Uganda: The Influence of Health on Chronic Poverty

David Lawson
The University of Nottingham

1. Introduction

Although Uganda has made significant reductions in poverty levels, from 56% of the population in 1992 to 34% in 1999/2000, there is evidence to suggest that households far below the poverty line are more likely to experience extended duration of poverty, with a major cause being the lack of human/health endowment. Health plays a major role in establishing whether people are trapped in poverty, and is particularly important in Uganda where there is a high incidence of HIV/AIDS and economic reforms are primarily aimed at creating an enabling environment for economic agents to exploit by using their initial endowment of capabilities.

Using household panel data from for 1992-2000 this paper investigates the impact of sickness on the level of poverty (chronic, transient or non-poor) and the effects of income levels on health status. In order to fully analyse the former of these it is important to differentiate between long and short term sickness so that we can establish how serious illnesses, such as AIDS, might differ in the impact on poverty status, compared to less serious illnesses. However, equally as important is the influence of income on health status, and more specifically how income levels might influence changes in sickness levels.

2. Econometric Specification and Literature

Income has a major role to play influencing both an individuals health state and health care choice. There is comprehensive recent evidence using Ugandan household data (Lawson 2003) that concludes income to be a major influence on the heath status of adults and children in Uganda, when using either anthropometric and self reported sickness measures.[1] The simple facts are that Uganda, the poor appear to face substantially increased probabilities of falling ill. However to provide greater understanding of the relationship between poverty and health there is a need to examine the mechanisms through which the poor are made more vulnerable through sickness and subsequently stay in or move into poverty.

By using panel data we can investigate mechanisms through which these interactions occur, by looking at the factors which might be associated with different poverty levels (i.e. subsistence agricultural activities or large household sizes) and then interact these independent variables with general health status. Further value can be added to the analysis by using long term sickness variables and subsequent creation of sickness interaction terms.

An econometric specification of the aforementioned issues can defined via reduced form expressions. The level of poverty (and changes in poverty) can have right hand side explanatory variables will comprise a combination of dynamic variables such as the changes such things as the change; assets, household composition or changes in health, in addition to static independent variables. With these latter variables representing original values of such things as household head education and sex, as the start period (1992 in this instance)

$$? P \; orPovertyLevel ? \; ? (X_{99} ? \; X_{92}) ? \; a \; X_{92}$$

[1] Using health measures taken at one point in time – in this instance, using 1999 Ugandan cross sectional data.

Equally as important as the influence of income on health status, is how health status of the chronically/transiently/non-poor is affected by varying welfare levels. By using panel data we can analyse these influences. With the change in health between two period or state of health as at the first period being a function of instrumental variables and independent variables in the original period, such as sex, age and education.

$$? Health_i ? ? (X_{99} ? X_{92}) ? b X_{92}$$

Alternative methodologies could be used to analyse the health and chronic poverty. Health measures themselves could even be used as a direct measure of chronic poverty or chronic deprivation. For instance anthropometric measures such as weight for height represent an individuals state of wasting. Such measures can fluctuate quite significantly over relatively short time horizons, hence making the distinction between transient and chronic poverty an important one. These fluctuations may reflect various factors such as the period of the agricultural season or the effects of disease. Fluctuations of this nature are less of an issue for other nutritional measures which provide information on longer term nutritional status. Height-for-age malnutrition often reflects past events and may be less easily reversed. Thus highlighting that the chronic/transient distinction is important for some dimensions of poverty, but much less important for others.

There are also other direct health measures of chronic poverty which can be used. For example, severe poverty concepts such as the one discussed by Mehta and Shah (2001) for India which focused on the inability to consume two square meals a day, can be used to measure chronic poverty. Mehta found that in 1993/94 84.2% of rural households and 98.5% of urban households did consume two square meals a day throughout the year. In rural areas non-availability of two square meals a day peaked between June-September in urban and rural areas, with up to 2.7% of rural households not receiving this. This measure can also be used to provide a geographic profile of severe poverty; in the case of India, the proportions of households not consuming two square meals a day were highest in Orissa, Kerala, West Bengal and Assam. Multidimensional measures can also be used, which combine different dimensions of deprivation. To date there has been little attempt to do this at the household level, although it has been widely attempted at national or regional level, for example the UNDP's family of indices measuring human development"

Although these latter mentioned measures can be utilised as direct health measures and subsequently used as a proxy for chronic poverty they potentially tell us little about the interaction between health and chronic poverty. Hence, the approach to be adopted for this analysis will adopt monetary measures for poverty and self reported health measures to represent health status.

Dynamics of Poverty

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. This two wave panel forms the basis of what is used for the analysis in this paper.

3.2 Data Matching

Given that the papers focus is to analyse the impact of health on chronic poverty, it was decided that the health of the household head should be adopted as the sickness indicator for the household. This is logical from several perspectives, but most importantly, given that it is likely that the head will be the main income earner in addition being responsible for organising general daily activities/work patterns of the household. Therefore if the household head is sick, this is most likely to have direct and indirect consequence on welfare and other household aspects.

To ensure that the household head was actually the same person for which data was being recorded across the two waves of data, a matching process was undertaken which matched both the sex and age of the household head from 1992 with that of the household head in 1999. More specifically this process involved the sex matching and the age being within an accepted error range.[2] This matching process produced a sample of 1005 households which contained the same household head, and forms 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 Deolalikar1993). 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 Table 7.

4. Descriptive Data

Given the aforementioned poverty definitions, I will now provide a broad overview of poverty dynamics in Uganda, not just for the 1992/99 panel but for all of Uganda's two wave panel data sets, before focusing on how the health state of a household head influences the level of poverty

4.1 Poverty trends

As can be seen in table 1, for the 1992/99 two wave household panel, almost 20% of Ugandan households were in chronic poverty (poor in both 1992 and 1999), and six in every ten household were poor in at least one of the periods. In addition, there also seems to be large

[2] 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.

movements both into and out of poverty, with almost one third of Ugandans moving out of poverty and 10% moving back into poverty, between 1992 and 1999. Similar trends exist between the 1992/99 panel which uses those households with the same household head, and the 'full' panel (includes households with the same household heads as at 1999 and 1992, in addition to households which are headed, in 1999, by someone who was also in the household in the previous period).

The aforementioned trends largely confirm the findings of Okidi and Kempaka (2002) that even though there appears substantial mobility out of poverty, there remains a 'core' (in this case one fifth of Ugandan households) in permanent poverty and some movement back into poverty

Table 1 **Ugandan – Two Wave Panel Data Sets**

% Poor at ..(household multiplier weighted to national levels)		% Poor in Both Periods	Moving Out of Poverty	Moving into Poverty	% Poor (in at least one period)	% Not Poor (in both periods)	Number of Households
PANEL WITH THE SAME HOUSEHOLD HEAD IN EACH PERIOD:							
1992	**1999**						
54.1%	32.5%	18.9%	29.4%	9.9%	58.1%	41.7%	1005
Non Sick Households Only							
56.2%	32.3%	19.8%	30.2%	8.6%	58.5%	41.2%	825
Sick Households Only							
44.4%	33.5%	15.0%	25.6%	15.6%	56.1%	43.9%	180
FULL PANELS (After matching of households by confirming current head was in the same household in the first period):							
1992	**1999**						
54.1%	35.1%	18.9%	29.6%	10.3%	58.9%	40.9%	1105
1992	**1993**						
50.1%	44.0%	24.5%	17.5%	9.6%	51.6%	48.4%	767
1993	**1994**						
42.3%	45.8%	19.8%	13.0%	15.8%	48.7%	51.3%	474
1994	**1995**						
48.5%	45.7%	19.2%	17.0%	12.6%	49.8%	48.20%	308
1992	**1995**						
46.6%	48.3%	19.6%	18.8%	13.2%	53.0%	45.1%	572

The other two wave panels confirm the existence of approximately 20% of household being chronically poor, with figures also supporting the initial suggestion that there appears to be substantial transient poverty

4.2 Characteristics

In this section I 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, transient or non poor, and how the health state of the household head influences these factors.

Firstly it is pertinent to outline what appears to be, the broader impact of health on poverty and to see if a household being headed by a sick individual appears to have any distinct influence on a households welfare status.

Health Status and Poverty Levels
As can be seen in columns one and three in Table 2, households with relatively larger proportions of sick heads in 1992 comprise larger proportions of both the chronically poor and households which move into poverty.

Of the chronically poor (moving into poverty) 21% (28.3%) are headed by an individual who was sick in 1992, compared to households moving out of poverty which were headed by only 15% of sick individuals. Descriptive data for the 'long term' sick (more than 10 days of sickness per 30 day period) accentuate such trends.

Further analysis of Table 2 clearly shows that the initial health status of the household head has a key role in determining a household's level of the poverty level. In particular, column eight shows that households moving into poverty have a larger proportion of sick household heads, than non sick. The reverse is true for households moving out of poverty. This descriptive data is therefore suggestive that sickness has a major role to play in determining whether households move into poverty and, to a lesser extent, keep households in poverty. Findings which are largely in line with what intuition might suggest.

Geographical/Spatial
Geographically the Northern region of Uganda has often been considered relatively deprived in terms of infrastructure and investment, relative to the rest of Uganda, over the last few decades. It therefore might come as little surprise that households in the Northern region appear less likely to be never in poverty or move out of poverty (Table 3). Inversely, the Northern region is also associated with higher levels of chronic and descending poverty transitions. The initial health status of the household head appears to have little influence on welfare movements for the Northern region.

By contrast, households in the Western region appear to be associated with moving out of poverty. This particularly the case for households headed by non-sick individuals. Almost one third of non sick households moving out of poverty are from the Western region.

Demographics
Tables 8 and 9 show the demographic statistics associated with different poverty categorisations, with the latter of these tables dis-aggregated by whether a household is sick/non-sick headed households.

The former of these tables clearly shows that both chronic/moving into poverty households have higher initial and final level levels of household size. This is especially the case for the chronically poor which have an average of 6.1 (6.7) household members in 1992 (1999). Households moving into poverty appear to have relatively small initial household sizes (4.95), compared with chronic poverty but similar 1999 levels, therefore implying greater increases in household size. On average, households moving into poverty, increase their household size by 76%, compared to 9% increases for households moving out of poverty.

Table 2 **Poverty Level and Household Head Health Status**

Household Head	**Chronic Poor** (1)	**Moving out of Poverty** (2)	**Moving in to Poverty** (3)	**Never In Poverty** (4)	**All** (5)	**Chronic Poor** (6)	**Moving out of Poverty** (7)	**Moving into Poverty** (8)	**Never In Poverty** (9)
Proportion of Households with head who has long (>10 days) sick in 1992	6.84%	6.44%	8.08%	6.92%	6.87%	18.8%	27.5%	11.6%	42.0%
Proportion of Households with head sick in 1992	21.8%	15.6%	28.3%	18.9%	17.9%	15.0%	25.6%	15.6%	43.9%
Proportion of Households with head not sick 1992	78.2%	84.4%	71.7%	81.1%	82.1%	19.7%	30.2%	8.6%	41.2%
Proportion of Households with head who has long (>10 days) sick in 1999	12.1%	21.0%	11.1%	16.2%	16.4%	13.9%	37.6%	7.3%	41.2%
Proportion of Households with head sick in 1999	37.9%	30.3%	45.1%	38.4%	39.5%	18.10%	33.40%	7.80%	40.50%
Proportion of Households with head not sick 1999	62.1%	68.7%	54.9%	61.6%	60.5%	19.50%	26.60%	11.30%	42.40%
Dyanmics Household Head - Health Status									
Proportion of Hholds with Head sick in both 1992 and 1999	6.8%	9.8%	12.40%	10.0%	9.6%				
Proportion of Hhold with Head not sick in 1992 but sick in 1999	31.1%	35.3%	18.2%	28.4%	30.0%				
Proportion of Hholds with Head Sick in 1992 but not sick in 1999	7.4%	5.7%	16.6%	8.8%	8.4%				
Proportion of Hhold with Head not sick in either period	54.7%	49.2%	52.6%	52.7%	52.0%				
Rural/Urban/Region									
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%				

Table 3 **Household Head Health Status At 1992 and Poverty Status**

	Chronic Poverty		**Moving out of Poverty**		**Moving into Poverty**		**Never In Poverty**		**All**	
Rural/Urban/Region	**Sick (1)**	**Not Sick (2)**	**Sick (3)**	**Not Sick (4)**	**Sick (5)**	**Not Sick (6)**	**Sick (7)**	**Not Sick (8)**	**Sick (9)**	**Not Sick (10)**
Urban	7.4%	7.9%	6.5%	13.7%	7.1%	5.6%	18.1%	22.4%	12.2%	15.4%
Rural	92.6%	92.0%	93.5%	86.3%	92.9%	94.4%	81.0%	77.6%	87.8%	84.6%
Central	25.9%	24.0%	34.8%	32.1%	28.6%	26.8%	36.7%	38.2%	33.3%	32.6%
East	22.2%	19.6%	34.8%	25.7%	32.1%	18.3%	21.5%	18.5%	26.7%	20.9%
North	25.9%	28.8%	15.2%	11.2%	25.0%	22.5%	12.7%	9.9%	17.2%	13.5%
West	25.9%	27.6%	15.2%	30.9%	14.3%	32.4%	29.1%	33.4%	22.8%	33.0%
Household Head Health Status At 1999 and Poverty Status										
Urban	6.9%	8.5%	8.3%	16.0%	9.7%	4.3%	22.4%	21.2%	13.9%	15.4%
Rural	93.1%	91.5%	91.7%	84.0%	90.3%	95.7%	77.6%	78.7%	86.1%	84.5%
Central	25.0%	23.7%	30.8%	34.0%	38.7%	23.2%	37.3%	38.4%	33.0%	32.6%
East	23.6%	17.8%	37.6%	18.5%	25.8%	20.3%	22.4%	17.1%	28.0%	18.0%
North	26.4%	29.7%	7.5%	15.4%	19.4%	24.6%	7.5%	7.0%	11.8%	15.7%
West	25.0%	28.8%	24.1%	32.1%	16.1%	31.9%	32.9%	37.6%	27.2%	33.8%

Therefore, it is not just the initial and final levels of household size which are important but also the rate of change in households size and composition of such changes. For instance, it is important to know if the households moving into poverty are experiencing greater increases in dependants relative to workers, and therefore experiencing an overall decrease in worker numbers. From the final two rows of Table 9 we can also see that large increase in household size are reflected relatively evenly across sick and non-sick headed households, for most of the poverty categories. However, for households moving out of poverty, the household size (calculated in nominal and per adult equivalent terms) actually decreases for the sick households moving out of poverty. Thus suggesting that decreases in the household size, upon being sick, would help in coping with/escaping from poverty.

Household dependency composition changes are particularly interesting when comparing the sick/non-sick households. For both chronic/moving into poverty, with a sick head at 1992, there are at least 5% increases in the number of children, compared with a 9% reduction for households moving out of poverty. The negative effect on the capacity to generate earnings, of this increase in young dependants, is further compounded by an 18% (9%) decrease in worker aged households members for the chronic (moving into) poverty households. As a result the proportionate increase in household size for the sick headed chronically poor is close to 12%. This is in contrast to non sick, chronically poor, who have a household size decrease of 0.5%.

Main Economic Activity

Tables 10 and 11 outline the main activity states of the household head at 1992 and how these have changed relative to health status different poverty categorisations. There are three key trends. Firstly, the final row of Table 11 shows that for the chronic/moving into poor households that there is a movement away from the main income categories to the 'other' category, which largely comprises the unemployed and disabled. This is especially the case for the chronically poor households headed by sick household heads.

Secondly, sick headed household moving into poverty have a tendency to stay in own account agricultural production (Table 11, row 1). This links in with the demographic characteristics which suggested that households moving into poverty experienced large declines in worker aged individuals and large increases in young dependants. It would therefore seem logical that these two factors are connected. With households headed by the sick and experiencing increase proportions of young dependants being restricted to agricultural own account employment. This is because they need to generate more food to feed the incoming dependants and have a lowered income generation return capacity, as the most productive aged individuals are no longer in the household.

Thirdly, non agricultural wage employment, and remaining in this type of employment, appears to be the type of employment most related to moving out or never being in poverty. This would seem to indicate that this to be the most formal and reliable income sector.

Asset

Table 12, 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 the sick and not sick households, column 11 indicates that not only are the land areas smaller for the sick than non-sick (3.54 acres and 4.59 acres respectively) but land increases for the sick are almost half that of the non sick headed households (65.7% compared with 36/7% for the sick). Similar trends exist for the other enterprise assets such as chickens and cows. For instance non sick households have increases in the quantity of chickens and

cows, of 161% and 26%, respectively, compared to the sick household increase of chickens of 52% and decrease in cows by almost a quarter (22%).

The sick/non sick contrast is most stark for chickens. In all categories of poverty, the sick experience substantially smaller increases compared to the non-sick. For instance, households moving into poverty experience chicken number decreases by upto one third, compared to a 50% increase for the non sick. Thus suggesting the depletion of assets, and in particularly chickens, is one coping mechanism through which households try and avoid falling into poverty. This theory certainly appears to hold true if we look across the different poverty categories, with households moving out of/never in poverty experiencing generally larger increases in chickens and land than households chronic/moving into poverty.

Interestingly the asset depletion story of the sick which seems particularly strong for enterprise assets is also present for the luxury good of tv/radios, with the proportion of sick households possessing a tv or radio in 1992 and 1999 being more than 10% fewer than the non sick. This characteristic is present across all poverty categories, although once again, larger proportions of households moving out of/never in poverty appear to have tv/radios and bicycles.

In summary, the descriptive data suggest that health status of the household head, at 1992, has an influence on chronic poverty, but is especially linked with households moving into poverty. Ultimately the mechanism through which this transmission, of sickness to poverty, takes place appears to be through a combination of demographic, activity and asset based factors.

From a sick/non sick perspective, perhaps most striking is the suggestion that households headed by a sick individual, and are chronic/moving into poverty, appear to experience relatively larger reductions in worker aged individuals, with the negative effect of losing the most productive aged labour being compounded by increases in the proportions of young in the household. The loss of working aged labour and increase in young dependants appears then to confine the chronically/moving into poverty to agricultural own account employment with lower returns resulting from using less skilled labour - this appears to be particularly the case for the sick headed households for those moving into poverty. This confinement to agricultural own account work, low returns and then poverty appears to be accentuated by the sale of enterprise assets.

The sale of enterprise livestock suggests a particular distinction between the way sick and non sick households cope in either trying to stay out of poverty, move out of poverty, or avoid chronic/moving into poverty. Asset decreases for all households headed by the sick are distinctly larger than the decreases for the non-sick households. This is likely to be partly reflective of the relatively large increases in the sick moving to 'other' categories of employment which represent generally lower return activities states such as unemployment

5. Econometric Findings

Estimation Methods

This analysis will use a multinomial logit approach to analyse the key determinants of chronic, transient and never being in poor. The merits and drawbacks of adopting such an approach have been outlined in Lawson, Mckay & Okidi (2003). However, to summarise, the multinomial logit model has been widely used, in recent literature, for analysing the choice of chronic poverty. 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'.[3] As a consequence, if, for example, an alternative choice of poverty is introduced all the selection probabilities would be reduced proportionately.

Table 4 : Variables Definitions for Equations

Dependant Variables:	
Cpov	Dependant Variable: 0 - Never Poor, 1 - Chronically Poor, 2 - Moving out of Poverty, 3 - Moving into Poverty.
Change in Log of Welfare	Change in log of welfare between 1999 and 1992
Chsick	Change in sickness (1999 health status – 1992 health status)
Independent Variables	
Variables for initial period (1992) -	
Sexhed	0 if individual is male, 1 if female
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 of dependants 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)
Sksexhed	Sick*Sexhed
Skgoats99	Sick*goats92
Skagownac	Sick*Agricultural own account worker

[3] This property is a consequence of the implied assumption of no correlation between the error terms

Regression Results

Table 5 shows the main econometric results for all households in the 1992/99 matched panel. This includes both sick and non-sick households. Table 6 takes the analysis one step further by included sickness interaction terms, and the regression results in the appendix look at how long term sickness might influence chronic poverty

In agreement with the descriptive data, Table 5 shows that if a household head is sick as at 1992, then this is statistically significant in increasing the probability of households moving into poverty and significant in reducing the probability of never being, but not chronically poor. The former of these results in also confirmed in Table 6.

Furthermore the association between households with a sick head in 1992 and moving into poverty is furthered when we look at the bottom portion of Tables 6 and 15, and the interaction terms. There appears to be a positive association between a household head being sick (and female) and the probability of moving into poverty. Furthermore, and as might be expected, sick subsistence agricultural workers are also associated with moving into poverty, and long term sick agricultural workers are associated with being chronically poor.

Intuitively this latter finding may seem logical, however it is in direct contradiction to some of the recent work done by Mwabu and O'connell (2001) who found that workers in formal wage employment who became sick then faced an increased probability of poverty. The intuition behind their result, for Kenya, was that formal workers face limitations in being able to adapt their work patterns if they fall sick. They are subsequently more likely to lose their main income source, especially if prolonged sickness occurs. Similarly, Pitt and Rosenweig (1986) for Indonesia found sickness to have relatively minor influence on farm profits.

Increased education level of the household head and spouse appears to have a significant and positive influence on not being poor. Equally as significant are reduced levels of secondary education of the household head which are associated with an increased probability of being chronically poor and moving into poverty. Primary education of the spouse appears equally as important, with each year additional year of spouse primary education reducing the probability of being in chronic poverty by 1.8 percentage points.[4]

In agreement with the descriptive section, it appears that both the size of the household and the proportionate increase in household size play an important role in determining the poverty status of the household. This is particularly the case for chronic poverty where increased original household size is significant at the 1% level.

Of the other variables of key influence, regional location and asset levels (and changes) appear to be important. Although a relatively crude measure for capturing regional effects (see Lawson, McKay & Okidi 2003 for further discussion), some of the regional dummies indicate quite clearly that households in the rural Northern region, in particular, have a higher probability of being chronically poor/moving into poverty, relative to the rural Western region. Households with higher asset levels also appear less likely to be associated with chronic poverty, especially in relation to cows, and decreased quantities of land are associated with moving into poverty.

[4] Relative to the default of having missed education

Table 5 **All Sample - Multinomial Logit Marginal Effects 1992/99 Panel**

Variable	Not Poor (1)	Chronic Poverty (2)	Moving Out of Poverty (3)	Moving Into Poverty (4)
Constant	0.2601 (1.345)	-0.0523 (-0.397)	-0.1373 (-0.753)	-0.0705 (-1.003)
AGEHED	-0.0119 (-1.473)	0.0054 (1.025)	0.0068 (0.923)	-0.0003 (-0.092)
AGEHEDSQ	0.0001 (1.297)	-0.0001 (-0.978)	-0.0001 (-0.705)	0.0000 (-0.104)
SEXHED	0.0660 (0.918)	-0.0414 (-0.773)	-0.0225 (-0.328)	-0.0021 (-0.077)
HSIZE92	-0.0321 (-3.434)***	0.0194 (3.472)***	0.0079 (0.976)	0.0048 (1.329)
ROOMSPAE	0.1003 (2.187)**	-0.1543 (-3.715)***	0.0247 (0.565)	0.0293 (1.75)*
SICK92	-0.0659 (-1.975)**	0.1223 (1.472)	-0.0921 (-1.371)	0.0357 (2.186)**
DEPRAT	-0.0003 (-0.014)	-0.0010 (-0.088)	-0.0071 (-0.422)	0.0084 (1.234)
HSIZECH	-0.0047 (-0.615)	0.0142 (2.942)***	-0.0212 (-2.896)***	0.0117 (4.146)***
PRIM	0.0240 (2.877)***	-0.0076 (-1.482)	-0.0203 (-2.649)***	0.0039 (1.267)
SEC	0.0389 (2.255)**	-0.0287 (-2.02)**	0.0111 (0.676)	-0.0213 (-2.313)**
SPRIM	0.0226 (2.632)***	-0.0200 (-3.501)***	-0.0009 (-0.112)	-0.0017 (-0.542)
SPDUMMY	0.0449 (0.63)	-0.0265 (-0.521)	-0.0107 (-0.158)	-0.0078 (-0.294)
LAND92	0.0025 (0.197)	-0.0001 (-0.011)	0.0114 (0.974)	-0.0138 (-2.841)***
LANDCH	0.0030 (1.33)	-0.0042 (-1.641)	0.0041 (2.205)**	-0.0029 (-1.441)
CHICK92	0.0021 (0.242)	0.0065 (1.216)	-0.0014 (-0.168)	-0.0073 (-2.188)**
CHICKCH	0.0049 (2.161)**	-0.0036 (-1.141)	0.0043 (2.402)**	-0.0056 (-2.492)**
COWS92	0.0186 (1.933)*	-0.0147 (-2.241)**	-0.0019 (-0.207)	-0.0020 (-0.565)
COWSCH	0.0144 (2.584)***	-0.0080 (-1.662)*	-0.0053 (-0.996)	-0.0012 (-0.451)
UCENTRAL	0.0614 (0.679)	-0.0097 (-0.147)	0.0422 (0.478)	-0.0939 (-1.525)
RCENTRAL	-0.0343 (-0.716)	0.0016 (0.05)	0.0358 (0.783)	-0.0031 (-0.168)
REAST	-0.1365 (-2.449)**	-0.0073 (-0.207)	0.1270 (2.526)**	0.0168 (0.838)
UEAST	-0.0242 (-0.215)	-0.0331 (-0.376)	0.1138 (1.045)	-0.0565 (-0.894)
UWEST	0.1611 (1.492)	-0.1425 (-1.429)	0.0339 (0.322)	-0.0525 (-0.87)
UNORTH	-0.0416 (-0.338)	-0.0697 (-0.763)	0.1226 (1.106)	-0.0113 (-0.232)
RNORTH	-0.3456 (-4.34)***	0.1944 (4.821)***	0.0801 (1.149)	0.0711 (3.068)***
AGWAGE	-0.0107 (-0.089)	0.0326 (0.417)	0.0296 (0.257)	-0.0515 (-0.853)
AGOTHER	-0.1087 (-1.034)	0.0360 (0.59)	0.0598 (0.657)	0.0130 (0.372)
NAGOWNAC	0.2610 (3.775)***	-0.0557 (-1.092)	-0.1471 (-2.038)**	-0.0582 (-1.616)
NAGWAGE	0.0442 (0.829)	-0.0428 (-1.156)	0.0135 (0.271)	-0.0149 (-0.729)

* Significant at 1% level

** Significant at 5% level

*** Significant at 10% level

Table 6 **Multinomial Logit Marginal Effects 1992/99 Panel with Sick92 Interaction terms**

	Not Poor	**Chronic Poverty**	**Moving Out of Poverty**	**Moving Into Poverty**
Variable	(1)	(2)	(3)	(4)
Constant	0.2636 (1.483)	-0.1280 (-0.996)	-0.0641 (-0.393)	-0.0715 (-0.928)
AGEHED	-0.0064 (-0.894)	0.0046 (0.911)	0.0026 (0.403)	-0.0008 (-0.248)
AGEHEDSQ	0.0000 (0.636)	0.0000 (-0.856)	0.0000 (-0.115)	0.0000 (0.135)
SEXHED	0.1172 (2.194)**	-0.0539 (-1.495)	-0.0421 (-0.871)	-0.0211 (-0.798)
PRIM	0.0185 (2.324)**	-0.0066 (-1.258)	-0.0171 (-2.368)**	0.0052 (1.467)
SEC	0.0429 (2.52)**	-0.0296 (-2.019)**	0.0156 (0.981)	-0.0290 (-2.642)***
SPRIM	0.0194 (2.494)**	-0.0181 (-3.214)***	0.0007 (0.102)	-0.0019 (-0.548)
DEPRATE	-0.1304 (-1.586)	0.0737 (1.206)	0.0227 (0.302)	0.0340 (0.939)
HSIZE92	-0.0147 (-1.87)*	0.0098 (2.002)**	0.0031 (0.458)	0.0017 (0.46)
ROOMSPAE	0.1435 (3.553)***	-0.1578 (-4.002)***	-0.0043 (-0.113)	0.0186 (1.077)
LANDR	0.0137 (0.473)	-0.0186 (-0.749)	0.0229 (0.816)	-0.0180 (-0.907)
LAND92	-0.0093 (-0.361)	0.0188 (0.808)	-0.0128 (-0.507)	0.0033 (0.173)
CHICK92	-0.0002 (-0.019)	0.0080 (1.428)	-0.0005 (-0.062)	-0.0074 (-1.793)*
COWS92	0.0112 (1.244)	-0.0134 (-2.051)**	0.0031 (0.379)	-0.0009 (-0.225)
GOATS92	0.0084 (0.985)	-0.0026 (-0.461)	-0.0027 (-0.349)	-0.0031 (-0.758)
UCENTRAL	0.1359 (1.219)	-0.0790 (-0.833)	0.0583 (0.542)	-0.1153 (-1.521)
RCENTRAL	-0.0165 (-0.362)	-0.0134 (-0.406)	0.0378 (0.873)	-0.0078 (-0.36)
REAST	-0.1269 (-2.383)**	-0.0118 (-0.328)	0.1200 (2.52)**	0.0187 (0.802)
UEAST	0.0396 (0.307)	-0.0894 (-0.843)	0.1502 (1.222)	-0.1004 (-1.14)
UWEST	0.1851 (1.405)	-0.1894 (-1.497)	0.1001 (0.784)	-0.0957 (-1.046)
UNORTH	-0.0341 (-0.274)	-0.0406 (-0.44)	0.0975 (0.851)	-0.0229 (-0.374)
RNORTH	-0.3229 (-4.248)***	0.1855 (4.616)***	0.0629 (0.961)	0.0746 (2.858)***
AGOWNAC	-0.0581 (-1.102)	0.0508 (1.289)	0.0019 (0.04)	0.0053 (0.214)
AGWAGE	-0.0215 (-0.176)	0.0419 (0.481)	0.0403 (0.356)	-0.0607 (-0.807)
AGOTHER	-0.0980 (-0.963)	0.0686 (0.983)	0.0030 (0.033)	0.0264 (0.59)
NAGOWNAC	0.1946 (2.578)***	0.0243 (0.404)	-0.1450 (-1.864)*	-0.0739 (-1.382)
HSIZECH	-0.0088 (-1.209)	0.0111 (2.348)**	-0.0172 (-2.544)**	0.0149 (4.856)***
SKSEXHED	-0.1154 (-1.119)	0.0167 (0.234)	0.0295 (0.311)	0.0692 (1.715)*
SICK92	-0.1615 (-1.754)*	0.0750 (0.977)	0.0739 (0.79)	0.0126 (0.264)
SKGOATS9	0.0178 (0.97)	0.0021 (0.157)	-0.0103 (-0.578)	-0.0095 (-1.074)
SKAGOWNA	0.0811 (1.14)	-0.0592 (-1.197)	-0.0702 (-1.062)	0.0484 (1.762)*

* Significant at 1% level

** Significant at 5% level

*** Significant at 10% level

We can also adopt a similar multinomial approach to analysing the dynamics of sickness. On this occasion the default is if the head was healthy in both periods. Similar drawbacks to the approach exist, as have been previously mentioned.

Table 7 **Multinomial Logit Marginal Effects 1992/99 Panel - Change in health status**

	Non sick both periods	**Sick in both periods**	**Sick then non sick**	**Non sick then sick**
Variable	(1)	(2)	(3)	(4)
Constant	0.6812 (2.044)**	-0.4165 (-3.012)***	-0.5204 (-3.209)***	0.2558 (0.842)
AGEHED	0.0015 (0.204)	0.0025 (0.929)	0.0023 (0.64)	-0.0063 (-0.964)
AGEHEDSQ	-0.0001 (-1.179)	0.0000 (-0.047)	0.0000 (-0.413)	0.0001 (1.617)
SEXHED	-0.0385 (-0.817)	0.0150 (0.84)	0.0165 (0.77)	0.0070 (0.165)
PRIM	0.0072 (0.938)	-0.0026 (-0.785)	-0.0002 (-0.057)	-0.0044 (-0.625)
SEC	0.0115 (0.693)	-0.0238 (-2.159)**	0.0104 (1.359)	0.0019 (0.118)
SPRIM	0.0159 (2.101)**	0.0007 (0.199)	-0.0045 (-1.153)	-0.0121 (-1.683)*
DEPRATE	0.1276 (1.618)	-0.0735 (-2.403)**	-0.0237 (-0.63)	-0.0304 (-0.424)
HSIZE92	0.0150 (2.213)**	-0.0031 (-1.083)	0.0023 (0.784)	-0.0141 (-2.184)**
ROOMSPAE	0.1059 (2.923)***	-0.0192 (-1.286)	-0.0264 (-1.274)	-0.0602 (-1.79)*
AGOWNAC	-0.0457 (-0.952)	0.0120 (0.511)	0.0131 (0.528)	0.0206 (0.454)
OTHER	-0.1588 (-1.546)	0.0588 (1.672)*	0.0269 (0.574)	0.0730 (0.809)
NAGOWNAC	-0.0496 (-0.714)	0.0036 (0.105)	0.0000 (0.001)	0.0460 (0.705)
UCENTRAL	0.0442 (0.515)	-0.0145 (-0.298)	-0.0746 (-1.321)	0.0449 (0.585)
RCENTRAL	-0.0860 (-1.86)*	0.0405 (1.98)**	0.0174 (0.745)	0.0281 (0.654)
REAST	-0.2027 (-3.914)***	0.0527 (2.357)**	0.0320 (1.278)	0.1180 (2.547)**
UEAST	-0.2098 (-1.834)*	0.0739 (1.606)	0.0118 (0.212)	0.1241 (1.223)
UWEST	0.1363 (1.234)	0.0935 (2.508)**	-0.0916 (-1.214)	-0.1381 (-1.264)
UNORTH	-0.0151 (-0.134)	0.0247 (0.477)	-0.0231 (-0.399)	0.0135 (0.127)
RNORTH	0.0106 (0.168)	0.0236 (0.822)	0.0005 (0.017)	-0.0347 (-0.579)
TFLUSH	-0.0366 (-0.284)	-0.0867 (-1.211)	-0.0403 (-0.74)	0.1636 (1.436)
TLAT	-0.0004 (-0.007)	-0.0138 (-0.668)	-0.0685 (-3.076)***	0.0827 (1.629)
TOILOTHE	0.0024 (0.013)	0.0292 (0.518)	-0.0013 (-0.021)	-0.0303 (-0.166)
PUBTAP	0.1323 (1.284)	-0.0750 (-1.14)	-0.0146 (-0.254)	-0.0426 (-0.461)
UNPROTEC	0.0145 (0.404)	0.0169 (1.091)	0.0263 (1.457)	-0.0577 (-1.75)*
LOGWEL92	0.0355 (1.798)*	-0.0418 (-2.145)**	0.0452 (2.826)***	-0.0389 (-0.568)

* Significant at 1% level

** Significant at 5% level

*** Significant at 10% level

Perhaps most striking is the consistent story that continues to evolve in relation to income levels. Lawson (2003) found higher income to be consistently associated with lower morbidity, across both adults and children, using both self reporting and anthropometric health measures. As we can see in Table 7, health dynamics appear similarly influenced. Households with higher levels of initial income are significantly associated with moving out of sickness and not being sick. Equally as strong is the influence of lower initial income, which is significant at the 5% level, in being associated with household heads being sick in both periods.

Lower levels of household head secondary education is associated with being sick in both periods and increased spouse primary education is associated with being healthy in both periods. Geographically, people living in the Eastern region appear to face increased probability of being chronically sick (sick in both periods).

6. Conclusion

It is clear that despite Uganda's excellent poverty reduction over the last decade that there is a core of Uganda household not benefiting from economics reforms. This has resulted in a number of households being in persistent poverty and some households moving back into poverty. As one might expect, given the Ugandan governments focus on creating an enabling environment which economic agents can exploit by utilising their initial capabilities, the health status of the household head can play a major role in poverty dynamics.

In particular, it appears that sick headed households are more strongly associated with moving into poverty, have larger reductions in their asset base and remain in agricultural own account activities. Lack of education is also an important factor, and is particularly associated with people staying poor and household heads being chronically sick (sick in both periods). Importantly it also appears that low initial income levels have a similarly strong positive association with poor dynamic health states (being sick in both periods) as it does for poor static health measures (sick in one period only) used in previous quantitative analysis, for Uganda.

7. Appendices

Table 7 - Equivalence Scales By Sex/Age

	Male		Female	
Age	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*(calorie requirements/3000)

Source: p 14 Appleton (2001)

Table 8	Chronic Poor	Moving out of Poverty	Moving in to Poverty	Never In Poverty	All
Demographics	(1)	(2)	(3)	(4)	
Size of Household at 1992	6.16	4.81	4.95	4.84	5.38
Size of Household at 1999	6.76	5.79	6.75	5.89	6.11
Age Compositions of HH					
Proportion of Household 0-5 years at 1992	25.0%	20.1%	22.4%	22.0%	22.0%
Proportion of Household 0-14 years at 1992	52.0%	45.6%	43.8%	43.9%	45.9%
Proportion of Household > 60 years at 1992	5.1%	7.8%	8.9%	5.9%	6.6%
Proportion of Household 15-60 years at 1992	47.4%	50.8%	49.4%	57.9%	53.0%
Dependency Ratio at 1992	1.49	1.41	1.44	1.27	1.37
Proportion of HHold are 'dependants'	57.1%	53.4%	52.7%	49.8%	52.5%
Proportion of Household 0-5 years at 1999	16.3%	14.7%	18.8%	15.3%	15.7%
Proportion of Household 0-14 years at 1999	49.0%	40.8%	52.1%	44.9%	45.2%
Proportion of Household > 59 years at 1999	9.3%	14.5%	7.9%	10.5%	11.2%
Proportion of Household 15-59 years at 1999	41.7%	44.7%	40.0%	44.6%	43.6%
Dependency Ratio at 1999	1.65	1.436	1.723	1.525	1.54
Proportion of HHold are 'dependants'	58.3%	55.3%	60.0%	55.4%	56.4%
Changes in Household Size					
Change in Household Size (Based on 1992 HH Size)	19.3%	9.3%	76.8%	40.5%	30.9%
Change in PAE Household Size (Based on 1992 HH Size)	17.1%	6.5%	67.4%	30.1%	24.3%

Table 9 **Household Head Health Status At 1992 and Poverty Status**

	Chronic Poor		Moving out		Moving into		Never In		All	
Households Demographics	**Sick (1)**	**Not Sick (2)**	**Sick (3)**	**Not Sick (4)**	**Sick (5)**	**Not Sick (6)**	**Sick (7)**	**Not Sick (8)**	**Sick (9)**	**Not Sick (10)**
Size of Household at 1992	6.29	6.14	5.26	5.89	4.82	5.01	4.95	4.96	5.12	5.43
Size of Household at 1999	6.53	6.84	4.17	6.08	6.25	6.95	6.02	5.81	5.72	6.20
Age Compositions of HH										
Proportion of Household 0-5 years at 1992	17.2%	26.2%	11.0%	21.8%	17.2%	24.5%	16.6%	23.2%	15.4%	23.5%
Proportion of Household 0-14 years at 1992	38.9%	54.2%	36.7%	47.2%	43.5%	43.9%	40.6%	44.7%	39.8%	47.2%
Proportion of Household > 60 years at 1992	11.3%	4.0%	13.4%	6.8%	9.2%	8.8%	7.2%	5.5%	9.7%	5.9%
Proportion of Household 15-60 years at 1992	56.3%	46.0%	57.7%	49.5%	50.9%	48.8%	58.3%	57.8%	56.7%	52.2%
Dependency Ratio at 1992	1.31	1.52	1.31	1.42	1.50	1.42	1.20	1.29	1.29	1.39
Proportion of Household are 'dependants'	50.1%	58.3%	50.2%	54.0%	52.7%	52.6%	47.8%	50.3%	49.5%	53.1%
Proportion of Household 0-5 years at 1999	14.5%	16.6%	8.8%	15.8%	16.5%	19.7%	17.2%	14.9%	14.6%	15.9%
Proportion of Household 0-14 years at 1999	44.0%	49.8%	28.0%	43.1%	48.9%	53.4%	42.6%	44.6%	41.8%	45.9%
Proportion of Household > 59 years at 1999	17.6%	7.9%	25.5%	12.5%	9.7%	7.2%	13.7%	9.8%	16.7%	10.0%
Proportion of Household 15-59 years at 1999	38.4%	42.3%	46.5%	44.4%	41.4%	39.4%	44.6%	45.7%	41.6%	44.1%
Dependency Ratio at 1999	1.88	1.61	1.15	1.48	1.56	1.78	1.61	1.51	1.53	1.55
Proportion of Household are 'dependants'	61.6%	57.7%	53.5%	55.6%	58.6%	60.6%	56.4%	54.3%	58.4%	55.9%
Nominal Changes in Households Demographics										
Change in proportion of 0-5 year olds in hhold	-2.6%	-9.7%	-2.2%	-6.0%	-0.7%	-4.8%	0.6%	-8.3%	-0.8%	-7.6%
Change in proportion of 0-14 year olds in hhold	5.2%	-4.4%	-8.7%	-4.1%	5.4%	9.5%	2.1%	-0.2%	2.0%	-1.4%
Change in proportion of >60 year olds in hhold	6.3%	3.9%	12.0%	5.7%	0.5%	-1.6%	6.5%	4.2%	7.0%	4.1%
Change in proportion of 15-59 year olds in hhold	-17.9%	-3.7%	-11.2%	-5.1%	-9.5%	-9.4%	-13.7%	-12.1%	-15.1%	-8.1%
Change in Dependency Ratio	0.57	0.10	-0.16	0.06	0.06	0.36	0.41	0.22	0.24	0.16
Change in Proportion of Holds who are dependants	11.5%	-0.5%	3.3%	1.6%	5.9%	8.0%	8.6%	4.1%	8.9%	2.7%
Proportionate Changes in Household Demographics										
Change in HH Size (Based on 1992 HH Size)	3.8%	11.4%	-20.7%	3.2%	29.7%	38.7%	21.6%	17.1%	11.7%	14.2%
Change in PAE HH Size (Based on 1992 HH Size)	2.1%	19.6%	-19.9%	11.4%	61.8%	69.7%	42.2%	27.2%	23.4%	24.5%

Table 10 **Activity/Household Head Health Status At 1992 and Poverty Status**

Activity of Household Head at 1992	Chronic Poor		Moving out of Poverty		Moving into Poverty		Never In Poverty		Long Sickness Periods of Sick (> 10 days) (9)	All	
	Sick (1)	Not Sick (2)	Sick (3)	Not Sick (4)	Sick (5)	Not Sick (6)	Sick (7)	Not Sick (8)		Sick (10)	Not Sick (11)
Ag - wage	0.0%	2.5%	0.0%	2.8%	0.0%	1.4%	3.8%	2.1%	1.4%	1.7%	2.3%
Ag - ownac/employer	77.8%	76.2%	73.9%	69.1%	85.7%	73.2%	62.0%	56.8%	73.9%	71.1%	66.2%
Non Ag - wage	14.8%	11.0%	10.9%	18.5%	7.1%	16.9%	13.9%	23.2%	10.1%	12.2%	18.8%
Non Ag - ownac/employer	0.0%	6.1%	2.2%	5.6%	0.0%	4.2%	18.9%	15.9%	4.3%	8.9%	9.8%
Other	7.4%	4.2%	13.0%	4.0%	7.1%	4.2%	5.1%	2.9%	10.1%	7.8%	3.8%
Activity of Household Head at 1999											
Ag - wage	0.0%	2.5%	1.6%	4.2%	3.6%	5.6%	5.1%	2.6%	4.9%	3.9%	2.5%
Ag - ownac/employer	74.1%	78.5%	73.1%	73.9%	85.7%	70.4%	67.1%	62.9%	72.9%	72.8%	69.8%
Non Ag - wage	7.4%	8.6%	12.9%	6.5%	3.6%	8.5%	12.7%	13.8%	4.3%	8.9%	12.0%
Non Ag - ownac/employer	0.0%	4.3%	6.4%	4.3%	0.0%	4.2%	13.9%	15.6%	4.4%	7.2%	9.6%
Other	18.5%	6.1%	6.0%	10.9%	7.1%	11.3%	0.0%	5.0%	13.5%	6.7%	6.1%

Table 11 **Change in Activity/Household Head Health Status At 1992 and Poverty Status**

Change in Household Head Activities	Chronic Poor		Moving out of Poverty		Moving into Poverty		Never In Poverty		Long Sickness Periods of Sick	All	
Main Economic Activity Across The two waves	Sick (1)	Not Sick (2)	Sick (3)	Not Sick (4)	Sick (5)	Not Sick (6)	Sick (7)	Not Sick (8)	(> 10 days) (9)	Sick (10)	Not Sick (11)
Stayed in same activity											
Ag - ownac/employer	64.9%	68.3%	62.2%	63.7%	75.0%	56.9%	52.9%	50.0%	58.9%	60.7%	58.3%
Ag - wage	0.0%	1.2%	0.0%	0.0%	0.0%	0.0%	2.4%	0.2%	0.7%	0.1%	0.3%
Non Ag - ownac/employer	0.0%	1.2%	0.0%	2.0%	0.0%	0.0%	9.4%	9.9%	5.0%	4.0%	4.9%
Non Ag - wage	2.7%	3.0%	11.2%	12.3%	3.6%	5.6%	9.4%	10.5%	6.6%	7.0%	8.7%
Changed Activity											
ag own ac to ag wage	0.0%	0.6%	2.0%	0.4%	3.6%	5.6%	2.4%	0.3%	2.1%	2.0%	0.8%
other to ag wage	0.0%	0.6%	2.0%	1.2%	0.0%	1.3%	0.0%	2.0%	0.0%	0.5%	1.8%
ag wage to ag own ac	0.0%	0.6%	0.0%	2.4%	0.0%	0.0%	1.1%	1.5%	0.7%	0.5%	1.8%
other to ag own ac	16.9%	9.7%	10.2%	7.6%	10.7%	13.9%	15.3%	12.5%	14.2%	13.8%	10.7%
to non ag wage	2.7%	5.4%	0.0%	2.0%	0.0%	1.7%	3.5%	3.2%	3.5%	2.9%	3.2%
to non ag own ac	0.0%	3.0%	6.1%	4.3%	0.0%	4.1%	3.6%	6.8%	4.2%	3.9%	4.7%
to Other (unemployed, disabled etc.)	12.8%	6.4%	6.1%	4.0%	7.1%	11.1%	0.0%	3.2%	4.2%	4.5%	4.6%

Table 12 **Household Head Health Status At 1992 and Poverty Status**

	Chronic Poor		Moving out of Poverty		Moving into Poverty		Never In Poverty		Long Sickness Periods of Sick	All	
Asset Change and Quantities	**Sick (1)**	**Not Sick (2)**	**Sick (3)**	**Not Sick (4)**	**Sick (5)**	**Not Sick (6)**	**Sick (7)**	**Not Sick (8)**	**(> 10 days) (9)**	**Sick (10)**	**Not Sick(11)**
Land Area at 1992	2.85	2.71	2.63	2.80	2.60	2.35	2.48	2.87	2.66	2.59	2.77
Land Area at 1999	3.81	3.21	3.88	5.36	3.00	2.27	3.46	5.18	3.94	3.54	4.59
% Increase in Land Area	33.7%	18.5%	47.5%	91.4%	15.4%	-3.4%	39.3%	80.5%	48.1%	36.7%	65.7%
Average Land Asset Increases (acres)	0.96	0.50	1.25	2.56	0.40	-0.08	0.98	2.31	1.28	0.95	1.82
Proportion of Households with Land at 1992	85.2%	82.8%	78.3%	82.7%	82.1%	76.1%	77.2%	83.2%	85.5%	79.4%	82.4%
Proportion of Households with Land at 1999	85.2%	82.2%	78.3%	81.5%	82.1%	77.5%	77.2%	82.6%	85.5%	79.4%	81.8%
Number of Chicken at 1992	1.96	1.87	1.61	1.57	1.64	1.16	1.73	1.73	1.30	1.72	1.66
Number of Chicken at 1999	2.44	2.93	2.63	5.41	1.10	1.75	3.21	4.80	2.26	2.62	4.34
% Increase in Chicken Numbers	24.5%	56.7%	63.6%	244.6%	-32.9%	50.5%	85.5%	177.5%	73.3%	52.3%	161.4%
Average Increase in Number of Chickens	0.48	1.06	1.02	3.84	-0.54	0.59	1.48	3.07	0.96	0.90	2.68
Proportion of Household with chickens at 1992	55.6%	54.0%	37.0%	44.6%	42.9%	40.8%	48.1%	47.9%	36.2%	45.6%	47.4%
Proportion of Household with chickens at 1999	48.1%	51.5%	34.8%	41.8%	39.3%	38.0%	46.8%	46.5%	33.3%	42.8%	45.2%
Number of Cows at 1992	0.41	0.91	1.17	0.99	1.39	0.89	1.27	0.98	0.93	1.13	0.97
Number of Cows at 1999	0.15	0.78	0.45	1.13	1.36	0.70	1.21	1.62	1.01	0.88	1.22
% Increase in Cows Numbers	-63.6%	-14.3%	-61.5%	14.0%	-2.4%	-20.6%	-4.7%	65.6%	9.4%	-22.1%	26.3%
Average Increase in Number of Cows	-0.26	-0.13	-0.72	0.14	-0.03	-0.18	-0.06	0.64	0.09	-0.25	0.25
Proportion of Household with cows at 1992	7.4%	22.1%	23.9%	24.5%	35.7%	18.3%	29.1%	23.5%	24.6%	25.6%	23.2%
Proportion of Household with cows at 1999	7.4%	21.5%	21.7%	22.9%	35.7%	18.3%	27.8%	23.2%	23.2%	24.4%	22.4%
Proportion of Households with Bicycle at1992	33.3%	47.2%	32.6%	56.6%	39.3%	40.8%	50.63	53.52	36.2%	41.7%	52.0%
Proportion of Households with Bicycle at1999	33.3%	46.0%	30.4%	55.0%	39.3%	40.8%	50.6%	51.8%	36.2%	41.1%	50.5%
Proportion of Household With TV, Radio at 1992	22.2%	35.0%	30.4%	52.6%	21.4%	43.7%	62.0%	62.1%	39.1%	41.7%	52.1%
Proportion of Household With TV, Radio at 1999	22.2%	34.4%	30.4%	51.8%	21.4%	43.7%	62.0%	62.4%	40.6%	41.7%	51.9%
(Change) Asset Returns											
Asset returns 1992											
Asset returns 1999 (Enterprise Income/Enterprise Asset value)	596.5%	470.2%	548.7%	1175.0%	592.3%	423.0%	1098.0%	844.6%	1266.0%	100.0%	639.4%

Table 13

Household Public Goods	Household Head Health Status at 1992: Long Sickness Periods of Sick (> 10 days)	Sick	Not Sick	All 1992	Household Head Health Status at 1999: Long Sickness Periods of Sick (> 10 days)	Sick	Not Sick	All 1999
Water source at 19..								
Piped	1.4%	1.1%	1.2%	1.2%	1.8%	2.5%	3.6%	3.2%
Public tap	2.9%	1.7%	4.0%	3.6%	5.5%	6.0%	5.3%	5.6%
Protected	4.3%	1.7%	1.7%	1.7%	36.4%	41.0%	47.0%	44.6%
Unprotected	66.7%	62.2%	55.2%	55.4%	51.5%	45.0%	33.2%	38.2%
Rain	0.0%	0.0%	0.1%	0.1%	0.6%	0.2%	0.8%	0.6%
Vendor	0.0%	0.0%	0.6%	0.5%	1.2%	1.0%	0.8%	0.9%
River	24.6%	33.3%	37.2%	37.5%	3.0%	4.0%	8.2%	6.9%
Toilet Type								
Flush Toilet	0.0%	2.2%	2.5%	2.5%	1.8%	2.0%	2.0%	2.0%
Latrine	76.8%	75.0%	84.2%	82.6%	87.3%	85.4%	88.3%	87.2%
Other toilet	2.9%	2.2%	1.0%	1.2%	1.2%	3.5%	1.3%	2.2%
bush	20.3%	20.6%	12.2%	13.7%	9.7%	9.0%	8.4%	8.7%

Table 14: Descriptive Statistics households

	All	
Variable	**Mean**	**St. Dev**
AGEHED	41.80	14.92
AGEHEDSQ	1969.67	1400.25
SEXHED	0.21	0.41
PRIM	3.95	2.77
SEC	0.51	1.23
SPRIM	2.00	2.68
DEPRATE	0.50	0.24
HSIZE92	5.64	3.27
ROOMSPAE	0.75	0.57
LANDR	2.46	1.69
LAND92	2.74	1.56
CHICK92	1.67	2.16
COWS92	1.00	2.01
GOATS92	1.60	2.35
UCENTRAL	0.06	0.23
RCENTRAL	0.27	0.44
REAST	0.19	0.39
UEAST	0.03	0.17
UWEST	0.04	0.19
UNORTH	0.03	0.16
RNORTH	0.12	0.32
AGOWNAC	0.67	0.47
AGWAGE	0.02	0.15
AGOTHER	0.04	0.21
NAGOWNAC	0.09	0.28
LOGWEL92	8.69	0.59
HEALTHPR	0.22	0.21
HSIZECH	0.47	2.96
CHFIVE	-0.22	1.43
CHSIXFO	0.54	1.80
CHWORK	0.02	1.79

Table 15 **Multinomial Logit Marginal Effects 1992/99 Panel with Longtermsick Interaction terms**

	Not Poor	Chronic Poverty	Moving Out of Poverty	Moving Into Poverty
Variable	(1)	(2)	(3)	(4)
Constant	0.2623 (1.472)	-0.1201 (-0.941)	-0.0628 (-0.384)	-0.0794 (-1.033)
AGEHED	-0.0069 (-0.968)	0.0045 (0.897)	0.0024 (0.367)	0.0001 (0.036)
AGEHEDSQ	0.0001 (0.695)	0.0000 (-0.869)	0.0000 (-0.092)	0.0000 (-0.044)
SEXHED	0.1150 (2.256)**	-0.0499 (-1.468)	-0.0498 (-1.081)	-0.0152 (-0.646)
PRIM	0.0184 (2.309)**	-0.0062 (-1.198)	-0.0168 (-2.325)**	0.0047 (1.317)
SEC	0.0426 (2.502)**	-0.0278 (-1.921)*	0.0145 (0.911)	-0.0293 (-2.66)***
SPRIM	0.0199 (2.565)**	-0.0181 (-3.235)***	0.0004 (0.049)	-0.0022 (-0.626)
DEPRATE	-0.1398 (-1.706)*	0.0792 (1.316)	0.0342 (0.457)	0.0264 (0.732)
HSIZE92	-0.0134 (-1.709)*	0.0089 (1.814)*	0.0034 (0.5)	0.0011 (0.285)
ROOMSPAE	0.1469 (3.621)***	-0.1595 (-4.045)***	-0.0011 (-0.03)	0.0137 (0.793)
LANDR	0.0129 (0.445)	-0.0189 (-0.769)	0.0243 (0.866)	-0.0183 (-0.923)
LAND92	-0.0102 (-0.395)	0.0188 (0.817)	-0.0124 (-0.489)	0.0038 (0.197)
CHICK92	0.0008 (0.099)	0.0077 (1.393)	-0.0011 (-0.14)	-0.0074 (-1.816)*
COWS92	0.0108 (1.197)	-0.0123 (-1.905)*	0.0024 (0.292)	-0.0009 (-0.218)
GOATS92	0.0142 (1.741)*	-0.0055 (-1.009)	-0.0033 (-0.438)	-0.0054 (-1.413)
UCENTRAL	0.1465 (1.312)	-0.0775 (-0.827)	0.0595 (0.552)	-0.1285 (-1.676)*
RCENTRAL	-0.0136 (-0.297)	-0.0204 (-0.619)	0.0377 (0.866)	-0.0037 (-0.17)
REAST	-0.1194 (-2.244)**	-0.0167 (-0.472)	0.1151 (2.416)**	0.0210 (0.898)
UEAST	0.0377 (0.292)	-0.0936 (-0.892)	0.1470 (1.193)	-0.0911 (-1.045)
UWEST	0.1974 (1.493)	-0.2137 (-1.677)*	0.1151 (0.897)	-0.0988 (-1.086)
UNORTH	-0.0302 (-0.242)	-0.0419 (-0.461)	0.0983 (0.855)	-0.0261 (-0.421)
RNORTH	-0.3214 (-4.216)***	0.1806 (4.533)***	0.0640 (0.973)	0.0768 (2.944)***
AGOWNAC	-0.0524 (-0.996)	0.0542 (1.376)	-0.0139 (-0.284)	0.0121 (0.486)
AGWAGE	-0.0233 (-0.189)	0.0461 (0.537)	0.0386 (0.34)	-0.0614 (-0.813)
AGOTHER	-0.1108 (-1.082)	0.0708 (1.014)	0.0076 (0.084)	0.0324 (0.704)
NAGOWNAC	0.1912 (2.53)**	0.0257 (0.431)	-0.1461 (-1.871)*	-0.0708 (-1.318)
HSIZECH	-0.0091 (-1.249)	0.0109 (2.32)**	-0.0174 (-2.571)**	0.0156 (5.045)***
LONGSICK	0.1713 (1.136)	0.0425 (0.456)	-0.0861 (-0.589)	-0.1277 (-1.341)
LSSEXHED	-0.1764 (-1.162)	-0.0647 (-0.6)	0.0894 (0.636)	0.1517 (2.257)**
LSAGOWNA	-0.0525 (-0.322)	0.1882 (1.765)*	-0.0716 (-0.443)	-0.0640 (-0.711)

* Significant at 1% level

** Significant at 5% level

*** Significant at 10% level

References

Appleton, S. (2001), "Education, Incomes and Poverty in Uganda in the 1990s", CREDIT Research Paper No 01/22, University of Nottingham.

Gaiha, R. and A.B. Deolaiker (1993), "Persistent, Expected and Innate Poverty: Estimates for Semi Arid Rural South India", *Cambridge Journal of Economics*, 17 (4), 409-21.

Lawson, David (2003), "Uganda: Health, Health Care and Chronic Poverty", PhD Thesis (unsubmitted)

Lawson, D, A. McKay and J.Okidi (2003), "Factors Affecting Poverty Dynamics and Persistence in Uganda", paper to be presented at Chronic Poverty Research Centre International Conference, Manchester, April 2003.

Mwabu, Germano M. and O'Connell, Stephen A (2001), "Health Maintenance by Workers in Rural and Urban Production Structures", Centre for the Study of African Economies *Working Paper Series* 2000-13, University of Oxford.

Okidi, J. and G. Kempaka (2002), "An Overview of Chronic Poverty and Development Policy in Uganda", Chronic Poverty Research Centre Working Paper No. 11, January.

Pitt, Mark M., and Mark R. Rosenweig (1986), "Agricultural Prices, Food Consumption, and the Health of Indonesian Farmers", Chapter 5 of Singh, Squire, Strauss (eds), *Agricultural Household Models: Extensions, Applications and Policy*. World Bank: Washington D.C.