poor in the second. This two stage probit model does not allow for the non-random nature of the sample at the second stage; an alternative approach dealing with this is to estimate a nested logit model.

When the dependent variable just distinguishes the poor from the non-poor, as in the probit model, this implies the loss of a substantial amount of information about the household's living standard, which, measurement error notwithstanding, is known much more precisely than this. It may be much more promising in modelling the dynamics of living standards directly, or within a panel context, modelling the factors influencing the change in household living standards by what is essentially a micro-level growth equation (Fields et al, 2003). In this way it is also straightforward to quantify the different factors associated with changes in living conditions.

Estimation results

This paper considers all three of the above approaches with a view to understanding the factors associated with chronic poverty, and with movements into and out of poverty. Similar sets of explanatory variables are used in each case, these being set out and defined in Table 6 below. These explanatory variables are almost all based on household characteristics in 1992, which can reasonably be considered to be exogenous for purposes of this model, plus a few variables measuring changes over the period that can reasonably be considered to be exogenous. They include education levels of the head and spouse, occupation categories, age, gender and other characteristics of the head, geographic location variables and ownership of land. The regression analysis is conducted based on the 1992/99 panel only, reflecting the relatively small number of observations in the other panels.

Table 6 : Variables Definitions for Poverty Equations

Dependent Variables:	
Cpov	Dependent Variable: 0 - Never Poor, 1 - Chronically Poor, 2 - Moving out of Poverty, 3 - Moving into Poverty.
Poor/not poor 92 (and 99)	0 – non-poor in 1992 (1999), 1 – poor in 1992 (1999)
Change in Log of Welfare	Change in log of welfare between 1999 and 1992
Independent Variables	
Variables for initial period (1992) -	
Agehed	Age of household head (years)
Agehedsq	Age squared
Sexhed	0 if household head is male, 1 if female
Hsize92	Household Size (number of individuals)
Roomspae	Rooms per adult equivalent
Male5	Number of male children (less than or equal to 5 years) in household
Female5	Number of female children (less than or equal to 5 years) in household
Male615	Number of male children (6-14 years) in household
Female615	Number of female children (6-14 years) in household
Prworker	Proportion of family working (relative to household size)
Deprate	Proportion aged less than 15 or more than 60 years to household size
Prim	Household Head - Completed years of primary education
Sec	Household Head - Completed years of secondary education
Sprim	Spouse - Completed years of primary education
Spdummy	Spouse – Dummy
Landr	Land area * rural
Land92	Land Area (acres)
Chick92	Number of chickens
Goats 92	Number of goats
Cows92	Number of cows
UCentral	1 If household is in an urban area of the central region, 0 otherwise
RCentral	1 If household is in a rural area of the central region, 0 otherwise
UEast	1 If household is in an urban area of the eastern region, 0 otherwise
REast	1 If household is in a rural area of the central region, 0 otherwise
UNorth	1 If household is in an urban area of the northern region, 0 otherwise
RNorth	1 If household is in a rural area of the northern region, 0 otherwise
UWest	1 If household is in an urban area of the western region, 0 otherwise
RWest	1 If household is in a rural area of the western region, 0 otherwise
Agownac2	1 If household head is agricultural own account worker
Agwage2	1 if household head is agricultural wage worker
Agother2	1 if household head is agricultural other worker
Nagownac2	1 if household head is non agriculture own account worker
Logwel92	Log of welfare in 1992
Variables measuring change	
Hsizech	Change in Household Size
Headchmf	Head changed – male to female
Headch	Head changed
Chfive	Change in the number of five year olds
Chsixfo	Change in the number of six to fourteen year olds
Chwork	Change in the number of working aged individuals (15-59 years)

The dependent variable of the multinomial logit distinguishes four cases: the never poor; those poor in both periods; those poor in 1992 and not in 1999 (escaping poverty); and those non-poor in 1992 but that were poor in 1999 (falling into poverty). The purpose of this analysis is to identify the distinguishing characteristics associated with each group. This provides a more careful analysis of the types of households in each of these groups, though does not form a sufficient basis from drawing conclusions about the associated causes. As the

coefficients of such models (presented in this instance in the appendix) refer to the impact of each variable relative on a group relative to an omitted group, the results are more easily interpreted in terms of their marginal effects, in other words the marginal effect of a change in an explanatory variable on the probability that a household is in the group under consideration. These marginal effects are presented in Table 7. By definition they add up to zero because if a change in an explanatory variable increases the probability that the household is in one group, it must reduce the probability that it is in one or more others.

Table 7: Multinomial Logit Marginal Effects 1992/99 Panel

Variable	Not Poor (1)	Chronic Poverty (2)	Moving Out of Poverty (3)	Moving Into Poverty (4)
Constant	0.2328 (1.367)	-0.0840 (-0.678)	-0.0119 (-0.075)	-0.1368 (-1.583)
AGEHED	-0.0060 (-0.911)	0.0026 (0.564)	0.0018 (0.291)	0.0016 (0.467)
AGEHEDSQ	0.0000 (0.711)	0.0000 (-0.565)	0.0000 (0.013)	0.0000 (-0.614)
SEXHED	0.0070 (0.106)	0.0065 (0.125)	-0.0068 (-0.109)	-0.0067 (-0.201)
PRIM	0.0158 (2.088)**	-0.0041 (-0.844)	-0.0147 (-2.124)**	0.0030 (0.799)
SEC	0.0423 (2.643)***	-0.0306 (-2.213)**	0.0042 (0.272)	-0.0159 (-1.643)
SPRIM	0.0173 (2.203)**	-0.0169 (-3.159)***	0.0007 (0.092)	-0.0010 (-0.259)
SPDUMMY	0.0892 (1.355)	-0.0633 (-1.256)	-0.0378 (-0.616)	0.0118 (0.356)
DEPRATE	-0.1242 (-1.374)	0.0839 (1.229)	0.0095 (0.111)	0.0308 (0.71)
HSIZE92	-0.0131 (-1.733)*	0.0065 (1.37)	0.0025 (0.378)	0.0041 (1.047)
ROOMSPAE	0.1426 (3.539)***	-0.1646 (-4.301)***	-0.0063 (-0.16)	0.0282 (1.506)
LANDR	0.0227 (0.84)	-0.0257 (-1.145)	0.0371 (1.384)	-0.0340 (-2.118)**
LAND92	-0.0152 (-0.637)	0.0271 (1.302)	-0.0271 (-1.119)	0.0152 (1.011)
CHICK92	-0.0025 (-0.316)	0.0082 (1.568)	0.0009 (0.126)	-0.0067 (-1.536)
COWS92	0.0130 (1.508)	-0.0129 (-2.118)**	0.0000 (-0.001)	0.0000 (-0.01)
GOATS92	0.0087 (1.159)	-0.0009 (-0.18)	-0.0013 (-0.185)	-0.0066 (-1.611)
UCENTRAL	0.1464 (1.389)	-0.1045 (-1.158)	0.0684 (0.666)	-0.1102 (-1.702)*
RCENTRAL	-0.0301 (-0.685)	-0.0062 (-0.198)	0.0454 (1.081)	-0.0090 (-0.373)
REAST	-0.1232 (-2.455)**	-0.0096 (-0.284)	0.1155 (2.553)**	0.0173 (0.677)
UEAST	0.0948 (0.792)	-0.0924 (-0.912)	0.0950 (0.807)	-0.0974 (-1.276)
UWEST	0.1787 (1.423)	-0.2043 (-1.688)*	0.2059 (1.707)*	-0.1803 (-1.876)*
UNORTH	-0.0529 (-0.436)	0.0195 (0.234)	0.0891 (0.781)	-0.0557 (-0.783)
RNORTH	-0.3354 (-4.597)***	0.1900 (5.036)***	0.0506 (0.806)	0.0948 (3.446)***
AGOWNAC2	-0.0416 (-0.859)	0.0395 (1.103)	-0.0195 (-0.428)	0.0217 (0.842)
AGWAGE2	-0.0325 (-0.272)	0.0330 (0.394)	0.0875 (0.824)	-0.0880 (-1.004)
AGOTHER2	-0.0005 (-0.005)	0.0692 (1.121)	-0.0825 (-0.993)	0.0138 (0.281)
NAGOWNA2	0.2171 (3.244)***	-0.0144 (-0.263)	-0.1468 (-2.091)**	-0.0558 (-1.217)
HSIZECH	-0.0311 (-0.826)	0.0465 (2.01)**	-0.0135 (-0.414)	-0.0019 (-0.1)
HEADCHMF	-0.4103 (-1.799)*	0.0097 (0.073)	0.2680 (1.521)	0.1326 (1.789)*
HEADCH	0.0264 (0.379)	0.0078 (0.17)	-0.0469 (-0.737)	0.0127 (0.347)
CHFIVE	0.0106 (0.261)	-0.0464 (-1.87)*	0.0102 (0.288)	0.0257 (1.263)
CHSIXFO	0.0281 (0.717)	-0.0320 (-1.336)	-0.0166 (-0.488)	0.0205 (1.041)
CHWORK	0.0234 (0.621)	-0.0363 (-1.559)	0.0009 (0.028)	0.0120 (0.621)

* Significant at 1% level

** Significant at 5% level

*** Significant at 10% level

Table 8: Comparisons between predicted and actual groups based on the multinomial logit model

Frequencies of actual & predicted outcomes
 Predicted outcome has maximum probability.

Actual	Predicted				Total
	0	1	2	3	
0	348	25	75	6	454
1	70	74	58	7	209
2	154	39	129	6	328
3	55	17	26	16	114
Total	627	155	288	35	1105

The model itself fits the data relatively well. Unsurprisingly the explanatory variables are jointly very strongly significant in explaining the observed distribution across groups, and a comparison of predicted groups with actual groups (Table 8) shows about 51% of households are predicted into the correct groups. This is an imprecise measure of fit, but provides some assurance. As expected, predictions are more accurate for the two extreme cases, the never and the always poor.

Focusing throughout on significant marginal effects at the 10% level at least, the most important determinants of which group a given household is in include education, assets (including housing), location variables, the main economic activity, demographics, and changes in the household head or in demographic composition over the period. Education of the head and spouse to primary level, and especially secondary education of the head all have strong positive influences on the likelihood that a household is never poor. The spouse having been educated to primary level or the head to secondary level both have strong negative influences on the likelihood that the household is chronically poor. These results correspond strongly with prior expectations, and education is very likely to be a strong causal influence on a household's poverty status. The negative effect of the head having primary education on the probability of a household escaping poverty may seem counterintuitive, but this is probably picking up the effect above – households whose head had completed primary school in 1992 were less likely to be poor to start with.

Those households that owned cattle in 1992 are significantly less likely to have been chronically poor over this period; the same variable has a quite large positive but no quite significant impact on the likelihood of a household being never poor. Similarly households with better dwellings measures in terms of number of rooms per adult equivalent are significantly more likely to be never poor, and significantly less likely to be chronically poor. Households whose main economic activity is non-agricultural own account work are also significantly more likely never to have been poor over this period. By contrast there is no significant association between working in own account agriculture and poverty status, despite the high concentration of poverty evident among such households in simple bivariate analysis.

There are a number of strong associations between poverty status and locality of residence. In one sense such correlations are unfortunate because they mean that the model (or available data) has been unable to capture the more fundamental factors underlying for instance the greater poverty of the rural north. But equally they do highlight important geographic differentials. The rural northern region is where the effects are strongest, households in this locality being significantly less likely to be never poor and significantly more likely to be

chronically poor or have moved into poverty over this period. Those in the rural eastern region are significantly less likely to be never poor, but more likely to be moving out of poverty – this being a locality where poverty fell sharply between 1992 and 1999. Those in the urban areas of the western region are significantly less likely to have been chronically poor or descending into poverty over this period, and significantly less likely to escape. Again these patterns are consistent with the geographic pattern of poverty reduction over this period (Appleton, 2001).

Changes in poverty status over a period of course may reflect changes affecting the household over this period. Many such changes are likely to be endogenous (for example accumulation of assets) and so cannot be considered as explanatory factors in models of this kind. However, for some types of changes it may be legitimate to argue that they are not endogenous, certainly changes in the ages of household members and also perhaps changes in the household head. Only these types of change variables were included in the regression. Some turn out to be important. Households where the head changed between 1992 and 1999, for whatever reason, are more likely to be chronically poor, while those where there was an increase in the number of children under five years were less likely to be chronically poor. Households where the head changed, and changed specifically from being male to female are more likely to have fallen into poverty over the period and less likely to have never been poor; in other words this change is associated with impoverishment.

Given the restrictive structure imposed by the multinomial logit model, we now consider the factors associated with whether a household is poor or not to start with separately from the factors associated with changes (or not) in the household's poverty status between 1992 and 1999 by means of three separate probit models as discussed above. The results of this model are reported in Table 9, where the dependent variable takes the value 1 if the household is poor in the relevant year and zero otherwise. The likelihood of a household being poor in 1992 is significantly associated positively with residence in the rural eastern or northern regions and negatively with the head and the spouse having primary education, the household having cattle, with the number of rooms per adult equivalent, and with being engaged in a non-farm own account activity. Conditional on a household having been poor in 1992, residence in the rural northern region is most strongly positively associated with the household being in persistent poverty. Households with higher levels of assets, specifically the human capital of the head or spouse and cattle, are significantly more likely to escape poverty, as are those in the urban western region. Counter intuitively ownership of land for those in urban areas is positively associated with remaining in poverty, though this is not the case in rural areas. For those that were non-poor in 1992, descent into poverty is positively associated with residence in the rural Northern region and negatively with land ownership in rural areas; secondary education of the head; working in a non-agricultural own account activity and location in the urban areas of the Central and Western regions. In broad terms these results are consistent with those of the multinomial logit, but in some instances they are more intuitive than the latter because they impose a less restrictive structure.

Table 9: Probit Regressions 1992/99
Panel – Marginal Effects

Variable	Poor/Not Poor 1992	Poor or Not Poor in 1999 Conditional upon being poor in 1992	Poor or Not Poor in 1999 Conditional upon not being poor in 1992
Constant	-0.1222 (-0.588)	0.0504 (0.157)	-0.4717 (-2.244)**
AGEHED	0.0077 (1.25)	-0.0007 (-0.077)	0.0077 (1.139)
AGEHEDSQ	0.0000 (-0.744)	0.0000 (-0.109)	-0.0001 (-1.208)
SEXHED	-0.0012 (-0.019)	0.0676 (0.612)	0.0122 (0.184)
HEADWIDO	0.0046 (0.063)	-0.2368 (-2.006)**	0.0071 (0.097)
HEADMARR	-0.0463 (-0.547)	-0.2017 (-1.511)	0.0581 (0.731)
PRIM	-0.0175 (-2.426)**	0.0017 (0.175)	0.0056 (0.734)
SEC	-0.0216 (-1.385)	-0.0598 (-2.128)**	-0.0316 (-1.905)*
SPRIM	-0.0195 (-2.601)***	-0.0185 (-1.7)*	-0.0109 (-1.417)
SPDUMMY	-0.1258 (-1.398)	-0.1526 (-1.077)	0.0124 (0.142)
MALE5	0.0350 (1.125)	-0.0266 (-0.5)	-0.0507 (-1.286)
FEMALE5	0.0340 (1.161)	-0.0569 (-1.082)	0.0301 (0.87)
MALE614	0.0293 (1.131)	-0.0045 (-0.096)	0.0133 (0.424)
FEM614	0.0193 (0.721)	0.0068 (0.144)	-0.0103 (-0.34)
PRWORKER	0.0315 (0.336)	0.1503 (0.725)	0.1494 (1.421)
DEPRATE	-0.0168 (-0.144)	0.1189 (0.873)	0.0663 (0.712)
HSIZE92	-0.0027 (-0.198)	0.0217 (0.808)	0.0107 (0.696)
ROOMSPA	-0.1393 (-3.589)***	-0.2130 (-2.779)***	-0.0235 (-0.699)
LANDR	0.0178 (0.686)	-0.0931 (-1.924)*	-0.0635 (-2.187)**
LAND92	-0.0031 (-0.135)	0.0809 (1.792)*	0.0337 (1.265)
CHICK92	0.0101 (1.321)	0.0105 (0.989)	-0.0092 (-1.148)
COWS92	-0.0137 (-1.651)*	-0.0219 (-1.808)*	-0.0045 (-0.536)
GOATS92	-0.0019 (-0.264)	-0.0009 (-0.093)	-0.0108 (-1.459)
UCENTRAL	0.0099 (0.098)	-0.2842 (-1.515)	-0.2809 (-2.335)**
RCENTRAL	0.0384 (0.872)	-0.0445 (-0.687)	-0.0100 (-0.234)
REAST	0.1022 (2.122)**	-0.0882 (-1.306)	0.0586 (1.223)
UEAST	0.0310 (0.264)	-0.2129 (-1.085)	-0.2241 (-1.636)
UWEST	0.0163 (0.138)	-0.5983 (-2.618)***	-0.3704 (-2.472)**
UNORTH	0.1201 (1.053)	-0.0526 (-0.292)	-0.0419 (-0.359)
RNORTH	0.2102 (3.639)***	0.2315 (3.113)***	0.2504 (4.224)***
AGOWNAC2	0.0197 (0.414)	0.0882 (1.16)	0.0458 (0.998)
AGWAGE2	0.1096 (0.959)	-0.0460 (-0.283)	-0.1039 (-0.721)
AGOTHER2	0.0043 (0.049)	0.1933 (1.486)	0.0578 (0.642)
NAGOWNA2	-0.1783 (-2.688)***	0.0906 (0.755)	-0.1272 (-1.918)*
HSIZECH	-	0.0824 (1.636)	0.0149 (0.406)
HEADCHMF	-	-0.3417 (-1.355)	0.4824 (2.671)***
HEADCH	-	0.0172 (0.185)	0.0050 (0.07)
CHFIVE	-	-0.0899 (-1.612)	0.0230 (0.556)
CHSIXFO	-	-0.0214 (-0.4)	0.0130 (0.337)
CHWORK	-	-0.0495 (-0.993)	0.0012 (0.033)

* Significant at 1% level

** Significant at 5% level

*** Significant at 10% level

**Table 10: FACTOR AFFECTING
CHANGE IN LOGWELFARE**

Variable	
Constant	7.5775 (22.899)***
AGEHED	-0.0044 (-0.695)
AGEHEDSQ	0.0001 (0.804)
SEXHED	-0.0044 (-0.067)
HEADWIDO	0.0658 (0.913)
HEADMARR	-0.0679 (-0.834)
PRIM	0.0032 (0.453)
SEC	0.0554 (3.728)***
SPRIM	0.0099 (1.327)
SPDUMMY	-0.0423 (-0.48)
MALE5	-0.0129 (-0.358)
FEMALE5	-0.0147 (-0.43)
MALE614	-0.0109 (-0.358)
FEM614	0.0023 (0.074)
DEPRATE	-0.1920 (-1.642)
PRWORKER	-0.1285 (-1.414)
HSIZE92	-0.0186 (-1.15)
ROOMSPA	0.0409 (1.169)
LANDR	0.0637 (2.601)***
LAND92	-0.0243 (-1.127)
CHICK92	-0.0049 (-0.65)
COWS92	0.0111 (1.354)
GOATS92	0.0039 (0.547)
UCENTRAL	0.5008 (5.179)***
RCENTRAL	0.0722 (1.658)*
REAST	-0.0655 (-1.375)
UEAST	0.3562 (3.174)***
UWEST	0.4775 (4.328)***
UNORTH	-0.0310 (-0.273)
RNORTH	-0.4521 (-8.086)***
AGOWNAC2	-0.1422 (-3.063)***
AGWAGE2	-0.1604 (-1.415)
AGOTHER2	-0.1355 (-1.587)
NAGOWNA2	0.0078 (0.128)
LOGWEL92	-0.7908 (-26.879)***
HSIZECH	-0.0725 (-2.089)**
HEADCHMF	0.1254 (0.772)
HEADCH	-0.0704 (-1.07)
CHFIVE	0.0192 (0.497)
CHSIXFO	0.0088 (0.237)
CHWORK	0.0461 (1.35)

* Significant at 1% level

** Significant at 5% level

*** Significant at 10% level

Finally we consider the factors changes influencing changes in household welfare of households within the panel. Regressing the change in the logarithm of the welfare measure over the period on its own initial level (similar to a growth regression equation) and many of the other explanatory variables considered in other models above identifies many of the same factors as being important, but also some additional ones (Table 10). The initial level of the logarithm of welfare has a strongly negative coefficient, so that ceteris paribus the growth rates of household the well being measure are higher for households that were poorer to start

with. But there are many other important intervening factors. Growth rates of the welfare measure are faster for households where the head has secondary education, or that have more land in rural areas, but they are slower for households engaged in own account agriculture, a finding which differs from those identified above. Again there are strong regional effects, with growth rates being higher in urban areas of all regions except the northern region, and lower in the rural areas of the northern region. Again this is consistent with the evidence on changing living conditions and poverty over this period (Appleton, 2001). Increases in household size over the period also have a negative influence on the growth of well being. Many of these factors of course favour richer households relative to poorer households, so offsetting the potential convergence suggested by the negative coefficient of the initial welfare level.

6. Conclusions

Despite its good record in poverty reduction over the 1990s, the extent of persistent poverty over this period and the tendency of some households to fall into poverty against a trend where more households were escaping has already been convincingly established elsewhere. It is important though to understand what factors underlie this. Both descriptive and econometric analysis enable a clearer understanding of the types of households experiencing these phenomena in contrast to those escaping and those that were non-poor over the period. Lack of education and lack of key assets such as cattle are clearly strongly important factors which are associated with people staying poor or being unable to escape poverty – although it is important to understand that this analysis does not establish causality. In addition, there is clearly a strong regional dimension to this, with much of the chronic poverty and much of the descent into poverty occurring in the northern region. Unfortunately the information available for this study does not allow the factors underlying this to be convincingly established, and many of these are unlikely to be captured in the types of household surveys that have formed the basis for this analysis. More detailed consideration of the two UPPAPs may offer important clues.

There is clearly scope for analysing the importance of these different factors much more based on the survey data, for example looking at interactions of different factors with gender, considering household members economic activities in greater depth, investigating to what extent persistent poverty is associated with disadvantaged local areas and so on. There is also scope for further development of the econometric techniques, and each of these is likely to offer further important insights. But ultimately a greater understanding may come from integrating some of the insights from the survey with those from UPPAP, in particular the recent round which explicitly identified the factors considered important by communities in escaping from, or falling into, poverty. By knowing and understanding the factors important for escaping poverty, this of course helps identify some of the important factors behind persistent poverty – in other words the absence of these interrupters.

Appendices:

Table 11 : Household Head Activity Status at 1992 and 1999

	1992/99					Chronic Poor	Moving out of Poverty	Moving Into Poverty	Never In Poverty
	Chronic Poor	Moving out of Poverty	Moving into Poverty	Never In Poverty	All				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Main Economic Activity of Household Head at 1992									
Ag - wage	1.9%	2.7%	0.1%	2.2%	2.2%	16.7%	37.5%	4.2%	41.7%
Ag - own ac	77.0%	70.1%	77.2%	56.4%	66.5%	21.9%	31.3%	12.0%	34.7%
Other	5.7%	5.5%	4.4%	5.1%	5.3%	20.4%	30.9%	9.5%	39.0%
Non Ag - wage	11.0%	17.1%	14.9%	21.5%	17.5%	11.9%	29.0%	8.8%	50.3%
Non Ag - own ac	4.8%	5.2%	3.5%	16.4%	9.5%	9.5%	16.2%	3.8%	70.5%
Main Economic Activity of Household Head at 1999									
Ag - wage	1.9%	2.1%	4.3%	2.9%	2.6%	13.8%	24.1%	17.2%	44.8%
Ag - ownac/employer	78.4%	73.7%	74.6%	64.6%	70.9%	21.1%	30.9%	10.9%	37.1%
Non Ag - wage	7.7%	11.0%	7.9%	12.8%	10.8%	13.5%	30.3%	7.6%	48.7%
Non Ag - ownac/employer	4.3%	6.4%	2.6%	15.0%	9.1%	8.9%	20.8%	3.0%	67.3%
Other (i.e. Unemployed /Disabled)	7.7%	6.7%	10.5%	4.6%	6.4%	22.5%	31.0%	16.9%	29.6%

Table 10: Changes in Household Head Activity Status
Main Economic Activity Across the two waves

	1992/99					Chronic Poor	Moving out of Poverty	Moving Into Poverty	Never In Poverty
	Chronic Poor	Moving out of Poverty	Moving into Poverty	Never In Poverty	All				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Stayed in same activity									
Ag - ownac/employer	67.5%	62.8%	60.5%	49.3%	57.9%	22.0%	32.2%	10.8%	34.8%
Ag - wage	1.0%	0.0%	0.0%	0.6%	0.4%	40.0%	0.0%	0.0%	60.0%
Non Ag - ownac/employer	1.0%	1.8%	0.0%	9.3%	4.5%	5.0%	12.0%	0.0%	83.0%
Non Ag - wage	2.9%	9.9%	4.9%	9.7%	7.6%	7.1%	35.7%	7.1%	50.0%
Changed Activity									
ag own ac to ag wage	0.5%	0.6%	4.4%	0.6%	0.9%	9.1%	18.2%	45.5%	27.3%
other to ag wage	0.5%	1.5%	0.9%	1.5%	1.3%	7.1%	35.7%	7.1%	50.0%
ag wage to ag own ac	0.5%	2.4%	0.0%	1.3%	1.4%	6.6%	53.4%	0.0%	40.0%
other to ag own ac	10.5%	9.1%	14.0%	15.3%	12.5%	18.9%	29.7%	10.3%	41.1%
					3.2%				
to non ag wage	4.8%	1.8%	2.6%	3.5%	4.6%	28.6%	17.1%	8.6%	45.7%
to non ag own ac	3.3%	5.4%	2.6%	6.3%	0.0%	13.7%	29.4%	5.9%	51.0%
to Other (unemployed, disabled etc.)	7.7%	4.6%	10.1%	2.6%	4.7%	25.0%	28.8%	23.1%	23.1%

Table 12: Assets

	1992/99				
	Chronic Poor	Moving Out of Poverty	Moving Into Poverty	Never In Poverty	All
ASSETS	(1)	(2)	(3)	(4)	(5)
Asset Quantities - All Households					
Amount of Land at 1992	2.71	2.75	2.47	2.76	2.72
Number of chickens at 1992	1.91	1.63	1.45	1.92	1.69
Number of cows 1992	0.85	0.98	1.02	1.01	0.98
Number of pigs 1992	0.70	0.80	0.73	0.72	0.74
Amount of Land at 1999	3.27	4.90	2.41	5.56	4.60
Number of chickens at 1999	3.11	4.91	1.68	4.32	3.99
Number of cows 1999	0.72	0.96	0.82	1.56	1.14
Number of pigs 1999	0.29	0.36	0.25	0.32	0.32
Rural Households Only					
Amount of Land at 1992	2.76	2.89	2.45	3.02	2.86
Number of chickens at 1992	1.90	1.70	1.36	1.88	1.77
Number of cows 1992	0.86	1.08	1.04	1.08	1.03
Number of pigs 1992	0.70	0.81	0.74	0.88	0.81
Amount of Land at 1999	3.41	5.34	2.36	5.47	4.66
Number of chickens at 1999	3.14	5.31	1.63	5.03	4.34
Number of cows 1999	0.76	1.08	0.87	1.44	1.12
Number of pigs 1999	0.28	0.37	0.26	0.38	0.34
Urban Households Only					
Amount of Land at 1992	2.29	1.75	2.70	1.88	1.93
Number of chickens at 1992	2.00	1.13	2.40	0.96	1.20
Number of cows 1992	0.76	0.30	0.70	0.79	0.67
Number of pigs 1992	0.71	0.75	0.60	0.16	0.39
Amount of Land at 1999	1.70	1.75	2.95	5.85	4.26
Number of chickens at 1999	2.88	2.05	2.20	1.78	1.99
Number of cows 1999	0.35	0.08	0.30	2.03	1.28
Number of pigs 1999	0.41	0.28	0.20	0.11	0.19
All Households					
Livestock Asset Proportions					
Proportion of Households with Chickens at 1992	55.0%	44.5%	43.9%	46.9%	47.4%
Proportion of Households with Cows at 1992	20.1%	23.5%	22.8%	24.6%	23.3%
Proportion of Households With Bulls at 1992	7.2%	4.9%	9.6%	8.4%	7.2%
Proportions of Households with Pigs at 1992	14.8%	16.1%	14.0%	14.8%	15.1%
Proportion of Households with Chickens at 1999	52.6%	41.8%	40.3%	45.6%	45.2%
Proportion of Households with Cows at 1999	19.6%	22.0%	22.8%	24.1%	22.5%
Proportion of Households With Bulls at 1999	6.7%	4.6%	9.6%	8.2%	6.9%
Proportions of Households with Pigs at 1999	14.8%	16.1%	13.2%	14.8%	15.0%
Other Asset Proportions					
Proportion of Household with Land at 1992	83.3%	82.3%	78.1%	81.6%	81.8%
Proportion of Households with Bicycle at 1992	45.0%	50.9%	38.6%	50.4%	48.2%
Proportion of Households with tv, radio at 1992	33.5%	48.5%	36.0%	61.3%	49.5%
Proportion of Household with Land at 1999	82.8%	81.1%	79.0%	81.4%	81.4%
Proportion of Households with Bicycle at 1999	44.0%	49.1%	44.0%	49.1%	47.0%
Proportion of Households with tv, radio at 1999	33.0%	47.3%	36.0%	61.7%	49.2%
Asset Changes					
% Increase in Land Area	30.8%	92.6%	88.9%	111.9%	79.4%
Average Land Asset Increases (Acres)	0.56	2.14	-0.05	2.79	1.88
% Increase in Chicken Numbers	128.7%	214.8%	69.9%	207.4%	178.9%
Average Increase in Number of Chickens	1.20	3.28	0.22	2.63	2.30

Table 13:

Variable	Mean	Std.Dev.
AGEHED	42.41	15.49
AGEHEDSQ	2038.50	1490.50
SEXHED	0.21	0.41
H SIZE92	5.49	3.10
ROOMSPA E	0.74	0.56
PRIM	3.96	2.77
SEC	0.51	1.22
SPRIM	2.07	2.72
SPDUMMY	0.29	0.45
LANDR	2.43	1.68
LAND92	2.72	1.56
CHICK92	1.69	2.16
UCENTRAL	0.06	0.23
RCENTRAL	0.26	0.44
REAST	0.19	0.40
UEAST	0.03	0.17
UWEST	0.04	0.18
UNORTH	0.03	0.16
RNORTH	0.12	0.32
AGOWNAC2	0.67	0.47
AGWAGE2	0.02	0.15
AGOTHER2	0.05	0.22
NAGOWNA2	0.10	0.29

Table 14- Equivalence Scales By Sex/Age

Age	Male		Female	
	Calorie Requirement	Equivalence Scale	Calorie Requirement	Equivalence Scale
0	755	0.25	700	0.23
1	1200	0.40	1140	0.38
2	1410	0.47	1310	0.44
3	1560	0.52	1440	0.48
4	1690	0.56	1540	0.51
5	1810	0.60	1630	0.54
6	1900	0.63	1700	0.57
7	1990	0.66	1770	0.59
8	2070	0.69	1830	0.61
9	2150	0.72	1880	0.63
10	2190	0.73	2015	0.67
11	2340	0.78	2130	0.71
12	2440	0.81	2225	0.74
13	2560	0.85	2295	0.77
14	2735	0.91	2370	0.79
15	2875	0.98	2385	0.88
16	2990	1.00	2425	0.89
17	3090	1.02	2435	0.89
18-29	3025	1.00	2350	0.87
30-39	2960	0.99	2325	0.87
40-59	2960	0.99	2295	0.86
60+	2290	0.86	1830	0.77

NOTE:- Calorie requirements are from Appleton's calculations based on WHO (1985) guidelines.

Equivalence Scales for children (I.e. aged 14 and under) are gained by dividing calorific requirements by 3000

Equivalence Scales for adults are given by $0.42+0.58*(\text{calorie requirements}/3000)$

Source: p 14 Appleton (2001)

Table 15

Multinomial Logit 1992/99 Panel – Coefficients

Variable	Chronic Poverty (1)	Moving Out of Poverty (2)	Moving Into Poverty (3)
Constant	-1.0840 (-1.056)	-0.5817 (-0.734)	-2.1036 (-1.823)*
AGEHED	0.0308 (0.794)	0.0194 (0.637)	0.0323 (0.707)
AGEHEDSQ	-0.0003 (-0.716)	-0.0001 (-0.354)	-0.0004 (-0.762)
SEXHED	0.0255 (0.06)	-0.0370 (-0.121)	-0.0928 (-0.21)
PRIM	-0.0636 (-1.517)	-0.0816 (-2.314)**	-0.0029 (-0.056)
SEC	-0.2953 (-2.638)***	-0.0863 (-1.181)	-0.2804 (-2.213)**
SPRIM	-0.1489 (-3.314)***	-0.0384 (-1.043)	-0.0520 (-0.987)
SPDUMMY	-0.6143 (-1.482)	-0.3236 (-1.065)	-0.0740 (-0.168)
DEPRATE	0.8289 (1.468)	0.3197 (0.759)	0.6413 (1.108)
HSIZE92	0.0724 (1.759)*	0.0383 (1.112)	0.0774 (1.469)
ROOMSPAE	-1.3887 (-4.317)***	-0.3533 (-1.908)*	-0.0130 (-0.054)
LANDR	-0.2176 (-1.212)	0.0595 (0.47)	-0.4408 (-2.087)**
LAND92	0.2096 (1.268)	-0.0466 (-0.415)	0.2085 (1.075)
CHICK92	0.0587 (1.324)	0.0088 (0.234)	-0.0699 (-1.21)
COWS92	-0.1131 (-2.232)**	-0.0304 (-0.755)	-0.0309 (-0.527)
GOATS92	-0.0262 (-0.626)	-0.0244 (-0.692)	-0.0953 (-1.756)*
UCENTRAL	-1.0129 (-1.402)	-0.1353 (-0.279)	-1.5979 (-1.887)*
RCENTRAL	0.0309 (0.119)	0.2085 (1.002)	-0.0324 (-0.102)
REAST	0.2272 (0.792)	0.6394 (2.761)***	0.4854 (1.42)
UEAST	-0.8144 (-1.01)	0.0664 (0.12)	-1.3312 (-1.353)
UWEST	-1.7282 (-1.801)*	0.2066 (0.38)	-2.4717 (-1.971)**
UNORTH	0.2488 (0.358)	0.3945 (0.696)	-0.5106 (-0.547)
RNORTH	2.0033 (5.811)***	0.9396 (2.735)***	1.8656 (4.732)***
AGOWNAC2	0.3504 (1.188)	0.0383 (0.17)	0.3445 (1.011)
AGWAGE2	0.2877 (0.415)	0.3419 (0.65)	-0.9262 (-0.815)
AGOTHER2	0.4447 (0.863)	-0.2495 (-0.6)	0.1579 (0.244)
NAGOWNA2	-0.6010 (-1.398)	-0.9543 (-2.932)***	-1.1445 (-1.943)**
HSIZECH	0.3711 (1.821)*	0.0318 (0.186)	0.0511 (0.198)
HEADCHMF	1.0236 (0.835)	1.7750 (1.783)*	2.4720 (2.144)**
HEADCH	-0.0115 (-0.029)	-0.2042 (-0.634)	0.0825 (0.169)
CHFIVE	-0.3223 (-1.476)	0.0062 (0.034)	0.2680 (0.97)
CHSIXFO	-0.2709 (-1.284)	-0.1163 (-0.652)	0.1672 (0.626)
CHWORK	-0.2878 (-1.407)	-0.0521 (-0.303)	0.0814 (0.313)

* Significant at 1% level

** Significant at 5% level

*** Significant at 10% level

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