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Abstract

Despite Uganda's impressive reduction in monetary based poverty, during the 1990's, recent evidence has shown there to be substantial mobility into and out of poverty. This paper provides one of the first attempts at combining both qualitative and quantitative information, on an equal basis, to understand the factors underlying such poverty transitions and persistence. Using national participatory surveys and panel data we find that a number of factors, such as lack of key physical assets, high dependency ratios and increased household size are identified by both qualitative and quantitative research as being major drivers of poverty dynamics. However, the paper also demonstrates that there is clearly considerable value added in combining the two approaches allowing us to provide a much richer understanding of many of the processes underlying poverty and poverty transitions.

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1. Introduction

Uganda's excellent record in reducing the national incidence of monetary poverty over the 1990s is widely known. Panel data though over this period shows that this net aggregate reduction was accompanied by substantial mobility into as well as out of poverty (Okidi and McKay, 2003). A majority of those that were poor in 1992 had escaped by 1999, but a substantial minority were left behind and many others fell into poverty over this period. Therefore, against the background of Uganda's impressive macroeconomic performance over this decade, there was a significant variation in individual experiences of poverty movements, and it is important to understand the factors, many of which are individual or local, that contributed to this.

This paper develops this understanding by combining qualitative and quantitative insights at the individual, household and community level. It builds strongly on earlier work by Okidi, with different authors, exploiting the available panel data sets for Uganda (Deininger and Okidi, 2003; Okidi and McKay, 2003, among others). The paper analyses panel data covering the 1992-99 period in combination with available qualitative information, notably the results of the two assessments conducted as part of the Uganda Participatory Poverty Assessment Process (UPPAP), to gain insights on the factors associated with poverty transitions and persistence. The qualitative sources add substantially to the information available from the panel survey data alone, by helping to identify key issues to investigate using the survey data and by providing important additional insights not available from the survey data, including about processes and contextual issues.

This paper is structured as follows. In section 2 we briefly review general approaches to developing a dynamic understanding of poverty, including persistent or chronic poverty. Building on this, we then consider in secion 3 the available evidence from qualitative sources about the key factors and processes identified by communities and their members as lying behind their experiences of poverty transitions or non-transitions, which identifies some clear individual, household, community and local

policy factors contributing to impoverishment in particular. Sections 4 and 5 then present descriptive and econometric analysis respectively using the panel data to consider the importance of different factors behind movements in monetary poverty, building on insights from the qualitative sources wherever possible. Section 6 concludes by seeking to synthesise the qualitative and quantitative insights, and then comments on the methodological scope for combining qualitative and quantitative insights in enhancing the understanding of poverty dynamics.

2. Understanding factors underlying poverty persistence and transitions

The key focus of this paper is to identify factors that are important drivers, interrupters and maintainers of poverty (Hulme et al, 2001) in Uganda, that is, influencing respectively movements into poverty, escapes from poverty and the inability to escape from poverty. An important starting point for this paper is to review existing approaches to identifying determinants of poverty, seen in a dynamic perspective. Existing literature on factors underlying chronic, or persistent, poverty is particularly relevant here, by helping identify the factors that prevent individuals and households from making poverty transitions. This can be viewed at different levels from the individual to national level and above, although the focus here will mostly be on the household and community level, reflecting available information for Uganda.

Chronic poverty is often seen as reflecting a lack of basic security, which is pervasive both over time and across different aspects of living conditions making it very difficult to escape poverty (Wresinski, 1987, Wood, 2003). A standard and basic economic approach views household income as reflecting the assets a household has command over and the returns to these assets, and so poverty as reflecting inadequate levels of one or both of these. Asset ownership and returns are of key importance, but a livelihoods approach (Ellis, 2000) is one important way of generalising this approach to a broader understanding of poverty, notably to a more dynamic approach which is of particular relevance here. According to the livelihoods framework a household's livelihood strategy, and so its level of well being, depends on the assets it has access to (classically financial, human, natural, physical and social capital); the

factors that mediate their access (for instance, gender relations or how markets operate); and contextual factors (such as macro policies or shocks). Both local factors and wider regional, national and global factors are important influences of living conditions.

Building on the livelihoods framework, and also drawing on Sen's freedoms approach (Sen, 1999), Hulme, Moore and Shepherd (2001) develop an extended view of chronic poverty based on a wider range of "assets", including political and security assets. Some of these factors may be what economists more typically think of as factors influencing returns to assets, but whichever framework is used this approach is useful in thinking about the wide range of factors influencing dynamic poverty status in Uganda.

In this paper we combine insights from qualitative and quantitative sources to seek to identify these factors. As noted above, the qualitative assessment draws particularly on the two rounds of the Uganda Participatory Poverty Assessment Process (UPPAP), whose primary aim was to allow communities to express their local understanding of poverty and their perceptions about policy priorities. These intuitive understandings of poverty are often highly dynamic in nature, and the participatory poverty assessments (PPAs) also help identify commonly perceived causes of poverty transitions.

The PPAs do not though allow for an understanding of the relative importance of different factors, nor do they enable generalisation to a wider level. For these reasons understandings of the factors influencing poverty dynamics are frequently drawn from nationwide panel surveys, most commonly analysed in consumption/income terms but which can be related to a wide range of correlates also available from the survey data. In this case, we analyse the results of the 1992-99 household panel formed by the 1992/93 Integrated Household Survey (IHS) and the 1999/2000 Uganda National Household Survey (UNHS) for information on poverty correlates. Such analysis is theoretically based on a Ramsey consumption growth model (Jalan and Ravallion, 1999), which relates changes in household living conditions (or discrete representations of this capturing movements across poverty lines) to initial period

levels of key household assets and other characteristics which are likely to influence their subsequent fortunes.

In this paper we seek to synthesise qualitative and quantitative insights on chronic poverty. We do this by first reviewing key insights about poverty transitions from the qualitative sources, and then see to what extent these are found to be a more widespread phenomenon in Uganda based on the quantitative data. The nature of the available information though is such that some factors can only be clearly identified from one approach or the other.

3. Qualitative evidence on factors affecting poverty transitions in Uganda

There is now a significant amount of qualitative information about poverty in Uganda, with the main source being the two large-scale participatory poverty assessments carried out as part of UPPAP in 1998/99 and 2002. Drawing on detailed fieldwork in nine districts in 1998/99 and twelve in 2002, the results provide a rich source of information on local understandings of poverty and of policy priorities (Republic of Uganda, 2000, 2002). Of specific relevance to this paper, they also provide valuable insights about factors contributing to poverty persistence and transitions, which we focus on in the following discussion.

Communities covered in both rounds typically express clear ideas of what poverty means to them, and these understandings have a clear and important dimension of persistence. Thus in the first PPA, poverty is described as a "perpetual need for daily necessities of life and a feeling of powerlessness" (Republic of Uganda, 2000), and the difficulty of overcoming poverty is stressed. In both rounds a household's lack of assets, such as land or financial capital, is seen as a major factor contributing to the perpetuation of poverty (Republic of Uganda, 2002).

Other factors are also of importance. For instance, having adequate land is insufficient by itself if there is no effective access to markets or if there are excessive local taxes

(a problem widely stressed). Another key issue identified in rural areas is lack of information. Communities also identify the absence of strong local leadership or participatory governance, and the presence of corruption or insecurity, as being other important factors behind poverty and its perpetuation.

However, the two factors most strongly identified in both PPAs were poor gender relations and alcohol abuse. Poor gender relations were regarded as "causing and perpetuating poverty" (Republic of Uganda, 2000). Key factors behind the perpetuation of unequal gender relations (identified very strongly as a central maintainer of poverty in the second PPA in particular) included the practice of paying a bride price; domestic violence (often linked to alcohol abuse); and conservative attitudes among both men and women. Excessive consumption of alcoholic drinks was widely regarded as a major issue in its own right and a widespread problem by both women and men, in terms of the amount of money spent on it as well as its effects. Although it was also recognised that the production and sale of alcoholic drinks was an important source of income, including for many women.

The participatory assessments also investigate the factors associated with movements into and out of poverty. The two key factors identified in both PPAs as underlying descents into poverty are ill health and alcoholism. Other important factors include being in a large (or polygamous) family; insecurity (especially in the north); loss of assets, a job, or remittances; loss of a spouse or marital breakup; and unfair taxation or lack of government support. Each of these individually, and more so the presence of more than one of these factors simultaneously, then generally makes it very difficult for a household to escape poverty. Determinants of households 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 or start a business); having access to assets (land, start up capital for a business); and acquiring skills.

Other qualitative evidence broadly supports these findings. Based on fieldwork in three districts, Bird and Shinyekwa (2003) look specifically at factors behind downward mobility in poor rural communities. They highlight the importance of multiple shocks at the household and community level in leading to descents into

poverty, with socio-cultural factors playing an important role in this. This leads to the likelihood that the individuals and households that face these multiple shocks, and so multiple deprivations, will be trapped in chronic poverty. Family defragmentation (following death of a key family member or marital breakdown) was a key shock, particularly impacting on women. Marginalised groups (such as the elderly, the disabled or internally displaced people), who typically have lower levels of assets anyway, face the further disadvantage of commonly being excluded from household and community support mechanisms exist.

As in UPPAP, Bird and Shinyekwka found poor gender relations and excessive alcohol consumption to be key factors, with the latter often financed by the sale of household assets and a major cause of domestic violence. Excessive drinking, reported by Bird and Shinyekwa to be widespread in rural areas, is thus a major shock and contributor to further and persistent impoverishment in its own right, and prevents an escape from poverty.

In summary, available qualitative evidence identifies some clear messages about perceived causes of persistent poverty and descents into poverty (although less on causes of escaping from poverty) in the communities it relates to, and the main results are clearly intuitive. The extent to which these can be generalised across Uganda is of course unknown, and it is also difficult to identify the relative importance of different factors. In addition, little is known about escapes from poverty (which conceivably may be difficult for communities to recognise unless the changes are dramatic; those that are doing well have an obvious interest not to advertise it too widely). For these reasons, as well as to confirm results from the qualitative analysis where possible, there is a major benefit to complementing messages from qualitative sources with quantitative insights. This is especially the case when we can base such insights on a relatively large scale, nationwide panel survey over a period where the aggregate figures for monetary poverty show that quite a large number of households appear to have bettered their position and escaped poverty.

4. The nature of poverty transitions: Insights based on panel data

The Uganda National Household Survey (UNHS) conducted in 1999/2000 was designed to revisit 1398 households nationwide that had previously been surveyed in the Integrated Household Survey (IHS) of 1992/93. The quantitative analysis in this paper is based on a subset of these intended panel households that can be matched with confidence (see below).

Both the IHS and UNHS surveys were large multi-purpose household surveys, each based on stratified random cluster samples of around 10,000 households. The panel subcomponent of this was also designed to be nationally representative. The surveys collected information at household and community level on a wide range of characteristics, including demographic composition; education, health and housing; economic activities; household expenditures; and community infrastructure and characteristics. The analysis of monetary poverty here is based on the same approach used for the national level poverty studies (Appleton, 2001). The monetary measure of wellbeing is calculated as total household consumption expenditure per adult equivalent, adjusted for variations in prices between regions and the time period between the surveys, and the poverty line is defined with reference to minimum calorie requirements.

Data matching and attrition

To ensure that the panel households were the same in both periods, a two part matching process was undertaken. The first stage matched the sex and age of the household head, allowing for an acceptable error range given uncertainty about precise ages etc.[1] A second stage captured those households whose head had changed over the period. For instance, it is quite conceivable that a household head may have died and another member of the family had become the new head. Therefore, in this phase, we checked to see if the current household head, checking by sex and age, was in the household in the previous period.

[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. 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 or +7 and –8 years.

[3] At a 10% significance level.

Combining both stages of this matching process, results in 1103 households being matched for the 1992/99 two wave panel, indicating an attrition level of 21% (295 households). At first glance, this seems to be quite a high attrition rate, potentially raising some sampling concerns, however, such levels of attrition are perhaps not surprising when considering that we are following households whose head in the second round is present in the household in the first round, over an eight year period. Furthermore, when we compare attrition levels, with similar empirical work (Davis and Stampini 2002, Alderman et al 2000), such levels are not unusual. Despite this however, we still consider it pertinent to test for sample selection.

In order to assess the relevance of attrition in this instance we perform two kinds of analysis. Firstly, we will compare the initial characteristics of both the reduced and full panel with the 1992 IHS, to see if the families which dropped out are different from those which stayed in. Secondly, we estimate probits, in order to analyse which variables predict attrition.

Appendix Table A2 outlines the means of the main household characteristics for the panel and attrited households. Overall, we notice that the full 'unmatched' panel households are characterised by lower incomes, than those in the IHS. Reassuringly however, such differences and the mean incomes of the attrited and matched panels, are not statistically different from zero,[3] and this is the distinction that matters for current purposes.

Of the other results, perhaps most importantly, when we test to see if the differences between the attrited and matched panel are significant, we find this to be the case for only the gender of the household head and level of spouse primary education. However, the probit regression in Appendix Table A3, shows that such characteristics are insignificant.[4]

Overall therefore, the results indicate that attrition is not a major problem for this sample, with both the simple descriptive data and multivariate probit showing that the

[4] Although panel households are more likely to have latrines and flush toilets, these variables are not of interest in this analysis, and therefore of no concern.

household characteristics in general are significant but explain only a small proportion of the probability of attrition. Given these results, we proceed by using standard data analysis and regression techniques.

Patterns of poverty dynamics in Uganda

Adopting the accepted poverty lines for Uganda calculated by Appleton (2001), which show the population identified as poor to have fallen from 55.7% in 1992 to 35.2% in 1999, we now focus on the dynamics of poverty change using the panels.

Although the panels represent small subsamples of the national surveys, as we can see from Table 1 the poverty incidence figures based on the panel households are broadly similar to the national level figures. Within the 1992-99 panel the poverty incidence fell from 48.6% of households in 1992 to 29.3% by 1999. 18.9% of these panel households were chronically poor, while nearly 40% experienced transitory poverty over this period, 29.6% of households moving out of poverty and 10.3% slipping in.[5]

Table 1: Poverty Incidence (by Region) – 1992/99 Panel

Geographic location	Poverty Status				All
	Chronic Poor	Moving Out of Poverty	Moving Into Poverty	Never In Poverty	
National	18.9%	29.6%	10.3%	40.9%	100%
Urban/Rural and Region					
Column percentages					
Urban	8.1%	12.2%	8.8%	21.9%	15.0%
Rural	91.9%	87.8%	91.2%	78.1%	85.0%
Central Region	23.4%	32.0%	26.3%	37.2%	31.9%
East Region	19.6%	28.0%	21.9%	19.9%	22.5%
North Region	30.1%	11.3%	25.4%	6.8%	14.5%
West Region	26.8%	28.7%	26.3%	36.1%	31.1%
Row percentages					
Urban	10.6%	23.9%	6.0%	59.1%	100%
Rural	20.5%	30.7%	11.1%	37.6%	100%
Central Region	13.8%	29.7%	8.5%	47.8%	100%
East Region	16.4%	36.8%	10.4%	36.2%	100%
North Region	38.9%	22.8%	18.1%	20.1%	100%
West Region	16.2%	27.2%	8.7%	47.6%	100%

There are also important geographic differences in the distribution of chronic and transitory poverty (Table 1). Most striking are results relating to rural areas and particularly to the northern region. Almost one third of chronically poor households

in Uganda reside in the Northern region, compared to just over one seventh of the population. Within this region almost two in every five households are chronically poor. They are also less likely to have escaped poverty and more likely to have fallen into poverty over this period compared to the other regions.

This evidence is corroborated by findings in the second UPPAP report, where the majority of the communities identified insecurity and displacement (a characteristic feature of the northern region) as a priority factor moving people into poverty. To the extent that insecurity had paralysed mainstream economic activities in the affected areas, some communities even viewed lawlessness such as corruption, theft and trafficking of illicit goods as a means of escaping poverty. Econometric results obtained by Deininger and Okidi (2003) also emphasise avoidance of civil strife as a critical determinant of households' ability to increase welfare and reduce the risk of falling into poverty.

In terms of other characteristics, in both years of the panel chronically poor households are larger on average, and have higher dependency rates than the corresponding national averages. Further, they have lower levels of human capital with both the household head and (especially) the spouse having attended fewer years of school. They are less obviously disadvantaged in terms of physical assets, in that they cultivate similar land areas to the national (or rural) average, though information on land quality is not available and these households are disproportionately in the northern region where land quality is poorer on average. They are, however, less likely to own cattle, and to own smaller quantities when they do. Perhaps more important is the economic activities in which they are engaged: they are more likely be reliant on own account agriculture and less likely to be engaged in non-farm wage work compared to the national average and especially compared to the never poor group. Again this latter fact may partly reflect their disproportionate numbers in the Northern region.

Table 2: Key household characteristics by poverty status

	Poverty status 1992/99

[5] Other two and three wave panels, for Uganda, covering various groupings of years between 1992 and 1995 also show substantial movements into and out of poverty.

	Chronic Poor (1)	Moving out of Poverty (2)	Moving into Poverty (3)	Never In Poverty (4)	All (5)
Average Household Size					
1992	6.24	5.91	5.06	4.95	5.48
1999	6.7	5.74	6.79	5.84	6.07
Average ratio of dependents to non-dependents					
1992	1.52	1.41	1.40	1.29	1.38
1999	1.67	1.47	1.77	1.52	1.55
Percentage of Female headed households	19.1%	21.0%	23.7%	20.4%	20.7%
Percentage of households with polygamous head	5.3%	7.3%	6.1%	3.9%	5.4%
Education: average number of primary years completed					
Head	3.47	3.54	3.92	4.51	3.96
Spouse	1.87	2.65	2.85	3.65	2.90
Asset ownership					
Average land area cultivated 1992	2.71	2.75	2.47	2.76	2.72
1999	3.27	4.90	2.41	5.56	4.60
Average number of cattle owned 1992	0.85	0.98	1.02	1.01	0.98
1999	0.72	0.96	0.82	1.56	1.14
Economic activity category in 1992					
Agricultural wage	1.9%	2.7%	0.1%	2.2%	2.2%
Agricultural– own account	76.6%	69.5%	77.1%	54.9%	65.5%
Non Agricultural – wage	11.0%	17.1%	14.9%	21.5%	17.5%
Non Agricultural – own account	4.8%	5.2%	3.5%	16.4%	9.5%
Other	5.7%	5.5%	4.4%	5.1%	5.3%
Changes in economic activity category1992 to 1999					
No change	72.2%	74.5%	65.4%	68.9%	71.4%
Agricultural Own account to agricultural wage	0.5%	0.6%	4.4%	0.6%	0.9%
Other to agricultural wage	0.5%	1.5%	0.9%	1.5%	1.3%
Agricultural wage to agricultural own account	0.5%	2.4%	0.0%	1.3%	1.4%
Other to agricultural own account	10.5%	9.1%	14.0%	15.3%	12.5%
to non agricultural wage	4.8%	1.8%	2.6%	3.5%	3.2%
to non agricultural own account	3.3%	5.4%	2.6%	6.3%	4.6%
to Other (unemployed, disabled etc.)	7.7%	4.6%	10.1%	2.6%	4.7%

Those that were transitorily poor over the period share many of the same initial characteristics as the chronically poor, if not always to the same extent: they tend to be larger households, with higher dependency rates and lower levels of human capital than the national average. As might be anticipated though there are some important differences between escaping and descending households in how these characteristics change over the 1992 to 1999 period. In particular for those falling into poverty there is a large increase in average household size and in the proportion of dependents over

the period, suggesting that in many cases this descent into poverty may reflect life cycle factors.

There are other important distinctions though. There is an increase in the average area of land cultivated by those escaping poverty, but a modest decline for those falling in. The average number of cattle owned by those falling into poverty declines over this period. These are important examples of asset depletion, consistent with evidence from the second round of UPPAP, indicating that farming households that suffered severe drought problems had to sell off their assets, especially land, in order to pay taxes, medical bills and school fees. This is obviously self-defeating behaviour in the longer term and seems to have led some households into poverty, and trapped others in it. In addition, households falling into poverty are less likely to have had non-agricultural wage work initially, and are more likely to have a household head that has ceased to work or moved from own account agricultural work into agricultural wage employment compared to the national average. This strongly suggests that it is not just life cycle effects that lie behind descents into poverty.

Table 3: Alcohol Expenditure as a Proportion of Consumption

	Poverty status				
	Chronic Poor	**Moving Out of Poverty**	**Moving Into Poverty**	**Never In Poverty**	**All**
Consumption/purchases of alcoholic drinks	(1)	(2)	(3)	(4)	(5)
Average consumption as proportion of all food and beverages	4.5%	3.7%	4.5%	3.3%	3.8%
Average purchases as proportion of all food and beverages	9.9%	7.7%	10.2%	6.8%	8.0%
Proportions of hhs with any alcohol consumption expenditure	42.6%	39.3%	48.2%	36.7%	39.8%
Proportions of hhs with any purchases of alcoholic drinks	40.6%	33.9%	41.6%	34.2%	36.1%
Proportions with cons exp > 25% of all food&bev cons. exp	4.3%	2.1%	2.6%	2.7%	2.8%
Proportions with purchases > 25% of all food&bev purchases	12.6%	10.7%	13.3%	9.6%	10.9%

Polygamy and excessive alcohol consumption are two drivers of poverty identified in the UPPAP assessments on which information is available in the panel data set. Households whose head is in a polygamous relationship, are more likely to be poor than average (Table 2), though not necessarily more likely to be chronically poor. But data on expenditure on purchases of alcoholic drinks show an emphatic relationship with poverty status (Table 3). This is true even though such purchases are widely under-reported in surveys of this type (and the respondent is often not the best informed about these specific purchases). In 1992, chronically poor households and households that were not poor then but later fell into poverty were more likely to purchase alcoholic drinks, and devoted higher proportions of their budgets to it.

Large numbers in these two groups devoted more than one quarter of their budget for the purchases of all food and drinks for the households to the purchase of alcoholic drinks. This reinforces very strongly the message from qualitative work.

Finally, it is important to consider the key characteristics of those that were not poor in either period. In many cases this is simply the absence of some of the impoverishing factors noted above; but a factor strongly associated with this is working in non-farm activities, whether for wages or on own account.

5. Factors influencing poverty transitions: econometric analysis

5.1 Estimation Methods and Approaches

In practice, a number of different approaches have been adopted to understanding the factors associated with chronic and transitory poverty, or with poverty transitions. Some are based on straightforward descriptive analysis, for instance Sen (2003), who considers these factors within a livelihoods framework. Most studies complement descriptive analysis with an explicitly multivariate approach, generally based on econometric analysis. These generally take two forms, those modelling a discrete dependent variable measuring dynamic poverty status and those modelling the (generally continuous) underlying variable measuring the standard of living. The former approach has been strongly criticised by Ravallion (1996) for the loss of information it implies; but if the poverty line is set at a meaningful absolute level, it is still valuable to consider modeling transitions across the poverty line.

Focusing first on the discrete dependent variable approach, McCulloch and Baulch (1999) distinguish chronically, transitorily and never poor households for Pakistan, and model the associated characteristics using both an ordered logit model and a multinomial logit model.[6] Whilst the ordered logit approach is good for understanding the relative influence of different household characteristics on its poverty status, the more widely used multinomial logit approach enables the identification of the characteristics that are more prevalent within each category (McCulloch and Baulch, 1999, p.13). The heterogeneity of the transient poor group can be overcome to some

extent by distinguishing those that have fallen in to, and escaped poverty (reference). It does suffer from the need to make the strong 'independence of irrelevant alternatives 'drawback'[7], but other options such as the multinomial probit have their own problems, such as the dimensionality of the response probabilities and being computationally extremely resource intensive.

A different approach though is to recognise that when modelling poverty transitions, different poverty states are dynamic in nature. For example, households that are escaping poverty, 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. One straightforward way of undertaking this sequential modelling is by means of a series of related probit models, as is used for instance by Bhide and Mehta (2003) in modelling poverty transitions in rural India. The first step of the model considers whether or not a household is poor in the earlier period, and the second step models for each group separately the factors associated with the same household being poor or not in the second period.

However, 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 (Dercon, 2003; Fields et al, 2003). In this way it is also straightforward to quantify the different factors associated with changes in living conditions and it does not lead to concerns related to the aforementioned approaches, which might be sensitive to the level at which the poverty line is set.

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[6] McCulloch and Baulch (1999) argue that there is a natural ordering of the chronically, transitorily or never poor.

[7] This property is a consequence of the implied assumption of no correlation between the error terms. As a consequence if, for example, an alternative choice of poverty is introduced, all the selection probabilities would be reduced proportionately

5.2 Estimation results

Both the discrete and continuous dependent variable approaches outlined above are applied to the panel data set described and analysed in section 4 above with a view to understanding the factors associated with a household's poverty status. Similar sets of explanatory variables are used in each case, and are almost all based on household characteristics in 1992, plus a very small number of variables measuring changes over the period, each of which can reasonably be considered to be exogenous for purposes of this model. Important likely explanatory variables suggested by the descriptive analysis in section 4 include demographic variables and other characteristics of the head, education, physical of assets, location, type of work, and relevant changes in household demographic variables. Many other changes in household characteristics may be important influences of changes in poverty status, such as changing economic activity status, and are likely to be endogenous.

Discrete models of poverty status

As discussed above, household movements relative to the poverty line are considered by means of a multinomial logit model and then a sequential probit formation. In the former case the dependent variable 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 provide a more careful analysis of the types of households in each of these groups, though does not form a sufficient basis for drawing conclusions about the associated causes. The results are interpreted in terms of the marginal effects of each variable, in other words the marginal effect of a change in that explanatory variable on the probability that a household is in the group under consideration. The model performs reasonably well in terms of fit, and is relatively successful in predicting the extreme cases of the never and always poor and, not surprisingly, less so at predicting the two categories of transitory poor (Table 4).

Table 4: Comparisons between predicted and actual groups based on the multinominal logit model

		Predicted			
Actual	**0**	**1**	**2**	**3**	**Total**
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

Focusing throughout on marginal effects that are significant 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 (Table 5). Education of the head and spouse to primary level, and especially secondary education of the spouse 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. They also correspond to the findings in the second round of UPPAP in which the communities covered primarily identified hard work and gainful employment, the productivity of which is enhanced by good health and appropriate education, as priority factors for moving out of poverty. Although completion of primary education is expected to significantly improve well being in itself, the communities emphasised access to skill and education at higher levels as crucial for sustained poverty reduction. In our estimation, 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.

Rural residents with more land are less likely to fall into poverty, and 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 not quite significant impact on the likelihood of a household being never poor. According to UPPAP findings, pastoral communities that were not affected by cattle rustling, drought, animal diseases and the associated low yields, reported welfare improvements, largely due to better marketing opportunities and access to grazing land. 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. The other characteristics of such households (e.g. low levels of education) may be more important in explaining the high incidence of poverty among this group. UPPAP results also help in that some communities in the second round felt that poverty among crop farmers had increased over time due to deterioration of farmland quality, coupled with an inability to purchase hybrid seeds and fertilisers. Communities also attributed low earnings among most crop farmers to taxes (which they say is the single most important impoverishing factor) and limited markets and low prices, especially for maize. The econometric results suggest though that these factors did not apply in all communities.

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 real 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).

Table 5: Multinomial Logit Marginal Effects 1992/99 Panel

	Poverty status			
	Not Poor	**Chronic Poverty**	**Moving Out of Poverty**	**Moving Into Poverty**
Variable	(1)	(2)	(3)	(4)

	Marg effect	t ratio	Marg effect	t ratio	Marg effect	t ratio	Marg effect	t ratio
Constant	0.4413	(2.224)**	-0.2972	(-1.786)*	0.1730	(0.931)	-0.3170	(-2.574)**
Age of head	-0.0058	(-0.884)	0.0023	(0.495)	0.0018	(0.298)	0.0017	(0.5)
Age of head squared	0.0000	(0.68)	0.0000	(-0.502)	0.0000	(0.022)	0.0000	(-0.65)
Sex of head	0.0695	(1.472)	-0.0443	(-1.383)	-0.0279	(-0.649)	0.0027	(0.11)
Dep Ratio	-0.1215	(-1.345)	0.0863	(1.269)	0.0030	(0.036)	0.0321	(0.738)
Household size	-0.0156	(-2.042)**	0.0075	(1.575)	0.0043	(0.647)	0.0039	(0.99)
Rooms pae	0.1549	(3.955)***	-0.1728	(-4.567)***	-0.0118	(-0.313)	0.0297	(1.642)
Education (yrs.)								
Head Primary	0.0173	(2.282)**	-0.0047	(-0.955)	-0.0156	(-2.271)**	0.0030	(0.807)
Head Secondary	0.0386	(2.382)**	-0.0317	(-2.27)**	0.0088	(0.56)	-0.0157	(-1.619)
Spouse Primary	0.0096	(1.251)	-0.0153	(-2.816)***	0.0073	(1.027)	-0.0016	(-0.401)
Spouse Secondary	0.0768	(2.131)**	0.0060	(0.224)	-0.0878	(-2.2)**	0.0049	(0.284)
Number of Assets per household								
Land (rural) hectares	0.0181	(0.667)	-0.0262	(-1.165)	0.0426	(1.585)	-0.0345	(-2.131)**
Land	-0.0111	(-0.461)	0.0280	(1.34)	-0.0325	(-1.335)	0.0155	(1.028)
Chickens	-0.0017	(-0.218)	0.0083	(1.562)	0.0002	(0.032)	-0.0067	(-1.553)
Cows	0.0130	(1.517)	-0.0127	(-2.067)**	-0.0003	(-0.038)	0.0000	(-0.005)
Goats	0.0082	(1.089)	-0.0006	(-0.114)	-0.0009	(-0.13)	-0.0068	(-1.654)*
Region								
Urban Central	-0.0410	(-0.345)	0.0976	(0.833)	-0.1253	(-1.088)	0.0687	(0.727)
Rural Central	-0.2077	(-1.659)*	0.1989	(1.635)	-0.1630	(-1.368)	0.1717	(1.786)*
Rural East	-0.3018	(-2.392)**	0.1983	(1.627)	-0.0942	(-0.793)	0.1978	(2.061)**
Urban East	-0.1070	(-0.786)	0.1083	(0.822)	-0.0845	(-0.635)	0.0831	(0.802)
Urban West	-0.1837	(-1.465)	0.2093	(1.723)*	-0.2058	(-1.72)*	0.1802	(1.876)*
Urban North	-0.2465	(-1.713)*	0.2284	(1.836)*	-0.1046	(-0.762)	0.1227	(1.201)
Rural North	-0.5213	(-3.867)***	0.4001	(3.315)***	-0.1537	(-1.234)	0.2749	(2.886)***
Type of Work								
Agricultural own account	-0.0494	(-1.019)	0.0421	(1.171)	-0.0140	(-0.307)	0.0212	(0.824)
Agricultural Wage	-0.0357	(-0.299)	0.0342	(0.406)	0.0882	(0.834)	-0.0867	(-0.988)
Other	-0.0162	(-0.18)	0.0716	(1.153)	-0.0688	(-0.825)	0.0134	(0.274)
Non agricultural own Account	0.2154	(3.2)***	-0.0167	(-0.303)	-0.1433	(-2.042)**	-0.0555	(-1.21)
Change Variables								
Change in household size	-0.0043	(-0.42)	0.0155	(2.296)**	-0.0297	(-3.125)***	0.0185	(3.568)***
Head Change Male-Female	-0.5008	(-2.192)**	0.0403	(0.302)	0.3412	(1.922)*	0.1193	(1.572)
Head Change (dummy)	0.0239	(0.342)	0.0111	(0.24)	-0.0473	(-0.748)	0.0123	(0.337)
Change in number of children less than five years old	-0.0155	(-0.993)	-0.0153	(-1.513)	0.0254	(1.771)*	0.0054	(0.695)
Change in number of children between six and 14 years old	-0.0239	(-0.609)	0.0314	(1.303)	0.0127	(0.373)	-0.0202	(-1.026)
Change in the number of worker aged individuals	-0.0057	(-0.382)	-0.0051	(-0.529)	0.0194	(1.413)	-0.0087	(-1.17)

* Significant at 10% level** Significant at 5% level,*** Significant at 1% level

Number of observations 1103 Chi squared 355.7422

NOTE: Defaults – Missed Education (for head and spouse), Urban West, Non Agricultural Wage Employment

As already seen in section 4, changes in poverty status over a period 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, including 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. Most importantly, increases in household size have a significant positive influence on the likelihood that the household is chronically poor or falls into poverty (consistent with the descriptive results in section 4), while reductions in household size have a significant positive impact of the likelihood of escaping poverty.

Given the restrictive structure imposed by the multinomial logit model, in particular the independence of irrelevant alternatives assumption, and the fact that it may be conflating correlate of initial poverty status with correlates of change over time, 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 6, 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 negatively associated with the head having primary education or the spouse (where present) having secondary education; with the household having cattle; with the number of rooms per adult equivalent; and with being engaged in a non-farm own account activity. Regional dummy variables are not significant here.

Table 6: Probit Regressions 1992/99 Panel – Marginal Effects

	No. of Obs - 1103 Chi squared 150.1669		No. of Obs – 537 Chi squared 91.77121		No. of Obs - 566 Chi squared 121.7139	
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**	
	Marg effect	t ratio	Marg effect	t ratio	Marg effect	t ratio
Constant	-0.5147	(-0.957)	-1.8054	(-1.937)*	-3.6388	(-3.456)***
Age of head	0.0179	(1.158)	-0.0009	(-0.035)	0.0340	(1.151)
Age of head squared	-0.0001	(-0.671)	0.0000	(-0.158)	-0.0004	(-1.217)
Sex of head	-0.1045	(-0.778)	-0.0311	(-0.144)	0.0730	(0.298)
Head is widowed	0.0361	(0.2)	-0.5295	(-1.764)*	0.0252	(0.08)
Head is married	0.0934	(0.621)	-0.2586	(-1.049)	0.2202	(0.876)
Number of Males less than 5 years old	0.0769	(0.982)	-0.0748	(-0.532)	-0.2173	(-1.259)
Number of Females less than 5 years old	0.0793	(1.077)	-0.1543	(-1.112)	0.1356	(0.893)
Number of Males between 6 and 14 years old	0.0688	(1.06)	-0.0328	(-0.266)	0.0594	(0.435)
Number of Males between 6 and 14 years old	0.0383	(0.573)	-0.0087	(-0.071)	-0.0445	(-0.337)
Pr worker	0.0869	(0.37)	0.4711	(0.87)	0.6425	(1.406)
Dep rate	-0.0162	(-0.055)	0.3508	(0.975)	0.2816	(0.698)
Household size	0.0016	(0.046)	0.0668	(0.953)	0.0447	(0.666)
Rooms pae	-0.3621	(-3.772)***	-0.5941	(-2.951)***	-0.0986	(-0.689)
Education (yrs.)						
Head Primary	-0.0471	(-2.599)***	0.0036	(0.135)	0.0249	(0.741)
Head Secondary	-0.0458	(-1.155)	-0.1641	(-2.217)**	-0.1400	(-1.88)*
Spouse Primary	-0.0298	(-1.581)	-0.0485	(-1.665)*	-0.0513	(-1.523)
Spouse Secondary	-0.1792	(-2.203)**	0.1374	(0.796)	0.0285	(0.226)
Number of Assets per household						
Land (rural) hectares	0.0584	(0.89)	-0.2517	(-1.969)**	-0.2828	(-2.165)**
Land	-0.0194	(-0.332)	0.2197	(1.843)*	0.1512	(1.272)
Chickens	0.0240	(1.25)	0.0277	(0.984)	-0.0400	(-1.146)
Cows	-0.0355	(-1.699)*	-0.0565	(-1.762)*	-0.0192	(-0.527)
Goats	-0.0030	(-0.166)	-0.0012	(-0.045)	-0.0472	(-1.463)
Region						
Urban Central	-0.0018	(-0.006)	0.8036	(1.418)	0.3930	(0.623)
Rural Central	0.0317	(0.107)	1.4640	(2.405)**	1.5862	(2.343)**
Rural East	0.1903	(0.641)	1.3442	(2.222)**	1.8839	(2.723)***
Urban East	0.1063	(0.323)	1.0018	(1.508)	0.6412	(0.939)
Urban West	-0.0601	(-0.202)	1.5788	(2.608)***	1.6279	(2.387)**
Urban North	0.2935	(0.87)	1.4192	(2.355)**	1.4379	(1.939)*
Rural North	0.4717	(1.552)	2.1761	(3.596)***	2.7228	(3.902)***
Type of Work						
Agricultural Own Account	0.0725	(0.607)	0.2366	(1.177)	0.1962	(0.977)
Agricultural Wage	0.3099	(1.088)	-0.0532	(-0.126)	-0.4550	(-0.723)
Other	0.0628	(0.287)	0.5082	(1.484)	0.2434	(0.62)
Non Agricultural Own Account	-0.4367	(-2.616)***	0.2506	(0.791)	-0.5592	(-1.912)*
Change Variables						
Change in household size	-	-	0.2157	(1.622)	0.0660	(0.411)
Head Change Male-Female	-	-	-0.9419	(-1.291)	2.0783	(2.611)***
Head Change (dummy)	-	-	0.0621	(0.253)	0.0251	(0.08)
Change in number of children less than five years old	-	-	-0.2299	(-1.559)	0.1019	(0.566)
Change in number of children between six and 14 years old	-	-	-0.0568	(-0.402)	0.0556	(0.331)
Change in the number of worker aged individuals	-	-	-0.1262	(-0.959)	0.0028	(0.018)

Significant at 10% level, ** Significant at 5% level, *** Significant at 1% level
NOTE: Defaults – Missed Education (for head and spouse), Urban West, Non Agricultural Wage Employment

Many more variables though are significant at the second stage. Conditional on a household having been poor in 1992, residence in any rural region is strongly positively associated with the household being in persistent poverty, with the effect being largest for the north. Households with higher levels of assets, specifically the human capital of the head or spouse; cattle; and land in rural areas are significantly more likely to escape poverty. Apparently 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. The urban result though may be picking up those households that need to rely on agricultural activities despite living in a town. Those poor households whose head was widowed in 1992 were significantly more likely to have escaped poverty by 1999.

For those that were non-poor in 1992, descent into poverty is positively associated with residence in any rural area, with the effect again being largest in the north. Descent into poverty is also negatively associated with: land ownership in rural areas; secondary education of the head; working in a non-agricultural own account activity; and positively associated with living in the urban north and with the household head changing from being male to female. In broad terms these results are consistent with those of the multinomial logit model, but in some instances they are more intuitive than the latter because they impose a less restrictive structure.

Modelling continuous changes in living standards

Finally we consider the factor 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 7). The model has a good fit as measured by its R-squared value. The initial level of the logarithm of welfare has a strongly negative coefficient, so that ceteris paribus the growth rates of household 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 and is perhaps more intuitive. Again, there are strong regional effects, with growth rates being lower in rural areas of all regions, again most strongly in the north. Growth rates are significantly lower in urban 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.

Again, despite the greater flexibility this model offers, these results are broadly consistent with those identified in the other econometric models. They also confirm some of the factors identified by the qualitative studies.

Table 7: Factor Affecting Changes in Household Well Being

Variable	Change in Log Welfare	
Constant	7.5775	(23.662)***
Age of head	-0.0044	(-0.715)
Age of head squared	0.0001	(0.828)
Sex of head	-0.0044	(-0.418)
Head is widowed	0.0658	(1.015)
Head is married	-0.0679	(-0.694)
Number of Males less than 5 years old	-0.0129	(-0.315)
Number of Females less than 5 years old	-0.0147	(-0.388)
Number of Males between 6 and 14 years old	-0.0109	(-0.389)
Number of Females between 6 and 14 years old	0.0023	(0.036)
Pr worker	-0.1285	(-1.627)
Dep rate	-0.1920	(-1.378)
Household size	-0.0186	(-1.157)
Roomspae	0.0409	(1.096)
Education (yrs.)		
Head Primary	0.0032	(0.487)
Head Secondary	0.0554	(3.509)***
Spouse Primary	0.0099	(1.262)
Spouse Secondary	-0.0423	(0.731)
Number of Assets per household		
Land (rural) hectares	0.0637	(2.518)**
Land	-0.0243	(-1.028)
Chickens	-0.0049	(-0.614)
Cows	0.0111	(1.402)
Goats	0.0039	(0.547)
Region		
Urban Central	0.5008	(0.186)
Rural Central	0.0722	(-3.703)***
Rural East	-0.0655	(-4.895)***
Urban East	0.3562	(-1.083)
Rural West	0.4775	(-4.321)***
Urban North	-0.0310	(-4.009)***
Rural North	-0.4521	(-8.23)***
Type of Work		
Agricultural Own Account	-0.1422	(-3.079)***
Agricultural Wage	-0.1604	(-1.394)
Other	-0.1355	(-1.614)
Non Agricultural Own Account	0.0078	(0.094)
Change Variables		
Change in household size	-0.0725	(-2.069)**
Head Change Male-Female	0.1254	(0.715)
Head Change (dummy)	-0.0704	(-1.025)
Change in number of children less than five years old	0.0192	(0.512)
Change in number of children between six and 14 years old	0.0088	(0.212)
Change in the number of worker aged individuals	0.0461	(1.321)
Initial Income	-0.7908	(-26.937)***
	No. of Obs - 1103	
	R-squared= .481,	

* Significant at 10% level, ** Significant at 5% level, *** Significant at 1% level

NOTE: Defaults – Missed Education (for head and spouse), Urban West, Non Agricultural Wage Employment

6. Conclusions

This paper represents one of the first attempts at combining qualitative and quantitative information on an equal basis to understand the factors underlying poverty transitions and persistence. The application to Uganda has shown that this dual approach offers a much richer understanding of these factors than using either approach in isolation.

The quantitative analysis provides a national picture, and its multivariate nature allows many factors to be considered simultaneously, and their relative importance to be assessed. It has also been more successful than the qualitative sources in identifying escapes from poverty and their main influences. But it also misses many factors, with the limited nature of a survey questionnaire inevitably restricting the range of factors that can be considered and also the understanding of them that can be obtained in a survey format (for example, gender). Put another way, well conducted qualitative analysis provides a much richer understanding of many of the processes underlying poverty and poverty transitions. For example, the survey can measure reported purchases on alcoholic beverages and study their determinants, but is weak in being able to identify the impoverishing social and economic impacts of excessive alcohol consumption.

In the case of Uganda, where the qualitative and quantitative analyses cover similar topics, their results generally confirm or complement each other. Both the qualitative and quantitative results identify ownership of, or access to, assets at individual, household and community level as being major factors influencing poverty transitions and persistence. Lack of education and lack of key physical assets such as land and cattle are clearly identified as very important factors in both qualitative and quantitative work, as are demographic factors such as high dependency rates or increasing household size. The activities people are engaged in are important drivers of poverty dynamics, with working in non-agricultural activities in rural areas often being an important escape route: but this too often depends on a sufficient level of human capital.

It is important to have a broad interpretation of assets and of the mediating factors that influence livelihoods. Social and political capital, as well as security, are clearly important factors, including such factors as poor governance, excessive local taxation, a culture of excessive drinking, and pervasive insecurity, especially in the north being identified as very important factors especially in qualitative work. Indeed, in the second round of UPPAP, insecurity in the affected areas was the primary factor reported to be responsible for declines in well being. The survey confirms that households that are persistently poor or fell into poverty were those that were more likely to purchase alcoholic drinks and to spend on them, exactly matching the findings of qualitative work. Other important mediating factors are norms in relation to gender and other disadvantaged groups such elderly people or the disabled, with such groups often being doubly disadvantaged by lower levels of assets and processes of exclusion that only enable them to attain a low return on the assets they do have.

Results from the recent round of UPPAP reveal that communities that enjoyed welfare improvements during the 1990s associated the changes with expanded household asset bases. Although the communities appreciated increased access to health, education and safe water, they lamented the deterioration in the quality of public service delivery. The households that were reported to have enjoyed welfare growth were those with hard working and educated members and those with family assets acquired through purchases or inheritances. Conversely households that experienced declines in welfare were reported to be those that had lost productive assets (which, in some cases, were liquidated to finance other pressing needs, though as noted above, in other cases for less pressing needs). Agricultural produce marketing constraints and a feeling of exploitation of the smallholders in the context of liberalisation were also identified as influencing factors for deterioration of living standards. Furthermore, increased taxation in a bid by the central authorities and local governments to increase revenue and HIV/AIDS were also considered very important for falling conditions of living.

This paper has demonstrated that there is clearly considerable value added in combining qualitative and quantitative approaches equally and in a meaningful way to understand drivers, maintainers and interrupters of poverty. This approach can equally be applied in other countries, and there is also scope to develop it further in

Uganda, in providing additional understanding of key issues. Further work on gender and purchases of alcoholic drinks, for example, would seem to be two important priorities in this respect.

Appendix

Table A1: Basic Descriptive Statistics of Data used in Econometric analysis

Variable	Mean	St. Dev
Age of head	**42.41**	***15.49***
Age of head squared	**2038.50**	***1490.50***
Sex of head	**0.21**	***0.41***
Head is widowed	**0.10**	***0.30***
Head is married	**0.77**	***0.42***
Number of Males less than 5 years old	**0.67**	***0.84***
Number of Females less than 5 years old	**0.67**	***0.90***
Number of Males between 6 and 14 years old	**0.80**	***1.06***
Number of Females between 6 and 14 years old	**0.80**	***1.02***
Dep rate	**0.51**	***0.24***
Pr worker	**0.53**	***0.25***
Household size	**5.76**	***3.34***
Roomspae	**0.74**	***0.56***
Education (yrs.)		
Head Primary	**3.96**	***2.77***
Head Secondary	**0.51**	***1.22***
Spouse Primary	**2.07**	***2.72***
Spouse Primary Dummy	**0.29**	***0.45***
Number of Assets per household		
Land (rural) hectares	**2.43**	***1.68***
Land	**2.72**	***1.56***
Chickens	**1.69**	***2.16***
Cows	**0.98**	***1.99***
Goats	**1.58**	***2.33***
Region		
Urban Central	**0.06**	***0.23***
Rural Central	**0.26**	***0.44***
Rural East	**0.19**	***0.40***
Urban East	**0.03**	***0.17***
Urban West	**0.04**	***0.18***
Urban North	**0.03**	***0.16***
Rural North	**0.12**	***0.32***
Type of Work		
Agricultural Own Account	**0.67**	***0.47***
Agricultural Wage	**0.02**	***0.15***
Other	**0.05**	***0.22***
Non Agricultural Own Account	**0.10**	***0.29***
Change Variables		
Change in household size	**0.30**	***3.07***
Head Change Male-Female	**0.01**	***0.11***
Head Change (dummy)	**0.08**	***0.27***
Change in number of children less than five years old	**-0.24**	***1.44***
Change in number of children between six and 14 years old	**0.49**	***1.84***
Change in the number of worker aged individuals	**-0.05**	***1.82***
Income	**8.69**	***0.59***

Table A2: Descriptive Data Comparison for 1992, Full Panel and Reduced Panel after Matching

	IHS Sample		Full Panel			Matched Panel		Attrited Sample		
	Mean	**s.d**	**Mean**	**s.d**	**Diff**	**Mean**	**s.d**	**Mean**	**s.d**	**Diff**
Change in Income	-	-	0.35	*0.70*	-	0.34	*0.69*	0.37	*0.73*	**-0.03**
Agehed	40.17	*15.25*	43.04	*15.42*	**-2.86*** **	43.40	*15.50*	46.44	*16.24*	**-3.04*** **
Sexhed	0.27	*0.44*	0.24	*0.42*	**0.03**	0.21	*0.41*	0.28	*0.46*	**-0.07**
Education										
Missed	0.28	*0.45*	0.20	*0.40*	**0.07**	0.25	*0.43*	0.33	*0.49*	**-0.08**
Primary	3.93	*2.87*	3.73	*2.81*	**0.20**	3.97	*2.77*	3.78	*2.83*	**0.19**
Secondary	0.68	*1.48*	0.47	*1.20*	**-0.21***	0.51	*1.22*	0.35	*1.10*	**0.16**
Spouse Missed	0.40	*0.49*	0.29	*0.45*	**0.11**	0.30	*0.46*	0.29	*0.45*	**0.00**
Spouse Primary	3.14	*2.93*	1.87	*2.65*	**1.27*** **	2.07	*2.72*	1.53	*2.52*	**0.54**
Spouse Secondary	0.35	*1.05*	0.11	*0.58*	**-0.24** **	0.12	*0.61*	0.13	*0.64*	**-0.01**
Deprate	0.47	*0.27*	0.51	*0.25*	**-0.04**	0.51	*0.24*	0.52	*0.26*	**-0.02**
Hsize92	5.07	*3.39*	5.62	*3.29*	**-0.54** **	5.77	*3.34*	5.56	*3.36*	**0.21**
Roomspae	0.72	*0.58*	0.74	*0.56*	**-0.02**	0.74	*0.56*	0.73	*0.55*	**0.01**
Region										
Central	0.15	0.36	0.16	*0.35*	**-0.02**	0.17	*0.35*	0.16	*0.33*	**0.01**
East	0.14	0.35	0.12	*0.30*	**0.01**	0.12	*0.30*	0.14	*0.31*	**-0.02**
West	0.08	0.28	0.03	*0.18*	**0.046*** **	0.03	*0.18*	0.03	*0.16*	**0.00**
North	0.11	0.32	0.07	*0.23*	**0.039** **	0.08	*0.25*	0.09	*0.23*	**-0.01**
Type of Work										
Agricultural Own Account	0.53	*0.50*	0.67	*0.47*	**-0.13*** **	0.67	*0.47*	0.66	*0.47*	**0.01**
Agricultural Wage	0.03	*0.18*	0.02	*0.15*	**0.01**	0.02	*0.15*	0.03	*0.17*	**-0.01**
Other	0.06	*0.24*	0.06	*0.23*	**0.01**	0.05	*0.22*	0.09	*0.29*	**-0.04**
Non Agricultural Own Account	0.14	*0.35*	0.09	*0.28*	**0.05***	0.10	*0.29*	0.09	*0.28*	**0.01**
Non Agricultural Wage	0.22	*0.42*	0.16	*0.37*	**0.06***	0.17	*0.38*	0.13	*0.34*	**0.05**
Income	8.79	*0.69*	8.68	*0.59*	**0.11**	8.69	*0.59*	8.64	*0.59*	**0.05**
Sick92	0.19	*0.39*	0.17	*0.38*	**0.02**	0.16	*0.36*	0.18	*0.39*	**-0.02**
Assets										
Land	-	-	2.56	*1.65*		2.72	*1.56*	2.11	*1.77*	**0.62*** **
Chickens	-	-	1.63	*2.17*		1.69	*2.16*	1.50	*2.18*	**0.19**
Cows	-	-	0.89	*1.91*		0.97	*1.98*	0.61	*1.60*	**0.36** **

Table A3: Probit Regression - Whether Household Is In the Full Panel?

Variable	In Full Panel (No/Yes)		In Matched Panel (No/Yes) (compared with 'full' panel	
Constant	-1.6703	(-10.255)***	-0.0285	(-0.039)
Sex of head	-0.0578	(-0.981)	-0.1712	(-1.299)
Age of head	0.0043	(3.104)***	-0.0040	(-1.201)
Household size	0.0164	(1.357)	0.0497	(1.602)
Head is Married	-0.0520	(-0.77)	-0.0754	(-0.463)
Number of Males less than 5 years old	0.0356	(1.362)	0.0070	(0.105)
Number of Females less than 5 years old	0.0378	(1.474)	-0.0838	(-1.304)
Number of Males between 6 and 14 years old	0.0043	(0.183)	-0.0664	(-1.175)
Number of Females between 6 and 14 years old	0.0357	(1.485)	-0.0308	(-0.515)
Days Ill	0.0005	(0.458)	-0.0050	(-0.647)
Fallsick	-0.0005	(-0.523)	0.0055	(0.714)
Household Public Goods				
Flush Toilet	0.1723	(1.403)	0.6295	(1.768)*
Latrine Toilet	0.1843	(3.531)***	0.3624	(3.134)***
Other type of Toilet	0.0965	(0.588)	0.5630	(1.25)
Piped Water	-0.5779	(-3.811)***	-0.2144	(-0.489)
Public Tab	-0.3627	(-1.694)*	-0.1431	(-0.635)
Protected Water Source	-0.1340	(-0.978)	-0.2273	(-0.708)
Unprotected Water Source	0.0277	(0.723)	0.0750	(0.837)
Rain as Water Source	-0.8061	(-1.763)*	-	-
Vendor	-	-	-0.3406	(-0.7)
Education (yrs.)				
Head Missed	0.0629	(0.836)	0.0484	(1.51)
Head Primary	0.0082	-0.488)	0.0305	(0.657)
Head Secondary	-0.0033	(-0.199)	-1.2002	(-1.222)
Spouse Missed	-0.0419	(-0.466)	0.0987	(1.39)
Spouse Primary	-0.0333	-(2.529)**	0.0404	(1.481)
Spouse Secondary	-0.1737	-(1.485)	-	-DEFAULT AS NO UNIV OBS
Type of Work				
Agricultural Own Account	0.1415	(2.228)***	0.0627	(0.475)
Agricultural Wage	-0.1274	(-1.07)	-0.2527	(-0.907)
Other	-0.0668	(-0.731)	-0.0248	(-0.114)
Non Agricultural Own Account	-0.1037	(-1.006)	-0.1661	(-0.944)
Region				
Central	-0.0114	(-0.242)	0.1397	(1.69)*
North	-0.1877	(-2.196)**	0.0705	(0.673)
East	-0.0101	(-0.199)	-0.0796	(-0.958)
Income	0.0015	(0.293)	0.0433	(0.556)

* Significant at 10% level

** Significant at 5% level

*** Significant at 1% level

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