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Demographic Factors, Household Composition, Employment and Household Welfare

S. T. Mwisomba
B. H. R. Kiilu

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ALLEVIATION**

Research Report No. 01.5

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EMPLOYMENT AND HOUSEHOLD WELFARE**

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Abstract

This study has analysed two different Household Budget Survey (HBS) data to find out how the composition of poor households varies with the chosen method and index of distinguishing the households between poor and the non-poor. The objective of the study was to obtain evidence as to whether factors, other than large household size have negative or positive effect on household welfare. In other words whether poverty is explained largely by the small size of the household or whether demographic factors like age, household composition, employment status and other factors as well are significant. Also, to find out, as to whether the best method of identifying the poor households is to use total consumption or consumption per capita.

The researchers found out that small sized households make up a large segment of the poor when the method of identifying the poor uses total household consumption as a measure of welfare with no focus on the household composition. However, the poor are substantially made up of members from larger households when the measure of welfare is on the per capita basis and there is focus on the household composition. Household composition and use of adult-equivalence scales to get per capita measures as welfare measures have an important effect upon the welfare rankings of households.

When welfare is measured at per capita basis and households are ranked accordingly, larger households are more prone to poverty than smaller households. It was also found out that with this measure of welfare, average household size of identified poor households is larger than the national average household size, while the average for non-poor ones is smaller than the national average.

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Equally, we must absolve them all, including our employer, the Eastern Africa Statistical Training Centre (EASTC), from the views that we have sought to articulate in here.

1. Introduction

This study, has examined, using four different methods of measuring the welfare of and identifying the poor the households, the effects of household size, composition, education and employment status, on household welfare in rural areas of Tanzania and Uganda.

Using the two data sets mentioned above and four methods two of which are at *per capita* and two *at total level*, the results of this study reveal that there is a considerable evidence of strong **negative** correlation between household size and household welfare, when the welfare is measured by consumption per person, contrary to the evidence from Kamuzora et al (1999) whose welfare measuring method is that of total consumption type. The scenario also seems to be the same even in the highly HIV infested areas.

The measurement of welfare is sensitive to the choice of either using or not using equivalence scales. Household equivalence scales take into consideration the relative needs of households of varying sizes and composition in measuring welfare and come up with the welfare measure at the per capita level.

It is not adequate to use unadjusted aggregate household expenditure as a measure of household welfare to rank the two categories of poor or non-poor, just as it is inadequate to use GDP as a measure of a country's welfare. Here the assumption is that the *cost of a given level of household welfare is directly proportional to household size*. A simple total expenditure is thus not a suitable measure for a household's welfare and cannot be used to compare with the welfare of other households of different sizes.

The study by Kamuzora et al (1999) showed that there was a positive correlation between welfare and household size, i.e. larger-sized households tended to be less poor than others. The data used in their study are from the Demographic and Health Survey (DHS) and the welfare was measured by using what the household possessed, (possession index). This finding was clearly quite radical given the widely held view that larger families in developing countries tend to be poorer than smaller ones, hence prompting this current study.

The data used in the current study are of two origins. The first one is the 1991/92 Tanzania HBS and the second one is the Uganda 1994/95 HBS. On the basis of four different household welfare measurement indices, households are grouped into two groups: Poor and Non- Poor. Finally, logistic regression is used to

detect the effects of some variables on household welfare in each categorical method of identifying the poor. The possession index method has been equated to the total consumption method because there are considerations of size.

A common view of the role of demographic issues and one, which was predominant until very recently is that smaller-sized households have a higher probability of being better off. That is why population control programmes in the form of family planning have spread in many third world developing countries. These have been supported by USAID and monitored through Demographic Health Surveys (such as Tanzania DHS, 1993, Tanzania DHS, 1997 and Family Planning programmes).

The ineffectiveness of family planning programmes mean that the role of population size and structure in the development process, is more complex but not irrelevant as inferred by the study in dispute. For example, large family sizes seem often to be actually desired either because of high mortality risks or because the household economic and security benefits of having children are important. Therefore, a large family seems part of the normal pattern of life because of such factors. A family planning programme urges for lower fertility on the assumption that this will increase welfare in future generations. This implies a loss of welfare to day, in the form of wanted children and a welfare gain in the form of higher living standards in the future. Family planning programmes have made headway in Botswana, Kenya and Zimbabwe.

It should be noted that solutions to demographic difficulties are by-products of social and economic developments in the form of sustainable development where progress permeates all sectors and where there are immediate and rapid action to facilitate declining fertility. That is why family planning projects seem not to work because they do not permeate all sectors. That however, should not be construed as a justification for big families, as if they are desired and are good for household welfare.

2. The Problem

Presented during the 4th Bi-Annual REPOA Workshop, the paper by Kamuzora and Mkanta (1999), based on a study of a village in Bukoba Rural District, did not use some important ingredients of poverty such as the implications of choosing a particular poverty index, the definition of resources, the definition

of children, the sharing of resources among household members and the choice of the unit of analysis. The study concluded that the larger the family size, the less probable that the household would be poor, especially in the rural areas where agriculture is predominant. The authors quote earlier works including Caldwell (1977), Meillassoux (1972, 1973) and Kamuzora (1984), to support their finding a smaller size is no longer better than a larger one. The main hypothesis is that the pattern of poverty levels versus household size depends on the developmental stage of a community whereby in less developed communities the notion of the “bigger the household size the better” becomes relevant. These findings vary and differ from the current study and also other recent works on the relationships between welfare and family size. Recent works, like those by Ying (1996) in *Economies in Transition from Command to Market System*, Appleton (1997), Rutasitara (1999), Backer and Chamwali, (1998) and Chamwali (2000), Ferreira and Goodhart, (1995) to name a few, still support the smaller the better hypothesis.

The “bigger the better” situation is true in traditional African crop production and livestock husbandry methods. In that situation, traditional land tenure systems and land use practices, traditional responsibility of women in rural production and household maintenance systems, and traditional methods of utilising woodlands and forest resources was in place. At that time population densities were low and growing only slowly. This was the time when it was pointed out that farmers were unlikely to intensify their mode of production and produce more output per unit, unless there was a constraint on the amount of land available for farming with low labour and low capital inputs (Boserup, 1965). As long as population growth was slow and land remained available, the additional people could be accommodated by gradually bringing more land into farming.

With new developments, the population growth rate has dramatically increased and traditional systems of cultivation, land tenure, women’s responsibilities and forest resource use have changed drastically. New land cultivation has become increasingly scarce. Sharp declining mortality rates and high birth rates put strain on rural livelihood system. Together with rising population growth rate, there is also soil erosion, accelerating deforestation and soil fertility loss. This degradation reduces the productivity and resilience of natural resources, which then contributes to agricultural stagnation and, in turn, impedes the onset of

demographic transition. The late onset of demographic transition, unfortunately, is being translated as if it is an acceptance of big families.

However, Kamuzora et al, try to interpret this slow evolution by arguing that an adult, as well as children, are considered to provide labour, thus their presence in a household, in a labour-intensive socio-economy, has economies of scale in production and so a big household is a desirable one. In their analysis, labour is not differentiated for its quality either. The analysis is based on the total possession index as a measure of welfare or lack of it. The possessions are derived from households that were used in the DHS. The total material possessions at household level were used to rank the households and then divide them into poor and non-poor.

3. Objective

Given that the controversial results above pertain to only a very small portion of Tanzania, Bukoba, this study has carried out further research by using four different indices to measure welfare and identify the poor in the whole country. An analysis is made of how the composition of the poor varies with the chosen method of measuring welfare. The expectation is that single person households will be making up a larger segment of the poor when household size and composition are not taken into consideration and that the poor will be substantially made up of members of larger households when household size, age and sex composition are incorporated in the analysis.

The study also demonstrates the determinants of welfare at household level in the rural areas of Tanzania and Uganda, using representative samples. The study further uses the 1991/92 HBS of Tanzania and the 1994/95 HBS of Uganda. These surveys were carried out when the HIV/AIDS scourge had already set in. The decision to use both the Uganda and Tanzania data is because the source of the controversial results is a village on the Tanzania / Uganda border. A further analysis limited to the rural households in Kagera region and the neighbouring region of Masaka in Uganda, have been used to give more light as to whether the HIV/AIDS has introduced a new phenomenon in household behaviour or not. Since the data were not meant to provide estimates up to regional levels, the regional results are not robust results but only tentative ones to shed more light during the process of analysing the results. Therefore the results should be treated cautiously.

Finally, the researchers want to contribute to the understanding of the need for the use of appropriate methods of measuring poverty, including equivalence scale issues in welfare analysis. In the opinion of the researchers a serious analysis on poverty should use measures that take into consideration household composition, age, sex and size. This will assist in obtaining meaningful and comparable results

4. Literature Review

Generally poverty is a condition of living below a certain minimum standard of welfare; Bagachwa (1994), Mtatifikolo (1994) and Semboja (1994). According to the National Poverty Eradication Strategy of Tanzania,

“Poverty at its broadest level, can be conceived as a state of deprivation prohibitive of decent human life. This is caused by lack of resources and capabilities to acquire basic human needs as seen in many, but often mutually reinforcing parameters which include malnutrition, ignorance, prevalence of diseases, squalid surroundings, high infant, child and maternal mortality, low life expectancy, low per capita income, poor quality housing, inadequate clothing, low technological utilization, environmental degradation, unemployment, rural-urban migration and poor communication. ”

According to Chambers (1988), poverty is treated as a process and not as a state, where poverty is considered a multi-faceted phenomenon that includes vulnerability and powerlessness, deprivation, isolation, lack of decision-making power, lack of assets and insecurity.

A relatively easy definition of poverty would be as according to Ravallion (1992), where poverty is:

“ A condition in a society where one or more members of that society are unable to attain a level of material well-being considered as an acceptable minimum by the standard of the society.”

Practical problems, however, crop up because of identification of the poor and the use of aggregate measures. Identification concerns the evaluation of individual well being and the determination of the threshold below which a household is

said to be poor. Therefore, irrespective of whether comparisons of well being are made on the basis of individual level of utility, evaluated by the individuals themselves or virtually independently of data on individual utility, it is important to stress that the standard of living of a person is generally determined in terms of her/his consumption of private and where applicable, public goods and services available. Current consumption is, in most cases in developing countries, considered as the preferred proxy indicator of well-being while income is commonly used in developed countries.

Analysis of welfare and poverty involves both, choosing a method as well as a measure of welfare that distinguishes the poor from the non-poor. Early studies on poverty started with measures of welfare in per capita terms, (Kuznets, 1975). The usual practice is to measure welfare by consumption or expenditure per person because consumption can be more reliably measured than income by using the HBS. Consumption includes less transitory variations, Ravallion (1992), Kuznets (1975). Household income is a necessary but insufficient indicator of welfare or poverty because of the disparity between potential and realised needs satisfaction. Households differ in their size and composition. Therefore, it is necessary in the standardisation process to establish a standard method, which takes account of economies of scale in consumption.

Some empirical studies have shown that the level of well being of large households do not fall exactly in proportion to increase in household size. Thus it is usual to use “adult equivalent scales” to determine the adult equivalent of consumption of persons of different ages and sex in the household. This procedure may incorporate differences in real requirements of households due to their differing age-sex compositions.

Adjusting household income or expenditure for the number of adult equivalents within a household recognises, at the measurement level, that there are differences in household composition (size, age, sexes and so on), place and differential nutritional needs within households. It is therefore inaccurate to use total income/expenditure as a measure of household welfare. For example, GDP is not a suitable measure of welfare or wealth of a country because it is lacking the distributional trait. Thus consumption per person, adjusted accordingly, is a better household welfare indicator, (Mwisomba and Mkai, 1998).

The Engle’s coefficient is derived from the HBS data by distinguishing household expenditure as that which is spent on food and that portion spent on non-food.

The ratio of food expenditure to total expenditure is the Engle's coefficient. We use this fraction to distinguish the poor from the non-poor households. The poor are those living in households whose food expenditure accounts for more than 60 per cent of the household total expenditure, while the non-poor households are all those whose food expenditure accounts for less than 60 per cent of their total expenditure.

Relative measures of poverty, on the other hand, are related to the concept of relative deprivation. Relative poverty measures assume poverty always exists in a given country or community because the people in the lower segments of society face conditions of deprivation relative to the rest of the country. The relative poverty line has been calculated as the 50 per cent of the mean adult equivalent expenditure. The adult equivalent expenditure is the total household expenditure adjusted for age and sex composition and for household economies of scale.

The demographic factors that we consider in this study are the size and age-sex composition. When we consider demographic factors like sex, age, and size, we find that an increasing population in an already low supply of resources can only result in diminishing returns. This shows the relationship between output and labour force depends on the quality of labour and the available techniques of production. In Tanzania, it is true that cultivable land resource is in plenty, about 4 acres per person, however, capital is still scarce and improvement is extremely slow. Thus, increases in the use of unskilled labour without offsetting increases in capital and technological improvements, leads to diminishing returns. No wonder that the claim that children are productive assets does not hold any water. Population pressure leads to the inability to shift around on the virgin land, yet the households still continue to use outdated production methods. This leads to non-viable farming because of soil degradation and consequently, decline in crop yields.

At this particular moment in time, the size of a particular age group influences socio-economic developments. For example, an increased number of school-aged children call for the expansion of teaching facilities so that they attend school. Thus the social and economic consequence of big households in Tanzania will result in children not attending school, due to lack of resources, which retards development of quality labour. Under present level of technology in Tanzania (predominantly hand hoe and for very few households, the tractor), a

bigger household size accentuates the rate at which accumulated resources are used up, while at the same time increasing the costs of their use by law of diminishing returns. A big sized household will be forced to live from hand to mouth because even the land available to them might not be productive enough to feed them all the year round. This might necessitate the household into selling its unskilled labour to well-off neighbours. It is logical that for the household to accumulate and accelerate the rate of capital formation, size is a significant factor. A head of the household in such a situation is progressively becoming poorer at a time when he has to provide for the ever-increasing family size.

5. Hypotheses

The following hypotheses have guided this study:

- i. Household size and composition do not affect the level of welfare of a household.
- ii. The number of children living in the household does not affect the welfare of a household.
- iii. Female-headed households receive fewer transfers than male-headed households.
- iv. A household headed by an employee has low probability of being poor.
- v. In areas highly infected with AIDS a large sized household has a low probability of being poor.

6. Methodology

First the rural households were grouped into poor and non-poor, using the unadjusted total expenditure. The poor were all those households whose expenditure was less than half the average household expenditure in the sample. Incidences of poverty by household size have been calculated to see how poor households are associated with household size. In this method the welfare measure is obtained without taking into consideration the household composition and size. Each of the household's total expenditure is compared to half the average household expenditure in the sample. A household is considered poor if its expenditure is less than half the average household expenditure in the sample.

With this method, the bigger the household size, the well off they are. This method is equivalent to the possession index method because it does not adjust the welfare by size of the household to get at per capita stage before ranking.

Secondly, the same rural households were grouped into poor and non-poor by using Engle's household food expenditure coefficients. According to common usage of Engle's law, households that spend more than 60 per cent of their total resources on food are poor while those that spend less than 60 per cent on food, are non-poor. Incidences of poverty by household size have been calculated to see how poor households are associated with household size. Here the proportion of efforts/resources spent on getting food for the household was used as a measure of poverty. The resources at household level are approximated by the total household consumption without taking into consideration the size of the household.

In the third treatment, the rural households were grouped into poor and non-poor by using the possession index similar to the study by Kamuzora et al (1999). The non-poor are those households owning motor vehicles, tractors and sewing machines and at the same time living in quality houses. By definition, the quality houses are those houses that are roofed with corrugated iron sheets. Again, the households have been grouped according to sizes to find out the association between household poverty and household size. Incidences of poverty have been calculated for each group category.

The categorisation of families under poverty levels, based on their household possessions, has some problems. The index does not consider household composition. As a result, we can equate this index to the GDP and we can equate this method to the first and second methods where we had not taken into account the household demographic factors like size. There are reasons why the GDP is not used but instead the GDP per capita is used as a measure of welfare. On the same basis, the possession index is here strongly discredited as a measure of welfare together with the total consumption and the Engle's law methods. As our definition of poverty says, poverty is multi-faceted, including lack of possessions. Thus possessions alone cannot determine everything, distribution should also feature in the measurement of welfare to ensure all tenets of poverty are being captured.

The households were then divided between poor and non-poor by using relative expenditure method. To analyse poverty based on this method requires taking

into consideration household size and composition where adult equivalent scales based on caloric and protein requirements for different ages and sex have been used. Many studies have used estimated equivalence scales since Engle, in 1895, estimated the new born baby equivalence among households of varying sizes. Our study uses the Calorific Table (Table 1), for age and sex, and the economies of scale, (Table 2), to take care of the household composition, World Bank, (1993).

To identify the poor, the size of each household is expressed in terms of the number of equivalent adults (consumer units). Each household member is assigned an adult equivalent weight according to age and sex from Table 1. The contention being that it costs less to meet food caloric requirements for children than for adults.

Household expenditure is then divided by the sum of its adult equivalent weights to obtain expenditure per equivalent adult. Household expenditure computed includes own-produce consumed by the household. Then the expenditure per equivalent adult is computed for each household. This is then used for assessing a household's poverty status, whether poor or non poor. Poor households are those households whose adult equivalent expenditure is less than half the average adult equivalent expenditure in the HBS.

Table 1: Adult Equivalence Scales: Index of Calorific Requirements by Age and sex for East Africa.

AGE GROUP (Years)	SEX	
	Male	Female
0 - 2	X ₁ 0.40	X ₂ 0.40
3 - 4	X ₃ 0.48	X ₄ 0.48
5 - 6	X ₅ 0.56	X ₆ 0.56
7 - 8	X ₇ 0.64	X ₈ 0.64
9 - 10	X ₉ 0.76	X ₁₀ 0.76
11 - 12	X ₁₁ 0.80	X ₁₂ 0.88
13 - 14	X ₁₃ 1.00	X ₁₄ 1.00
15 - 18	X ₁₅ 1.20	X ₁₆ 1.00
19 - 59	X ₁₇ 1.00	X ₁₈ 0.88
60 +	X ₁₉ 0.88	X ₂₀ 0.72

Source: WB 1993: Tanzania. A Poverty Profile. World Bank Draft Report No. 12298- TA.

Table 2: Index of Household Economies of Scale

HOUSEHOLD SIZE (Number of adults)	COST	
	Marginal	Average
1	1.0	1.0
2	0.892	0.946
3	0.798	0.897
4	0.713	0.851
5	0.632	0.807
6	0.632	0.778
7	0.632	0.757
8	0.632	0.741
9	0.632	0.729
10	0.632	0.719

Source: WB 1993: Tanzania. A Poverty Profile. World Bank Draft Report No. 12298- TA.

The literature on equivalence scales is vast and has left a wide range of applicable equivalence scales from which researchers and policy makers can select. For example, the Organisation for Economic Co-operation and Development (OECD) uses the following equation to obtain the household adult equivalent size for a household:

$$E = 1 + 0.7(NA - 1) + 0.5(NC)$$

Where: NA= number of adults and NC = Number of children, McClements (1997).

South Africa, uses the following equation to obtain the household adult equivalent size:

$$E = (A + 0.5C)^{0.9}$$

Where A is the number of adults and C is the number of children.

The prominent thing is that they both take care of the size and composition.

For Tanzania, there are definite scales, as displayed in Tables 1 and 2. Table 1 takes care of the age and sex, while Table 2 takes care of economies of scale. These tables have been used in several poverty studies, for example, World Bank draft Report (1993).

A substantial adjustment in total household expenditure is necessary to reflect equivalence per capita consumption of households of different sizes. There should be a standardisation or scaling in order to account for the fact that large households need more resources than small ones to reach a similar level of welfare, that adults need more food and other commodities than children and there are some economies of scale in household production. Let us demonstrate how we use the two tables.

The recorded total household consumption (in cash and in kind) during the survey period is used as well as the household age-sex composition. The adjustment for household composition is carried out by means of equivalence weights.

Each member in the household roster is treated in turns. The age and sex of the member in the household is looked at and the corresponding calorific index recorded. All the resulting calorific values then added.

To get equivalence weight size of the household (EWS) the following mathematical operation was performed using Table 1.

$$\begin{aligned} \text{EWS} = & 0.4 x_1 + 0.4x_2 + 0.48x_3 + 0.48x_4 + 0.56x_5 + 0.56x_6 + 0.64x_7 + 0.64 x_8 \\ & + 0.76 x_9 + 0.76x_{10} + 0.80 x_{11} + 0.88 x_{12} + 1.0x_{13} + 1.0 x_{14} + 1.2 x_{15} + 1.0 x_{16} \\ & + 1.0 x_{17} + 0.88 x_{18} + 0.88 x_{19} + 0.72 x_{20} \end{aligned}$$

where $X_1, X_3, X_5, X_7, X_9, X_{11}, X_{13}, X_{15}, X_{17}, X_{19}$, = Number of males in each age group in the household. The age groups in years are 0-2, 3-4, 5-6, 7-8, 9-10, 11-12, 13-14, 15-18, 19-59, and 60+, where $x_2, X_4, X_6, X_8, X_{10}, X_{12}, X_{14}, X_{16}, X_{18}$, and X_{20} = the number of females in each age group as above.

Example

If we have a household with 5 members with a father aged 30 years, a mother aged 25 years, two male children aged 13 and 10 years and finally a girl aged 7 their weights appear as indicated below:

	Age	weighting
Father's	(19-59) (X_{17})	1.00
Mother's	(19-59) (X_{18})	0.88
Male child 13 year	(13-14) (X_{13})	1.00
Male child 10 year	(9-10) (X_9)	0.76
Girl 7 years	(7-8) (X_8)	0.64
Total		4.28

The total obtained is multiplied by the index of the economies of scale. Looking into the household roster the number of adults is counted, irrespective of their sex and then look into the economies of scale table, (Table 2) for the relevant average index for that number of adults. The table show both, the Marginal and the Average. What is needed is the Average weight for the number of adults in the household irrespective of sex.

The number of adults i.e. those aged above 15yrs is 2. From Table 8, the average value for two is 0.946, so we multiply the total weight of 4.28 from the example by the average index obtained for 2 adults from Table 8. i.e. 4.28×0.946 . The result is 4.04888. The five members are equivalent to 4.04888 adults and not 5 adults which shows that the three children have been equated to about two adults.

The total household consumption expenditure of this household, obtained from the HBS, results will then be divided by this adult equivalent size. The result is an adult equivalent household expenditure.

This calculation is done for each household in the sample to get adult equivalent household expenditures and the households are then ranked and the adult equivalent expenditures are added together. The mean adult equivalent expenditure is obtained by dividing the total value of all adult equivalent expenditure, by the total value of adult equivalents. This operation results in getting a mean adult equivalent expenditure.

The earlier study (Kamuzora et al 1999) implicitly assumed economies of scale in production but did not take into consideration needs due to age and sex. However, households with many members have on average higher unequivalised incomes than households with fewer members, but when we use adult equivalence, the reverse is most likely to happen because distribution is introduced in the analysis.

In this research, the size of each household has been expressed in terms of the number of equivalent adults (or consumer units). Each household member was assigned an adult equivalent weight according to age and sex.

The household expenditure in each household was weighed by its adult-equivalent size obtained from Tables 1 and 2, to obtain expenditure per adult.

The household adult equivalent expenditure was used as the measure of household welfare. The relative poverty line threshold is calculated by getting half the average equivalent expenditure of the households. Then all household adult equivalent expenditures are ranked according to size from the lowest to the highest. The calculated poverty line is used to distinguish the poor households from the non-poor ones. Those households whose adult equivalent expenditures are below half the average adult equivalent expenditure of the households (the relative poverty line) are regarded as poor while those whose household adult expenditures are above, are regarded as non-poor.

Using this index, the rural households have been put into ten groups according to household size. In each group, the incidence of poverty has been calculated.

Lastly, to evaluate the relationship between poverty and demographic factors and employment status, a logistic model of the following form was estimated:

Household poverty status=f (Household size, sex of head, remittances, education of head, employment of head).

The regressions were employed to see how household poverty, in each of the four cases, was affected or influenced by big and small household size, fewer or more children, employment status and remittances. An analysis, involving all the above situations was undertaken separately for Kagera, Kilimanjaro and Masaka regions in order to test the effect of HIV on household welfare. Kagera and Masaka are high HIV infection areas while Kilimanjaro acted as a control because the incidence is quite low. However, the sample of households in each region being small regional-level results should be treated cautiously. Regional

analysis has been done in order to get a rough idea and although such indulgences were also taken by the World Bank (1993), which helped in grouping the regions according to agro-climatic zones and poverty levels in Tanzania, the conclusions should be taken cautiously.

7. Analyses

The unit of analysis is the household while the response variable is the household welfare. There are several explanatory variables namely, age group of head of household, sex of head of household, household receiving remittances, household size, the number of members in the i th Household, employment status of household head. These variables are coded as follows:

- X_{i1} = Age group of head of household
- X_{i2} = Sex of head of household (1 = male, 0 = female)
- X_{i3} = Household receiving remittances (1 = receiving headed by male, 0 = otherwise)
- X_{i4} = Household size, the number of members in the i th Household.
- X_{i5} = Employment status of household head (1= employed in agriculture, 2 = Business)
- X_{i6} = Number of children
- X_{i7} = Number of males adults
- X_{i8} = Number of female adults
- X_{i9} = Education of head

Specific analyses have been undertaken on data related to Kagera and Kilimanjaro regions, in Tanzania and Masaka region in Uganda, for tentative directions only.

The descriptive analyses performed, in essence, are bi-variate. The explanatory variables have been tested for their association to the response variable. At the multivariate analysis stage, all the explanatory variables have been included in the logistic model fitted, and tested for significance at the 5% level. It should be noted that when the variable *total persons in the household* (X_{i4}) was used, the variables *male adults* (X_{i7}), *female adults* (X_{i8}) and *children under 15* (X_{i6}) were

not included at the same time. When these three variables were included, that add up to the household size, the variable household size X_{14} , was excluded.

8. Statistical Modelling

All variables included in this study are categorical. The response variable, welfare status of a household is a binary categorical variable. An appropriate modelling procedure is therefore logistic regression. The data this study uses for its analysis is therefore of binary or binomial type since there are only two possible values for the response variable, i.e. poor and non-poor. The data are discrete and not normally distributed so that normal regression model would not be appropriate. The outcome of the response (in this case, poor or non-poor) is not really of interest; rather we are interested in the likelihood or probability of that outcome. Thus when modelling the binary logistic model, the main interest is to find the probability of a household being poor with the selected predictors. The binary response of interest in this study (“success”) is a household being poor, whereas, the other possible outcome (“failure”) is a household being non-poor.

If we let Y_i be the random response variable in the present study then,

$$Y_i = \begin{cases} 1 & \text{if success (a household is poor)} \\ 0 & \text{if failure (a household is non-poor)}. \end{cases} \quad (1)$$

Y_i is said to take on a Bernoulli distribution with the probability mass function of the form

$$f(y_i) = p_i^{y_i} (1 - p_i)^{1-y_i} \quad (2)$$

where $y_i = 0, 1$ and p_i is the probability of success outcome, that is, a household is poor, which depends on a set of explanatory variables. The aim then is to obtain a function that relates p_i to a linear combination of predictors.

To understand this let us assume that the response variable Y_i is normally distributed with mean p_i and variance s^2 ,

i.e. let $Y_i \sim N(p_i, s^2)$ and that

$$p_i = E(Y_i) = b_0 + \sum b_i X_i \quad (3)$$

Where b_0 ‘s a constant, b_i ‘s are coefficients, and X_i ‘s are explanatory variables. This assumption theoretically suggests that we can fit the data using normal

regression. However, considering the data we are dealing with in this study, and the fact that Y_i is a binary response variable it is clear that we cannot fit the data using normal regression approach.

To get around the problem, the usual solution is to model the transformations of p_i 's instead of p_i 's themselves. Suppose h_i is a transformed function of p_i in terms of X_i 's; and g is a function that maps the unit interval onto the real line, then:

$$h_i = g(p_i) = b_0 + \beta X_i \quad (4)$$

and

$$g^{-1}(h_i) = p_i \in (0, 1) \quad (5)$$

Statistically, we may adopt a logit transformation which maps the interval (0,1) onto the real line with infinite limits $(-\infty, +\infty)$ given by:

$$h_i = \text{logit}(p_i) = \log [p_i / (1 - p_i)] \quad (6)$$

The logistic regression is most often used for a dichotomous response where the basic random variable Y is a dichotomous variable taking value 1 with probability p and value 0 with probability $1-p$. Thus combining (4) and (6) we obtain the logistic model:

$$h_i = \text{logit}(p_i) = \log [p_i / (1 - p_i)] = b_0 + \beta X_i \quad (7)$$

It follows that:

$$p_i / (1 - p_i) = e^{(b_0 + \beta X_i)} \quad (8)$$

h_i is the logistic transformation of the probability of occurrence of outcome of interest (success), p_i , which now lies in the interval (0,1). The ratios $p_i / (1 - p_i)$ represent the odds in favour of the numerator events. The predicted values of p_i can be derived using the relationship

$$p_i = e^{(b_0 + \beta X_i)} / [1 + e^{(b_0 + \beta X_i)}] \quad (9)$$

9. Interpretation of Parameter Estimates

One of the advantages of the logistic regression model is the convenience afforded in interpreting estimates of parameters. The parameters are estimated as log

odds of a specified numerator event, since the logit model normally models the odds of a success event, i.e.

$$p/(1-p).$$

In this study, the outcome of interest is poverty of a household. Thus the binary logistic model fitted essentially models the odds of the event that a household becomes poor. Odds of an event are obtained by exponentiations of the estimates of the model.

The response variable, Y_i , assumes the values 0 or 1, such that the events $Y_i=1$ and $Y_i=0$, are mutually exclusive and exhaustive. Thus the odds in favour of the success outcome $Y_i=1$ against the failure outcome $Y_i=0$ are given by the ratio

$$Pr(Y_i=1)/Pr(Y_i=0) = Pr(Y_i=1)/(1 - Pr(Y_i=1)) \quad (10)$$

Now $Pr(Y_i=1) = p_i$, and using equation (8), the odds in favour of success outcome can also be expressed as

$$odds = Pr(Y_i=1)/Pr(Y_i=0) = p_i/(1 - p_i) = e^{(b_0 + \sum a_i X_i)} \quad (11)$$

And using equations (9) and (11) the probability of occurrence of success outcome, p_i , can simply be expressed as

$$p_i = odds/(1 + odds) \quad (12)$$

A value of the odds greater than 1 indicates that the numerator outcome is more likely (in this case a household is poor) than the denominator outcome. On the other hand, if odds are less than 1, it implies that it is less likely that a household becomes poor.

10. Model Selection Procedure

The logistic regression model for this analysis was fitted using the SPSS software. During a logistic regression session, SPSS specifies the total number of cases included in the model, the number of selected cases, the number of cases rejected because of missing data, as well as the net number of cases included in the analysis. Variables included in the model along with their categories are also specified. SPSS computes the log likelihood and goodness of fit statistics for each model. Estimates for each coefficient of explanatory variables as well as their standard errors are computed. SPSS also determines the significance of each category for each explanatory variable.

1. The first fit in the model is for Tanzania Mainland

$$Y_i = \beta_0 + \sum \beta_i x_i + \varepsilon_i$$

Where Y_i = household welfare measured by mean adult equivalent Household expenditure and $Y_i = 0$ if the household is above the relative Poverty line and $= 1$ otherwise

X_{i1} = Age group of head of household

X_{i2} = Sex of head of household (1 = male, 0 = female)

X_{i3} = Household receiving remittances (1 = receiving headed by male, 0 = otherwise)

X_{i4} = Household size, the number of members in the i th household.

X_{i5} = Employment status of household head (1= employed in agriculture, 2 = Business)

X_{i6} = Number of children

X_{i7} = Number of male adults

X_{i8} = Number of female adults

X_{i9} = Education of head

2. The second logit regression has the above variables but with $Y_i = 0$ if the household possesses motor vehicle or motor cycle or sewing machine and housing roof of corrugated iron sheets.

$Y_i = 1$ otherwise.

3. The third logit regression has the above variables but with $Y_i = 0$ if the household spends less than 60 per cent of total household expenditure on food, $Y_i = 1$ otherwise.

4. The fourth logit regression is as in 1, but for Kagera Region

$$Y_i = \beta_0 + \sum \beta_i x_i + \varepsilon_i$$

$Y_i = 0$ if the household is above the relative poverty line = 1 otherwise.

5. The fifth logit is as in 2 above but for Kagera with $Y_i = 0$ when the household possesses motor vehicle or motor cycle or sewing machine and housing roof of corrugated iron sheets.

= 1 otherwise

6. The sixth logit is as in 3, but this is for Kagera with $Y_i = 0$ if the household spends less than 60 per cent of total household expenditure on food,

= 1 otherwise

7. The seventh logit regression is as in 1, but this is for Uganda

$$Y_i = \beta_0 + \sum \beta_i x_i + \varepsilon_i$$

$Y_i = 0$ if the household is above the relative poverty line = 1 otherwise.

8. The eighth logit regression is as in 2, but for Uganda with $Y_i = 0$ if the household possesses motor vehicle or motor cycle or sewing machine and housing roof of corrugated iron sheets

= 1 otherwise.

9. The ninth logit is for Uganda as in 3 with $Y_i = 0$ if the household spends less than 60 per cent of total household expenditure on food,

= 1 otherwise.

10. The tenth logit regression is as in 1, but is for Masaka Region in Uganda

$$Y_i = \beta_0 + \sum \beta_i x_i + \varepsilon_i$$

$Y_i = 0$ if the household is above the relative poverty line

= 1 otherwise.

11. The eleventh logit regression is as in 2, but this is for Masaka region in Uganda with $Y_i = 0$ if the household possesses motor vehicle or motor cycle or sewing machine and housing roof of corrugated iron sheets

= 1 otherwise.

12. The twelfth logit is as in 3, but this is for Masaka Region in Uganda with $Y_i = 0$ if the household spends less than 60 per cent of total household expenditure on food,

= 1 otherwise.

In the regression, when we used total persons in the household (XI4), we did not, at the same time, include the variables male adults (XI7), female adults (XI8) and children under 15 (XI6), while when we had included these three disaggregated variables of size, that add up to the household size, the variable household size (XI4), was excluded.

11. Results and Discussion

The common perception of the population problem starts with the observation that poorer households tend to be larger than non-poor households. This is so because poverty being generally measured on the basis of per capita income/consumption, increasing household size while keeping total income/consumption constant will make households poorer.

When statistical analysis of the relationship between welfare and household size using HBS data from Uganda and Tanzania was carried out, the results of these two household expenditure surveys displayed two features: (i) positive correlation between unadjusted household expenditure and household size, and (ii) a negative correlation between per capita household expenditure and household size. We argue that the logic of the relationships and the empirical basis varies depending on which method of identifying the poor is used. This section presents the results of using four methods to identify the poor households and the significant factors that affect household poverty for each method (Table 3). The interpretation of the logistic regression results includes the sign of the variable and its significance from zero. The sign, if negative and significant, indicates that the factor reduces poverty while a positive sign and significant indicates that the factor increases poverty.

11.1 Methods of identifying the poor

Tables 3 and 4 present the distribution of the incidence of poverty in Tanzania by household sizes using the four methods of identifying the poor.

Table 3: Percentage Distribution of Tanzania Poor Households by Household Size by Type of Method of Identifying the Poor.

Household (1)	Unadjusted Expenditure (2)	Possession Index (3)	Engel Index (4)	Relative Size Poverty Line (5)
1	74.2	21.3	37.1	13.3
2	76.3	30.4	39.2	22.5
3	72.3	27.9	43.7	23.2
4	61.5	29.6	37.6	30.0
5	59.7	33.4	44.6	36.8
6	55.1	30.5	44.7	43.0
7	55.8	33.9	43.2	47.6
8	53.8	32.6	48.0	49.2
9	44.8	32.8	39.6	55.7
10+	32.2	38.3	40.0	56.4

Source: Calculated from HBS, 1991/92, National Bureau of Statistics.

Table 3 shows that the unadjusted expenditure method (column 2) and the possession index method (column 3) support the idea that smaller households are more prone to poverty than larger households. Higher percentages of poor households are found in the smaller sized households than in the bigger sized households. These are the methods similar to Kamuzora et al where size, age and sex are not taken into account. The other method, which has incorporated size and composition (column 5), show that as the size of households increase; the percentage of poor households also increases. This supports the view that bigger households are more vulnerable to poverty than smaller households. The Engle's law in column 4 does not give a decisive trend.

Table 4: Percentage Distribution of Poor Households Identified by Different Methods by Household Size, Kagera Region

Household (1)	Unadjusted Expenditure (2)	Possession Index (3)	Engel Index (4)	Relative Poverty Line (5)
1-2	80.0	60.0	60.0	0.0
3-4	48.0	30.0	30.0	37.0
5-6	70.0	50.0	23.0	57.0
7-8	58.0	38.0	46.0	54.0
8- 10+	40.0	38.0	35.0	50.0

Source: Calculated from HBS 1991/92, NBS

Although the 1991/92 HBS was designed to give national, rural/urban and zone estimates only, for exploratory reasons, desegregation to regional level for Kagera, using the four methods of identifying the poor was attempted.

The results in Table 4 show that for the methods which do not take into consideration the size and composition of the households i.e. the unadjusted method, the possession method and the Engel's law, the vulnerability of these households to poverty decreases as the household size increases, however, for the relative poverty method, the method that ranks household after the expenditure has been adjusted for size, age and sex, the result show that larger households are more vulnerable to poverty than smaller ones. These findings support the opinion that when the correct method to measure household welfare is used and households are identified in that light as poor or non poor, the results are contrary to the findings that Kamuzora et al, obtained, even for Kagera, their study area. Probably the method used of identifying the poor households did not capture poor households.

The argument here is that measures of poverty that are based on unadjusted income/expenditure or on possession and use of commodities, are not adequate in examining individual welfare. It is proposed that, the consequences of individual deprivation, both within and outside the household, will be reflected most clearly in the achievements of the persons concerned in terms of considerations such as their survival chances, life expectancy, etc. Data on these achievements are collected at the individual level through demographic surveys and population censuses. There is, thus, a strong practical reason — apart from concern for what is intrinsically important — to focus on strictly individual

features of well being in examining deprivation and poverty (Anand 1994, Morduch and Ahmad 1996).

Tables 5 and 6 present the incidence of poverty in Uganda by household sizes using three methods.

Table 5: Percentage Distribution of Poor Households Identified by Different Methods by Household Size, Uganda

Household Size	Unadjusted Expenditure	Engel Index	Relative Poverty Line
1	-	-	-
2	-	-	-
3	43.3	-	40.7
4	46.1	-	55.4
5	46.8	-	61.6
6	37.4	-	65.1
7	38.3	-	65.1
8	31.7	-	71.8
9	26.7		68.8
10+	17.0		60.4

Source: HBS.

In the Uganda case the unadjusted method, results show that large sized households are less vulnerable to poverty than smaller ones while with the relative poverty method, the method recommended by poverty study experts (Foster J.E., Greer J. and Thorbecke E. (1984), Ravallion, M. (1990)), results show that for larger sized households, the probability of being poor is higher than that of small sized households. This means that when welfare is correctly measured on per capita basis, then households with larger sizes are more vulnerable to poverty than smaller ones in Uganda. For Uganda, the Engle method could not be used because all households in the sample spent less than 60 percent of their total expenditure on food. Also the survey had no data on household possessions, hence the poor could not be identified using the asset possession method. However, the point is clear that when welfare is on per capita basis and not on per capita basis, the results conform to those found in Tanzania.

Table 6: Percentage Distribution of Poor Households Identified by Different Methods by Household Size in Masaka

Household Size	Unadjusted Expenditure	Engel Index	Relative Poverty Line
1-2	0	-	0
3-4	14	-	9.0
5-6	12	-	53.0
7-8	17	-	55.0
9-10+	0	-	17.0

The findings for Masaka (Table 6) show that when using the method of adult equivalent expenditure and unadjusted expenditure, a clear indication in the relation between household size and poverty levels is seen. For the relative poverty method, the bigger the household size, the more vulnerable it is to poverty. The unadjusted method shows the opposite, that is, the smaller in size the household is, the more vulnerable it is to poverty. Here again we should caution the reader that the data were meant to give robust results at national, rural/urban and zonal level only and may not be as robust at lower levels.

The finding that size is associated positively with total consumption but negatively with consumption per capita is in conformity to that found with Kenya Second Welfare Monitoring Survey data of 1994. Large households in Kenya have been found to be much more likely to be poorer than small ones. In that study, household welfare was measured using relative poverty lines and not total consumption or possession index, to identify the poor. The quote below certifies:

“Generally, the proportion of the poor increases as the number of household members increases, while that of the non-poor decreases as the number of household members decreases, leading to the general conclusion that the poor have relatively large household sizes when compared to the non-poor.” First Report on Poverty in Kenya. Volume II, July 1998.

The same finding was reached at by the World Bank study in 1993, in Tanzania, where poor households had an average household size of 7.06 while better off households had a lower average of 5.88 and the national average was in between, that is 6.31. This means that poor households have larger sizes than the national average while non-poor ones have an average size that is smaller than the national average.

A simpler way of examining the relationship between household size and poverty is to directly compare the average household size of the poor and non-poor as in Table 7.

Table 7: Average Household Size of Poor and Non Poor Households by Type of Method of Identifying The Poor in Tanzania 1991/92

Type of method	National mean	Poor households	Non-poor households
Relative Poverty Method	5.8	7.1	5.1
Possession Index	5.8	6.4	5.6
Engle's Index	5.8	5.8	5.8
Unadjusted Expenditure	5.8	4.9	7.1

Source: Calculated from HBS 1991/92

Table 7 shows that poor households have average sizes that are larger than the national average for Relative poverty and possession index methods of identifying the poor, while for the unadjusted method, the results are that the average size of poor households is smaller than both the national and that for the non poor. With the Engle's index, the results show indifference. The findings from the World Bank study of 1993 concerning the association between household size and household welfare are in conformity with that of the Relative method of identifying the poor in this study while other methods give conflicting results.

Given the results therefore, the researchers argue that smaller sized households have a bigger chance of being better off than bigger sized ones, when size and composition are taken into account in determining household welfare.

11.2 Factors Affecting Household Welfare

Factors that affect household welfare were investigated using the logistic regression. Appendix 1 and Table A1 and A2 show Logistic regression results for Tanzania.

When the poor households are identified using the unadjusted expenditure method the results (Appendix 1) show that households with a head employed in agriculture as well as households with fewer male and fewer female adults are more vulnerable to becoming poor than others. However, a household with an educated head is less likely to be poor. This means that agricultural employment

and less members in the household make a household prone to poverty, supporting the fewer the poorer statement because the poor were identified through the non per capita method of total consumption.

Table A2 shows that a smaller household size, engagement in agriculture and education of the household head are significant contributors towards the poverty of a household in the rural areas. It is suggested that smaller household size and employment in agriculture increase the chance of a household being poor while education of the head has the opposite effect of decreasing the chance of being poor.

Table A3 shows that agricultural employment, fewer male adults, fewer female adults and education are significant. It means that engagement in agriculture, having fewer adult males and females increases the vulnerability of a household to being poor while a household headed by an educated person is less likely to be poor.

Table A4 on the other hand, shows that households headed by older people and employment in either agriculture or wage sector increases the vulnerability towards poverty while male headed households, households that receive remittances and households that are headed by an educated person are less likely to be poor.

Observations in Table A5 show that remittances is significant showing that households that receive remittances are more likely to be poor than others. This seems to contradict the common notion that those who receive remittances are generally better off than the rest.

In Table A6 remittances, household size, employment and education are significant. This indicates that households that receive remittances are more vulnerable to poverty while those households with smaller size, household head educated and household head employed in wage employment, have a lesser probability of living below the poverty line.

The results in Table A7 indicate that age of head, remittances, agricultural employment, female adults and education have significant contribution towards the welfare of the rural households. It is suggested that households headed by younger people are less likely to be poor while those headed by older people are more vulnerable to poverty. Remittances reduce the probability of falling below the poverty line while households headed by a person engaged in agriculture are more likely to be poor. Additionally, those households that have male adults or are headed by an educated person are less likely to be poor.

Table A8 shows that age of head, household size, employment status, and education are significant showing that households headed by younger heads are less likely to be poor while those that are headed by older ones are more vulnerable to poverty. It is also indicated that smaller sized households are less likely to be poor than large sized ones. As regards employment status, we find that agricultural households are more likely to be poor than wage-employment households. Finally, households headed by educated heads are less likely to live below the poverty line.

In all it should be noted that when the poor are identified using the Unadjusted and the Possession index methods, households that are more vulnerable to poverty are those headed by a head, irrespective of sex, engaged in agriculture and those households with less than three adult males or females. Households headed by persons, irrespective of sex, who have some education, are less likely to be vulnerable to poverty.

The Engle index method gives no significant results except for remittances; that households receiving remittances are more vulnerable to poverty. Remittances seem to increase the chance of being poor when poor households are identified using this method.

With the Relative poverty index case, a household with a younger head irrespective of sex, a household receiving remittances, a household with few adult males and a household with few adult females, is less likely to be poor. These factors reduce the chance of being poor. However, a household with an older household head and a household with a head engaged in agriculture are more prone to poverty. There seems to be no distinction between male-headed and female-headed households. This means that the sex of the head does not have a significant effect on the probability of a household being poor.

Analysis was also performed on Kilimanjaro and Masaka data with similar results. The results are shown in Appendix 2 (Tables A9 – A16), Appendix 3 (Tables A17 – A20) and Appendix 4 (Tables A21 – A24).

12. Conclusions and Recommendations

From the results, the researchers are strongly convinced that the analysis of welfare or poverty is sensitive to the importance granted to the selection of appropriate methods of measuring welfare and to how household composition is appropriately incorporated and treated. Household Welfare assessments require

comparisons of individual welfare levels, which are typically unobserved. The traditional way to infer these individual welfare levels from available household micro-data is through the use of equivalence scales. These scales convert household/family consumption or even income, into equivalent consumption/income, that are comparable across households. In this way, one compares consumption figures that are comparable.

However, comparing two households, one with 4 members, of who 3 are children and a household of 4 members of who all are adults, gives different results. The choice of a particular scale does therefore introduce important value judgements on how needs of individuals are assessed. This calls for the need to use total expenditure as well as household composition and size.

The average household sizes of poor and non-poor households show a clear difference. With relative poverty and possession index, poor households have average sizes that are larger than the national average while non-poor households have smaller sizes.

This study has added some new light on the method of identifying the poor despite having some limitations. The HBS data was designed to give robust results at urban/rural levels only but we ventured to get regional estimates. Further more, the data is for 1991/92. It would be more revealing to replicate the study to 2000/2001 using the 2000/2001 HBS results and investigate the extent to which these findings are persistent. The 2000/2001 HBS can give results up to regional level.

This study has used four methods to identify poor and non-poor households and analysed the characteristics of those identified as poor. This has led to the conclusion that patterns of poverty level versus household size, especially when measured by taking into consideration household composition shows that the poor have relatively larger household sizes when compared to the non-poor.

Concerning the possession index, researchers strongly suggest that it should be adopted in the evaluation of poverty alleviation projects where possession changes indicate that the project has either a positive or negative effect on the life of the beneficiaries. Its noticeable deficiency is that it does not take into account household composition or rather, the distribution aspect, which is very vital in gauging sustainable human development.

The lack of proper understanding or conflicting ideas about the relationship between population and development and therefore the inability to integrate

demographic variables and process into development plans, is still a problem. The low levels of contraceptive prevalence coupled with demand for large families imply a doubling of efforts in making Family Planning services available and acceptable. Family life education should be institutionalised for both in and out of school youths. Both traditional and new methods should be popularised. The stress in the education should be child spacing and not population control. Many critics of Family Planning programmes equate the programme to a hidden agenda of population control.

Therefore, policies that will lead to increased demand for fewer children should be put in place. Improving the status of women and expanding the use of family planning programmes will have a major role to play and bring down population growth. Thus, family planning messages should be integrated in all aspects of development. This endeavour will then be beyond the Ministry of Health and involve all ministries, an approach that emphasises holistic family welfare. The government should strongly support the programme, explaining why there is a need to adjust fertility downwards.

Parents will demand few children not because they no longer expect assistance from their children but because parents know that if they are to get assistance from their children, such children must be educated. The need for education derives from the fact that with increasing population, there is no longer enough land of economically viable size, which can be transferred from one generation to the next. Education has thus replaced land as an inter-generation status transfer. With the increasing magnetisation of the economy exacerbated by drought, food has been rendered expensive. With the Structural Adjustment Programmes (SAP), there is an increasing cost of children and the perception about the benefits of children is declining. Parents also find the need to adjust fertility largely to match benefits from children, which counters Cadwell's wealth flow theory. This is so because children must spend more time in school to be able to fulfil their parent's expectations in the current socio-economic context.

Thus, policies that will lead to increased demand for fewer children and policies that lead to the demand for reducing fertility levels should be put in place. These include educational efforts directed at both men and women in the form of increasing girls' school enrolment rates which would ultimately lead to a rise in awareness of the benefits of fewer children. Also better health care services and access to safe water will improve child survival rates and hence lower demand

for children. Likewise, decreasing women's workload and agricultural development to improve food security will also reduce the need for child labour. This study has made a critical contribution to the knowledge of how to identify the poor and processes leading to vulnerability. The state of knowledge about measurement, analysis and use of poverty studies at this stage shows that there is still a need for research and capacity building in this area.

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APPENDICES

Appendix 1: Logistic Regression Results for Tanzania (Tables A1 – A8)

The relevant variables are as follows:

AGE GROUP OF HEAD
SEX OF HEAD
REMITANCES
HOUSEHOLD SIZE
EMPLOYMENT STATUS OF HEAD
NUMBER OF CHILDREN (<15)
NUMBER OF MALE ADULTS
NUMBER OF FEMALE ADULTS
EDUCATION OF HEAD

Coding for these variable categories is as follows:

Dependent Variable Encoding:

Original value = 0, Internal value = 1

Independent Variable coding:

AGE OF HEAD	SEX OF HEAD	REMITTANCE	HOUSEHOLD SIZE	EMPLOYMENT STATUS	NUMBER OF CHILDREN
18 – 29:1	Female: 0	No: 0	Small size: 1	Agriculture: 1	1 – 3: 1
30 – 49:2	Male: 1	Yes: 1	Large size: 2	Wage: 2	4 – 6: 2
50+:3				Informal: 3	7+: 3
NUMBER OF MALE ADULTS		NUMBER OF FEMALE ADULTS		EDUCATION	
1 – 3: 1		1 – 3: 1		No education: 0	
4 – 6: 2		4 – 6: 2		Primary: 1	
7+: 3		7+: 3		Post primary: 2	

Table A1: Coefficients, Odds Ratio and Standard Error from Logistic Regression of the Effects of Selected Characteristics Using the Unadjusted Expenditure to Identify Poor Households, Tanzania Data. (Disaggregated Household Size)

Variable	B	S.E.	Sig	Exp (B)
Younger Head	.1141	.0915	.2126	1.1209
Older Head	-.0021	.0634	.9740	.9979
Male Head	-.0496	.0821	.5459	.9517
Remittances	-.0540	.0442	.2216	.9475
Agric. Employment	.4217**	.1280	.0010	1.5246
Wage Employment	-.2171	.2367	.3589	.8048
Fewer Children	-.0358	.0731	.6242	.9648
More Children	-.0810	.0803	.3134	.9222
Fewer Male Adults	.8508***	.1847	.0000	2.3415
More Male Adults	.2083	.01973	.2909	1.2316
Fewer Female Adults	.3830*	.1623	.0183	1.4667
More Female Adults	-.2441	.1760	.1655	.7834
Education	-.2404***	.0755	.0015	.7864
Constant	-.6500	.2581	.0118	

NB: *= significance at 5%, **=significance at 1%, ***=significance at 0.1%

Table A2: Coefficients, Odds Ratio and Standard Error from Logistic Regression of the Effects of Selected Characteristics Using the Unadjusted Expenditure Poverty Index to Identify the Poor (Aggregated Household Size).

Variable	B	S.E.	Sig	Exp(B)
Younger Head	.0616	.0636	.3330	1.0635
Older Head	.0388	.0472	.4118	1.0395
Male Head	.0443	.0509	.3840	1.0453
Remittances	.0187	.0350	.5936	1.0188
Smaller Size	.6461***	.0488	.0000	1.9082
Larger Size	.0438	.0477	.3582	1.0448
Agric. Employment	.5064***	.1009	.0000	1.6593
Wage Employment	-.3328	.1848	.0718	.7169
Education	-.3002***	.0602	.0000	.7406
Constant	.4675	.1196	.0001	

NB: *= significance at 5%, **=significance at 1%, ***=significance at 0.1%

Table A3: Coefficients, Odds Ratio and Standard Error from Logistic Regression of the Effects of Selected Characteristics Using the Possession Index (Disaggregated Household Size)

Variable	B	S.E	Sig	Exp(B)
Younger Head	.1141	.0915	.2126	1.1209
Older Head	-.0021	.0634	.9740	.9979
Male Head	-.0496	.0821	.5459	.9517
Remittances	-.0540	.0442	.2216	.9475
Agric. Employment	.4217**	.1280	.0010	1.5246
Wage Employment	-.2171	.2367	.3589	.8048
Fewer Children	-.0358	.0731	.6242	.9648
More Children	-.0810	.0803	.3134	.9222
Fewer Male Adults	.8508***	.1847	.0000	2.3415
More Male Adults	.2083	.1973	.2909	1.2316
Few Female Adults	.3830*	.1623	.0183	1.4667
More Female Adults	-.2441	.1760	.1655	.7834
Education	-.2404**	.0755	.0015	.7864
Constant	-.6500*	.2581	.0118	

NB: *= significance at 5%, **=significance at 1%, ***=significance at 0.1%

Table A4: Coefficients, Odds Ratio and Standard Error from Logistic Regression of the Effects of Selected Characteristics Using the Possession Index (Aggregated Household Size)

Variable	B	S.E.	Sig	Exp (B)
Younger Head	.0794	.0738	.2814	1.0827
Older Head	.1148*	.0545	.0353	1.1216
Male Head	-.2109***	.0573	.0002	.8098
Remittances	-.2211***	.0395	.0000	.8016
Smaller Size	-.0640	.0548	.2427	.9380
Larger Size	.0735	.0552	.1829	1.0763
Agric. Employment	.8093***	.0992	.0000	2.2463
Wage Employment	.3641*	.1805	.0437	1.4393
Education	-.3270***	.0697	.0000	.7211
Constant	-.5632	.1237	.0000	

NB: *= significance at 5%, **=significance at 1%, ***=significance at 0.1%

Table A5: Coefficients, Odds Ratio and Standard Error From Logistic Regression of The Effects of Selected Characteristics Engel Poverty Index (Disaggregated Household Size)

Variable	B	S.E.	Sig	Exp (B)
Younger Head	-.1437	.0904	.1119	.8661
Older Head	.0320	.0625	.6083	1.0325
Male Head	.1104	.0794	.1647	1.1167
Remittances	.2327***	.0435	.0000	1.2621
Agric. Employment	.0051	.1359	.9698	1.0052
Wage Employment	-.3193	.2543	.2093	.7267
Fewer Children	.0812	.0720	.2595	1.0845
More Children	.0071	.0793	.9288	1.0071
Few Male Adults	.2706	.1605	.0918	1.3107
More Male Adults	.1374	.1731	.4274	1.1472
Fewer Fem Adults	.0766	.1567	.6251	1.0796
Many Fem Adults	-.0997	.1687	.5544	.9051
Education	-.1124	.0743	.1301	.8936
Constant	-.6449**	.2429	.0079	

NB: *= significance at 5%, **= significance at 1%, *** = significance at 0.1%

Table A6: Coefficients, Odds Ratio and Standard Error from Logistic Regression of the Effects of Selected Characteristics Engel Poverty Index (Aggregated Household Size)

Variable	B	S.E.	Sig	Exp (B)
Younger Head	-.1009	.0618	.1025	.9040
Older Head	.0110	.0457	.8094	1.0111
Male Head	.0574	.0479	.2311	1.0591
Remittances	.2616***	.0339	.0000	1.2990
Smaller Size	-.1450**	.0465	.0018	.8650
Larger Size	.0836	.0467	.0735	1.0872
Agric. Employment	.0713	.1107	.5198	1.0739
Wage Employment	-.4560*	.2074	.0279	.6338
Education	-.1463*	.0582	.0120	.8639
Constant	-.4004**	.1263	.0015	

NB: *= significance at 5%, **=significance at 1%, ***=significance at 0.1%

Table A7: Coefficients, Odds Ratio and Standard Error from Logistic Regression of the Effects of Selected Characteristics Relative Poverty Line Disaggregated Household Size

Variable	B	S.E.	Sig	Exp(B)
Younger Head	-.2080*	.0944	.0276	.8122
Older Head	.1650*	.0651	.0113	1.1794
Male Head	-.0522	.0820	.5243	.9492
Remittances	-.0968*	.0446	.0300	.9077
Agric Employment	.6396***	.1322	.0000	1.8958
Wage Employment	-.3686	.2469	.1355	.6917
Fewer Children	-.0599	.0733	.4139	.9419
More Children	.0084	.0805	.9168	1.0084
Fewer Male Adults	-.0111	.1565	.9435	.9890
More Male Adults	-.1804	.1705	.2902	.8350
Fewer Fem Adults	-.7641***	.1773	.0000	.4658
More Fem Adults	-.0966	.1869	.6055	.9080
Education	-.2305**	.0769	.0027	.7942
Constant	.3989	.2504	.1112	

Table A8: Coefficients, Odds Ratio and Standard Error from Logistic Regression of the Effects of Selected Characteristics Relative Poverty Line (Aggregated Household Size)

Variable	B	S.E.	Sig	Exp (B)
Younger Head	-.2857***	.0720	.0001	.7515
Older Head	.1881***	.0513	.0002	1.2069
Male Head	-.0618	.0533	.2459	.9401
Remittances	-.0322	.0366	.3781	.9683
Smaller Size	-.6902***	.0514	.0000	.5015
Larger Size	.1414**	.0492	.0041	1.1519
Agric. Employment	.7824***	.1158	.0000	2.1868
Wage Employment	-.5598*	.2182	.0103	.5713
Education	-.2151***	.0631	.0007	.8065
Constant	-.6470***	.1343	.0000	

NB: *= significance at 5%, **=significance at 1%, ***=significance at 0.1%

Appendix 2: Logistic regression coefficients for Kilimanjaro Region (Tables A9 – A16)

Tables A9 to A16 show the logistic regression coefficients for Kilimanjaro Region. While the HBS data were not planned to give regional estimates the Kilimanjaro results may still be used to shed some light on the effects of different methods of identifying the poor.

Table A9: Coefficients, Odds Ratio and Standard Error from Logistic Regression of the Effects of Selected Characteristics Unadjusted Expenditure Poverty Index – Disaggregated Household Size

Variable	B	S.E.	Sig	Exp (B)
Younger Head	.1141	.0915	.2126	1.1209
Older Head	-.0021	.0634	.9740	.9979
Male Head	-.0496	.0821	.5459	.9517
Remittances	-.0540	.0442	.2216	.9475
Agric. Employment	.4217**	.1280	.0010	1.5246
Wage Employment	-.2171	.2367	.3589	.8048
Fewer Children	-.0358	.0731	.6242	.9648
More Children	-.0810	.0803	.3134	.9222
Fewer Male Adults	.8508***	.1847	.0000	2.3415
More Male Adults	.2083	.1973	.2909	1.2316

Fewer Fem Adults	.3830*	.1623	.0183	1.4667
More Fem Adults	-.2441	.1760	.1655	.7834
Education	-.2404**	.0755	.0015	.7864
Constant	-.6500	.2581	.0118	

NB: *= significance at 5%, **=significance at 1%, ***=significance at 0.1%

It is seen here that employment status, number of male adults, number of female adults and education are significant. It means that agricultural households, households with fewer male adults and fewer female adults are more vulnerable to poverty while those households headed by educated people are more unlikely to be poor.

Table A10: Coefficients, Odds Ratio and Standard Error from Logistic Regression of the Effects of Selected Characteristics Unadjusted Expenditure Poverty Index – Aggregated Household Size

Variable	B	S.E.	Sig	Exp (B)
Younger Head	.0616	.0636	.3330	1.0635
Older Head	.038	.0472	.4118	1.0395
Male Head	.0443	.0509	.3840	1.0453
Remittances	.0187	.0350	.5936	1.0188
Smaller Size	.6461***	.0488	.0000	1.9082
Larger Size	.0438	.0477	.3582	1.0448
Agric. Employment	.5064***	.1009	.0000	1.6593
Wage Employment	-.3328*	.1848	.0718	.7169
Education	-.3002***	.0602	.0000	.7406
Constant	.4675	.1196	.0001	

NB: *= significance at 5%, **=significance at 1%, ***=significance at 0.1%

The results show that household size, employment status and education are significant in the sense that small size and employment in agriculture increases the probability of such a household to fall below the poverty line while a household headed by an educated person has a smaller chance of falling below the poverty line.

Table A11: Coefficients, Odds Ratio and Standard Error from Logistic Regression of the Effects of Selected Characteristics Possession Index–Disaggregated Household Size

Variable	B	S.E.	Sig	Exp (B)
Younger Head	.1141	.0915	.2126	1.1209
Older Head	-.0021	.0634	.9740	.9979
Male Head	-.0496	.0821	.5459	.9517
Remittances	-.0540	.0442	.2216	.9475
Agric. Employment	.4217**	.1280	.0010	1.5246
Wage Employment	-.2171	.2367	.3589	.8048
Fewer Children	-.0358	.0731	.6242	.9648
More Children	-.0810	.0803	.3134	.9222
Fewer Male Adults	.8508***	.1847	.0000	2.3415
More Male Adults	.2083	.1973	.2909	1.2316
Fewer Female Adults	.3830*	.1623	.0183	1.4667
More Female Adults	-.2441	.1760	.1655	.7834
Education	-.2404**	.0755	.0015	.7864
Constant	-6.500	.2581	.0118	

NB: *= significance at 5%, **=significance at 1%, ***=significance at 0.1%

Employment status, male adults, female adults and education are here seen to be significant. It is indicated that employment in agriculture, fewer male adults and fewer female adults in a household make the household prone to being poor while a household headed by an educated head irrespective of sex, has a reduced chance of being poor.

Table A12: Coefficients, Odds Ratio and Standard Error From Logistic Regression of The Effects of Selected Characteristics Possession Index–Aggregated Household Size

Variable	B	S.E.	Sig	Exp(B)
Younger Head	.0794	.0738	.2814	1.0827
Older Head	.1148*	.0545	.0353	1.1216
Male Head	-.2109***	.0573	.0002	.8098
Remittances	-.2211***	.0395	.0000	.8016
Smaller Size	-.0640	.0548	.2427	.9380
Larger Size	.0735	.0552	.1829	1.0763

Agri Employment	.8093***	.0992	.0000	2.2463
Wage Employment	.3641*	.1805	.0437	1.4393
Education	-.3270***	.0697	.0000	.7211
Constant	-.5632	.1237	.0000	

NB: *= significance at 5%, **=significance at 1%, ***=significance at 0.1%

The results show that age of head, sex of head, remittances, employment status, and education, are significant. It means that older age and agricultural employment status of the head of household increases the chance of being poor while remittances and education decreases that chance.

Table A13: Coefficients, Odds Ratio and Standard Error from Logistic Regression of the Effects of Selected Characteristics Engel Poverty Index – Disaggregated Household Size

Variable	B	S.E.	Sig	Exp(B)
Younger Head	-.1437	.0904	.1119	.8661
Older Head	.0320	.0625	.6083	1.0325
Male Head	.1104	.0794	.1647	1.1167
Remittances	.2327***	.0435	.0000	1.2621
Agric. Employment	.0051	.1359	.9698	1.0052
Wage Employment	-.3193	.2543	.2093	.7267
Fewer Children	.0812	.0720	.2595	1.0845
More Children	.0071	.0793	.9288	1.0071
Fewer Male Adults	.2706	.1605	.0918	1.3107
More Male Adults	.1374	.1731	.4274	1.1472
Fewer Female Adults	.0766	.1567	.6251	1.0796
More Female Adults	-.0997	.1687	.5544	.9051
Education	-.1124	.0743	.1301	.8936
Constant	-.6449	.2429	.0079	

NB: *= significance at 5%, **=significance at 1%, ***=significance at 0.1%

The results show that only remittances significantly increase the chance of a household being poor.

Table A14: Coefficients, Odds Ratio and Standard Error from Logistic Regression of the Effects of Selected Characteristics Engel Poverty Index – Aggregated Household Size

Variable	B	S.E.	Sig	Exp (B)
Young Head	-.1009	.0618	.1025	.9040
Older Head	.0110	.0457	.8094	1.0111
Male Head	.0574	.0479	.2311	1.0591
Remittances	.2616***	.0339	.0000	1.2990
Smaller Size	-.1450**	.0465	.0018	.8650
Larger Size	.0836	.0467	.0735	1.0872
Agric. Employment	.0713	.1107	.5198	1.0739
Wage Employment	-.4560*	.2074	.0279	.6338
Education	-.1463*	.0582	.0120	.8639
Constant	-.4004	.1263	.0015	

NB: *= significance at 5%, **=significance at 1%, ***=significance at 0.1%

Here the results show that the chance of a household being poor increases when the household is receiving remittances while wage employment and education of the head reduces it.

Table A15: Coefficients, Odds Ratio and Standard Error from Logistic Regression of the Effects of Selected Characteristics Relative Poverty Index – Disaggregated Household

Variable	B	S.E.	Sig	Exp (B)
Young Head	-.2080*	.0944	.0276	.8122
Older Head	.1650*	.0651	.0113	1.1794
Male Head	-.0522	.0820	.5243	.9492
Remittances	-.0968*	.0446	.0300	.9077
Agric. Employment	.6396***	.1322	.0000	1.8958
Wage Employment	-.3686	.2469	.1355	.6917
Fewer Children	-.0599	.0733	.4139	.9419
More Children	.0084	.0805	.9168	1.0084
Fewer Male Adults	-.0111	.1565	.9435	.9890
More Male Adults	-.1804	.1705	.2902	.8350
Fewer Fem Adults	-.7641***	.1773	.0000	.4658
More Fem Adults	-.0966	.1869	.6055	.9080
Education	-.2305**	.0769	.0027	.7942
Constant	.3989	.2504	.1112	

NB.: *= significance at 5%, **=significance at 1%, ***=significance at 0.1%

The results show that age of head, sex of head, remittances, employment status, number of female adults and education are significant. This means that households with younger heads are less likely to be poor than if the head is older. In addition, households, which get remittances, that have fewer female adults and those headed by educated people are less likely to be poor.

Table A16: Coefficients, Odds Ratio and Standard Error from Logistic Regression of the Effects of Selected Characteristics Relative Poverty Index – Aggregated Household Size

Variable	B	S.E.	Sig	Exp(B)
Young Head	-.2857***	.0720	.0001	.7515
Older Head	.1881***	.0513	.0002	1.2069
Male Head	-.0618	.0533	.2459	.9401
Remittances	-.0322	.0366	.3781	.9683
Smaller Size	-.6902***	.0514	.0000	.5015
Larger Size	.1414**	.0492	.0041	1.1519
Agric. Employment	.7824***	.1158	.0000	2.1868
Wage Employment	-.5598*	.2182	.0103	.5713
Education	-.2151***	.0631	.0007	.8065
Constant	-.6470	.1343	.0000	

NB: *= significance at 5%, **=significance at 1%, ***=significance at 0.1%

The pattern here is that age, household size, type of employment and education significantly affect the welfare status of a household. However, only older household head, larger household size and agricultural employment increase the chance of a household being poor.

Tables A17 to A20 show the logistic regression coefficients for Uganda

Appendix 3: Logistic regression coefficients for Uganda (Tables A17 – A20)

Table A17: Coefficients, Odds Ratio and Standard Error from Logistic Regression of the Effects of Selected Characteristics Unadjusted Expenditure – Disaggregated Household Size

Variable	B	S.E.	Sig	Exp(B)
Younger Head	.2080***	.0593	.0005	1.2313
Older Head	-.4052***	.0508	.0000	.6668
Male Head	.1701***	.0514	.0009	1.1854
Fewer Children	.2522***	.0603	.0000	1.2868
More Children	.0140	.0652	.8298	1.0141
Fewer Male Adults	2.1429	2.0710	.3008	8.5243
More Male Adults	.6546	2.0765	.7526	1.9244
Fewer Fem Adults	2.2004	2.4237	.3640	9.0287
More Fem Adults	.3981	2.4298	.8698	1.4891
Constant	-4.6987	3.1811	.1397	

NB.: *= significance at 5%, **=significance at 1%, ***=significance at 0.1%

From these results we find that age, sex of head and number of children significantly affect the welfare of a household in Uganda. Households headed by a young male with fewer children have a higher probability of being poor, whereas households headed by an older male, irrespective of sex, have less chance of being poor.

Table A18: Coefficients, Odds Ratio and Standard Error from Logistic Regression of the Effects of Selected Characteristics Unadjusted Expenditure–Aggregated Household Size

Variable	B	S.E.	Sig	Exp(B)
Young Head	.2115***	.0601	.0004	1.2355
Older Head	-.4003***	.0506	.0000	.6701
Male Head	.1730***	.0508	.0007	1.1889
Smaller Size	.3577***	.0589	.0000	1.4300
Larger Size	.2325***	.0507	.0000	1.2618
Constant	-.3671	.0527	.0000	

NB: *= significance at 5%, **=significance at 1%, ***=significance at 0.1%

The significant factors here include age and sex of head, and household size. It is contradicting that both small and large sizes are significant in the same direction. In Statistics, this is called spurious relationship. Such a meaningless relationship can only come about because of the unsuitable way of identifying the poor.

Table A19: Coefficients, Odds Ratio and Standard Error From Logistic Regression of the Effects of Selected Characteristics Relative Poverty Index - Disaggregated Household Size

Variable	B	S.E.	Sig	Exp (B)
Younger Head	.1692**	.0637	.0079	1.1844
Older Head	-.4344***	.0521	.0000	.6477
Male Head	.1338*	.0537	.0127	1.1432
Fewer Children	-.8593***	.0654	.0000	.4235
More Children	.1407*	.0696	.0431	1.1511
Fewer Male Adults	1.2751***	.3672	.0005	3.5791
More Male Adults	.1598	.3785	.6729	1.1733
Fewer Fem Adults	.6239*	.3010	.0382	1.8662
More Fem Adults	-.8071*	.3141	.0102	.4461
Constant	-.7065	.4479	.1147	

NB: *= significance at 5%, **=significance at 1%, ***=significance at 0.1%

The above results show that age, sex of head, number of children, number of male adults and number of female adults have significant effects on the poverty situation at household levels. Households headed by a young male head, with more children, fewer male and female adults are more prone to being poor while those households headed by an older head with fewer children and more female adults are less prone to being poor.

Table A20: Coefficients, Odds Ratio and Standard Error from Logistic Regression of the Effects of Selected Characteristics Relative Poverty Index –Aggregated Household Size

Variable	B	S.E.	Sig	Exp(B)
Young Head	.2739***	.0629	.0000	1.3150
Older Head	-.3702***	.0499	.0000	.6906
Male Head	.0736	.0508	.1476	1.0764
Smaller Size	-.4872***	.0580	.0000	.6144
Larger Size	.1903***	.0500	.0001	1.2096
Constant	.5514	.0536	.0000	

NB: * = significance at 5%, ** = significance at 1%, *** = significance at 0.1%

The results show that age and household size significantly influence the chance of a household being poor. If the size is small, poverty is less likely than if the size is big. It is also seen that households headed by young people are more vulnerable to poverty than those headed by older ones.

Tables A21 to A24 show the logistic regression coefficients for Masaka Region (Uganda).

Appendix 4: Logistic regression coefficients for Masaka Region (Tables A21 – A24)

Table A21: Coefficients, Odds Ratio and Standard Error from Logistic Regression of the Effects of Selected Characteristics Unadjusted Expenditure Index – Disaggregated Household Size

Variable	B	S.E.	Sig	Exp(B)
Younger Head	.2086***	.0437	.0000	1.2320
Older Head	.1966***	.0508	.0001	1.2173
Fewer Children	.1563***	.0385	.0000	1.1691
Fewer Male Adults	.7192***	.1350	.0000	2.0528
Fewer Fem Adults	.8984***	.1540	.0000	2.4556
Constant	-1.8507	.2004	.0000	

NB: * = significance at 5%, ** = significance at 1%, *** = significance at 0.1%

The results show that age of head, number of children as well as number of male adults and female adults significantly increase the chance of a household being poor. This conclusion cannot, however, be firm as the sample is small.

Table A22: Coefficients, Odds Ratio and Standard Error from Logistic Regression of the Effects of Selected Characteristics Unadjusted Expenditure Index – Aggregated Household Size

Variable	B	S.E.	Sig	Exp(B)
Younger Head	-4.0658	20.5046	.8428	.0171
Male Head	1.2143*	.4910	.0134	3.3678
Smaller Size	.1790	.4893	.7145	1.1960
Constant	-5.6887	20.5048	.7814	

The results show that when household composition is not controlled for, this method shows that the sex of head is a significant factor in influencing chance of a household being poor. That is to say households headed by a male are more likely to be poor. Again caution should be taken on these results as noted above, due to the limited sample that was not meant to give regional estimates.

Table A23: Coefficients, Odds Ratio and Standard Error From Logistic Regression of the Effects of Selected Characteristics Relative Poverty Line – Disaggregated Household Size

Variable	B	S.E.	Sig	Exp(B)
Younger Head	.1966***	.0465	.0000	1.2173
Male Head	.1602**	.0528	.0024	1.1738
Fewer Children	-.5353***	.0400	.0000	.5855
Fewer Male Adults	.4983***	.0885	.0000	1.6459
Fewer Fem Adults	.6124***	.0926	.0000	1.8449
Constant	-.2424*	.1225	.0478	

NB.: * = significance at 5%, ** = significance at 1%, *** = significance at 0.1%

While still taking a precautionary stance it is seen from the results that all factors in the model significantly influence the chance of a household being poor. While households headed by a young male, with fewer male and female adults has a higher chance of being poor, those having fewer children, however, have less chance of being poor.

Table A24: Coefficients, Odds Ratio and Standard Error from Logistic Regression of the Effects of Selected Characteristics Relative Poverty Line – Aggregated Household Size

Variable	B	S.E.	Sig	Exp(B)
Young Head	.1936	.3483	.5784	1.2136
Male Head	.2889	.3879	.4564	1.3350
Smaller Size	-1.0524*	.4145	.0111	.3491
Constant	-1.0493*	.4835	.0300	

NB: *= significance at 5%, **=significance at 1%, ***=significance at 0.1%

Here it is noted that when household composition is not controlled for a smaller household size significantly reduces the chance of a household being poor. Again this conclusion cannot be taken as firm due to the smallness of the sample.

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