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Welfare Distribution and Poverty in Uganda, 1992 to 2000

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ABSTRACT
The study covers a period of far-reaching economic reform policies and programs in Uganda. Measures of inequality and stochastic dominance analysis are applied to a series of regionally representative national household survey data to shed light on the patterns of intertemporal changes in levels and distribution of welfare in Uganda. Stochastic dominance analysis of welfare distribution reveals that Ugandan households were better off in 2000 and 1997 than in 1992 irrespective of the choice of a poverty line. Using a sub-regional panel dataset that was constructed on the basis of rural/urban categorization we estimate elasticities of poverty with respect to growth to illustrate that deliberate policies focusing on welfare distribution would significantly enhance the poverty-reducing impact of growth. Using the estimated elasticities we highlight the scenarios under which Uganda can achieve either the income-poverty Millennium Development Goal or the more ambitious national goal of reducing absolute poverty to less than 10% of the population by 2017.

Keywords – Uganda, inequality, stochastic dominance, poverty elasticities

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Welfare Distribution and Poverty in Uganda, 1992 to 2000

1 INTRODUCTION

Uganda's dramatic turnaround from the political, social and economic decay of the 1970s and early 1980s earned the country some international recognition as a successful case of both *post-conflict* economic recovery and peacetime policy reforms. This was achieved mainly through firm commitment to stringent donor-supported reform programs. In the late 1980s, the initial period of the economic recovery, the country benefited from several lending operations that targeted rehabilitation of key social and economic infrastructure. The rehabilitation process was immediately followed by unwavering pursuit of reform policies and programs that aimed to restore macroeconomic stability and promote aggregate growth. Policy focus on human capital development and a general move from macro to micro concerns are recent developments that are succinctly manifested in the Poverty Eradication Action Plan (PEAP), Universal Primary Education program (UPE), and Plan for Modernization of Agriculture (PMA).

The impact of the various policies and programs on the nation's welfare is reflected in the reduction in the percentage of the population living in poverty from 56% in 1992 to 44% in 1997 to 35% in 2000 (Appleton, 2001). The distribution of the realized reduction in poverty is however skewed. In the agricultural sector, for instance, much of the reduction in poverty occurred among coffee farmers. But with the downward spiral in the coffee sector after the boom of the mid 1990s, serious skeptical scrutiny of the performance of the economy has recently taken center stage in Uganda's reform story.

The contentious debate about the reform success story takes two major dimensions. The first is that although there has been tremendous macroeconomic growth, the distribution of the associated welfare benefits is quite unequal across the various groups that are of political and socioeconomic policy interest. The second dimension is that the growth debate features serious skepticism about the official government position on the trend of poverty in Uganda. Skeptics contend that poverty has not declined at all in Uganda. Others argue that poverty certainly declined up to 1995/96, after which, they contend, it started to rise. The principal objective of this study is, therefore, to capitalize on the time series of Uganda national household survey in order to make additional scientific contributions to the debate on the trend of growth and changes in welfare levels and distribution in Uganda.

This paper seeks to make the following specific contributions in furthering policy relevant knowledge on poverty and welfare distribution. First, it analyses inequality in Uganda using the Gini coefficient in order to shed light on inequality trends in the country by various

spatial and socioeconomic categories of interest. Second, we apply stochastic dominance analysis to compare the distribution of welfare levels within and across groups over time in order to test the robustness of the changes in poverty that have been reported by other scholars who have used the same data. Third, we construct rural/urban sub-regional panels from five consecutive annual national household surveys and use the resulting data to estimate the potential long-term impact of growth and inequality on poverty. The data used are from three household surveys, which were conducted between 1992 and 2000 by the Uganda Bureau of Statistics (UBOS). In each survey a nationally representative sample of households – about 10,000 households in the 1992/93 Integrated Household Survey (IHS), about 6,500 households in a follow-up monitoring survey (MS) in 1997, and about 11,000 households in 1999/2000.

The rest of the paper is structured as follows. Section two briefly describes the background to Uganda's poverty reduction efforts. Section three highlights some of the specific anti-poverty programs that have so far been adopted. Section four outlines the derivation of the poverty lines used in our analysis. Section five reviews the poverty trend in the country during 1992 to 2000. In section six we use the Gini index of inequality to describe within-group distribution of welfare in Uganda during the 1990s. Section seven applies stochastic dominance analysis to the Uganda welfare data. Section eight uses econometric methods to estimate the elasticity of poverty headcount index to growth and inequality. The last section summarizes key results and draws basic conclusions.

2 BACKGROUND TO CURRENT POVERTY REDUCTION EFFORTS IN UGANDA

Due to the political and civil strife that plagued Uganda during the 1970s and early 1980s, the economy contracted significantly as a direct result of destruction, dissaving, physical and human capital flight, and reduced productivity through disruption and diversion of expenditure (Collier and Reinikka, 2001). Gross Domestic Product (GDP) declined by 40% from 1971 to 1986, which Collier and Ritva estimate to have translated into a one percent annual decline in the economy. But following the restoration of relative political and economic order in much of the country in the second half of the 1980s coupled with strong leadership will to reform, the country attracted substantial donor support for an Economic Recovery Program (ERP) that was launched in May 1987, an initiative that was immediately followed by a sequence of Structural Adjustment Programs (SAP). The ERP that was supported by the Economic Recovery Credits (ERC) and Structural Adjustment Credits (SAC) from the International Development Association and the Enhanced Structural Adjustment Facility (ESAF) from the International Monetary

Fund, plus other multi-lateral and bilateral assistance were primarily aimed at realizing economic rehabilitation, growth, domestic financial stability, and low inflation rates. Indeed, a stable macroeconomic environment was established by 1992 and has since been maintained, resulting in sustained economic growth rates of not less than five percent per annum during the nineties. Tax revenue rose from 5% of GDP in 1986 to about 12% in 1997 after which it basically remain unchanged. The stable macroeconomic environment and the restoration of relative peace, which reduced conflict risk level from 16% between 1986 and 1991 to only 2.4% for the period 1999 to 2004 must have underpinned the reversal of capital flight from a net flow of US $ –17.3 in 1991 to US $ + 311.3 in 1997 (Collier and Reinikka, 2001).

An important aspect of Uganda's policy reform was trade liberalization through extensive reduction of nontariff barriers, competitive tendering for government purchasing and a switch from export taxation to import taxation. Significant gains were realized from trade liberalization, for example, the 1991/92 abolition of coffee export tax together with overall coffee marketing liberalization increased competition among exporters and resulted in producer prices received by coffee growers as a share of border prices increasing sharply from 30% to more than 80% (Collier and Reinikka, 2001).

To ensure that conscious efforts are directed at sustaining and translating high economic growth rates into poverty reduction, in 1997, the Government of Uganda launched a Poverty Eradication Action Plan (PEAP) as the national policy framework for medium-term economic growth and human development. Detailed plans of action and goals for particular sectors are contained in the respective sector development plans, such as the Education Sector Investment Plan, the Health Sector Plan, the Plan for Modernization of Agriculture, the Social Development Sector Strategic Plan, and the Road Sector Development Plan. The implementation of the various sector-wide plans, which has been instrumental in diversifying growth, depends on the resources (spending ceilings) provided within the Medium Term Expenditure Framework (MTEF), which is a three-year rolling spending plan that links priority public spending areas to medium-term development goals[1]. Because of budgetary discipline, which is central to MTEF operationalization, any shortfalls in resources are met with matching within-year budget cuts except for activities under the Poverty Action Fund (a common pool to which debt-relief funds are channeled for use on directly poverty-reducing programs)[2]. But making within-year adjustments or cuts in the releases of funds disrupts original funding plans because it increases

volatility and weakens the budget as the instrument for allocating public resources (Henstridge and Kasekende, 2001). Fortunately there have been minimal severe consequences of such fiscal disciplinary measures, partly because stable macroeconomic conditions have undoubtedly made it easier to forecast revenues and expenditures (World Bank, 2003, pp. 62).

In pursuit of private-sector-led and investment-driven growth, government reversed the investment incentive system that was biased in favor of domestic firms. Several specific steps were taken in this regard, the most crucial of which was the establishment of the investment code of 1991 that relaxed numerous constraints and introduced attractive incentives for foreign direct investment. Successful implementation of privatization of non-performing state enterprises further induced efficiency and boosted the growth of the private sector in industrial, commercial, agricultural, and hotel sectors. By the end of 1999, the government had completed 93 divestitures of enterprises, privatizing 62 firms and liquidating the remainder (Collier and Reinikka, 2001).

In spite of the numerous positive outcomes of the policy reforms, major challenges remain, especially for private sector development. These include high cost of capital goods due to high transport costs of importing them, inadequate and unreliable electric power supply, corruption, and tax administration (Reinikka and Svensson, 2001). For household enterprises, credit financing remains a major constraint although the proportion of producers with access to credit rose from 8 to 16 percent between 1992 and 1999 (Deininger and Okidi, 2001). Despite the significant reduction in income poverty headcount from 56% in 1992 to 35% in 2000 (Appleton, 2001), panel data evidence covering the same period show that a significant proportion of Ugandans (20%) were chronically poor, 30% moved out of poverty, and about 10% fell into poverty (Lawson, *et al.* 2003).

In a bid to solicit the views of the poor about their welfare so as to deepen the understanding of poverty, especially with respect to its multidimensional nature, the Uganda Participatory Poverty Assessment Project (UPPAP) was carried out in nine districts in 1998. A total of 24 rural and 12 urban communities were consulted. The process aimed at incorporating the voices of the poor into the national planning and policy formulation process by complementing quantitative with qualitative evidence. The results of the exercise confirm existing statistical evidence, which shows that much as poverty is location-specific, social groups characterize it as well. The participatory assessment report emphasizes the complex and diverse nature of poverty, which was defined by poor people as a feeling of powerlessness, coupled with the inability to influence events around them. While in some districts the general feeling was that poverty had decreased over the past 20 years, in others, people felt that it had increased substantially. The qualitative approach through participatory assessment brings out voices from a

few specific villages (national household survey enumeration areas), which are usually averaged out when poverty is analyzed using quantitative approaches due to lack of representative small area samples. But where the qualitative and quantitative analyses cover similar topics, their results generally confirm or complement each other (Lawson *et al.*, 2003). In particular, using multinomial logit to model changes in poverty status between 1992 and 2000, it is found that factors that are responsible for moving households out of poverty are basically the same factors, which participatory assessment also identify as the key causes of poverty in communities where members report increasing poverty, and vice versa (Lawson *et al.*, 2003, Deininger and Okidi, 2003).

3 SPECIFIC ANTI-POVERTY PROGRAMS IN UGANDA

According to the capability approach to tackling poverty, what poor people need is the enhancement of their capability to realize their aspirations and achieve certain specific goals that are derivatives of a broad set of aspirations. The World Development Report 2000/2001 underscores promotion of opportunities, facilitation of empowerment, and enhancement of security against vulnerability as a comprehensive approach to poverty reduction. In order for people to benefit from productive activities in the real sector of the economy, they must have the necessary mix of own and public assets. The PEAP specifies medium- to long-term plans of action that aim at facilitating the private sector to contribute to, and benefit from, the country's macroeconomic growth. In this context many donor-supported specific poverty-oriented policies and programs have been adopted to create economy-wide opportunities for welfare improvement and to provide individuals with the capability to increase incomes and improve their quality of life. Between 1987 and 1992 alone, the country enjoyed World Bank support for about twenty-five lending operations worth over one billion United States dollars for rehabilitating key economic and social infrastructure (Kreimer *et al.*, 2000).

After significant progress was made to reconstruct major physical infrastructure the country embarked on economic reforms that emphasized macroeconomic stabilization and the rebuilding of human and social capital through investment in education, health, institutions of government, civil society, and attitudinal and behavioral values. A notable component of Uganda's economic reform was the liberalization of commodity prices and removal of monopoly powers of government enterprises, namely Coffee Marketing Board (CMB), Lint Marketing Board (LMB) and Produce Marketing Board (PMB). At the time when the CMB was solely responsible for exporting Uganda's coffee, farmers' share of the export price was less than 30%. After liberalization of the coffee sub-sector in 1991, their share rose from 45% in 1991/92 to 82% in 1996/97. This has had positive implications for poverty because an estimated 2.5 million

people (about 13 % of the total population) depend on coffee for their livelihood through production and marketing. Overall, the economic reforms have led to an average growth rate of more than 5% per annum during the nineties – a pro-poor growth[3] that resulted in poverty reduction from a headcount of 56% in 1992 to 35% in 2000. This growth rate is, however, below the national target of 7% per annum that is projected to achieve a reduction in income poverty to less than 10% by 2017.

To increase and sustain a high GDP growth rate, Uganda's development policy is focused on attracting a high rate of Foreign Direct Investment, increasing the competitiveness of Uganda's export sector, promoting domestic financial sector viability, and moving out of subsistence agriculture into modern commercial animal and crop husbandry. The implication of the outcomes of the commodity market reform is that focusing on agriculture, especially through a modernization program, presents a real opportunity to reduce poverty and achieve substantial growth in other sectors through consumption and employment linkages.

Uganda's Plan for Modernization of Agriculture (PMA) targets small-scale producers, and therefore if efficiently implemented should significantly contribute to sustained poverty reduction. However, the effectiveness of this program in alleviating poverty among vulnerable groups may not be extensive given their limited land ownership and access. Furthermore, recent research on rural livelihoods[4] has shown that although agriculture is a major means of livelihood, non-farm activities are contributing an increasingly greater share of rural household incomes. There is therefore need to consider the design of policy initiatives aimed at providing support to the development of non-farm enterprises as a means of improving rural livelihoods.

The planned modernization of agriculture may not, however, directly and substantially impact poverty at the chronic level. The reason is that most of the agricultural support programs such as the Danish-funded Agricultural Sector Program Support[5] and the National Agricultural Advisory Services (NAADS) target the more progressive farmers – those who come into the program with some minimum initial level of resources necessary to take advantage of the assistance programs. Furthermore, NAADS presumes the existence of farmers' groups that would then have the capability to prepare attractive proposals for financial support from government for purchasing services under NAADS. Modernization of agriculture as a pathway out of poverty could also get complicated if the 1998 Land Act provisions on access and ownership rights are not fully operationalized, and closely monitored for purposes of amendment, where necessary, to enhance women's rights to land.

Since over 80% of Uganda's labor force is in agriculture, which is rural-based, decentralizing fiscal responsibilities to local governments should take services closer to the

people with the potential for improving the efficiency with which rural households utilize their assets to improve their living standards. An EPRC/World Bank (1996) study shows that only 37% of the money released by the Ministry of Finance for non-salary primary school expenditures actually reached the intended schools. But the ongoing decentralization and the level of transparency in fund disbursement to the local level have dramatically improved the situation. Although decentralization of responsibilities from the center to the districts was initially not matched with flow of resources from the center (Obwona *et al.*, 2000), with accumulative decentralization, the flow of funds to the district governments is expected to improve significantly. In terms of resource allocation, the Medium Term Expenditure Framework for 1999/2000 to 2002/2003 indicates that fiscal transfers will continuously rise throughout this period, especially in sectors that have been identified to be crucial for poverty eradication. The increase in transfers is expected to come from increased flow of resources into the Poverty Action Fund (PAF), a pool into which savings from debt relief and poverty reduction resources are channeled.

4 MEASUREING WELFARE FOR UGANDA'S INCOME-POVERTY ANALYSIS

4.1 Major data adjustments

The use of the available Ugandan household survey data by various researchers to monitor changes in living standards has relied on household consumption expenditure as a measure of welfare. We use adjusted household consumption expenditure generated by Appleton (1999) in all calculations that involve a measure of welfare. Precisely, after data cleaning, the adjustments made ensured that the expenditure data reported by households are comparable across surveys, time and geographical regions.

The first set of adjustments was with regard to sampling. All the five surveys that generated the data analyzed in this paper used the same sampling frame based on the 1991 population census to draw nationally representative samples. But because of insecurity, two districts in the north and two in the west of the country were not covered in the 1997 survey. For consistency, the four districts, comprising about 6% of the country's population, were excluded from the analysis.

The consumption expenditure data is measured in 1989 shillings to adjust for intertemporal nominal price changes. The adjustment used the composite national Consumer Price Index (CPI) as the price deflator. Using the national household budget survey data and the 1992/93 integrated household survey data Appleton (1996) demonstrates that the deflator derived from the survey data largely corroborated the CPI. Appleton (1999) used monthly or annual

average of CPI in accordance with whether the reference period for a given expenditure item was "the last 30 days" or "the last one year."

Because food prices vary markedly between regions, especially between urban and rural areas, unit values of purchases of major food items (computed from the values and quantities reported in the survey) were used to construct rural/urban regional food price indices for each survey, which were, in turn, used to adjust the consumption expenditure data for spatial price variation. Non-food prices were assumed to be constant across regions.

After carrying out the major adjustments outlined above, Appleton (1999) applied the WHO's adult equivalent scales to generate household consumption expenditure per adult equivalent as the welfare measure for generating the widely quoted Uganda poverty trend statistics. Given that the last-stage sampling unit in the Uganda surveys is the household, for grossing up purposes, the household size was multiplied by the survey weight to obtain estimates of various poverty statistics for the population.

4.2 Derivation of poverty lines

A commonly used approach for identifying the poor is the costing of a basket of basic needs (basic food and non-food needs of the poor). The basic needs approach, what Appleton (1999) applied to generated the widely quoted poverty statistics for Uganda, can be described as follows in the context of the Ugandan work.

One of the first steps in the calculation of a poverty line via the basic needs approach is the adoption of a WHO daily food energy requirement for a given age group by sex. For the Uganda poverty lines, Appleton does not control for variation in energy requirement by sex. He uses WHO's adult male (18<=age<=30) energy requirement to calculate the value of the per-adult-equivalent daily calorie intake. Using the household consumption expenditure per adult equivalent, together with the cost of meeting the required per-adult-equivalent daily calorie intake (3000 calories per day) as the food poverty line, the non-food basic needs are inferred and the total poverty line is computed[6]. Households are then categorized as poor or non-poor depending on whether their total consumption per adult equivalent is below or above the total poverty line.

Because of the absence of some prior meaningfully derived poverty line for Uganda, Appleton ranks households by their consumption per adult equivalent and identifies 28 major food items that are consumed by the poorest 50% to serve as the reference food basket. Because the food items were reported in various measurement units, Appleton focuses on observations

with metric measurements to obtain the unit value in the respective metric measurement (reported value divided by reported quantity). Appleton then gets the median unit value in the respective metric unit, and converts the median unit values into per-kilogram unit values (adopted as the per-kilogram price now). A new set of quantities consumed is then generated by dividing each reported quantity (converted to kilogram) by the per-kilogram price. Finally, the mean daily quantity consumed of each item per person in the household is calculated and multiplied with the corresponding calorific value per kilogram times a scientifically determined retention rate to get the corresponding number of calories taken per person per day by the poorest 50%. The ratio of this number of calories to the WHO recommended 3000 calories is then used to scale the reference food basket in order to get the respective quantities required to provide 3000 calories. The total cost of the resulting food basket (where items are consumed in the same proportion as in the reference food basket) is then obtained and adopted as the food poverty line.

Using a standard procedure, the non-food requirements are derived using the food poverty line. Basically, the non-food expenditure of those households whose total expenditure is equal to the food poverty line is considered to be an expenditure towards meeting other basic needs since at their level of welfare, spending on non-food items occurs at the expense of food energy requirements. In brief, the process of obtaining non-food requirements involves regressing the share of food in household total expenditure on the log of the ratio of consumption expenditure per adult equivalent to the food poverty line, relevant location dummies, and basic demographic characteristics. The estimated equation is then evaluated at the value of consumption expenditure per adult equivalent equaling the food poverty line (i.e. to deal with those on the food poverty line only). The share of non-food expenditure for those on the poverty line is therefore obtained and taken as the non-food component of the total poverty line. The sum of the food and non-food requirement for a given geographical location is then calculated to generate location-specific poverty lines corresponding to the location dummies included in the regression equation. The justification for adopting location-specific poverty lines is that the estimated non-food shares (evaluated at the food poverty line) are significantly different between rural and urban areas for every region, arguably because urban residents may have to spend more on non-food requirements such as house rent and travel because of higher prices for those items.

5 POVERTY TRENDS IN UGANDA

The official poverty statistics of Uganda, which show that absolute income/consumption poverty declined nationally from 56 to 35 percent between 1992 and 2000, are derived from a time series of cross-sectional household survey data that the Uganda Bureau of Statistics has collected

periodically since 1992 with the primary purpose of providing information for tracking micro-level impacts of the economic reforms that the country has implemented for more than a decade now. Analysis of the survey data show that consumption expenditure per adult equivalent grew by one third and one half in rural and urban areas respectively between 1992 and 2000 (Appleton, 2001). In addition to urban bias in welfare growth, data for 1997 to 2000 provide evidence of general welfare inequality in that consumption expenditure for the richest 10% of the population grew by 20% while that of the poorest 10% grew by only 8%. Regional imbalance, especially between Northern and the rest of the country, has persisted at a deteriorating rate because it was only in the Northern region where per capita consumption declined between 1997 and 2000. The picture is expected to have been worse if the war-ravaged northern districts of Gulu and Kitgum were included in the analysis.

Decomposition of changes in poverty by economic sector (Appleton, 2001) indicates huge disparities in the ability of different socioeconomic groups to exploit the economic opportunities created by the stable macroeconomic environment in the country. Of all the major sectors reported by household heads as the main area of economic activity, the food crop sector was found to be the poorest in 1992 but poverty in this sector declined from 64% in 1992 to 46% in 2000. Although cash crop farming was the second poorest sector in 1992, it experienced a substantial decline in poverty from 60% in 1992 to 30% in 2000. In the non-crop agricultural sector there was an observed decline in poverty from 52 to 41 percent over the same period. It was in manufacturing and trade where the greatest proportionate decline in poverty occurred.

These trends in income poverty reveal that the economic reform programs that Uganda embarked on in the beginning of the last decade generated substantial welfare-increasing opportunities that enabled a significant fraction of the population to move out of poverty. But without specific measures that target welfare inequality and regional growth disparities, the full potential of growth-led economic reform programs to reduce poverty, especially for the chronically poor, may not be achieved. Regression analysis and simple simulation exercises using panel household data show that although coffee price increases during the 1990s significantly increased household economic growth and poverty reduction, low levels of household economic diversification leaves households very vulnerable to price falls (Deininger and Okidi, 2003).

6 INEQUALITY TRENDS IN UGANDA

We apply the Gini coefficient measure of inequality to the monthly household consumption expenditure per adult equivalent (CPAE) to shed light on trends in welfare inequality by different categories of policy interest. The results presented in Table 1 show that welfare inequality

declined from a national Gini coefficient of 0.37 in 1992/93 to 0.35 in 1997 (a change which is statistically significant at the five percent level) before rising by a statically significant magnitude (at the one percent level) to 0.40 in 1999/2000.[7] These results illustrate that although there was a robust and substantial decline in poverty between 1992 and 1997 (demonstrated in a later section using stochastic dominance method), very little of the poverty improvements are attributable to welfare redistribution.

[Table 1: Changes in welfare inequality: 1992 to 2000]

The inequality literature indicates that inequality measures should always be interpreted jointly with the mean of the welfare measure adopted in order to assess changes in aggregate well-being. The observation that inequality declined between 1992/93 and 1997 before rising in 1999/2000 (a period when poverty incidence was declining) illustrates that poverty does not always move in the same direction with welfare inequality. This is corroborated by Appleton's (1999) decomposition analysis of changes in poverty, which shows that the downward trend in poverty in Uganda was almost wholly due to growth rather than distribution – growth accounted for about 87% of the fall in the headcount index while welfare distribution accounted for only 12% of the poverty reduction from 56% in 1992 to 44% in 1997. The analysis further reveals that increases in living standards were greater in the lower deciles than among the affluent, contributing to a fall in inequality between 1992 and 1997. Applying standard decomposition analysis, Appleton (2001) estimates that had there been no growth between 1992 and 2000 poverty would have increased by a three-percentage point. For the period 1997 to 2000 poverty would have increased by about a four-percentage point if there had been no growth.

The zigzagging pattern of inequality in the 1990s could be reflecting the fact that in the first half of the 1990s government policies focused primarily on economic growth and macroeconomic stabilization and less on redistribution of the benefits of the policy reforms. It is conceivable that in the initial period of the reform process (1991 to 1996), the benefits associated with the realized economic growth and the successful coffee sector liberalization that coincided with high international coffee prices in the mid 1990s must have percolated the economy in a trickle-down fashion, leading to significant decreases in poverty. Coupled with the estimated significant decline in inequality between 1992 and 1997 (Table 1), the growth experienced in this period could appropriately be characterized as pro-poor (Kakwani and Pernia, 2000). But between 1997 and 2000, although growth rates remained high, inequality increased. In as far as the economic development framework of Uganda has been *welfarist* on the whole, it is likely that the

segment of the population that had the necessary initial human and physical assets capitalized on the growth opportunities that were ushered in by the sweeping policy reforms of the time – resulting in widening welfare disparities as the less endowed lagged behind. Panel data evidence from the 1992/93 and 1999/2000 National Household Surveys show that, indeed, high initial asset levels guaranteed households to be on a higher growth trajectory (Deininger and Okidi, 2003).

The pattern of inequality in the 1990s could in general be attributed to structural changes in key institutions following the adoption of the structural adjustment programs, long term shifts in macroeconomic policy stances, disparities in geographical or social allocation of public goods and services, pricing policies, and uneven spatial distribution of private sector investment incentives. During the reform period of the 1990s structural changes that occurred in the formal employment sector dealt a final blow to the then already weak abilities of labor organizations to effect wage and living conditions negotiations. For example, the retrenchment that characterized the public service reform of the mid 1990s increased unemployment and resulted in rapid growth of casual labor supply as a coping strategy, consequently depressing the share of labor in total income. In addition, the macroeconomic policy stances that aimed at achieving low inflation and low public budget deficits with minimum amelioration of the associated social and economic costs of restructuring are likely to have contributed to the changes in inequality that our analysis reveal. Ingeneral, the abilities and incentives of the private sector to fill the employment gaps created by public service downsizing and privatization of state enterprises were initially inadequate to stave off deepening inequality outcomes of restructuring.

Issues relating to the inequality in the distribution of arable land and human capital, and severely limited access to investment credit, which stifles family enterprise startups, have probably compounded the welfare inequality in the initial stages of the reform in Uganda. Furthermore, the peace that has been sustained in the center of the country and the resulting economic polarization should partly explain the conspicuous inter-regional welfare differentials in the country. However, the impact of a given spatial distribution of economic opportunities on intra-regional welfare inequality should be of great policy interest as well, especially in the wake of the recently implemented political and fiscal decentralization.

6.1 Changes in regional inequality in Uganda

Although the national inequality index for 1997 is lower than for 1992, a disaggregated analysis reveals some interesting within-group pattern. Regional inequality statistics show that with the exception of Eastern region, all the other regions enjoyed statistically significant declines in inequality (at least at the five percent level) between 1992 and 1997 (Table 1). The Central

region, which consistently remained the best off region, maintained the highest level of inequality throughout the period of analysis.[8] By contrast, Western region maintained the lowest intra-regional inequality over the same period. A notable similarity between Western and Northern is that by 1999/2000 their Gini coefficients had gone back to the 1992/93 levels. For Northern, the statistically significant decline in inequality between 1992 and 1997 is an interesting finding given that the region has suffered war ravages since the mid 1980s. A possible explanation for the observed decline in the Northern figures is that, the civil war in the region economically weakened the relatively better off such that there was no major improvement in their welfare compared to the other Northern residents. The plausibility of this explanation is reinforced by the finding that the headcount ratio for the Northern region declined significantly from 71.3% in 1992 to 58.8% in 1997 (Appleton, 1999). Intuitively, the movements out of poverty by such a large percentage of the households in the region, together with unfavorable security-related conditions for substantial economic progress for those with the capacity to do so, led to a decrease in inequality. However, the results for Northern region need to be interpreted with caution because the war ravaged districts of Gulu and Kitgum were omitted from the analysis since they were not covered during the 1999/2000 survey due to security problems.

Eastern was the only region in which inequality did not decline in either of the two intervening periods of analysis. This pattern is surprising given the geographical and economic diversity of the region. Economically, Eastern has some of the poorest districts (Katakwi and Kumi) and it is home to Jinja district, which has the second largest concentration of industries in Uganda. Agriculturally, households' main activities in Eastern region range from pastoralism (which is characterized by low standards of living) to coffee growing (which enjoyed increased profitability in the mid 1990s). Such a regional mix of inter- and intra-sectoral economic diversity would ordinarily lead one to expect significant changes in inequality, especially in a period of market-driven economic system.

6.2 Changes in inequality by rural/urban categorization

Another important perspective for welfare analysis is by rural/urban categorization. In Table 1 we observe that throughout the period of analysis inequality was higher in urban than in rural areas. But for both areas the Gini coefficient declined significantly from 1992 to 1997. After 1997 urban inequality increased quite significantly while rural inequality remained statistically unchanged. The implication is that although poverty fell in both rural and urban areas over the period,[9] and the mean living standards rose faster in rural areas, the improvements in rural living standards were more equally distributed. Alternatively, it is likely that the slump in the coffee sector after

the boom of the mid 1990s contributed to the observed reduction in welfare disparities in the rural areas. As stated earlier, structural changes that occurred in the then largest formal employment sector (the civil service), for example, the retrenchment that characterized the public service reform of the 1990s and the downsizing that accompanied the divestiture of public enterprises increased urban unemployment and resulted in rapid growth of casual labor supply as a coping strategy, with the likely effect of wage depression at that lower end of the labor market. This must have contributed to the observed rise in urban inequality.

6.3 Changes in inequality within agricultural and non-agricultural sectors

To further our understanding of inequality breakdown in Uganda, we extend the analysis to the main sector of the economy – agriculture. We further disaggregate the sector into crop and non-crop sub-sectors. The results in Table 1 show that within the crop sub-sector inequality declined significantly (with a *t*-ratio of 3.77) from a Gini coefficient of 0.32 in 1992 to 0.29 in1997. From 1997 to 2000 there was, however, a statistically significant rise (a reversal) of the sub-sector's Gini value to the 1992 level. For the non-crop agricultural sub-sector, although inequality reduced within the group between 1992 and 1997, the reduction was not statistically significant. But after 1997 the sub-sector experienced a significant rise in the Gini from 0.33 in 1997 to 0.40 in 2000.

7 STOCHASTIC DOMINANCE ANALYSIS OF WELFARE IN UGANDA

7.1 Changes in welfare at national level, 1992 to 2000

The results on welfare changes that were discussed earlier rely on a given set of poverty lines, which makes them sensitive to the segment of the welfare distribution in which the analysis is done, or in which the poverty line lies. A robust approach to monitoring welfare changes is through stochastic dominance analysis, which, applied to poverty analysis, plots and compares the cumulative distribution functions of a given welfare measure. Stochastic dominance is about ranking distributions and it works by treating economic agents as a continuum, with a welfare measure that is continuously distributed across the population. This is in contrast with dealing with concepts such as the fraction of people whose welfare level is less than a given value. Stochastic dominance ranges from *first* to n^{th} order dominance, where n is a positive integer. *First order stochastic dominance* occurs if distribution Y is at least as large as distribution X, that is, distribution X lies no higher than distribution Y. In this case X is said to have first order stochastic dominance over Y. First order stochastic dominance of distribution X over Y therefore implies that any social welfare function that is increasing in income, will record higher levels of welfare in distribution X than in distribution Y (Saposnik, 1981).

Since poverty lines at the upper end of welfare distribution are usually implausible, it is not necessary to apply stochastic dominance criterion over the entire distribution of the expenditure data. Accordingly, we truncate the distribution to include adult equivalent expenditure levels below Uganda Shillings 30,000 – a figure much higher than any of the rural/urban sub-regional poverty lines, which range from Shs 15,188 to 17,313 in 1993 prices. Figure 1 presents the stochastic dominance analysis of welfare for 1992, 1997 and 2000 at the national level. Clearly, the figure shows that both the 1997 and 2000 distributions dominate the 1992 distribution – a robust indication that a sizable proportion of Ugandans who were poor in 1992 moved out of poverty over time, irrespective of the choice of poverty line. Because real consumption per adult equivalent grew by about a third in rural areas and by about one half in urban areas between 1992 and 2000 (Appleton, 2001) it is not surprising that the 2000 distribution strictly dominates the 1992 distribution. Using the *poverty dominance* feature of the Distributive Analysis software (DAD 4.3), we determine that the decline in national poverty from 1992 to 1997 is statistically significant with a *t*-ratio of 9.77. [10]

Although on average consumption expenditure rose by 22% between 1997 and 2000, reading from figures 4 and 5 indicates that the improvement was confined to the lower and upper segments of the national welfare distribution, with the population in the middle part of the distribution having been better off in 1997 than in 2000. Given that a significant proportion of the 2000 distribution lies below that of the 1997 distribution within the range of consumption expenditure below the Ugandan poverty lines, it is expected that a substantial fraction of those who were poor in 1997 moved out of poverty in 2000. This assertion is corroborated by the fact that the decline in the national poverty headcount between 1997 and 2000 is statistically significant with a *t*-ratio of 8.57. The results showing that between 1992 and 1997 Uganda experienced robust improvements in living standards but that between 1997 and 2000 the changes were conditional on the segment of the distribution, necessitates a disaggregated analysis.

[Figure 1: Cumulative distribution functions of consumption per adult equivalent (CPAE) - Uganda]
[Figure 2: Cumulative distribution functions of CPAE for Uganda]

7.2 Changes in welfare by region, 1992 to 2000

As discussed earlier, there are clear differences in inequality and household welfare among different regions. In this section we use stochastic dominance analysis to provide within-year inter-regional welfare comparisons that are robust to the choice of poverty lines. We also apply

stochastic dominance to highlight inter-temporal changes in welfare distribution within the poorest region of the country. The results are shown in figures 6 to 8.

[Figure 3: Cumulative distribution functions of CPAE by region, 1992]
[Figure 4: Cumulative distribution functions of CPAE by region, 1997]
[Figure 5: Cumulative distribution functions of CPAE by region, 2000]

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The figures confirm the widely known poverty situation in Uganda that living standards in the Central region strongly dominate those in the rest of the country. Inter-regional poverty dominance test for 1992 show that the level of poverty in Central was statistically lower than those in Eastern, Western and Northern with corresponding *t*-ratios being 8.48, 6.28 and 14.58 respectively. Again, as expected, Northern region is dominated by all the other regions and therefore ranks the worst off, irrespective of the poverty line chosen. However, what is striking is the distribution function for 1997, which shows that first order stochastic dominance does not conclusively rank Eastern against Western. Beyond Shillings 9,000, Eastern region dominates the Western region, but for per capita expenditure levels below this mark, Western dominates. We find this interesting especially given that the two regions have been perceived as clearly contrasting - that Western region is typically better off than Eastern region. But with respect to the Ugandan poverty lines, the 1997 headcount index for Western is statistically lower than that of Eastern with a *t*-ratio of 3.50. Nevertheless, the stochastic welfare dominance results demonstrate that at higher poverty lines, Western region could have higher poverty headcount indices than Eastern for 1997. However, the curve for Eastern in 2000 strictly lies above that of Western.

With respect to intra-regional welfare changes over time, Figures 6 to 9 show that both the 1997 and 2000 distributions exhibit strict first order stochastic dominance over the 1992 distribution for every region. Western is the only region where the 2000 welfare distribution strictly dominates the 1997 one. For Central and Eastern the 2000 distribution functions single cross the 1997 curve from below within the distribution range that lies below the respective regional poverty lines. This indicates that for some plausible set of poverty lines a fall in the headcount index should be observed for the two regions between 1997 and 2000. In Northern region, irrespective of the poverty lines chosen, poverty headcount was expected to rise because the 2000 distribution curve lies strictly above that of 1997.

[Figure 6: Cumulative distribution functions of consumption expenditure, Western]

[Figure 7: Cumulative distribution functions of consumption expenditure, Eastern]

[Figure 8: Cumulative distribution functions of consumption expenditure, Central]

[Figure 9: Cumulative distribution functions of consumption expenditure, Northern]

8 IMPACT OF GROWTH AND INEQUALITY ON POVERTY

In this section, we analyze the relationship between poverty, growth and inequality using estimates from the Uganda National Household Survey data for the period 1992 to 1997. We start by investigating the impact of growth on poverty while controlling for its distributional aspects by exploiting the five-year time series of cross-sectional data to construct rural/urban sub-regional panels. Although five years is a relatively short period to establish the long-term relationship between key economic variables, the results of regression analysis applied to the constructed data provide useful insights on the responsiveness of poverty to growth and inequality.[11]

As discussed earlier, the use of the Ugandan household survey data by researchers to monitor changes in living standards has relied on household consumption expenditure as the welfare measure. In this study, we use Appleton's (1999) construction of adjusted household consumption expenditure to calculate sub-regional poverty headcounts, mean consumption expenditures, and Gini coefficients based on rural/urban categorization. If mean consumption expenditure in a given sub-region is equal to the corresponding sub-regional poverty line then it means that on average households barely meet their basic needs in that sub-region. Growth is therefore measured as changes over time in household consumption expenditure per adult equivalent as an indicator of households' ability to meet basic needs.

We proceed to econometrically estimate the relationship between growth and poverty by dividing each of the four regions of Uganda into rural/urban sub-regions to yield forty observations from the 1992 to 1997 cross-sectional series. A double log specification is applied to the data such that the estimated correlation coefficients are directly interpreted as the elasticities of poverty with respect to growth and inequality. The results of the estimated correlation are presented in Table 2 and Table 3. The various specification test statistics presented in the table show that: (i) at the four percent level of significance, the null hypothesis that there are no sub-regional fixed effects is accepted; (ii) there are no random effects that are sub-region specific; and (iii) the differences in correlation coefficients in the fixed versus random effects models are not systematic. These test results dictate that the ordinary least squares estimates are not only consistent but are the most efficient. We therefore base the interpretation of the poverty impact of growth and inequality on the OLS results with robust standard errors.

The estimation results indicate that growth and its distributional aspects are strongly correlated with poverty incidence at any level of statistical significance. Controlling for inequality, a one-percent increase in real mean consumption expenditure per adult equivalent reduces poverty headcount index by 1.67%. From Appleton's (1999) adjusted consumption expenditure data, there was a national increase of 16.5% in mean consumption expenditure per adult equivalent between 1992 and 1997. During this period, poverty headcount ratio declined by a twenty-one percentage point, from 0.56 to 0.44. Using the estimated elasticity of poverty to distribution-neutral growth, the 16.5% increase in mean consumption expenditure would have resulted in a twenty-eight-point decline in the poverty headcount index (more than the above-referred twenty-one point change). The difference between the two percentage-point changes in the headcount index can be explained. Whereas the estimation procedure for the twenty-eight-point change controls for inequality, the twenty-one-point change is arrived at without holding inequality constant.

[Table 2: Impact of growth and inequality on poverty]
[Table 3: Impact of growth on poverty, allowing for inequality]

On the basis of the above-discussed relationship between growth and poverty, we can make predictions about poverty level for a given rate of growth. The elasticity of poverty headcount with respect to growth, holding inequality constant, was estimated at –1.67. In addition, we estimate an elasticity of –1.39 when changing inequality is allowed for (Table 3). The elasticities from both specifications are much higher than the -0.59 that was estimated by McGee (2000) who used four years of the Uganda National Household Survey data to construct regional level variables yielding only sixteen data points. Our estimated elasticities (–1.67 and –1.39) are within range of the elasticity of -1.5 that was estimated by Hanmer and Naschold (2000) without holding inequality constant for low inequality developing countries under broader-based growth scenario.[12] The elasticity of –1.39 also compares well with the –0.82 that is cited by McGee (2000) for low-inequality Sub-Saharan Africa, where low inequality is defined to mean a Gini coefficient of less than 0.47.

Given that inequality reduces the impact of growth on poverty and given that Uganda's Gini coefficient was estimated at 0.40 for 2000, coupled with the fact that Uganda's economy has performed much better relative to other Sub-Saharan African countries, it is not surprising that Uganda's poverty elasticity is higher than that for the combined low-inequality Sub-Saharan African countries. Therefore, on the basis of the growth path of Uganda since the early nineties,

reinforced by its current policy emphasis on pro-poor and private sector led growth, it is realistic to adopt the broader-based growth scenario to project the impact of growth on poverty in realizing Uganda's national target of reducing poverty to less than 10% by 2017 and in meeting the Millennium Development Goal (MDG) of reducing income-poverty to half the level in 1990 (roughly from the 56% estimated in 1992 to 28% in 2015).

According to simple simulation, if inequality remains constant, any rate of growth from 4.5% to 7% would enable Uganda to meet the national poverty goals, as long as the responsiveness of poverty to growth is 1.67%. Because the income-poverty Millennium Development Goal is much less ambitious than the Uganda national goal, whenever the latter is feasible the former is as well achievable. However, if we allow for inequality (which has been increasing in recent years), the impact of growth on poverty is reduced to 1.39%. At this level of responsiveness the national poverty goal would only be attainable if the economy grows by at least 5.5%. But the country would still meet the millennium poverty goal even if it grows by as low as 3.5% per annum. But, if the responsiveness of poverty to growth in Uganda was to taper off to the Sub-Saharan African rate of 0.82%, then a minimum growth rate of 5.5% would be needed to achieve the income-poverty MDG. Under this scenario, the country would not achieve its more ambitious country goal of reducing poverty headcount to less than 10% by 2017 unless its annual growth rate jumps to at least 9%.

9 CONCLUDING REMARKS

This study exploited available national household survey data to investigate trends in inequality and changes in living standards in Uganda from 1992 to 2000. At the national level and in both rural and urban areas of Uganda, inequality decreased from 1992 to 1997. In urban areas, the initial fall in inequality between 1992 and 1997 was followed by a rise to the highest level in 2000. Regionally, it is Central, with the highest rate of urbanization, which consistently experienced the highest level of inequality over time. Eastern, which is the second poorest region of the country experienced insignificant changes in inequality between 1992, 1997 and 2000. Over time, it was in the mid 1990s when inequality was at the lowest level, a time when the economy was also at the peak of its performance since the reforms of the early 1990s, especially because of the relatively high international prices of the country's main export, coffee. Spatially, it is in Central region and urban areas, which supposedly had the highest benefit incidence from the opportunities generated by the reform programs that also registered the highest levels of inequality. These results suggest that higher welfare inequality is associated with higher economic growth unless the growth is broad-based such as the coffee-boom-driven growth of the

mid 1990s. Otherwise, growth with rising inequality should necessitate safety net and equalization programs to minimize the social costs of growth without redistribution and the risk of plunging into a scenario of "immiserizing" growth.

The stochastic dominance analysis has revealed that irrespective of the poverty line chosen within the range of all plausible poverty lines, Ugandans enjoyed continuous improvements in welfare during the 1990s. The improvements, which were more pronounced in the middle parts of the welfare distribution, were geographically widespread although in significantly different orders of magnitudes, at least until 1997. Nationally, first order stochastic dominance does not conclusively rank 2000 as a better year than 1997. But because the curve for 2000 crosses that of 1997 from below and within the range of expenditures above all plausible poverty lines, the poverty headcount index would be expected to decrease at the national level from 1997 to 2000.

Using aggregated data, at the sub-regional level we also showed that a growth-led poverty alleviation program is capable of significantly impacting poverty in the long run as long as there are deliberate policies to address household-specific inadequacies to exploit growth opportunities. Our stochastic dominance results together with the findings of previous studies confirm that the initial focus on growth in the economic reform process in Uganda has had a significant poverty reduction impact. But our regression results demonstrate that without systematic attention to distribution, the economy cannot fully capture the poverty alleviation benefits of growth. The implication is that if the current emphasis of policy statements on the poorest of the poor is translated into deeds, and the general mission of poverty eradication through (appropriate) modernization of agriculture is realized, then broad-based growth with redistribution will be realized. This could bring within reach the country's vision of income poverty eradication by the year 2017.

NOTES

[1] Many of Uganda's development goals are to be achieved ultimately in the private sector. Accordingly, the government emphasizes the promotion of the private sector as evident in the 1999/2000 launch of a five year Medium-Term Competitiveness Strategy (MTCS) to tackle major constraints to private sector development.

[2] After committing to creating and protecting the Poverty Action Fund, Uganda became the first country to benefit from the September 1996 decision of the World Bank and the IMF to grant debt relief to heavily indebted poor countries (HIPC) (Mijumbi, 2001).

[3] A decomposition analysis of changes in poverty from 1992 to 2000 reveals that the reduction in poverty was overwhelmingly due to growth and very little attributable to distribution (Appleton, 2001). Welfare inequality has actually increased in Uganda such that in the absence of growth, there would have been approximately four-percentage point increase in the poverty headcount index between 1997 and 2000. Using stochastic dominance analysis, Okidi *et al.* (2000) demonstrate that, irrespective of the choice of a

poverty line, there were widespread improvements in economic welfare across regional and socioeconomic groups.

[4] See Ellis, Frank and Godfrey Bahiigwa (2001)

[5] See Okidi (2000).

[6] According to the WHO's recommended calorific requirements, an adult male who is in the age range from 18 to 30 years and is a subsistence agricultural worker should have a daily intake of 3025 calories. However, Appleton (1999) uses 3000 instead of 3025. The resulting poverty lines are the ones that Uganda's official poverty statistics are based on. This paper does not attempt to reconsider the choice of this requirement but instead uses the expenditure aggregates generated by Appleton (2001) to investigate various welfare distributive issues.

[7] We used the command *ineqerr* in the STATA software to generate the Gini coefficients along with the bootstrap estimates of their standard errors in order to test for the statistical significance of the intertemporal changes in welfare inequality. Sample weights were applied.

[8] Note that Kampala City, the political and economic capital of Uganda is situated in Central region. Isolating the city and analyzing the region as two separate sub-regions would most likely change the results for Central.

[9] Poverty headcount ratio declined from 59.7 and 27.5 percent in 1992 to 39.1 and 10.3 percent in 2000 for the rural and urban areas respectively.

[10] In order to use the DAD software (which allows for only one poverty line) to test the statistical significance of changes in poverty headcount estimates, we take the weighted mean of the eight rural/urban sub-regional poverty lines – with the weights being $w_i = \frac{L_i}{\sum_{j=1}^{8} L_j}$ where L_i is the poverty line for the ith sub-region. Using the weighted mean poverty line, however, raises the poverty headcount, for example, for year 2000 from 35% to 36%.

[11] The results of the regression analysis do not depict any causality; they are simply a measure of correlation between growth and poverty.

[12] Broader-based growth scenario makes the following assumptions: the maintenance of low level of inequality; a more open economy, especially with respect to trade; investment which grows faster than the labor force; efficient use of capital to complement labor-intensive production techniques; and faster productivity growth in agriculture than in manufacturing and services.

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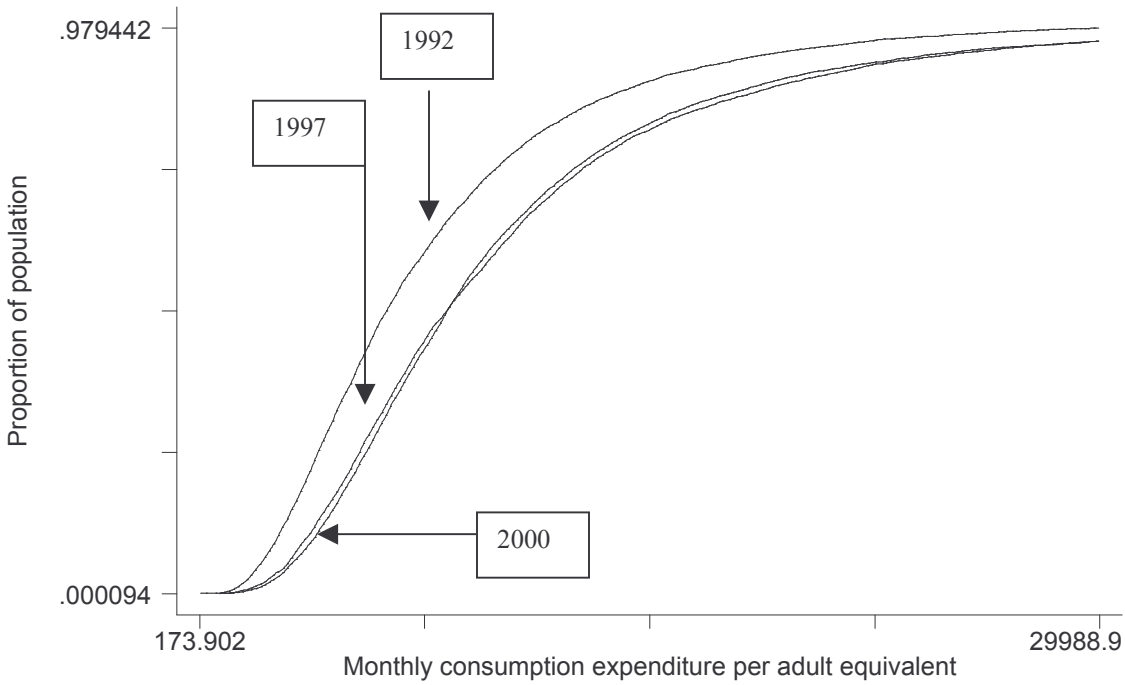
Table 1: Changes in welfare inequality: 1992 to 2000

	Gini coefficients and their bootstrapped standard errors						*t*- ratios for Gini differences	
	1992/93		'1997		1999/00		1992-1997	1997-2000
	Gini	Std Error	Gini	Std Error	Gini	Std Error		
National	0.3652	0.0055	0.3465	0.0050	0.3953	0.0077	-2.5089 **	5.3187 ***
Rural	0.3285	0.0047	0.3109	0.0050	0.3210	0.0053	-2.5850 ***	1.3996
Urban	0.3958	0.0183	0.3486	0.0076	0.4262	0.0133	-2.3780 **	5.0602 ***
Central	0.3950	0.0135	0.3568	0.0095	0.4177	0.0145	-2.3150 **	3.5098 ***
Eastern	0.3271	0.0063	0.3265	0.0072	0.3488	0.0106	-0.0554	1.7376
Western	0.3193	0.0058	0.2810	0.0069	0.3245	0.0067	-4.2456 ***	4.5254 ***
Northern	0.3448	0.0099	0.3136	0.0089	0.3398	0.0086	-2.3451 **	2.1195 **
Crop-agric	0.3165	0.0046	0.2913	0.0049	0.3206	0.0091	-3.7661 ***	2.8360 ***
Non-crop agric	0.3733	0.0135	0.3345	0.0229	0.4012	0.0215	-1.4604	2.1233 **

Source: Authors' computation from 1992/93, 1997 and 1999/2000 Uganda National Household Survey Data

Note: *** and ** indicate statistical significance at the 1 and 5 percent levels respectively.

Figure 1: Cumulative distribution functions of consumption per adult equivalent (CPAE) - Uganda



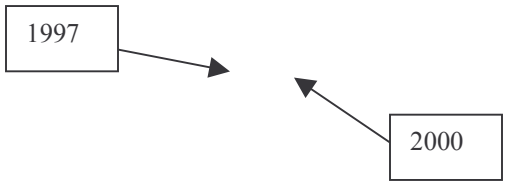


Figure 2: Upper portion of Cumulative distribution functions of CPAE, 1997 & 2000

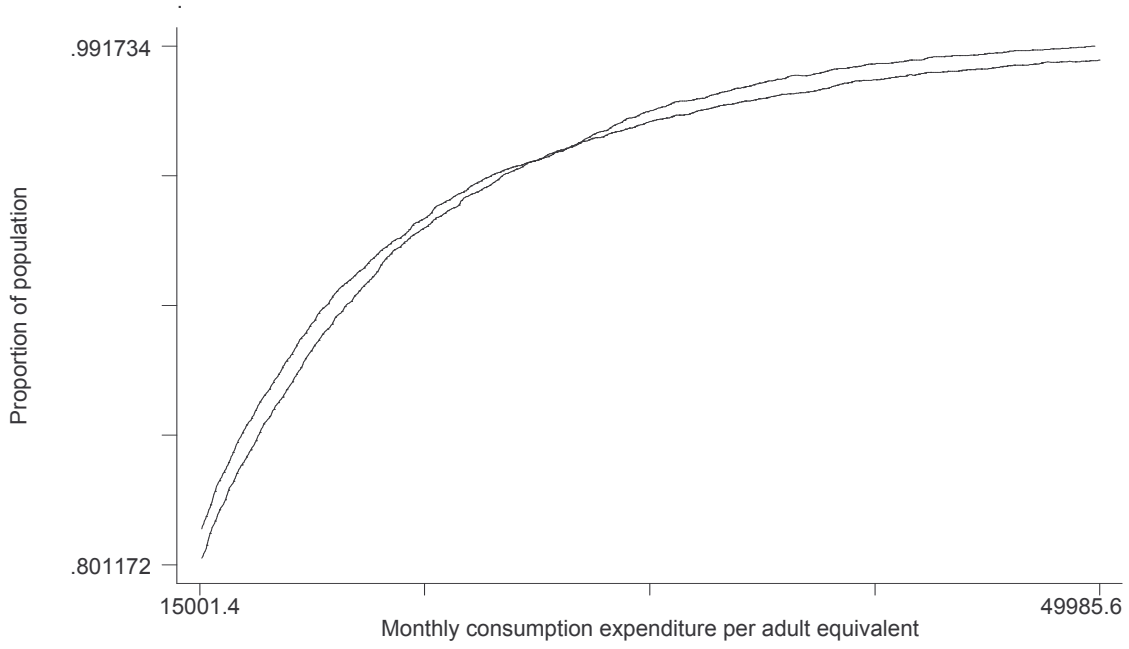

.991734
.801172
Proportion of population
15001.4
49985.6
Monthly consumption expenditure per adult equivalent

Figure 3: Regional cumulative distribution functions of consumption expenditure, 1992

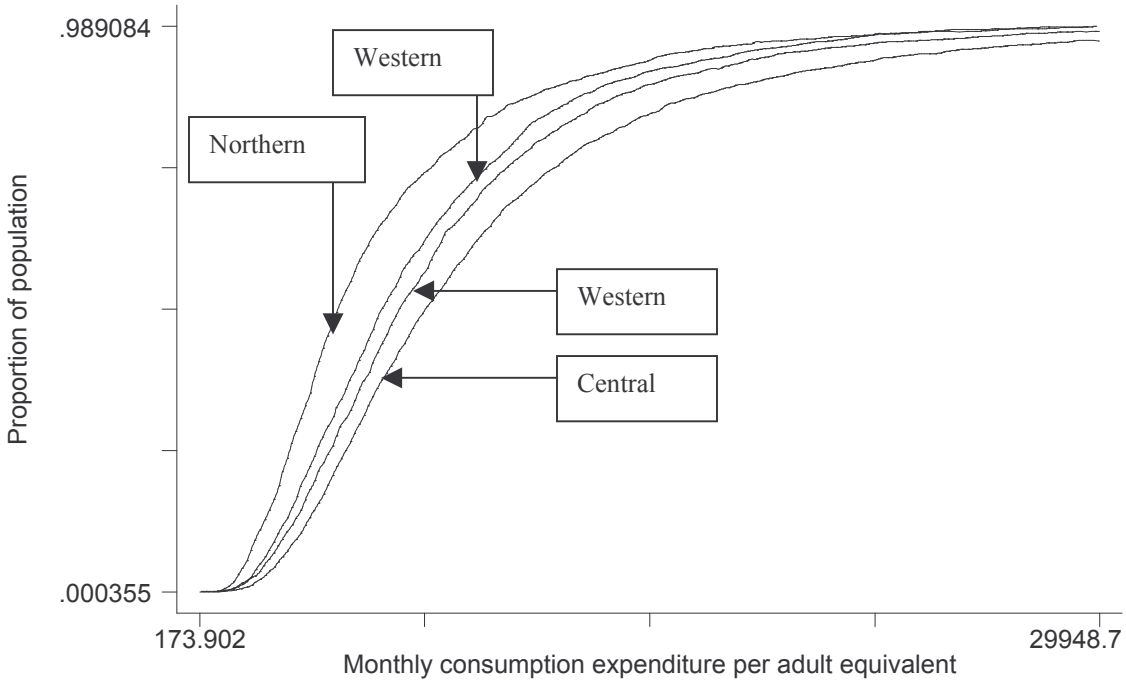


Figure 4: Regional cumulative distribution functions of consumption expenditure, 1997

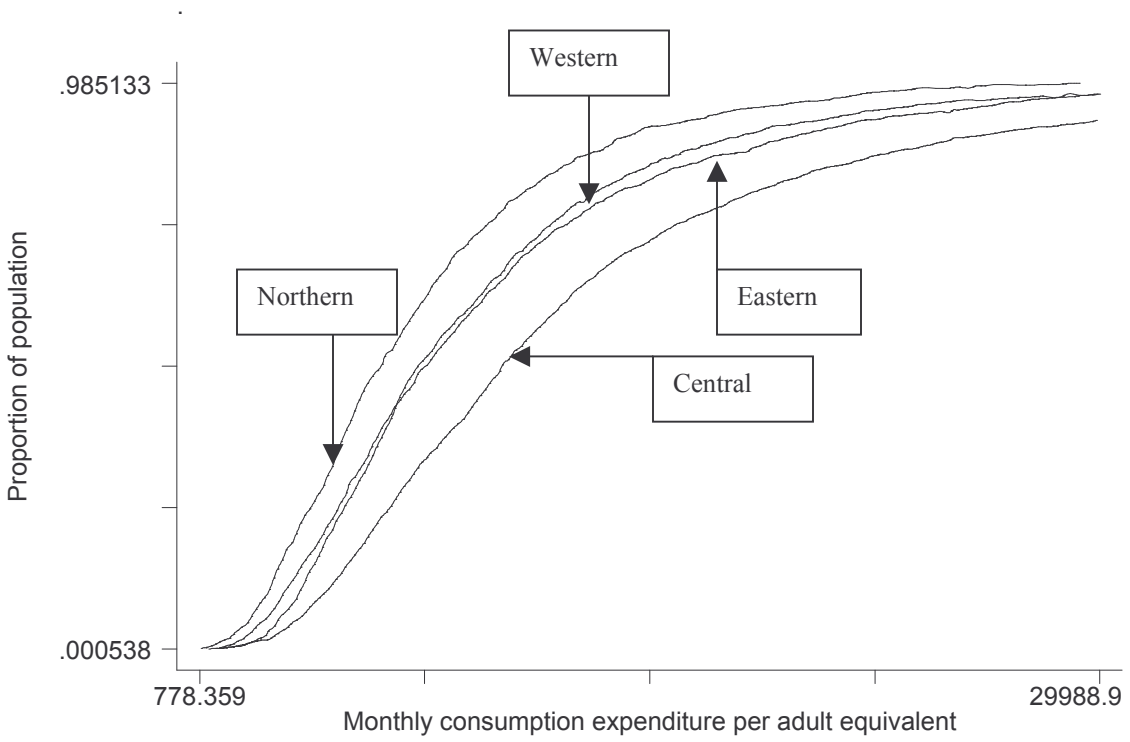


Figure 5: Regional cumulative distribution functions of consumption expenditure, 2000

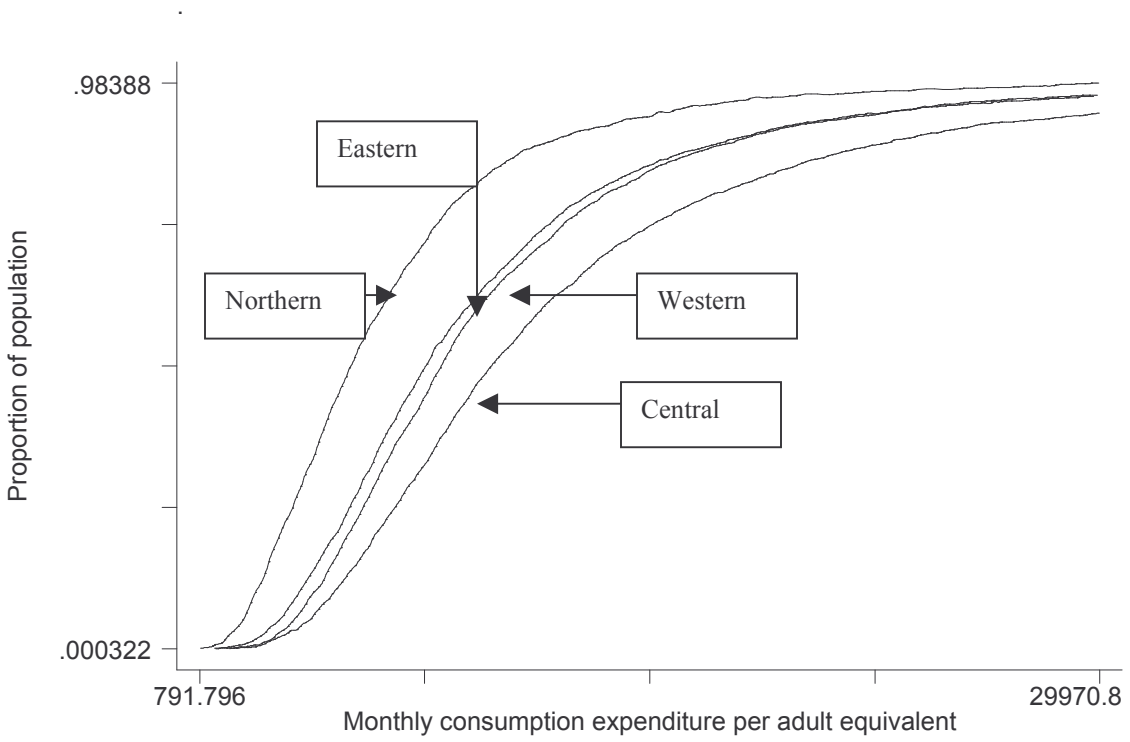


Figure 6: Cumulative distribution functions of consumption expenditure, Western

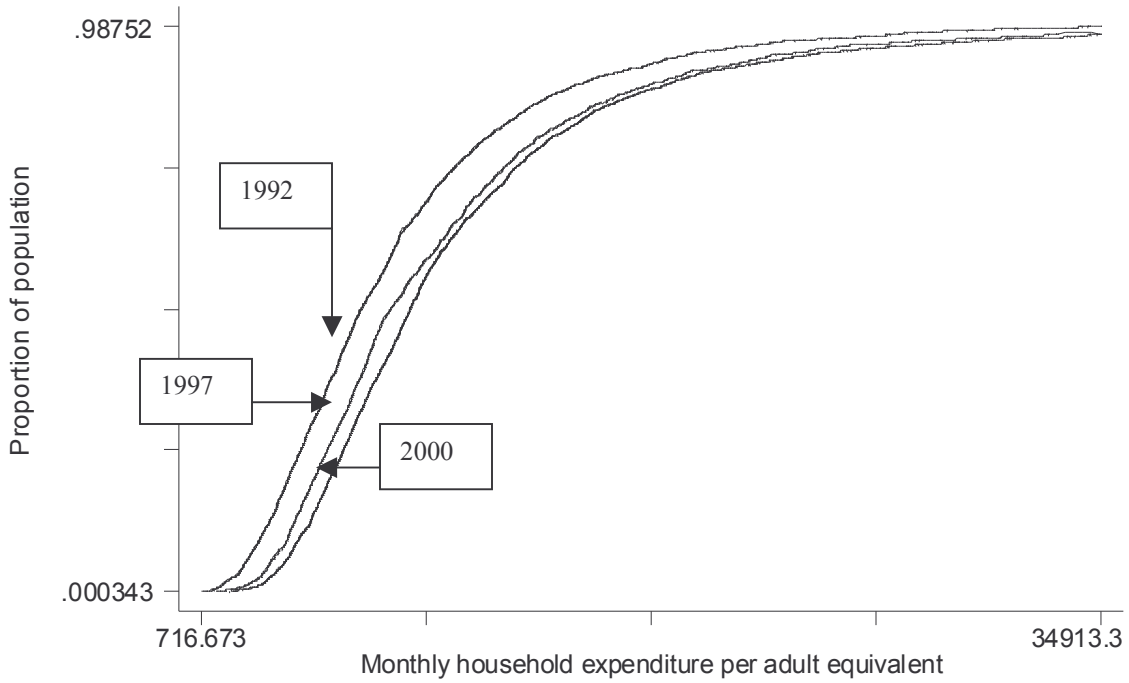


Figure 7: Cumulative distribution functions of consumption expenditure, Eastern

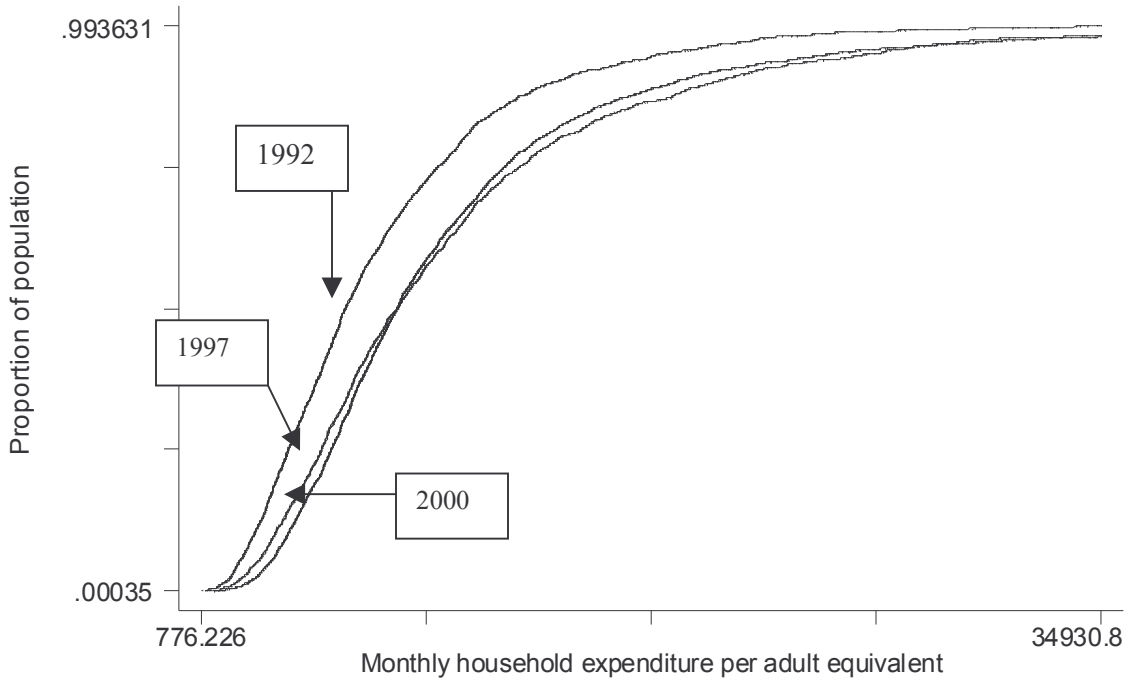


Figure 8: Cumulative distribution functions of consumption expenditure, Central

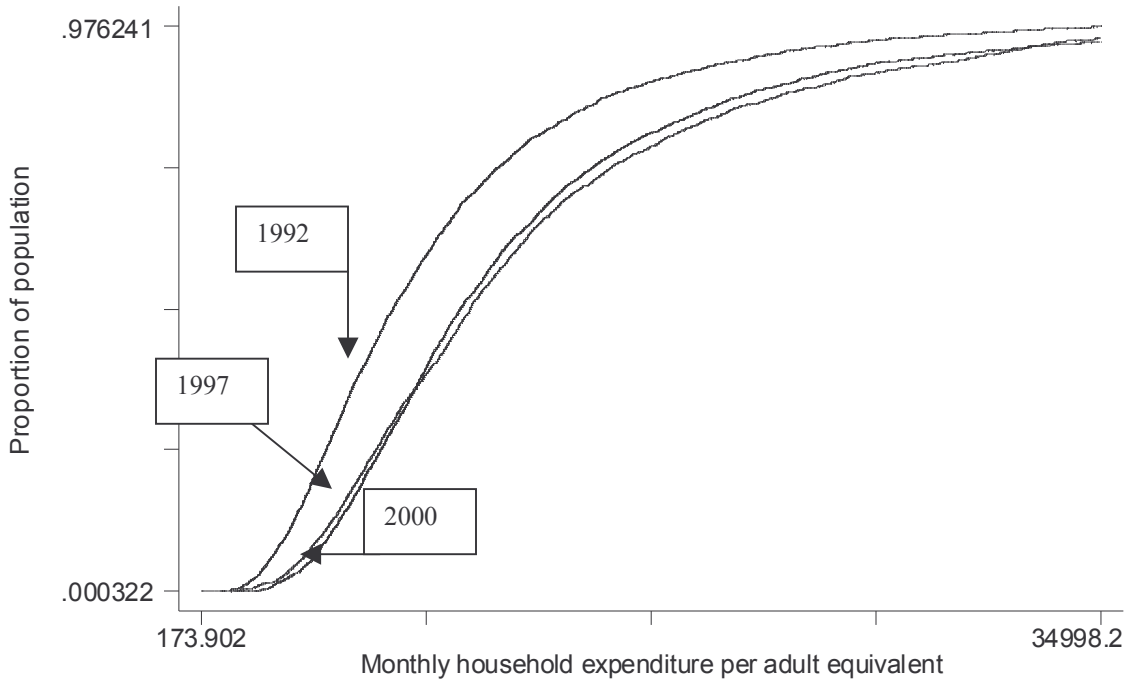


Figure 9: Cumulative distribution functions of consumption expenditure, Northern

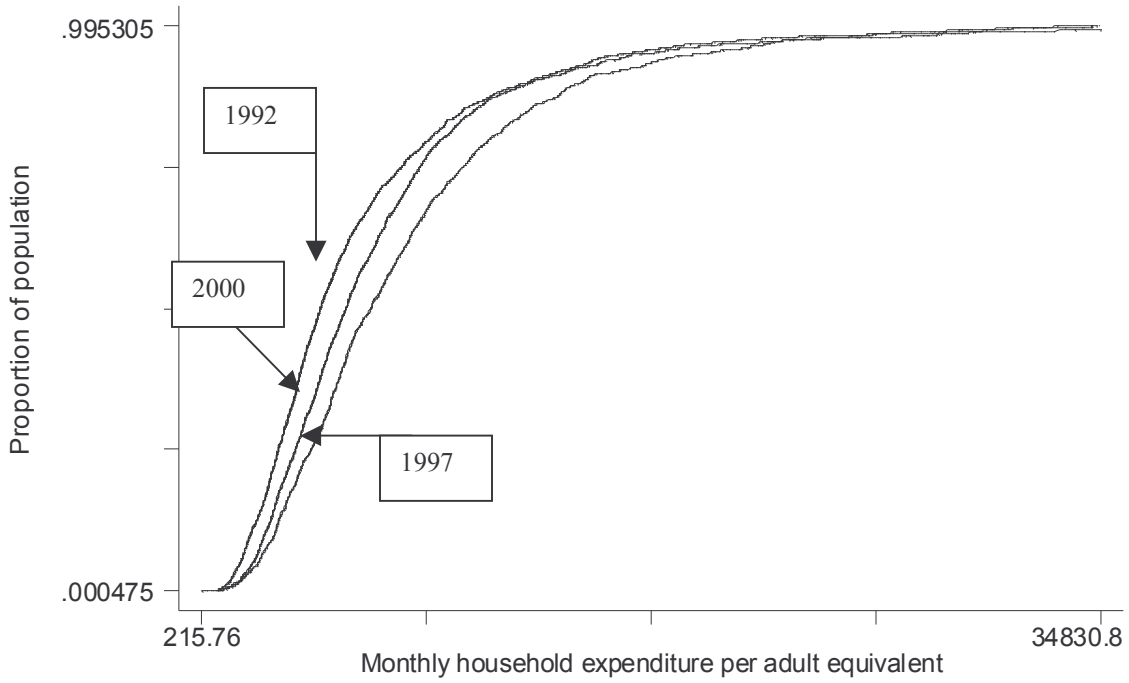


Table 2: Impact of growth and inequality on poverty

Dependent variable: Log of poverty headcount index

	OLS		Fixed Effects		Random Effects	
	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Log of MCPAE**	-1.6681	0.0000	-1.8739	0.0000	-1.6750	0.0000
Log of Gini coefficient	1.3622	0.0000	1.1550	0.0000	1.2972	0.0000
Constant	15.6148	0.0000	17.2846	0.0000	15.6098	0.0000

Number of observations = 40

F-test for fixed effects F(7, 30) = 2.511; P-value = 0.037
Breusch and Pagan Lanrangian multiplier test for random effects, chi2(1) = 1.58; P-value = 0.2086
Hausman Chi-squared specification test for fixed versus random effects, chi2(2) = 2.76; P-value = 0.2511

Source: Authors' estimation from the Uganda national household survey data series
**MCPAE = mean consumption per adult equivalent.

Table 3: Impact of growth on poverty, allowing for inequality

Dependent variable: Log of poverty headcount index

	OLS	
	Coefficient	P-value

Log of MCPAE**	-1.3946	0.0000
Constant	11.6725	0.0000

Number of observations = 40

Source: Authors' estimation from the Uganda national household survey data series
**MCPAE = mean consumption per adult equivalent.

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