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UNDERSTANDING THE DETERMINANTS OF INCOME INEQUALITY IN UGANDA

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Abstract

This paper aims to deepen our understanding of the determinants of income inequality in Uganda. Over the past 10 years, Uganda experienced gradual and sustained economic growth and poverty reduction. The benefits of growth, however, are not being distributed equally. The major contributions of this paper include: (i) Use of income data to decompose the contribution of each income source to overall inequality; (ii) Decomposition of consumption expenditure into subgroups in order to examine the contribution of each subgroup to overall inequality using their between- and within-subgroup components, both spatially and over time; (iii) Regression-based inequality decomposition to identify and quantify the relative contribution of household and community level factors in determining inequality. The evidence supports the hypothesis that higher income groups, possessing more income generating assets (productive assets, human assets, or both), are in a better position to benefit from increased national income.

Keywords: Uganda, Inequality, Poverty

1.0 INTRODUCTION

This paper aims to deepen our understanding of the determinants of income inequality in Uganda. Over the past 10 years, Uganda experienced gradual and sustained economic growth and poverty reduction. The benefits of growth, however, are not being distributed equally. In all regions of the country, income and consumption are growing at a slower rate in rural areas than in their urban counterparts. Moreover, both rural and urban areas are experiencing growing inequality between the top and bottom income quintiles (Appleton & Ssewanyana, 2003). Empirical studies, such as Appleton (2001), and Appleton & Ssewanyana (2003), provide limited policy guidance on how to address the inequality problem in Uganda. By extension, these studies have concentrated on consumption expenditure as a measure of welfare, and paid little attention to the available rich income data.

The major contributions of this paper include: (i) Use of income data to decompose the contribution of each income source to overall inequality. We are not aware of any work done on Uganda using the readily available disaggregated household income data to analyse the contribution of different income sources to overall income inequality. (ii) Decomposition of consumption expenditure into subgroups in order to examine the contribution of each subgroup to overall inequality using their between- and within-subgroup components, both spatially and over time. Bootstrapping techniques are adopted to test for any significant changes over time. (iii) Regression-

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based inequality decomposition to identify and quantify the relative contribution of household and community level factors in determining inequality.

It is generally hypothesized that there is a systematic tendency for inequality to increase with rapid economic growth, particularly when starting from a low economic base (Lecaillon, et al. 1984). Following Kuznets (1955), rising inequality is the inevitable consequence of economic growth at particular income levels. This is expected to be particularly true of rapid economic growth that results from a commodity boom, as the direct employment effect is minimal and the existing socio-economic structure remains, more or less, intact (Lewis, 1954). Inequality increases as the incomes of the asset-rich rise at a faster rate than those of the asset-poor (Valentine, 1993). As a result, some measures such as privatisation and financial liberalization may contribute to concentrate the ownership of resources in fewer hands, jeopardizing the distribution of present and future income.

The causes and implications of changes in inequality in many societies remain unclear. Categorizing Ugandan households by main occupation of the head, Okidi et al. (2003) find that within the agricultural sector inequality declined sharply from a Gini coefficient of 0.35 in 1992 to 0.31 in 2000. More generally, in the agricultural sector, changes in income inequality are usually explained as being directly related to changes in the structure of ownership of land. It is also recognized that non-agricultural income sources play a key part in rural inequality though with no agreement as to the direction of this relationship (Adams Jr, 1995). Diversification into non-farm income has been hypothesized to lead either to greater inequality as such opportunities are skewed towards the better-off; or less inequality if non-agricultural incomes are available to the poorer sections of the population (Adger, 1999).

Following Reardon and Taylor (1996), economic theory offers little insight into the relationship between income diversification and total income. Empirical studies of farm households in developing countries typically show a U-shaped relationship between non-farm income and total income. This implies that relatively poor and relatively rich households diversify their incomes, but the middle stratum's incomes are less diversified. Diversification helps the poor compensate for crop failure and landholding constraints. Shortfalls in farm incomes are partly counterbalanced by non-farm earnings, and there is a more equal size distribution of income than there would be without income diversification. Notably, most of these findings come from Asian study sites.

Comparing semi-arid South Asia with semi-arid Africa, Malton (1987) finds that the latter has less developed rural capital and insurance markets, more extreme climatic variation, more severe environmental degradation, a greater importance of livestock husbandry as an insurance mechanism, less availability of labour-intensive, low capital-input work for the poor, and more equal land distribution. These considerations can play an important role in shaping both the incentives to diversify and access to off-farm income.

Research on the relationship between rural household income composition and income inequality in Africa remains scanty. The little research that has been done tells an ambiguous story. Malton (1979) in Northern Nigeria; Collier, et al., (1986) in rural

Tanzania; and Reardon et al., (1992) in Burkina Faso find that the relatively poor earn less of their income from non-farm sources compared to the relatively rich. Reardon and Taylor (1996) reveal that in Burkina Faso, because the poor lack access to off-farm income, off-farm income increases inequality and fails to shield poor households against agro-climatic risks. This would suggest that non-farm income is more unequally distributed than total income and that it may exacerbate inequality arising from other sectors such as cropping. Other African studies find the opposite. Norman et al. (1982) find that non-farm incomes are more important in relatively poor Northern Nigerian households.

According to Li & Zou (1998), in light of both theoretical models and empirical findings, the association between income inequality and economic growth is a very complicated matter. The positive effects of inequality on savings and growth in Lewis (1954) and Kaldor (1957) are intuitively appealing. The negative effects of inequality on growth in the Alesina-Rodrik and Persson-Tabellini models are also plausible. On the basis of simple empirical observation, neither positive nor negative association between inequality and growth shall be interpreted as causality from inequality to growth. To illustrate this point, in 1984, China had a relatively low Gini coefficient of household income at 25.7 on a scale of 100. By 1992, China reached a relatively high Gini coefficient of income at 37.8. This rapid increase in income inequality (12 point rise in 8 years) is associated with the spectacular real GDP growth performance of 9.8%. For the UK, however, the 10 point rise in the Gini coefficient of income inequality was associated with moderate (2-3%) or even negative episodes of economic growth from 1977 to 1991 (Goodman & Webb, 1994).

Understanding the economic determinants of income inequality in order to assess its implications on welfare remains an empirical issue. It is especially so in the African continent, where poverty is widespread and where, given low per capita incomes, the poverty consequences of changes in income distribution are likely to be significant (Fofack & Zeufak, 1999).

According to Ravallion (2004), two sets of factors can be identified as the main causes of poverty reduction at given rates of growth: (i) the initial level of inequality; and (ii) how inequality changes over time.

The higher the initial level of inequality in a country (even if it does not change), the less the gains from growth tend to be shared by the poor. In other words, a smaller initial share tends to mean a smaller subsequent share of the gains from aggregate economic expansion. In each and every environment, there are inequalities in a number of dimensions that are likely to matter, including access to both private (human and physical) capital and public goods. In addition, inequalities in access to infrastructure and social services (health care and education) make it harder for poor people to take up the opportunities afforded by aggregate economic growth.

A second factor influencing the rate of poverty reduction at a given rate of growth is changing income distribution. Clearly, there are many country-specific factors (e.g. changes in trade regimes, tax reform, welfare-policy reforms and changes in demographics) underlying changes in distribution. Generalizations across country experiences are never easy, but one factor that is likely to matter in many developing countries is the *geographic and sectoral pattern of growth*. The marked concentration

of poor people in specific regions and/or sectors that one finds in many countries points to the importance of the pattern of growth to overall poverty reduction. The extent to which growth favours the rural sector is often key to its impact on aggregate poverty. The geographic incidence of both rural and urban economic growth is often important as well.

The rest of the paper is organized as follows: Section 2 provides an overview of poverty and inequality trends in Uganda over the past decade. Section 3 outlines the theoretical framework underlying the empirical strategy. Section 4 presents the data and describes the variables employed in the empirical analysis, while Section 5 presents and discusses the results. Finally, Section 6 summarizes the main conclusions and puts forward the key policy recommendations.

2.0 AN OVERVIEW OF POVERTY AND INEQUALITY TRENDS, 1992-2002/03

During the last decade, in a climate of economic reform consisting of financial liberalization, removal of policy-induced distortions, trade liberalization, foreign exchange reform, tax reform, and agricultural market liberalization, Uganda experienced high economic growth, falling income poverty, and relative political stability. According to Appleton's (1999) decomposition analysis of changes in poverty, the downward trend in poverty in Uganda was almost wholly due to growth rather than income distribution and welfare improvement. Further, Appleton (2001) estimated that had there been no growth between 1992 and 2000 poverty would have increased by a three-percentage point.

Headcount poverty in Uganda declined from 56% in 1992/93 to 34% in 1999/00, before rising to 38% in 2002/03. Similarly, the poverty gap declined from 20% in 1992/93 to 10% in 1999/00, and rose to 11% in 2002/03. Income growth grew at an average of 5.3% between 1992/93 and 1999/00, and 2.2% between1999/00 and 2002/03. The adverse changes in the distribution of income, rather than slower growth performance, are primarily responsible for the rise in poverty between 1999/00 and 2002/03 (Appleton & Ssewanyana, 2003).

The regional dimension of poverty is relatively strong. As per the 2002/03 survey round, the incidence of poverty remains highest in the Northern region and lowest in the Central region. In terms of absolute numbers, however, poverty is highest in the Eastern region. Further breakdown, suggest that poverty remains a rural phenomenon. In 1992/93 (2002/03), nearly 60% (41%) of the rural population lived below the poverty line while the corresponding figure for the urban population was 28% (12%). For all the years poverty has remained highest among crop farmers.

In the first half of the 1990s, government policies focused primarily on economic growth and macroeconomic stabilization and less on welfare distribution (Okidi et al., 2003). Subsequently, between 1997 and 2003, income inequality (measured by the Gini coefficient) increased from 0.347 to 0.428, and poverty reduction and real annual growth slowed down from 12 percentage points (56% to 44%) and 6.9% per annum registered in the previous five-year period, to 6 percentage points (44% to 38%) and 6.0% per annum, respectively. This evidence supports Ravallion's (1997) proposition that the higher the initial level of inequality, the less elastic poverty is with respect to growth.

Table 1 presents inequality trends in Uganda since 1992. Income inequality increased by 18% between 1992/93 and 2002/03, and 23% between 1997 and 2002/03. As a result, with a Gini coefficient of 0.428, Uganda's country status is moving away from low- towards high-income inequality. The national Gini coefficients seem to be driven primarily by inequality in the urban areas. Inequality levels were persistently higher in urban areas than in rural ones throughout the period, with the highest difference between the two recorded in 2002/03, and the lowest in 1997/98.

Table 1: Gini income inequality indicators for Uganda

	Survey period						
	1992/93	**1993/94**	**1994/95**	**1995/96**	**1997/98**	**1999/00**	**2002/03**
Rural	0.326	0.291	0.321	0.326	0.311	0.332	0.363
Urban	0.395	0.394	0.398	0.375	0.347	0.426	0.477
Uganda	0.364	0.354	0.365	0.366	0.347	0.395	0.428
	Percentage change [a]						
Rural		-10.7	10.3	1.6	-4.6	3.5	12.5
Urban		-0.3	1.0	-5.8	-7.5	17.0	17.5
Uganda		-2.7	3.1	0.3	-5.2	10.7	11.5

Source: Appleton (2001); Appleton & Ssewanyana (2003)
Notes: [a] Researchers' own calculations

Both urban and rural areas experienced the highest increase in inequality between 1999/00 and 2002/03. These striking increases in income inequality within such a short period of time, coupled with significant increases in the proportion of people living below the poverty line, cast doubt on the sustainability of Uganda's economic growth and poverty reduction.

Broad rural-urban decomposition of inequality, however, fails to shed light on the within differences based, say, on region and social group decomposition. To date, little, if any, empirical research has been carried out to understand the underlying factors driving the observed inequality patterns in Uganda.

3.0 THE THEORETICAL FRAMEWORK

This study relies on both consumption and income data as a measure of welfare in order to understand the inequality trends described in the previous section, and to probe more deeply into the relevant sources of inequality.[3] *Section 3.1* introduces the *descriptive approach*, focusing our decomposition of inequality between-subgroup and within-subgroup components; *Section 3.2* describes the *regression approach*, discussing multivariate regression-based inequality decomposition.

3.1 DESCRIPTIVE APPROACH

The descriptive approach is based on the decomposition of a chosen welfare indicator into predetermined subgroups. This type of analysis enables us to determine whether a potential increase in inequality is due to an increase in inequality between these subgroups or within each subgroup. Among other subgroups, we consider age, structure, and family structure, together with employment status, sector, region, and place of residence (rural/urban).

The Gini coefficient is arguably the most widely used income inequality measure. Theil's inequality measure, however, has an advantage over the Gini coefficient in that it is additively decomposable. It is additively decomposable between- (T_b) and within-subgroups (T_w) as expressed in Equation **(1)**.

$$\textbf{(1)} \qquad T = \frac{1}{n} \frac{y_i}{\bar{y}} \ln\left(\frac{y_i}{\bar{y}}\right) = \sum T_w + T_b = \sum_j s_j^* \ln\left(\frac{n}{n_j} s_j^*\right) + \sum_j s_j^* \sum_i s_i^j \ln(n_j s_i^j)$$

where y_i = income for the ith individual; s_j^* = share of the total income enjoyed by the jth subgroup (that is, $s_j = y_j/n\bar{y}$); s_i^j = share of the total income in j^{th} subgroup enjoyed by the ith individual; n = total population; and n_j is the number of individuals in the jth subgroup.

The decomposable nature of the Theil inequality measure allows us to examine whether the within, (T_w), or the between, (T_b), sub-group component dominates overall inequality in Uganda. We adopt bootstrapping techniques to test whether the observed inter-temporal and spatial dimensions of inequality changes are statistically significant.

In order to obtain an exact decomposition of the inequality of total income into inequality contributions from each of the income sources, we employ Shorrock's decomposition method. Let total income from all sources be divided into m sources for the ith household, as expressed in Equation **(2)**.

$$\textbf{(2)} \qquad y_i = \sum_{k=1}^{m} y_{ik}$$

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[3] We are aware that income data are often more susceptible to measurement error than consumption expenditure data. Basic descriptive statistics, such as coefficient of variation (see **Appendix I**), provide firm reassurance on the reliability of our income data.

Shorrock shows that the proportion of total inequality contributed by the kth income source is given by the following relationship:

(3) $\quad S_k = \dfrac{\text{cov}(y_k, y)}{\text{var}(y)} = \dfrac{r_k s_k}{s}$

where r_k = the correlation coefficient with total income; s_k and s are the standard deviation of the kth income component and total income, respectively. Equation **(3)** provides insights into the relative contribution of each income source to overall household income. For each income source, if the share of total income is higher than the contribution to total inequality, S_k, that income source is said to be having an equalizing effect; vice versa.

3.2 REGRESSION APPROACH

In addition to the conventional decomposition of inequality presented in the preceding section, this study analyses the determinants of income inequality (in both levels and differences) via multivariate analysis. More specifically, it adopts a methodology suggested by Fields (2002) to account for income inequality. This approach allows us to assess the importance of household and community characteristics in explaining the level of inequality, where the relative contribution by each factor is independent of the inequality measure used.

Assume that the logarithm of consumption expenditure per adult equivalent for the ith household ($\ln y_i$) is influenced by household and community level characteristics (z_i) as expressed in Equation **(4)**.

(4) $\quad \ln y_i = \sum_{j=0} \eta_j z_{ij} + \kappa_i$

The error term (κ) is assumed to be normally distributed with mean zero and constant variance.

(5) $\quad \dfrac{\sum_j \text{cov}(\eta_j z_{ji}, \ln y_i)}{\omega^2(\ln y)} = \sum_j S_j = 100 \quad$ where

(6) $\quad S_j = \dfrac{\text{cov}(\eta_j z_{ji}, \ln y_i)}{\omega^2(\ln y_i)} = \sum \eta_j \dfrac{\text{cov}(z_{ji}, \ln y_i)}{\text{var}(y)}$

Equations **(5)** and **(6)** suggest that the percentage of variance in consumption expenditure per adult equivalent can be explained by its covariance with each independent variables (z_i) and its parameter. The decomposition depends entirely on the regression specification in Equation **(4)**. Nevertheless, we need to be aware of the weaknesses of this approach. This regression-based inequality decomposition imposes

very restrictive assumption on the functional form. For instance, inclusion of interaction terms in the models makes the interpretation difficult.

In terms of the analysis of the determinants of income inequality in differences, unlike the levels decomposition, the decomposition in Equation **(7)** depends on the particular inequality measure, I, used, and the S_j as derived in Equation **(6)**.

$$ \textbf{(7)} \qquad \phi_j = \frac{S_{j,t-1}I_{t-1} - S_{j,t}I_t}{I_{t-1} - I_t} $$

Notably, we adjust household income/consumption expenditure with an equivalence scale. Broadly speaking, adjusted income for the ith household is given in Equation **(8)**:

$$ \textbf{(8)} \qquad y_i = (Y_i / hsize_i^{\chi}) $$

where y = adjusted income; Y= unadjusted income; *hsize* = household size; and χ is the size elasticity. If $\chi = 1.0$ equation **(8)** is equivalent to income per capita; $1-\chi$ measures of economies of scale of household size. There is no universally accepted methodology for this kind of approximation, and the existing literature presents mixed results (see, Canagarajah et al., 1998; Hunter et al., 2003). Previous poverty work on Uganda uses adult equivalent scales (see Appleton, 2001), with male adults between 18 and 30 years of age as the reference person. Hunter et al. (2003) adjust household income allowing $\chi = 1.0$ (i.e. income per capita). Others, such as Canagarajah et al. (1998), account for economies of scale.[4] For the sake of consistency and comparability with previous research on poverty in Uganda we adopt Appleton's (2001) approach.[5] In the process, we assume that household income/consumption expenditure is distributed equally among all individuals in the households.

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[4] Decision to use economies of scale in consumption in developing countries has received mixed response (see, Ravallion & Chen, 1999). The opponents argue that such an adjustment is not necessary since the share of income devoted to collectively consumed goods within the households tends to be small.

[5] Equivalence scale for adults are given by 0.42 + 0.58 (calorie requirement/3000). For more details refer to Appleton (2001).

4.0 THE DATA

The data comes from four of the eight rounds of the Uganda national household surveys, viz. 1992/93, 1997, 1999/00 and 2002/03, conducted by the Uganda Bureau of Statistics (UBoS). The 1992/93, 1997, 1999/00, and 2002/03 survey rounds cover 9,925, 6,564, 10,696, and 9,711 households, respectively. All surveys are nationally representative, and can be disaggregated down to regional and/or rural/urban level. Further, they adopt identical definitions, concepts, and structure for all variables of interest, making comparability over time feasible.[6]

With the exception of the survey conducted in 1997, the remaining survey rounds collected data on all socio-economic aspects of the household, and community characteristics. What follows provides a detailed description of our welfare indicators, viz. income and consumption expenditure, together with all the variables used in the analysis.

Income data: With the exception of 2002/03, all survey rounds include comprehensive information on both income and consumption expenditure data. These survey rounds included most of the components of income. The information collected on income includes income received in kind as well as in cash during the last 12 months prior to the survey. Household income was measured as income from crop farming, non-crop farming (mainly livestock, poultry), non-agricultural enterprises (for example, household enterprises and any other activities such as brewing), property (e.g. rent from land or buildings, dividends plus interest received), employment[7] (hereafter referred to as off-farm employment for rural households), and other sources (e.g. transfers and remittances) net of taxes. For comparability across survey rounds the total income does not include savings, albeit such data were collected in 1997 survey. As expected some households did not earn income from all sources.

Consumption expenditure data: The surveys shared very similar consumption sections, with almost the same list of item codes and identical recall periods. Although the 2002/03 survey includes a few items not listed (separately) in the previous surveys, these changes are minor and mainly reflect new areas of consumption (e.g. mobile phones). Different recall periods were used to capture information on different sub-components of household expenditures. While a 7-day recall period was used for expenditure on food, beverages, and tobacco, a 30-day recall period was used in the case of household consumption expenditure on non-durable goods and frequently purchased services.[8] For non-consumption expenditure, semi-durable, and durable goods and services the recall period was 365 days.

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[6] Due to insurgency in some parts of the northern and western regions, there are differences in the geographical coverage of the survey rounds. The districts of Bundibugyo, Kasese, Gulu and Kitgum were not covered in the 1999/00 survey round. To ensure comparability across the surveys, we restrict our analysis to the districts covered in all the survey rounds.

[7] Employment data were collected on individuals reporting to have earned some income during the last 365 days prior to the survey. For the purpose of our analysis, such information was aggregated at the household level.

[8] Per questionnaire design, in the 1992/93 survey round, the recall period for food expenditure was also 30 days.

In all survey rounds, purchases by household members and items received free as gifts were valued and recorded at current prices. Items consumed out of home produce were valued at the current farm-gate/producer prices, while rent for owner occupied houses was imputed at current market prices. Food consumption includes food consumed from own production, purchases, and free collection/gifts.

All types of expenditure were aggregated according to the recall period, and by broader sub-components of expenditure, at the household level. Given the different recall periods used to collect data on household expenditures, some conversion factors were applied to change the data to a monthly basis. Finally, all the different sub-components of expenditure were aggregated to derive the total expenditures at the household level.[9]

Further adjustments were made in the construction of the consumption aggregate. These adjustments included accounting for inter-temporal and spatial price variations, revaluation of foods derived from own consumption into market prices, and accounting for household composition in terms of sex and age. As it was mentioned in the previous section, in our calculation of household composition we accounted for economies of scale of consumption within the household. This was done by dividing household consumption expenditure by the square root of the number of persons in the household. In other words, we used an equivalence-scale elasticity of 0.5, as derived from regressing total household consumption expenditure on total household size. The income/consumption expenditure of individuals is calculated by attributing to each individual the per capita income of their households, which assumes that income/consumption expenditure is distributed evenly within the household irrespective of sex or age.

Other household characteristics: Other variables of interest include education, household size, age, gender, employment status, occupation and employment sector for the household head, family type, and income quintile.[10]

Community characteristics: In addition to the variables described above, the Uganda National Household Survey (UNHS) captures information on community level characteristics. We hypothesize that access to infrastructure has a positive impact on income distribution. For instance, lack of access to social services may limit the investment opportunities of the poor, thus widening the income gap between households. These community characteristics include road infrastructure and social services, such as the provision of water, schools, health facilities, and electricity. These variables are very instrumental in evaluating the impact of government interventions on growth, poverty reduction, and, more important, inequality between poor households and their wealthier counterparts.

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[9] This measure excludes non-consumption expenditure such as remittances, funeral costs, etc.

[10] Income quintile based on the consumption expenditure per adult equivalent, and generated according to national population.

5.0 ESTIMATION AND RESULTS

This section outlines the empirical results based on the methodologies introduced in section 3. Section 5.1 discusses the contribution of different income sources to overall inequality, together with the trends of welfare inequality. Section 5.2 presents the results from the regression analysis.

5.1 DESCRIPTIVE RESULTS

5.1.1 INEQUALITY USING INCOME DATA

Income source profile: In this section we endeavour to explore the contribution of different income sources to overall income inequality between 1997 and 1999/00. The analysis is based on the decomposition of income data by source. **Table 2** presents a profile of sources of income by expenditure quintile, distinguishing between rural and urban areas to get a snapshot overview of different economic activities. Notably, a very small proportion of urban population derives income from farm activities, making the comparison according to rural/urban dichotomy irrelevant.

Broadly speaking, households derive their incomes from a diverse portfolio of activities, namely, crop farming, non-crop farming, non-agricultural enterprises, employment income, property and other activities.[11] In line with Ellis (1998), non-farm activities are becoming a common practice in rural Uganda, suggesting that households are shifting their focus from farm to non-farm activities. For instance, at the national level between 1997 and 1999/00, the proportion of total income from non-farm activities for rural households increased from 41% to 46%. These contributions are in the range of 40-45% reported for sub-Saharan African countries. Similarly, the share of non-farm income for the bottom quintile increased from 38% in 1997 to 52% in 1999/00. A similar trend is observed for the richest 20% of the population, although this percentage increase remains below 1%.

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[11] Non-crop farming such as poultry, livestock; property income such as rents from land & buildings, interests, dividends; other sources include transfers, remittances and other unspecified incomes.

Table 2: Mean shares of income by source and expenditure group

Expenditure quintile	Source of income							
	Crop farming	Non-crop farming	Non-agric. enterprises	Property	Others sources	Employment	Farm	Non-farm
1997								
Poorest 20%	0.609	0.003	0.085	0.051	0.144	0.107	0.612	0.388
Lower middle	0.580	0.006	0.097	0.062	0.132	0.123	0.585	0.415
Middle	0.569	0.010	0.116	0.053	0.126	0.126	0.579	0.421
Upper middle	0.513	0.013	0.168	0.051	0.111	0.144	0.526	0.474
Richest	0.324	0.031	0.238	0.047	0.129	0.231	0.355	0.645
Total	0.519	0.013	0.141	0.053	0.128	0.146	0.532	0.468
Rural								
Poorest 20%	0.618	0.001	0.082	0.052	0.142	0.104	0.620	0.380
Lower middle	0.601	0.005	0.088	0.064	0.132	0.110	0.606	0.394
Middle	0.603	0.007	0.104	0.053	0.123	0.110	0.610	0.390
Upper middle	0.578	0.006	0.144	0.055	0.109	0.109	0.584	0.416
Richest	0.475	0.027	0.184	0.053	0.127	0.134	0.502	0.498
Total	0.582	0.008	0.115	0.055	0.127	0.112	0.590	0.410
Urban								
Poorest 20%	0.290	0.057	0.199	0.037	0.234	0.183	0.347	0.653
Lower middle	0.182	0.022	0.254	0.034	0.146	0.362	0.204	0.796
Middle	0.160	0.051	0.262	0.062	0.153	0.312	0.211	0.789
Upper middle	0.126	0.058	0.314	0.028	0.123	0.351	0.184	0.816
Richest	0.064	0.037	0.333	0.036	0.133	0.396	0.102	0.898
Total	0.107	0.043	0.309	0.037	0.139	0.365	0.150	0.850
1999/00								
Poorest 20%	0.425	0.049	0.124	0.071	0.247	0.084	0.474	0.526
Lower middle	0.518	0.038	0.111	0.059	0.185	0.089	0.557	0.443
Middle	0.505	0.033	0.123	0.067	0.165	0.107	0.537	0.463
Upper middle	0.458	0.039	0.152	0.072	0.154	0.125	0.497	0.503
Richest 20%	0.282	0.040	0.233	0.092	0.144	0.209	0.323	0.677
Total	0.438	0.040	0.149	0.072	0.179	0.123	0.477	0.523
Rural:								
Poorest 20%	0.430	0.050	0.121	0.072	0.248	0.080	0.480	0.520
Lower middle	0.533	0.040	0.103	0.059	0.184	0.080	0.572	0.428
Middle	0.530	0.035	0.110	0.065	0.165	0.095	0.565	0.435
Upper middle	0.519	0.042	0.124	0.064	0.156	0.095	0.561	0.439
Richest 20%	0.433	0.061	0.160	0.075	0.153	0.117	0.494	0.506
Total	0.492	0.045	0.121	0.066	0.184	0.092	0.537	0.463
Urban:								
Poorest 20%	0.168	0.003	0.300	0.050	0.211	0.269	0.171	0.829
Lower middle	0.196	0.009	0.271	0.061	0.191	0.272	0.205	0.795
Middle	0.144	0.004	0.305	0.103	0.173	0.270	0.148	0.852
Upper middle	0.084	0.020	0.319	0.124	0.144	0.310	0.103	0.897
Richest 20%	0.040	0.007	0.351	0.118	0.129	0.355	0.047	0.953
Total	0.074	0.009	0.333	0.112	0.143	0.329	0.084	0.916

Notes: 1. Farm income included columns (1) + (2); Non-farm income = columns (3), (4), (5), and (6)
2. The mean shares are unconditional means, including all zero incomes

Despite a significant decline from 52% to 44% of total income between the two surveys, crop farming remains the main source of income among Ugandan households. This evidence is matched by the fact that 'other sources' of income registered a significant increase in contribution to total household income from 13% to 18% both at the national level, and among the rural population. On a similar note, the proportion of income from property increased threefold among the urban households from 4% to 11%. Government policies have been partly behind such an increasing reliance on non-farm incomes in the rural sector. However, it is not clear whether this process has led to diminishing returns in the agricultural sector, further hampering agricultural development. This issue requires further investigation, which goes beyond the scope of this paper.

Across income quintiles, in rural areas, all income groups derive the majority of their incomes from crop farming activities, while their urban counterparts derive the majority of their incomes from employment and non-agricultural enterprises. Moreover, within rural areas, in spite of the high incidence of poverty and the poor's dependence on agricultural produce, the richest quintiles are the ones reported to gain disproportionately from crop farming. Uneven access to social services and poor access to key agricultural inputs partly explain this finding. Using the 1999/00 survey round, Pender et al. (2004) found the poor to have less access to market information, extension services, and credit. These results are suggestive of a widening gap of income generating opportunities between the top and bottom ends of the population.

Contribution to overall income inequality: **Table 3** presents the contribution of different income sources to overall income inequality by geographical location, based on Equation (3). As it was stated above, for each income source, if the share of total income is higher than the contribution to total inequality (S_k) then that income source is said to be having an equalizing effect; vice versa. Initially, we disaggregate total income into two broad categories, namely farm and non-farm income. The former is made up of income derived from crop farming and non-crop farming, whereas the latter combines all the other sources as discussed in the previous section. In line with the findings of a number of studies on African countries, and in contrast to the findings of other studies on Asian countries, both cited in Adams Jr. and He (1995), our analysis is suggestive of the fact that non-farm income increases income inequality, whereas farm income reduces income inequality. Whether the fact that non-farm income is inequality increasing is harmful to the rural sector is also beyond the scope of this paper.

There is no doubt that the farm/non-farm classification of income sources outlined above is rather restrictive, especially in an environment where households' portfolios have been shown to be convincingly diverse. A further aim of this section is to examine the contribution to income inequality at a more disaggregated level.

The results do not yield a systematic trend across income sources over the two survey rounds, with some sources resulting inequality equalizing in one period and disequalizing in the other. In 1999/00, irrespective of geographical location, crop farming contributes less to inequality than its share in total income, suggesting that crop farming is inequality reducing. While remaining inequality reducing, between 1997 and 1999/00, the share of crop farming to total earnings in central rural Uganda

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doubled from 9% to 18%. As it was already discussed, poorer households in rural areas derive a higher share of their income from agriculture.

While income derived from non-farm sources as a whole is inequality increasing, not all sources of non-farm have unfavourable effect on income distribution among the rural population. At the national level, income from non-agricultural enterprises is inequality increasing both in 1997 and 1999/00. Between the same period, income from 'other sources' and employment goes from being inequality increasing to inequality decreasing, whereas property income goes from being inequality reducing to inequality increasing. Further, at the regional level, the contribution of non-agricultural enterprises to overall inequality increases over time in all regions. With the exception of the central region, income from non-agricultural enterprises grew very unevenly over both space and time. Notably, aside from the Western region, the results are also suggestive of the fact that in 1999/00 employment[12] is inequality increasing in all rural areas. This finding conforms to the existing literature on the relationship between formal employment and inequality (see Adams Jr, 1995).

In urban areas, despite a decline in its contribution to overall inequality between 1997 and 1999/00, property income remains inequality increasing. In other words, the decrease in the contribution of property income to overall inequality was not sufficient to turn it into an equalizing source of income by 1999/00. The same source of income, while being inequality increasing in 1997, turned into inequality reducing in 1999/00 in all rural areas, with the exception of the central region. The fact that the rich earn more income from property income implies that increases in inequality of property income ultimately raise overall income inequality.

The main finding emerging from the income data is that the share of non-farm income in total household income is growing over time even among the poorer households. Nevertheless, its increasing contribution has brought along increasing income inequality. Poorer households might have benefited less from income diversification mainly due to their poor asset status (i.e. low education, low skills. etc.). Although non-farm income has an overall disequalizing effect on income distribution, this was not the case for all the components of non-farm income.

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[12] All employment income, irrespective of government, private or self-employment.

Table 3: **Contribution to overall inequality and shares in total household income**

	1997						1999/00					
	All		Rural		Urban		All		Rural		Urban	
Factor	Contr.	Share	Contr.	Share	Contr.	Share	Contr.	Share	Contr.	Share	Contr.	Share
Crop farming	7.9	39.6	20.8	51.9	1.2	6.2	8.4	33.9	22.2	46.7	5.2	5.3
Non-crop farming	3.7	2.4	5.4	1.7	1.5	4.4	1.6	3.6	4.9	4.8	0.4	0.9
Non-agricultural enterprise	44.1	22.5	46.7	17.2	0.5	2.8	47.0	23.4	42.4	16.2	48.7	39.4
Property	1.5	3.9	2.5	4.3	40.3	36.7	20.2	9.1	6.2	6.0	27.4	16.1
Others	12.5	11.4	8.6	11.3	16.4	11.6	8.2	13.8	13.0	15.2	5.7	10.6
Employment	30.3	20.2	16.0	13.6	40.0	38.3	14.6	16.2	11.2	11.0	12.7	27.8
Farm	11.6	42.0	26.2	53.6	2.7	10.6	10.0	37.5	27.1	51.6	5.6	6.2
Non-farm	88.4	58.0	73.8	46.4	97.3	89.4	90.0	62.5	72.9	48.4	94.4	93.8
Central												
Crop farming	1.4	26.3	8.8	43.1	-0.1	4.7	0.8	24.7	18.4	47.1	0.0	3.1
Non-crop farming	4.4	4.3	8.4	3.9	1.1	4.8	1.0	3.0	6.9	5.6	0.1	0.6
Non-agricultural enterprise	51.7	29.4	65.3	23.4	0.1	2.4	44.4	28.1	43.1	17.3	43.6	38.4
Property	0.7	3.3	1.5	4.1	41.0	37.1	31.0	12.9	8.4	6.7	37.4	18.9
Others	8.3	10.6	2.6	10.3	12.4	11.0	8.0	12.2	9.6	13.3	7.3	11.2
Employment	33.4	26.0	13.4	15.2	45.5	40.0	14.8	19.1	13.5	10.0	11.6	27.8
Farm	5.8	30.6	17.2	47.1	1.0	9.5	1.8	27.7	25.3	52.7	0.1	3.7
Non-farm	94.2	69.4	82.8	52.9	99.0	90.5	98.2	72.3	74.7	47.3	99.9	96.3
Eastern												
Crop farming	28.5	46.0	52.7	53.1	2.6	7.4	24.0	36.9	25.8	41.7	24.7	15.1
Non-crop farming	1.5	0.8	0.6	0.4	2.3	2.7	0.9	3.1	3.0	3.7	0.0	0.3
Non-agricultural enterprise	39.8	20.3	0.8	3.6	1.7	1.7	45.2	21.2	20.2	16.9	56.7	41.1
Property	1.1	3.3	23.3	16.2	59.9	42.6	4.6	5.4	5.7	5.3	4.0	5.7
Others	8.7	14.1	7.9	14.5	9.6	11.8	9.4	17.7	26.1	19.0	1.5	11.3
Employment	20.4	15.5	14.7	12.2	23.9	33.7	15.9	15.7	19.2	13.4	13.1	26.6
Farm	30.0	46.8	53.2	53.6	4.9	10.1	24.9	40.0	28.8	45.3	24.7	15.3
Non-farm	70.0	53.2	46.8	46.4	95.1	89.9	75.1	60.0	71.2	54.7	75.3	84.7
Northern												
Crop farming	18.3	56.4	30.9	61.5	8.5	14.7	8.8	36.5	19.3	40.8	0.0	3.5
Non-crop farming	0.6	0.8	0.6	0.6	0.4	1.8	0.2	3.5	0.3	3.9	0.2	0.7
Non-agricultural enterprise	18.9	13.7	8.1	4.9	1.7	8.1	55.9	21.9	23.6	18.0	88.5	52.1
Property	5.4	5.2	14.2	11.9	21.6	28.6	7.2	5.9	12.7	5.8	1.2	7.3
Others	39.5	11.0	34.6	10.5	47.6	15.8	15.4	18.0	31.0	19.3	0.3	7.3
Employment	17.3	12.8	11.7	10.6	20.2	30.9	12.6	14.2	13.1	12.3	9.9	29.0
Farm	19.0	57.2	31.6	62.1	8.9	16.1	9.0	40.0	19.6	44.6	0.2	4.3
Non-farm	81.0	42.8	68.4	37.9	91.1	83.5	91.0	60.0	80.4	55.4	99.8	95.7
Western												
Crop farming	16.0	48.2	21.6	53.7	2.4	10.1	14.9	47.4	20.7	53.2	6.4	9.8
Non-crop farming	3.3	1.1	0.0	0.1	15.5	8.0	4.7	5.2	4.6	5.4	5.3	4.0
Non-agricultural enterprise	23.7	15.4	2.8	5.2	0.3	2.0	59.4	17.1	60.4	13.6	57.1	39.8
Property	2.2	4.8	22.3	13.6	26.0	28.0	5.4	6.6	2.9	5.9	10.1	11.4
Others	7.3	9.4	6.3	9.1	10.0	11.9	5.0	11.5	6.2	12.3	2.4	6.5
Employment	47.4	21.1	47.0	18.4	45.8	40.1	10.6	12.2	5.2	9.7	18.8	28.5
Farm	19.3	49.3	21.6	53.8	17.9	18.0	19.6	52.6	25.4	58.6	11.6	13.8
Non-farm	80.7	50.7	78.4	46.2	82.1	82.0	80.4	47.4	74.6	41.4	88.4	86.2

5.1.2 INEQUALITY USING CONSUMPTION EXPENDITURE DATA

Before discussing the details of changes in inequality from 1992 to 2003 we present a spatial overview of welfare levels and distribution during this period. **Table 4** shows that average welfare level increased consecutively throughout the period of analysis both in rural and urban areas, although it is the 1992-1997 and 1997-2000 changes that are statistically significant with the respective calculated *t*-ratios of 10.75 and 15.94 at the national level. These results, especially for the period 1992-1997, are corroborated by the stochastic dominance depicted in Figure 1, which illustrates that welfare levels in 1992/93 were strictly first-order dominated by those in the subsequent years. In other words, irrespective of the choice of a plausible poverty line, an improvement in poverty would have definitely been observed after 1992/93. The statistically insignificant change in average household expenditure between 1999/00 and 2002/03 during which poverty and inequality were increasing suggests that growth over this period was not sufficient to stave off the unfavourable poverty impacts of rising inequality. Because the welfare dominance results in Figure 2 show that the 1999/00 distribution crosses that of 2002/03 from below and within the range of consumption expenditures that are above the Uganda poverty lines, it is expected that any standard calculations based on these lines should return poverty statistics that portray a reversal of the downward trend that the country experienced throughout the 1990s.

Although Uganda has maintained a macroeconomic growth rate of over 5% per annum since 1992, including significant positive growth in household consumption expenditure during the same period, the distribution of the benefit of growth has become increasingly skewed. A widening of welfare distribution can be a result of the poor getting relatively poorer, the rich getting relatively richer, or a combination of the two. **Table 4** shows that by any measure of inequality welfare distribution was at the best level in 1997, when the Gini coefficient was 0.35. After 1997, welfare gaps widened progressively as reflected in the rise in the Gini coefficient to 0.43 in 2002/2003. This increase in inequality is statistically significant at the 1% level (see **Appendix II**). The Generalized Entropy indices ($GE(\zeta)$ where $\zeta \mid 0,1,2$) reported in **Table 4** indicate that the observed increases in inequality are mainly attributed to widening disparities at the top of the welfare distribution. The higher the value of ζ the more sensitive the inequality measure is to the welfare differences at the top of the distribution. Accordingly, the estimated large changes in GE(2) imply that growing differences at the upper end of welfare distribution in Uganda, especially in urban areas, has been the driver of the worsening overall inequality.

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Table 4: **Real mean monthly expenditure per adult equivalent and inequality**

	Survey period				Percentage change		
	1992/93	1997	1999/00	2002/03	1992-1997	1997-2000	2000-2003
National							
Expenditure p.a.e.	24,262	28,155	35,706	36,433	16	27	2
Gini coefficient	0.36	0.35	0.40	0.43	-5	14	8
GE(0)	0.22	0.20	0.26	0.31	-11	32	17
GE(1)	0.25	0.22	0.32	0.41	-13	46	29
GE(2)	0.42	0.32	0.62	1.59	-24	95	157
Rural							
Expenditure p.a.e.	21,420	24,873	29,782	29,952	16	20	1
Gini coefficient	0.33	0.31	0.33	0.36	-5	7	9
GE(0)	0.18	0.16	0.19	0.22	-10	17	17
GE(1)	0.19	0.17	0.20	0.25	-8	14	28
GE(2)	0.27	0.24	0.39	0.41	-9	60	5
Urban							
Expenditure p.a.e.	44,335	50,158	75,051	77,812	13	50	4
Gini coefficient	0.40	0.35	0.43	0.48	-12	23	12
GE(0)	0.27	0.20	0.30	0.41	-24	49	34
GE(1)	0.29	0.20	0.30	0.53	-30	45	79
GE(2)	0.46	0.26	0.51	2.05	-43	95	304

Figure 1: Cumulative monthly expenditure per adult equivalent, 1992-2002/03

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.959589

Proportion of population

1992/93

2002/03

1999/00

.000094

611.527

79931.4

Monthly household expenditure per adult equivalent
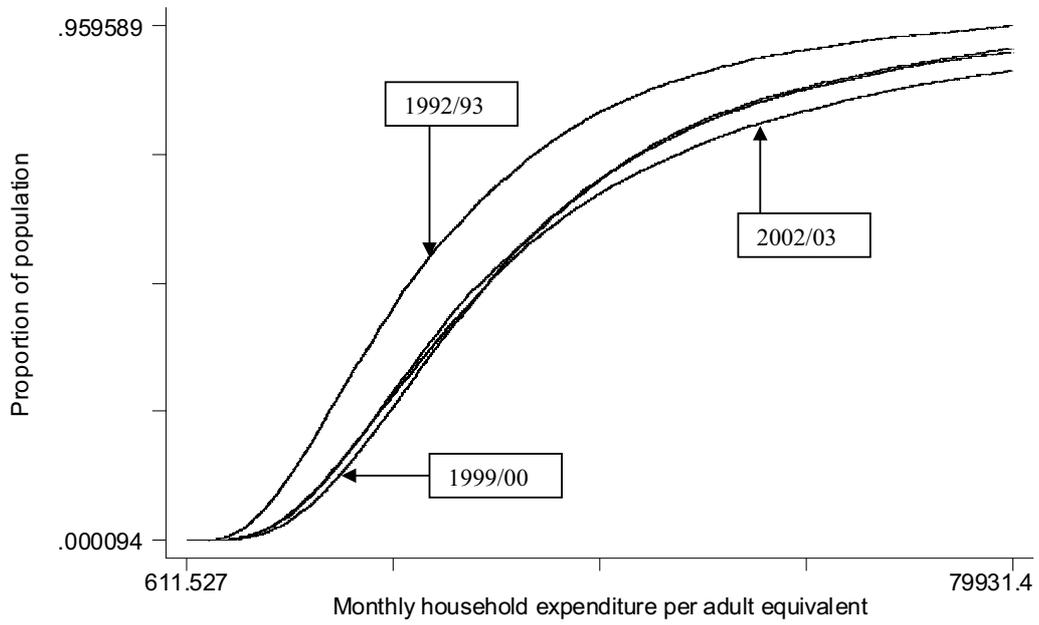
Figure 2: Cumulative monthly expenditure per adult equivalent, 2000 and 2002/03

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.909703

Proportion of population

2002/03

1999/00

.000094

2333.04

79931.4

Monthly household expenditure per adult equivalent
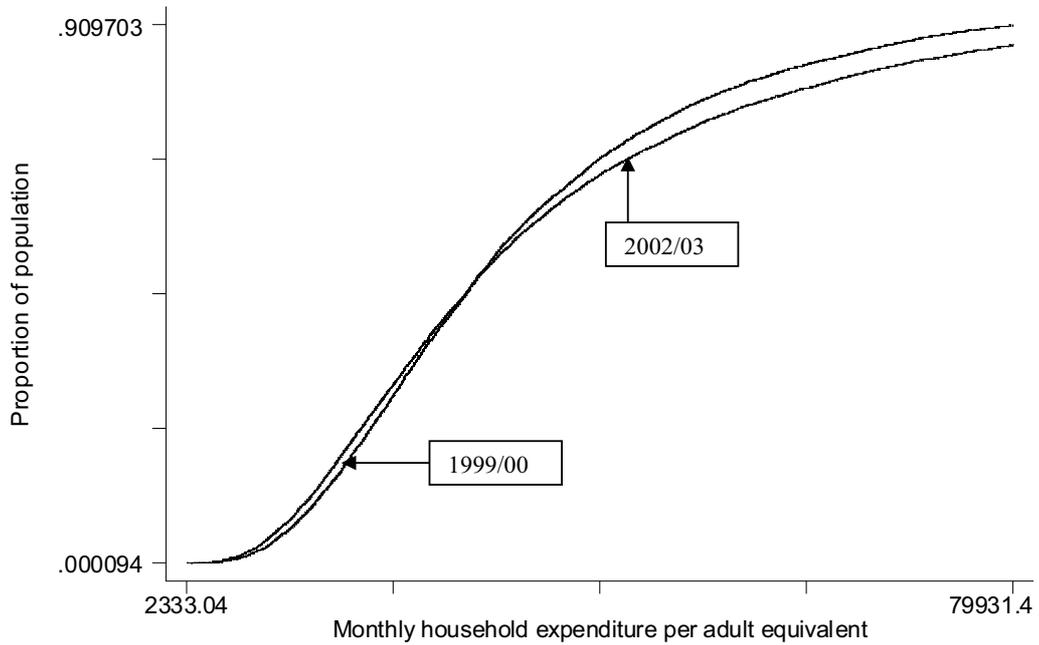
Inequality by spatial and welfare subgroups: A comparison of rural and urban Uganda unsurprisingly indicates that welfare inequality is substantially higher in urban than in rural areas. Whereas in 1992/93 the Gini for the urban population was 0.40 compared to 0.33 for rural, in 1997 the coefficients declined to 0.35 and 0.31, before rising to 0.48 and 0.36 in 2002/03, respectively. These increases are statistically significant at the 1% level (see **Appendix II**). **Table 5** shows that according to the relative mean measure of inequality, the welfare of the average rural household dropped over time from being 88% of the national average welfare in 1992/93 to 82% in 2002/03. In contrast, the average urban household was better off than the average Ugandan household by about 1.8 times in 1992/93, a scale factor that increased to 2.1 by 2002/03.

Table 5: **Inequality by spatial and welfare groups, 1992-2002/03**

	Relative mean of expenditure				Gini coefficient			
	1992/93	1997	1999/00	2002/03	1992/93	1997	1999/00	2002/03
National	1.00	1.00	1.00	1.00	0.36	0.35	0.40	0.43
Rural	0.88	0.88	0.83	0.82	0.33	0.31	0.33	0.36
Urban	1.83	1.78	2.10	2.14	0.40	0.35	0.43	0.48
Central	1.28	1.37	1.41	1.45	0.40	0.36	0.42	0.46
Eastern	0.89	0.84	0.89	0.78	0.33	0.33	0.35	0.36
Western	0.93	0.92	0.96	0.95	0.32	0.28	0.32	0.36
Northern	0.77	0.76	0.58	0.58	0.34	0.31	0.34	0.34
Central rural	0.99	1.12	1.02	1.06	0.33	0.32	0.33	0.37
Central urban	2.11	1.98	2.36	2.50	0.39	0.33	0.41	0.48
Eastern rural	0.85	0.79	0.83	0.72	0.32	0.31	0.32	0.34
Eastern urban	1.25	1.43	1.57	1.51	0.32	0.34	0.43	0.40
Western rural	0.90	0.89	0.90	0.88	0.31	0.27	0.29	0.33
Western urban	1.64	1.57	2.07	1.64	0.35	0.36	0.39	0.44
Northern rural	0.75	0.74	0.55	0.55	0.33	0.30	0.32	0.32
Northern urban	1.11	1.17	1.13	1.12	0.39	0.33	0.39	0.41
Quintile 1	0.34	0.37	0.34	0.31	0.14	0.12	0.15	0.14
Quintile 2	0.57	0.59	0.56	0.51	0.06	0.06	0.07	0.06
Quintile 3	0.79	0.80	0.76	0.69	0.05	0.05	0.07	0.05
Quintile 4	1.11	1.11	1.04	0.98	0.06	0.06	0.08	0.07
Quintile 5	2.18	2.12	2.37	2.50	0.23	0.22	0.30	0.33

Regionally, the central region, with the highest rate of urbanization, has maintained the highest index of inequality in each of the four survey periods reported in **Table 5**. The inequality trends during the periods are the same for all the four regions of the country – falling between 1992 and 1997, and rising by statistically significant magnitudes to new heights in 2002/03. In terms of relative means, the average household in the poorest (Northern) region of Uganda experienced declining relative welfare from being 0.76 times that of the average Ugandan household in 1992/93 to a low of only 0.58 times by 2002/03. This is in stark contrast to what was observed for the central region where the average household expenditure continuously rose from 1.3 to 1.5 times the national average between 1992/93 and 2002/03. The corresponding figures for Western and Eastern regions fluctuated over the period with the western region having the same relative welfare level in the 1992/93 and 2002/03

survey periods, whilst the eastern region experienced a fall in relative mean expenditure from 0.89 in 1992/93 to 0.78 in 2002/03.

In terms of welfare quintiles, **Table 5** shows that inequality levels are very low (with Gini coefficients of less than 0.10) within each of the three middle sub-groups of the population. Overall, the Gini coefficients for quintiles one, two, three and four have remained virtually the same since 1992. But among the richest 20% of Ugandans there was a statistically significant increase of the Gini coefficient (see **Appendix II**) from 0.22 in 1997 to 0.33 in 2002/03. It is evident from the relative mean statistics in **Table 5** that it is the richest 20% of Ugandans that has been driving the national average welfare growth. Specifically, the average household in the top 20% enjoyed sequential increases in relative mean expenditure from 2.12 in 1997 to 2.28 in 1999/2000, to 2.50 in 2002/03. In effect, whereas in 1997 the welfare level of the richest 20% was about six times that of the poorest 20%, by 2002/03 the disparity had risen to a scale factor of eight in favour of the former.

Inequality by household characteristic subgroups: Much as differentials in living standards can be location specific as illustrated above, in the long run, household-specific characteristics are expected to predominate the determination of the position of a household on the welfare distribution curve. **Table 6** demonstrates this using some basic demographic and socio-economic characteristics of the household's head.
It is evident that inequality with respect to the gender of the head of the household has not followed a uniform pattern of differentials during the period of analysis. Although the Gini coefficient for female-headed households is higher than for male-headed households in virtually each of the four survey periods, the difference is statistically significant at the 5% level in 1997 and 2002/03 only. The relative mean statistics show that the average female-headed household was better of than the average Ugandan household in the 1992/93 and 2002/03 periods. But in the intervening survey periods, the male counterparts had higher-than-average household expenditure.

Table 6: Inequality by household head's characteristics, 1992-2002/03

	Relative mean of expenditure				Gini coefficient			
	1992/93	1997	1999/00	2002/03	1992/93	1997	1999/00	2002/03
Headship								
Male-headed households	0.99	1.00	1.01	0.98	0.36	0.34	0.39	0.42
Female-headed households	1.02	0.98	0.95	1.06	0.36	0.36	0.41	0.46
Head's education level								
No formal education	0.79	0.77	0.72	0.63	0.33	0.31	0.34	0.35
Some primary education	0.91	0.91	0.87	0.78	0.33	0.31	0.34	0.35
Completed primary	1.00	1.02	0.91	0.93	0.34	0.29	0.32	0.35
Some secondary education	1.15	1.18	1.26	1.21	0.33	0.35	0.37	0.38
Completed secondary	1.71	1.54	1.70	1.74	0.41	0.36	0.44	0.46
Post secondary education	2.28	1.98	2.74	3.28	0.38	0.38	0.48	0.51
Head's economic sector								
Crop-farming	0.83	0.82	0.81	0.70	0.32	0.29	0.32	0.34
Non-crop-farming	1.07	1.11	0.91	1.08	0.37	0.33	0.40	0.42
Construction/Mining	1.49	1.32	1.09	1.16	0.42	0.33	0.37	0.35
Manufacturing	1.17	1.15	1.22	1.04	0.35	0.32	0.39	0.37
Trade	1.66	1.53	1.65	1.33	0.38	0.35	0.43	0.40
Transport/communication	1.40	1.46	1.55	1.50	0.36	0.35	0.37	0.42
Gov't-services	1.40	1.46	1.59	1.82	0.38	0.36	0.45	0.46
Other services	1.63	1.44	1.80	1.74	0.40	0.39	0.45	0.55
Not working	0.84	0.99	0.98	1.00	0.34	0.38	0.47	0.44
Head's age group								
Below 25 years	1.13	1.23	1.17	1.09	0.33	0.34	0.38	0.38
25 to 34 years	1.13	1.09	1.03	0.99	0.38	0.34	0.38	0.40
35 to 44 years	0.98	1.01	1.01	0.94	0.36	0.37	0.41	0.40
45 to 54 years	0.88	0.91	0.96	1.14	0.37	0.33	0.40	0.51
55 to 64 years	0.90	0.84	0.93	0.97	0.36	0.30	0.37	0.45
65 plus years	0.89	0.85	0.98	0.89	0.32	0.31	0.40	0.41
Household size								
1 person	1.80	2.03	2.00	2.25	0.36	0.38	0.42	0.44
2 persons	1.45	1.49	1.42	1.75	0.36	0.35	0.36	0.46
3 persons	1.14	1.36	1.20	1.46	0.33	0.34	0.36	0.48
4 persons	1.05	1.15	1.11	1.14	0.32	0.31	0.39	0.43
5 person	0.99	0.99	1.01	0.97	0.34	0.30	0.40	0.40
6 persons or higher	0.90	0.85	0.91	0.85	0.37	0.33	0.39	0.39

Table 6 also contrasts the welfare levels associated with different educational attainments of the heads of households. Evidently, higher level of education is associated with higher subgroup Gini coefficient. As it is with the spatial categories considered earlier, the inter-temporal changes in education subgroup Gini coefficients are statistically significant (see **Appendix II**). Using the relative mean approach to provide an alternative perspective, we observe that elevating a household's head from having no formal education into the subgroup with primary education would raise the household's welfare, although still leaving the household's expenditure well below the national average. If instead the household's head were effectively moved into the subgroup of high school graduates, *ceteris paribus*, the household would experience

at least a three-fold leap in its expenditure. At the extreme, moving a household from the no-formal education to the university-education group would have scaled up the household's welfare by about nine times according to the 2002/03 estimates. Relative to the average Ugandan household, a household headed by a university degree holder was six times better off in 2002/03.

When households are categorized according to the head's main sector of economic activity we observe in **Table 6** that the low welfare in the country is largely as a result of the crop-farm sector dragging the welfare distribution leftward. Except for those who are not working, it is the crop-farming households that have consistently stayed below the national average welfare throughout the survey periods. Although the non-crop sectors are individually small, in total they are currently the economic mainstay of about 48% of Ugandan households. Throughout the period of analysis the average household in each of the non-crop sectors maintained welfare levels that were higher than the national averages.

Some studies report significant impact of the life cycle on welfare inequality, although our descriptive analysis reveals no overall systematic inter-temporal life cycle effects for the age cohorts. Considering age as an important determinant of head's ability to provide for their household members, we make the following observations based on **Table 6**. There is a tendency for younger households to have higher-than-average welfare levels according to the relative mean results. On the contrary, the average household headed by those in the age groups older than 44 years had a lower welfare relative to the average Ugandan household. Over time, the Gini coefficient for households in the head's age group below 25 years increased from 0.33 in 1992/93 to 0.34 in 1997 before rising and tapering off to 0.38 in the 1999-2003 period. But none of the consecutive inter-temporal changes in the inequality index for this subgroup is statistically significant (see **Appendix II**). For the other age subgroups, however, the increases in inequality from 1997 to 1999/00 are all statistically significant. Whereas in 1992/93 the highest subgroup inequality (Gini coefficient of 0.38) was recorded for the age range 25-34, in 1997 and 1999/00 the highest subgroup figure was observed in the age range 35-44. The upward shift in the age group with the highest inequality continued such that in 2002/03 households whose heads were aged 45-54 had the highest Gini index of 0.51, rising dramatically and in a statistically significant order of magnitude from 0.40 in 1999/00. An important observation is that for the prime age groups of 35-44 and 45-54, the initial decline in the Gini coefficient and the subsequent consecutive increases to the 2002/03 levels are all statistically significant.

In terms of household size as a measure of dependency burden, the relative means in **Table 6** confirm the expected result that smaller households are significantly much better off than larger ones. Specifically, households with a size of four or smaller, on the average, enjoy a higher standard of living than the overall average Ugandan household. But it is also within these household size brackets, particularly the subgroups of fewer than four members, that the Gini coefficient remained statistically unchanged from one year to the next between 1992 and 2000. For the subgroups characterized by at least four household members, the increases in inequality were statistically significant between 1997 and 2000; thereafter which the level of inequality remained statistically unchanged.

Contributions of within- and between –group inequality: Having described the trends of inequality for each subgroup, and related subgroup welfare levels to the national average, it is important to investigate the contribution of within- and between-group inequality to the national level of inequality. **Table 7** presents the percent contributions of these inequality components to the national Theil index for the different survey periods. For all the spatial and household-specific subgroups the contribution to national inequality of within-group inequality is several-fold higher than that of between-group inequality. Nevertheless, the between-group contribution is distinctly higher for quintiles, education, and rural/urban subgroups. In essence, rising inequality in Uganda is primarily driven by within-group disparities. The lowest contribution of between-group inequality, which is almost at zero percent, is observed when female- versus male-headed decomposition is applied. The largest between-group contribution to national inequality comes from quintile subgroups, but this contribution has declined from 79% in 1997 to 64% in 2002/03. Conversely, the within-quintile contribution to inequality has risen from 21% in 1997 to 36% in 2002/03. Differences in head's education level exhibit the second highest between-group inequality with a rise in the corresponding percentage contribution from 15% in 1997 to 27% in 2002/03.

Table 7: **Percentage contributions of within- and between-group inequality**

	1992/93	1997	1999/00	2002/03
Rural/urban				
Within-group	83.9	82.4	77.1	80.5
Between-group	16.1	17.6	22.9	19.5
Regional				
Within-group	92.5	87.1	86.4	87.4
Between-group	7.5	12.9	13.6	12.6
Quintiles				
Within-group	24.5	21.3	30.7	35.8
Between-group	75.5	78.7	69.3	64.2
Male/Female headship				
Within-group	100.0	100.0	99.9	99.9
Between-group	0.0	0.0	0.1	0.1
Head's education level				
Within-group	83.8	85.0	79.7	75.2
Between-group	16.2	15.0	20.3	24.8
Head's economic sector				
Within-group	85.0	84.2	84.4	84.8
Between-group	15.0	15.8	15.6	15.2
Head's age group				
Within-group	97.7	97.1	99.5	99.3
Between-group	2.3	2.9	0.5	0.7
Household size group				
Within-group	93.9	88.1	95.3	91.7
Between-group	6.1	11.9	4.7	8.3

5.2 REGRESSION RESULTS

The previous section focused on the decomposition of (i) total income inequality into income sources (using income data); and (ii) total inequality into within- and between-subgroup components (using consumption expenditure data). This section uses consumption expenditure data to investigate further the dispersion within each subgroup and the relative contribution of each factor to overall inequality. The summary statistics of the variables included in the model are presented in **Table 8**.

Table 8: Descriptive statistics

Variables	1992		1999/00		2002/03	
	Mean	*Standard Deviation*	*Mean*	*Standard Deviation*	*Mean*	*Standard Deviation*
Lnwelf – Ln of welfare expenditure per adult equivalent	8.219	0.723	10.336	0.705	10.322	0.753
Male dummy	0.742	0.438	0.729	0.445	0.741	0.438
Age:						
Under 25 yrs	0.121	0.326	0.081	0.273	0.118	0.322
25-34 yrs	0.307	0.461	0.267	0.443	0.334	0.472
35-44 yrs	0.203	0.402	0.245	0.430	0.242	0.428
45-54 yrs	0.156	0.363	0.162	0.368	0.148	0.355
55-64 yrs	0.106	0.308	0.119	0.324	0.083	0.276
65 plus	0.107	0.310	0.126	0.332	0.076	0.265
Education:						
No education	0.314	0.464	0.265	0.441	0.178	0.383
Some education	0.414	0.493	0.407	0.491	0.408	0.491
Completed primary	0.094	0.292	0.109	0.312	0.145	0.352
Some secondary	0.096	0.294	0.130	0.337	0.161	0.368
Completed secondary	0.049	0.217	0.050	0.219	0.070	0.256
Post secondary	0.032	0.176	0.038	0.191	0.037	0.190
Household size:						
1-person	0.114	0.318	0.100	0.299	0.092	0.289
2-persons	0.122	0.328	0.091	0.287	0.099	0.299
3-persons	0.140	0.347	0.118	0.322	0.121	0.327
4-persons	0.141	0.348	0.133	0.340	0.147	0.354
5-persons	0.134	0.341	0.135	0.342	0.137	0.343
6 plus persons	0.348	0.476	0.423	0.494	0.404	0.491
Sector:						
Crop farming	0.651	0.477	0.650	0.477	0.492	0.500
Non-crop agriculture	0.057	0.231	0.029	0.167	0.048	0.213
Mining/construction	0.018	0.132	0.021	0.144	0.022	0.146
Manufacturing	0.045	0.208	0.035	0.185	0.074	0.262
Trade	0.076	0.266	0.079	0.270	0.150	0.357
Transport/communication	0.016	0.124	0.023	0.151	0.031	0.172
Other services	0.077	0.267	0.052	0.221	0.060	0.238
Government services	0.026	0.160	0.055	0.227	0.060	0.238
Not working	0.034	0.181	0.056	0.230	0.064	0.244
Occupation:						
Professional	0.042	0.202	0.056	0.231	0.058	0.235
Administrative	0.009	0.095	0.015	0.121	0.005	0.073
Service	0.030	0.171	0.108	0.310	0.181	0.385

Agriculture	0.677	0.468	0.678	0.467	0.510	0.500
Production	0.094	0.292	0.045	0.208	0.077	0.266
Unskilled	0.083	0.277	0.041	0.199	0.103	0.303
Not stated	0.063	0.243	0.056	0.230	0.065	0.247
Region:						
Central	0.311	0.463	0.315	0.464	0.336	0.472
Eastern	0.258	0.437	0.262	0.440	0.273	0.446
Northern	0.244	0.430	0.188	0.390	0.155	0.362
Western	0.187	0.390	0.236	0.424	0.235	0.424
Urban dummy	0.145	0.352	0.157	0.364	0.170	0.376
Community level characteristics:						
Public primary schools within 3 km[13]	0.854	0.353	0.886	0.318	0.917	0.276
Private primary schools within 3 km					0.476	0.499
Public secondary schools within 3 km[11]	0.348	0.476	0.874	0.332	0.816	0.387
Private secondary schools within 3 km					0.762	0.426
Safe drinking water within 1km			0.585	0.493	0.674	0.469
Clinics/health facilities within 3km			0.408	0.491	0.701	0.458
Feeder road within 1km[14]	0.712	0.453	0.559	0.497	0.826	0.379
Availability of electricity	0.197	0.398	0.223	0.416	0.260	0.439
Availability of telephone within 2km	0.197	0.398	0.159	0.366	0.280	0.449
Markets for agricultural input 5km	0.271	0.445	0.419	0.493	0.589	0.492
Markets for agricultural produce 5km	0.313	0.464	0.413	0.492	0.634	0.482
Markets for non-agricultural produce 5km			0.153	0.360	0.640	0.480
Financial institution within 10km	0.369	0.483	0.295	0.456	0.364	0.481
Source for credit with collateral within 10km					0.366	0.482
Source for credit with no collateral within 10km					0.290	0.454
Existence of a major factory within 10km					0.459	0.498

Source: Uganda National Household Survey (1992, 1999/00, 2002/03)

Table 9 presents the main results of our regression-based inequality decomposition. In accordance with the results in the previous section, household size is an important variable in explaining the observed variations in welfare. The signs on most

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[13] The variable definition for the year 1992 refers to 'primary and secondary schools within 3km', bearing no distinction between public and private institutions. Nonetheless, it is observed that in 1992 the nearest school was more likely to be public than private.

[14] The variable definition for the year 1992 refers to 'all season feeder road within 1km', whilst the UNHS 1999/00 and 2002/03 refer to 'feeder road within 1km'. This difference in definitions explains the puzzling trend of the statistics for road distance.

household size dummies influence expenditure in the expected direction, and all of them are statistically significant at standard levels. In other words, welfare decreases with increasing household size.

Education is positive and significantly related to the logarithm of consumption expenditure. Education at all levels plays a crucial part in increasing household welfare, with its effect increasing with educational attainment. Since the majority of the poor have less than 4 years of schooling, they will continue to benefit less from education compared to the non-poor. Over the period of analysis, we observe higher income gains for having education compared to no education, suggesting higher returns to education. In support of this argument, Appleton (2001c) finds that an extra year of primary education among the adult members of the household raises household earnings by 8% in 1999/2000, compared to 5% in 1992. Averaging an extra year of secondary education raises household income by 13% in 1999/2000, compared to 10% in 1992. The rise in the coefficient on university education is even larger. If all household members had attended university, income would be 183% higher, *ceteris paribus*, in 1999/2000; in 1992, the corresponding figure is 54%.

The sector of employment of the household head is also an important determinant of welfare. Over the study period, and especially in 2002/03, households whose head works in non-crop farming, trade and transport/communication registered consistently higher welfare levels than their counterparts in crop farming. The occupation of the household head also influences the expenditure level relative to those involved in professional jobs after controlling for sector.

Finally, **Table 9** reveals significant regional and rural/urban disparities in log of expenditure levels. The log of expenditure is significantly higher in central and western Uganda compared to other regions. The effect of community level characteristics is mixed.[15]

Turning to contribution to over all inequality, **Table 9** suggests that a significant proportion of the variation in log of consumption expenditure remains unexplained. Notably, however, over the survey rounds the proportion of unexplained variation decreases in size.

The overall contribution of regional inequality to total inequality was relatively higher than that of the rural/urban dichotomy. The contribution of these two factors was at its lowest in 1992/93 and highest in 1999/00. Education explains between 10% and 15% of the variance in household expenditure with a significantly higher contribution in 2002/03 than 1999/00. In other words, education seems to be a key factor influencing the degree of income inequality (Gregorio and Lee, 2002). The contribution of education to overall inequality is relatively higher than that of household size in 2002/03. Taking the relative contribution for each education category, the observed contribution is higher among those with post secondary education. Having some primary formal education reduces inequality for all the period of analysis, while completion of primary was inequality reducing in 2002/03, reversing the pattern

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[15] Our basis for inclusion of community level characteristics was heavily dependant upon the availability of data within all survey rounds. In this respect, the 2002/03 survey round provides the most detailed set of community level characteristics. For instance, distance to primary school disaggregated by ownership.

observed in the earlier years. Further, the results suggest that having education attainment beyond primary education is an important contributor to increases in inequality. In other words, while primary education and below is inequality reducing, educational attainment beyond primary can be inequality increasing.

Sector contribution to overall inequality since 1992 has remained below 10%, though with an increasing trend. This is largely driven by disparities in trade, which accounts for over 70% of total sector inequality contribution in 1992, 40% in 1999/00, and 44% in 2002/03. The contribution of sectors other than trade was relatively small and has declined for some sectors such as 'other services' and increased for others such as non-crop farming and government services. Overall contribution of occupation is mixed over the period of analysis. While in 1992/92 and 2002/03 it was inequality increasing, in 1999/00 it was inequality reducing. Taking the relative contribution for each occupation category in 2002/03, services and production were inequality reducing, whereas agriculture was inequality increasing.

Unsurprisingly, availability of social services within communities is found to have a significant impact on the household's welfare. The contribution of community level characteristics to inequality amounted to 4%, 5%, and 9% in 1992, 1999/00, and 2002/03, respectively. Availability of electricity and health facilities significantly contribute to inequality. In other words, bringing such facilities closer to the communities would reduce the observed inequalities in household incomes. It is also important to note that overall relative contributions are greater from household characteristics than from community characteristics.[16]

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[16] For comparability reasons, we performed the same analysis based on the log of consumption expenditure per person. Generally speaking, we found that failure to take into account economies of scale leads to an overestimation of the relative contribution of household size, and an underestimation of all other factors.

Table 9: Regression results of log of expenditure per adult equivalent and relative contribution, 1992-2002/03

	Parameter coefficients			Relative contribution			Overall relative contribution		
	1992	1999	2002	1992	1999	2002	1992	1999	2002
Male dummy	-0.066***	0.022	-0.045*	0.001	0.000	0.001	0.001	0.000	0.001
	(-4.18)	(1.02)	(-1.90)						
Age:									
25-34 yrs	0.027	0.015	0.050*	0.002	0.001	0.002	0.003	-0.002	-0.005
	(1.29)	(0.63)	(1.73)						
35-44 yrs	0.003	-0.0004	0.054*	0.000	0.000	-0.001			
	(0.12)	(-0.01)	(1.74)						
45-54 yrs	-0.010	-0.001	0.107***	0.000	0.000	-0.001			
	(-0.40)	(-0.03)	(3.15)						
55-64 yrs	0.020	0.059**	0.092**	0.000	-0.001	-0.002			
	(0.68)	(2.04)	(2.15)						
65 plus	-0.042	0.076*	0.094***	0.001	-0.002	-0.003			
	(-1.37)	(1.92)	(2.18)						
Education:									
Some education	0.141***	0.159***	0.206***	-0.007	-0.014	-0.024	0.080	0.106	0.133
	(8.11)	(7.05)	(8.28)						
Completed primary	0.211***	0.209***	0.288***	0.000	0.000	-0.001			
	(8.24)	(7.57)	(9.46)						
Some secondary	0.343***	0.393***	0.438***	0.015	0.033	0.036			
	(13.76)	(13.70)	(14.31)						
Completed secondary	0.442***	0.475***	0.560***	0.023	0.021	0.036			
	(14.11)	(10.95)	(12.55)						
Post secondary	0.723***	0.776***	0.896***	0.049	0.068	0.087			
	(17.66)	(13.91)	(14.85)						
Household size:									
2-persons	-0.284***	-0.265***	-0.316***	-0.015	-0.015	-0.018	0.115	0.123	0.124
	(-11.03)	(-8.50)	(-9.07)						
3-persons	-0.449***	-0.425***	-0.467***	-0.007	-0.015	-0.012			
	(-18.03)	(-14.17)	(-13.36)						
4-persons	-0.549***	-0.512***	-0.603***	0.007	0.000	0.007			
	(-22.24)	(-19.30)	(-16.79)						

	Parameter coefficients			Relative contribution			Overall relative contribution		
	1992	1999	2002	1992	1999	2002	1992	1999	2002
5-persons	-0.613***	-0.620***	-0.683***	0.018	0.016	0.019	0.018	0.050	0.052
	(-23.84)	(-21.17)	(-19.34)						
6 plus persons	-0.750***	-0.734***	-0.807***	0.112	0.136	0.128			
	(-33.47)	(-26.21)	(-25.20)						
Sector:									
Non-crop agriculture	0.172***	0.083*	0.301***	0.001	0.000	0.000			
	(3.98)	(1.84)	(6.68)						
Mining/construction	0.026	0.081	0.221***	0.000	0.000	0.002			
	(0.28)	(0.82)	(3.22)						
Manufacturing	0.001	0.076	0.179***	0.000	0.001	0.002			
	(0.01)	(0.84)	(3.07)						
Trade	0.151	0.250***	0.253***	0.015	0.021	0.023			
	(1.68)	(2.83)	(4.13)						
Transport/communication	0.203*	0.196**	0.387***	0.003	0.005	0.007			
	(2.16)	(1.98)	(5.08)						
Other services	-0.061	0.209**	0.195***	0.003	0.012	0.010			
	(-0.70)	(2.30)	(3.26)						
Government services	0.110	0.123	0.091	-0.003	0.008	0.007			
	(1.22)	(1.45)	(1.09)						
Not working	0.157*	-0.313**	-0.070	-0.001	0.004	0.001			
	(2.27)	(-2.23)	(-0.42)						
Occupation:									
Administrative	0.069	0.231***	0.163	0.001	0.007	0.003	0.028	-0.011	0.020
	(1.06)	(3.20)	(0.98)						
Service	-0.064	-0.045	-0.243***	-0.001	-0.005	-0.028			
	(-1.45)	(-0.84)	(-3.42)						
Agriculture	-0.120	0.028	-0.215**	0.026	-0.007	0.051			
	(-1.29)	(0.34)	(-2.52)						
Production	-0.060	-0.030	-0.320***	-0.003	-0.001	-0.008			
	(-1.32)	(-0.38)	(-4.33)						
Unskilled	0.037	-0.271***	-0.446***	0.004	-0.003	0.001			
	(0.84)	(-4.09)	(-6.12)						

	Parameter coefficients			Relative contribution			Overall relative contribution		
	1992	1999	2002	1992	1999	2002	1992	1999	2002
Not stated	-0.270** (-2.63)	0.233* (1.68)	-0.154 (-0.97)	0.001	-0.003	0.001			
Urban dummy	0.067** (2.80)	0.268*** (5.38)	0.132*** (2.99)	0.014	0.063	0.033	0.014	0.063	0.033
Region:									
Eastern	-0.144*** (-8.16)	-0.219*** (-10.02)	-0.208*** (-7.37)	0.003	0.003	0.008	0.025	0.074	0.050
Northern	-0.013*** (-0.70)	-0.499*** (-13.79)	-0.429*** (-11.44)	0.022	0.072	0.043			
Western	-0.238 (-12.24)	-0.030 (-1.30)	-0.066** (-2.02)	0.000	-0.001	-0.001			
Community level characteristics:									
Public primary schools within 3 km	0.016 (0.78)	0.005 (0.15)	-0.085** (-2.09)	0.000	0.000	-0.002	0.042	0.051	0.094
Private primary schools within 3 km			0.026 (0.95)			0.005			
Public secondary schools within 3 km	-0.002 (-0.14)	0.072** (2.06)	0.001 (0.04)	0.003	0.005	0.000			
Private secondary schools within 3 km			0.085*** (3.25)			0.009			
Safe drinking water within 1km		-0.012 (-0.59)	0.033 (1.44)		-0.001	0.004			
Clinics/health facilities within 3km		0.003 (0.13)	0.066** (2.43)		0.001	0.009			
Feeder road within 1km	-0.018 (-1.19)	0.005 (0.24)	0.035 (0.89)	0.000	0.000	0.003			
Availability of electricity	0.084*** (4.00)	0.082*** (2.71)	0.104*** (2.62)	0.016	0.019	0.028			
Availability of telephone within 2km	0.124*** (5.66)	0.080* (1.90)	0.041 (1.31)	0.023	0.016	0.010			

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	Parameter coefficients			Relative contribution			Overall relative contribution		
	1992	1999	2002	1992	1999	2002	1992	1999	2002
Markets for agricultural input 5km	0.059***	-0.070*	-0.054	-0.002	0.004	-0.008			
	(3.14)	(-1.71)	(-1.49)						
Markets for agricultural produce 5km	0.006	0.105**	0.071*	0.000	-0.006	0.010			
	(0.35)	(2.52)	(1.81)						
Markets for non-agricultural produce 5km		-0.084***	0.053		0.006	0.007			
		(-2.75)	(1.44)						
Financial institution within 10km	0.013	0.036	0.064	0.002	0.007	0.014			
	(0.78)	(1.24)	(1.45)						
Source for credit with collateral within 10km			-0.039			-0.008			
			(-0.86)						
Source for credit with no collateral within 10km			0.025			0.004			
			(0.85)						
Existence of a major factory within 10km			0.048*			0.009			
			(1.77)						
Constant	8.699***	10.605***	10.658***						
	(88.53)	(102.85)	(99.86)						
Residual				0.679	0.546	0.498	0.679	0.546	0.498
R-squared	0.321	0.423	0.461						

Note: (i) * denotes statistical significance at 10%, ** significant at 5%, *** significant at 1%. In addition, all reported standard errors are robust (White H., 1980; 1982). (ii) All the regressions are weighted. (iii) Multicollinearity: Variance Inflation Factor (VIF) < 5.

On a similar note, **Table 10** highlights factor contribution to changes in inequality. Regional differences accounted for 65% of the increase in the Gini coefficient from 0.364 to 0.395 between 1992/93 and 1999/00. In turn, the rural/urban dichotomy accounted for 64%, sector of employment of the head of the household for 43%, education for 41% and household size for 21%. These results are not surprising since these factors were inequality disequalizing over the two periods. By contrast, the changes in the overall contribution of occupation of the household head were inequality equalizing, hence the negative sign. While community services accounted for only 16% of the increases in inequality between 1992/93-1999/00, between 1999/00 and 2002/03 they recoded the largest contribution of 62%. During the same period, education accounted for 46%, followed by occupation of the head of the household at 40%; geographical location of a household did not contribute to the observed increase in inequality. To sum up, the three most important factors explaining changes in inequality between 1992/93 and 1999/00 were geographical location, sector of employment of the head of the household, and education. Between 1999/00 and 2002/03, however, community services, education and type of occupation were the most important factors.

Table 10: **Factor contribution to changes in inequality, 1992-2002/03**

	Overall relative contribution			Contribution to change in Gini coefficient	
	1992/93	1999/00	2002/03	1992 - 1999	1999 - 2003
Gender	0.001	0.000	0.001	-0.015	0.022
Age	0.003	-0.002	-0.005	-0.065	-0.034
Education	0.080	0.106	0.133	0.414	0.463
Household size	0.115	0.123	0.124	0.214	0.139
Sector	0.018	0.050	0.052	0.426	0.071
Occupation	0.028	-0.011	0.020	-0.470	0.401
Urban	0.014	0.063	0.033	0.639	-0.334
Region	0.025	0.074	0.050	0.645	-0.248
Community characteristics	0.042	0.051	0.094	0.156	0.617
Residual	0.678	0.546	0.498	-0.992	-0.091

6.0 DISCUSSION AND CONCLUSION

This paper supports the hypothesis that higher income groups, possessing more income generating assets (productive assets, human assets, or both), are in a better position to benefit from increased national income. The simultaneous increase in poverty and inequality after 1999/00, even when economic growth remained relatively strong, suggests that the trickle-down process is either halted, or has hit diminishing returns.

This study provides insights into deepening our understanding of the determinants of income inequality in Uganda between 1992 and 2002/03. Clearly, within- rather than between-group inequality accounts for the majority of total inequality. Decompositions by subgroups revealed that household characteristics are influential components of overall inequality, a finding also supported by the results based on the regression analysis. Using consumption expenditure per adult equivalent as a measure of welfare, the relative mean measure of inequality identified: (i) deepening of the rural-urban development dichotomy over time; (ii) the crop-farm sector systematically lagging behind national average welfare levels; (iii) the richest 20% becoming relatively richer over time – currently eight times better off than the poorest 20%; (iv) education as an important factor for explaining inter-household welfare disparities; (v) the gender of the household head not contributing significantly to overall inequality in Uganda; and (vi) family size of five and above moving a household to a welfare level that is below the national average.

Notably, decomposition by gender suggests that the welfare inequality among female-headed households has continued to widen over time and that it is inequality within each gender sub-group that contributes most significantly to total inequality. Disparities between female- versus male-headed households make very little contribution to overall inequality. Furthermore, intra-regional inequality appears to be more important than inter-regional inequality.

Notwithstanding the weaknesses of the income data, our analysis suggests that non-farm activities are inequality increasing, whereas farm activities are inequality reducing. Strategies aimed at increasing income of the rural population should not ignore the finding that income generated from non-farm activities is more unequally distributed in favour of the richer households. This explains the worsening income distribution in spite of increasing income levels for the rural population. Further disaggregation of non-farm activities suggested that non-agricultural enterprises, employment and property income sources were inequality increasing between 1997 and 1999/00.

The analysis from *Section 5* demonstrates that diversification of income sources out of agriculture brings about different impacts on inequality, depending on the structure of income. In rural areas, as well as among the poorest 20% of the population, the contribution of non-farm economic activities to total income has risen significantly indicating some positive returns to efforts to diversify the household's economic base. Nevertheless, this sectoral diversification has not helped to bridge the gap between the rich and the poor given that the welfare level of the richest 20% rose from being 6 to 8 times that of the poorest 20% between 1997 and 2002/03.

In terms of policy intervention, the Poverty Action Fund (PAF) is the government's main tool for channelling savings from debt relief into services (e.g. agricultural assistance, new feeder roads, health clinics, schools, and bore holes) to spread the benefits of growth, reduce the incidence of poverty, and the degree of inequality between poor communities and their wealthier counterparts.

The PAF orients social spending to promote economic growth and move Ugandan agriculture from a predominantly subsistence-based sector to one that is demand-driven and export-based. This observation, together with the finding that households with the largest initial endowments are the ones that seem to be experiencing real increases in consumption and income (GoU, 2001), suggests that the households that are better off to begin with are the ones that can benefit from PAF services. It follows that PAF interventions in their present form might not present a viable way to reduce the incidence of poverty and inequality.

According to Lentz (2003), with the exception of water, smallholder farmers do not feel that PAF services provide them with the means to achieve their basic needs. They perceive these services as goods to be consumed after basic needs are assured or, in some cases, at the expense of those needs. However, this does not mean that smallholder farmers place no value on PAF services. They feel that their lives would be worse off if the services were removed, and they would be willing to sacrifice some of their wealth and their asset base to retain them. Notably, smallholder farmers are not involved in the creation of development policies that affect them and do not have a say in which services they are provided.

It follows that PAF activities, despite reducing inequality of social services, have not helped smallholder farmers increase their earning potential, access key inputs, or reduce their vulnerability to shocks. A possible explanation for the ineffectiveness of the PAF is the existence of institutional barriers hindering service delivery and PAF implementation. One of Uganda's leading civil society organizations (CSOs), Uganda Debt Network (UDN), has been monitoring government expenditures through the PAF. UDN has documented examples of corruption, major time lags between release and receipt of PAF funds, and serious problems with the quality of the services delivered, which have compromised the potential impact of the PAF on poverty reduction (Lentz, 2003), and the mitigation of inequality.

In conclusion, although economic growth is poverty reducing since 2000, the poor have not been the main beneficiaries of Uganda's growth. Thus, Uganda's ambitious Poverty Eradication Action Plan's (PEAP) goal to reduce poverty to 10% of the population by 2017 looks very difficult to achieve, even if economic growth reaches the target level of 7% per annum, unless growth becomes decisively more pro-poor (Bevan et al., 2003).

Appendix I: Tests on reliability of income data

	1997				1999/00			
	Mean income per capita	Confidence interval		Coefficient of variation	Mean income per capita	Confidence interval		Coefficient of variation
		Lower	Upper			Lower	Upper	
Uganda	19,132	19,117	19,146	1.85	25,721	25,702	25,741	1.79
Rural	15,755	15,744	15,766	1.45	20,070	20,058	20,082	1.34
Urban	41,005	41,032	41,179	1.45	63,298	63,183	63,414	1.56
Central	29,338	29,300	29,377	1.59	40,595	40,544	40,646	1.60
Eastern	15,033	14,986	15,021	1.39	20,447	20,417	20,477	1.78
Northern	16,266	16,245	16,287	1.41	12,846	12,822	12,870	1.92
Western	12,043	12,026	12,060	1.29	23,954	23,924	23,984	1.49
Central rural	22,350	22,316	22,384	1.55	27,383	27,351	27,414	1.24
Central urban	46,503	46,404	46,602	1.39	72,815	72,668	72,962	1.39
Eastern rural	13,605	13,591	13,619	1.18	18,287	18,269	18,306	1.18
Eastern urban	31,368	31,225	31,511	1.51	44,033	43,750	44,317	2.27
Northern rural	15,150	15,133	15,168	1.24	11,834	11,817	11,850	1.42
Northern urban	37,674	37,438	37,910	1.54	31,833	31,488	32,179	2.52
Western rural	11,211	11,195	11,227	1.24	21,824	21,799	21,850	1.34
Western urban	23,115	23,001	23,230	1.18	58,498	58,212	58,784	1.40

Appendix II: Statistical significant of inter-temporal changes in welfare inequality, 1992–2003

Gini coefficients and their bootstrap standard errors

	1992/93		1997		1999/00		2002/03		t- ratios for differences in Gini over time			
	Gini	Std Error	Gini	Std Error	Gini	Std Error	Gini	Std Error	1992-1997	1997-2000	1999-2003	1997-2003
National	0.3641	0.0066	0.3467	0.0052	0.3953	0.0077	0.4277	0.0090	-2.0787 **	5.2229 ***	2.7412 ***	7.8045 ***
Rural	0.3256	0.0048	0.3109	0.0055	0.3210	0.0053	0.3628	0.0070	-2.0162 **	1.3303	4.7531 ***	5.8105 ***
Urban	0.3953	0.0184	0.3473	0.0096	0.4262	0.0133	0.4828	0.0205	-2.3067 **	4.8029 ***	2.3119 **	5.9773 ***
Central	0.3950	0.0135	0.3568	0.0101	0.4177	0.0145	0.4597	0.0179	-2.2675 **	3.4443 ***	1.8233 *	5.0061 ***
Eastern	0.3271	0.0063	0.3265	0.0072	0.3488	0.0106	0.3650	0.0098	-0.0554	1.7376 *	1.1275	3.1612 ***
Western	0.3192	0.0056	0.2810	0.0069	0.3245	0.0067	0.3588	0.0084	-4.2980 ***	4.5380 ***	3.1999 ***	7.1808 ***
Northern	0.3377	0.0124	0.3117	0.0086	0.3398	0.0086	0.3503	0.0098	-1.7253 *	2.3138 **	0.8056	2.9678 ***
Richest 20%	0.2344	0.0140	0.2178	0.0082	0.3022	0.0134	0.3266	0.0176	-1.0228	5.3532 ***	1.1040	5.6098 ***
Male-headed	0.3641	0.0081	0.3411	0.0071	0.3905	0.0099	0.4186	0.0099	-2.1275 **	4.0608 ***	2.0174 **	6.3737 ***
Female-headed	0.3638	0.0091	0.3644	0.0100	0.4116	0.0113	0.4564	0.0132	0.0463	3.1292 **	2.5856 ***	5.5712 ***
No formal education	0.3337	0.0063	0.3085	0.0074	0.3382	0.0083	0.3463	0.0135	-2.6009 ***	2.6699 ***	0.5077	2.4578 **
Some primary education	0.3268	0.0050	0.3138	0.0057	0.3406	0.0140	0.3493	0.0101	-1.7064 *	1.7808 *	0.5015	3.0668 ***
Completed primary	0.3399	0.0198	0.2894	0.0111	0.3165	0.0102	0.3520	0.0097	-2.2202 **	1.7946 *	2.5253 **	4.2443 ***
Some secondary education	0.3324	0.0115	0.3508	0.0142	0.3704	0.0145	0.3773	0.0089	1.0053	0.9693	0.4048	1.5829 *
Completed secondary	0.4044	0.0400	0.3662	0.0223	0.4367	0.0206	0.4568	0.0396	-0.8340	2.3229 **	0.4518	1.9947 **
Post secondary education	0.3840	0.0277	0.3765	0.0195	0.4785	0.0240	0.5098	0.0314	-0.2228	3.2972 ***	0.7935	3.6111 ***
Crop-farming	0.3165	0.0044	0.2913	0.0051	0.3206	0.0095	0.3372	0.0175	-3.7511 ***	2.7190 ***	0.8339	2.5188 **
Non-crop-farming	0.3735	0.0141	0.3349	0.0228	0.4012	0.0220	0.4192	0.0257	-1.4418	2.0913 **	0.5304	2.4515 **
Construction/Mining	0.4185	0.0655	0.3293	0.0278	0.3704	0.0265	0.3734	0.0256	-1.2544	1.0712	0.0809	1.1671
Manufacturing	0.3469	0.0146	0.3189	0.0137	0.3871	0.0170	0.3722	0.0162	-1.3937	3.1270 ***	-0.6364	2.5115 **
Trade	0.3770	0.0283	0.3532	0.0152	0.4289	0.0246	0.3981	0.0103	-0.7394	2.6174 ***	-1.1545	2.4460 **
Transport/communication	0.3583	0.0264	0.3508	0.0260	0.3654	0.0221	0.4140	0.0312	-0.2022	0.4288	1.2718	1.5563
Gov't-services	0.3774	0.0208	0.3574	0.0189	0.4465	0.0233	0.4630	0.0276	-0.7110	2.9763 ***	0.4567	3.1575 ***
Other services	0.3946	0.0238	0.3948	0.0224	0.4520	0.0240	0.5505	0.0386	0.0063	1.7433 *	2.1635 **	3.4847 ***
Not working	0.3399	0.0173	0.3844	0.0177	0.4696	0.0299	0.4579	0.0212	1.8020 *	2.4500 **	-0.3196	2.6620 ***

Gini coefficients and their bootstrap standard errors

	1992/93		1997		1999/00		2002/03		t-ratios for differences in Gini over time			
	Gini	Std Error	Gini	Std Error	Gini	Std Error	Gini	Std Error	1992-1997	1997-2000	1999-2003	1997-2003
Head aged below 25	0.3393	0.0130	0.3376	0.0106	0.3841	0.0268	0.3839	0.0115	-0.1022	1.6139	-0.0066	2.9607 ***
Head aged 25 – 34	0.3730	0.0154	0.3443	0.0085	0.3753	0.0099	0.3983	0.0080	-1.6319	2.3861 **	1.8104 *	4.6324 ***
Head aged 35 – 44	0.3589	0.0123	0.3698	0.0139	0.4139	0.0115	0.4018	0.0108	0.5836	2.4525 **	-0.7674	1.8223 **
Head aged 45 – 54	0.3692	0.0112	0.3298	0.0122	0.4022	0.0181	0.5072	0.0263	-2.3828 **	3.3247 ***	3.2897 ***	6.1191 ***
Head aged 55 – 64	0.3607	0.0205	0.3027	0.0136	0.3670	0.0166	0.4520	0.0279	-2.3561 **	2.9993 ***	2.6226 ***	4.8156 ***
Head aged 65 plus	0.3230	0.0095	0.3112	0.0118	0.4015	0.0398	0.4136	0.0278	-0.7789	2.1767 **	0.2492	3.3946 ***
1-person household	0.3600	0.0098	0.3779	0.0192	0.4175	0.0214	0.4350	0.0161	0.8335	1.3812	0.6520	2.2805 **
2-persons household	0.3592	0.0140	0.3445	0.0125	0.3646	0.0229	0.4565	0.0217	-0.7856	0.7704	2.9185 ***	4.4748 ***
3-persons household	0.3291	0.0104	0.3405	0.0198	0.3553	0.0165	0.4804	0.0499	0.5096	0.5732	2.3818 ***	2.6080 ***
4-person household	0.3191	0.0090	0.3078	0.0105	0.3849	0.0275	0.4320	0.0241	-0.8175	2.6201 ***	1.2873	4.7235 ***
5-person household	0.3418	0.0157	0.3051	0.0119	0.4007	0.0233	0.3985	0.0180	-1.8618 *	3.6519 ***	-0.0760	4.3198 ***
6 persons or higher	0.3659	0.0116	0.3275	0.0081	0.3857	0.0110	0.3903	0.0101	-2.7152 ***	4.2611 ***	0.3067	4.8625 ***

Note: * denotes statistical significance at 10%, ** significant at 5%, *** significant at 1%.

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