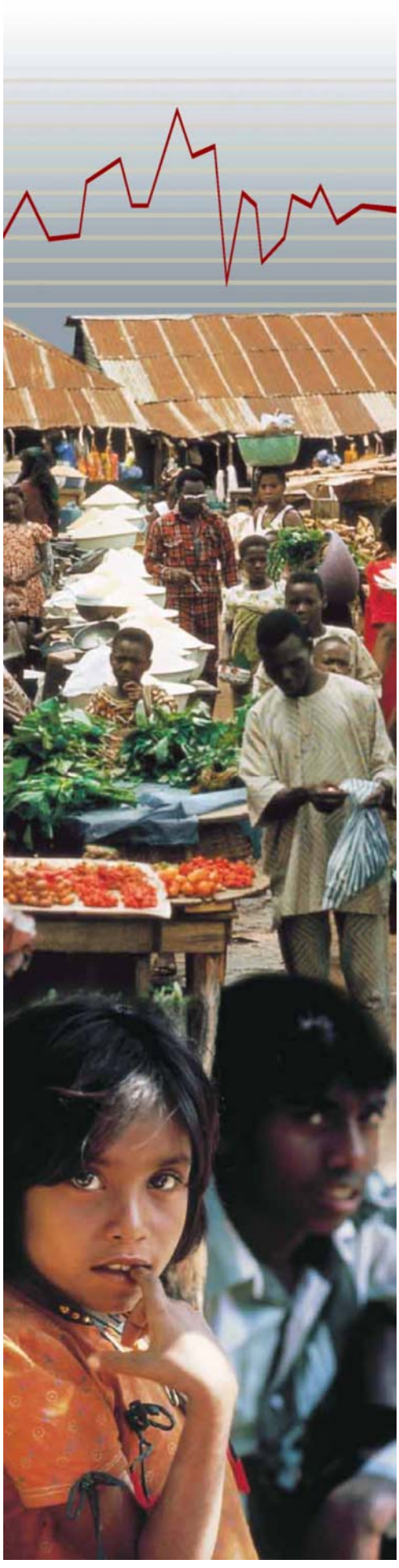

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A Profile of Inequality and Poverty in Burkina Faso

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Abstract

This study carries out an analysis of the poverty and inequality profile of Burkina Faso, which has been implementing a structural adjustment policy since 1991. The adoption of structural adjustment programs (SAPs) in Africa and the controversies on their social dimensions, have given rise to several studies on the phenomenon of poverty. However, these studies have been quite restrictive in their choice of poverty and inequality measures. Likewise, the choice of variables of interest and statistical weights and their influence on the results, have seldom been the subject of discussion. The present work uses a range of analytical tools - poverty/inequality curves; FGT indices; Atkinson and generalized Gini indices; CPG, concentration and density curves - to explore inequality and poverty indicators in greater depth and evaluate their robustness. The advantages and drawbacks in the choice of variables of interest and statistical weights are also discussed.

The results of these analyses show that inequality is mainly an urban phenomenon, while poverty basically remains rural. Contrary to what one may think, households managed by women are less poor than those managed by men. All the tools for measuring inequality are categorical, and reveal that inequality is a characteristic of the non-poor. This result is observed in all socio-economic groups, household size categories, and strata, and shows that a negative correlation exists between poverty and inequality in the case of Burkina Faso. This observation might be explained by the fact that large sized-households are the most numerous but also the poorest, and present relatively homogenous living standards.

The evaluation of welfare must take into account the weight of the statistical unit studied to avoid introducing a bias which can lower the living standard. Similarly, the choice of consumption per adult equivalent as a living standard measure takes scale economies into account better than per capita consumption.

Large sized-households mainly reside in rural areas. The Center-North and Center-South regions are renowned for being the poorest in Burkina Faso. In urban areas, extreme poverty mainly strikes the inactive population groups. These results seem to support the idea of a policy to combat poverty based on targeting the poor according to socio-economic groups and regions.

Keywords: **Poverty, inequality, social welfare, Burkina Faso**

JEL Classification: **D33, I32**

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Introduction

This study presents an inequality and poverty profile analysis under a period of structural adjustment. Burdened by unsustainable distortions and structural rigidities, Burkina Faso's annual GDP growth rate, which was around four percent between 1980 and 1988, fell to 1.6 percent between 1989 and 1990. This situation justified the adoption of Structural Adjustment Programs (SAPs) in 1991. Because of the SAPs' devastating social consequences and the need to stem poverty through appropriate policies, a number of studies have been undertaken to analyze this phenomenon in depth. The most important national far-reaching study, carried out in the context of the "Social Dimensions of Adjustment" of the Institut National de la Statistique et de la Démographie (INSD, 1996), was the "The Poverty Profile in Burkina Faso." Before and after this study, several studies were carried out at the regional level. Various studies were also carried out at the sub-regional West African level. Section two of this paper reviews these works. Generally speaking, four main limitations may be drawn from these studies.

First, poverty analyses are based on the Foster, Greer, and Thorbecke (FGT) class of indices. However, there are other tools whose strengths and weaknesses deserve to be discussed as part of the analysis of the poverty phenomenon, especially in Burkina Faso.

Second, preceding poverty analyses have generally been carried out with only one absolute poverty line. The use of a variable poverty line can improve the robustness of conclusions. Ravallion (1996), moreover, indicates that a series of recent research studies devoted to poverty analysis underscored the importance of the stochastic dominance theory for establishing the robustness of conclusions in poverty studies.

Third, inequality analysis has generally been confined to the use of Lorenz curves and Gini indices. However, complementary and otherwise more powerful tools could still be introduced to improve the quality of the inequality profile analysis.

Finally, the choice of variables of interest and statistical weights, which is seldom discussed in literature, affects the value of indicators in such a way that the latter displays an arbitrary nature from the start.

This study proposes to shed some additional light on poverty and inequality in Burkina Faso by systematically using several analytical tools available. In particular, this involves going beyond the most common tools to explore instruments such as density functions, cumulative poverty gap (CPG) curves, the FGT curves, concentration curves, Atkinson and generalized Gini indices, and entropy indices. This range of instruments allows one to analyze (1) problems related to targeting vulnerable groups; (2) the robustness of results from stochastic dominance; and (3) the advantages and drawbacks in the choice of variables and statistical weights.

The rest of this study is organized into four sections. The introduction is followed by two sections; namely, the review of the literature and the methodology. Section 4 is about the analysis of inequality and poverty profiles. This section draws up economic policy recommendations, which are the point of departure of future analyses of inequality and poverty. Section 5 covers the conclusions of the study.

Review of Literature and Data

Since July 1987, 30 countries have officially requested to participate in the social dimension of structural adjustment (SDA) project, which has three objectives:

- To create and update databases on the social dimensions of structural adjustment;
- To carry out studies of an operational nature on the social dimensions of structural adjustment; and
- To develop and monitor the evolution of social policies as well as anti-poverty programs and projects in the context of future structural adjustment operations.

In the end, the priority survey (PS) on household living conditions, which took place from October 1994 to January 1995, has made it possible to establish socio-economic indicators that identify vulnerable social groups and enhance INSD's technical capacities. This national survey gathered data on 8,642 households. They concern standards of living and are used in the calculations of poverty lines.

The priority survey data are representative at the national level, by area of residence, by stratum, and by Socio-Economic Group (SEG). Eight relatively homogenous strata were identified and seven SEGs retained in this study. The questionnaire administered to households by the INSD is based on the standard model of the priority survey (Marchand et al. 1987). Four types of questionnaires were used:

- Household enumeration cards;
- Household cards which list the households in the sample;
- Community questionnaires (information on equipment, markets, prices, etc) ;
- Household questionnaires, which are the basis for collecting data on poverty and consist of fourteen sections.[1]

Data collection was carried out by a dozen or so teams. Data were processed with the Integrated System for Survey Analysis (ISSA) software package. The files were later converted, and the analysis was carried out using SPSS software under Windows.

The priority survey had many organizational and implementation problems in the field. These problems were due to the choice of survey period and the failure to predict the accurate amount of material and financial resources needed to carry the survey through. Furthermore, the questionnaire was not translated into national languages. Likewise, the pilot survey results

[1] See the composition of the different sections in Appendix 1.

were not completely analyzed in a way that would permit a reformulation of the questions and their adaptation to different situations.

All these problems lead one to question the reliability of the data gathered. In effect, according to Scott and Overs (1988)[2], the errors made by survey researchers were two to four times higher in number when oral interpretations were made on the field than when written translations of questionnaires were carried out. The training of researchers was too short to allow them to master the different aspects of the questionnaire. Some data on the local measures of agricultural output, for instance, were given at the last minute. Researchers were therefore given too much freedom in the interpretation of the questionnaire. Also, household income data are more likely to be subject to controversy since it is at this level where the estimation is most difficult. Often, interviewees struggle to remember their annual income. As Lachaud (1999) has observed, the method for estimating non-labor income – in particular, informal sector and rural incomes – is subject to uncertainties.

For the expenditure data, the period of reference retained in the priority survey is a month. Yet, it has been shown that it is preferable to have two periods of reference: a short one (two weeks or a month) and a longer one (a year)[3]. This makes it possible to introduce appropriate adjustments to avoid errors linked to the failing memories of interviewees and the instability of expenditure over time in some households.

The method for constructing indices was to approximate. Prices were not collected during the community survey. Instead, data on millet and sorghum prices were obtained from the grain market information system of the Ministry of Trade, Industry and Crafts. Data on perishable food products were gathered by the INSD Price Service in February and July 1995.

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[2] INSD (1996), p. 10.

[3] Grosh and Munöz (1996).

A spatial index was then constructed. The temporal dimension was introduced by taking into account the Ouagadougou price index in October 1994. However, one also has to note that considering inflation in Ouagadougou only makes the temporal dimension too restrictive. Also, since prices (i.e. cost of living) vary from one place to another, such could mean a bias in poverty measures.

Ideally, the community questionnaire results could have permitted one to avail of first-rate economic data on infrastructure and equipment. Such information would have been useful in assessing the equipment (ploughs, tractors, etc) households used in rural areas. The priority survey, however, failed to mention agricultural goods and equipment either under the "agricultural production" heading or under the "household goods" heading of the questionnaire. The "household purchases" heading did not cover this type of data either.

Two main criticisms can be made concerning the sampling method used in this survey. First, the costs of the survey were high. As a consequence, it is now uncertain whether proponents of the study could still repeat the survey over several years (which would have permitted one to monitor and anticipate the evolution of poverty). Second, a large portion of the survey sample data focus on the household level instead of the individual level, which makes it impossible to carry out future poverty analyses below the household level (for instance, data on individuals are required to take account of intra-household transactions). These analyses are necessary in comprehending intra-household issues that are increasingly recognized as decisive factors in determining problems with access to resources and, hence, the level of poverty within specific population groups (e.g. women). Furthermore, the large sample size often leads one to focus on variables used to measure poverty, rather than on those variables that influence poverty and the policy needed to fight poverty. For instance, by ignoring production, resource endowments and distribution in rural areas, a researcher can determine the level and intensity of poverty, but cannot recommend policies for improving

household income (hence, for reducing poverty). In spite of these deficiencies, the priority survey remains the most complete and most dependable database that Burkina Faso has ever produced on household welfare issues (notably, income and expenditures).

The existence of this database constitutes a necessary but not sufficient condition for proposing an adequate profile. For instance, researchers must choose among the many equivalence scales proposed. All the households with the same level of expenditures do not necessarily have the same level of welfare. Such is due to differences in the demographic composition of households, which may vary either in size or in structure. A simple comparison of the total expenditure of households could induce an error in evaluating the welfare of different household members. According to Ravallion (1996), most analysts, now aware of this problem, are resorting to a normalization method. One of these methods, expenditure per adult equivalent, permits correction in differences in household size and structure so that welfare measures are of comparable size: that is, they are labeled in the same unit (e.g. adult equivalents). In very concrete terms, expenditure per adult equivalent is equal to the amount of total expenditures on all goods and services (including self-consumption) divided by an equivalence scale that takes into account the size and composition of households.

Aside from equivalence scales, using the individual – not the household – as an analytical unit takes into consideration the number of individuals living in each household. This way, two types of corrections are obtained using equivalent scales and "individual" weights:

1- The economies of scale realized by an individual living within a household, including the real needs of the individual depending on his age (for instance, a smaller weight is given to a child), are factored into the equation;

2- Emphasis is put on individuals, and not on households.

To calculate the poverty line in Burkina Faso, the INSD (1996) started by focusing on individual basic consumption needs. It took a look at the food expenditures necessary to ensure the consumption of the recommended nutritive energy. Non-food expenditures were also investigated. On the basis of the estimated daily food calorie requirement for adults of 2,283 calories and a structure of household food and non-food expenditures, a national absolute poverty line of 41,099 CFA francs per adult per year was calculated for Burkina Faso. The composition of expenditures shows that food expenditures (purchases and self-consumption combined) were higher than non-food expenditures (52.5 percent against 47.5 percent). After estimating poverty lines corresponding to two-thirds (moderate poverty) and one-third (acute poverty) of average expenditures, the INSD arrived at poverty lines of 48,522 and 24,266 CFA francs per adult per year, respectively.

The absolute poverty line shows that 44.5 percent of Burkina Faso's inhabitants are poor. By using the two-thirds average expenditure, on the other hand, one discovers that the number of poor individuals increases to 54 percent.

Knowing the poverty line allows one to proceed and use the FGT indices to measure poverty. In fact, the measurement of poverty in the West African sub-region was carried out by prioritizing FGT indices. The headcount index (P_0), the poverty gap (P_1) and the severity of poverty (P_2) in Burkina Faso were calculated by Savadogo et al. (1995), the INSD (1996) and Thiombiano et al. (1997). Calculations by Savadogo and Thiombiano yielded similar results because they used the same methodology. However, these results are significantly different from those of the INSD. Moderate poverty is 54 percent for the INSD but 42 percent for Savadogo et al. Data from the CEDRES/Laval project estimate the poverty gap at 20 percent and 14 percent in 1993 and 1994, respectively. Savadogo et al. (1995) estimate it at 12 percent; and INSD, at 19 percent. The INSD's results diverge from those of the other two

studies because the former factored in the urban area, where the level of expenditures is higher. Moreover, INSD results use expenditure per adult equivalent.

The studies mentioned above also differ in other areas. While the INSD put emphasis on a large sample, Savadogo et al. base their analyses on a reduced-size sample. In the study by Savadogo et al., nominal expenditures per adult equivalent are deflated by an index weighted by the prices of the main grains consumed in each region, the weights having been obtained from budget shares computed for each of the regions concerned. The authors thus obtain quite an original index which they call Grain Equivalent Kg/Adult Equivalent (CE Kg)/AE), the consumption of grain for one adult a year. The real expenditures thus reflect the quantity of grain that monetary expenditures could have financed. In an environment where grain represent more than half of household expenditures (Kazianga 1996), this approach appears appropriate for comparisons between regions.

As mentioned earlier, Savadogo et al.'s study has also defined a rural poverty profile as opposed to INSD's global poverty profile. Savadogo et al have calculated not only an absolute poverty line for Burkina Faso's rural areas, but also its moderate and acute poverty lines (however arbitrary they may be). They have defined a moderate poverty line as corresponding to two-thirds of the average consumption of (CE Kg)/AE per month by the population. Also, the acute poverty line is one-thirds of this average. Moderate poverty might be affecting 42 percent of the Burkina Faso population, whereas acute poverty may reach only 5.6 percent of individuals.

The FGT indices, on the other hand, which are defined more precisely below, have several properties: One is that they are decomposable. This explains their popularity in the construction of poverty profiles. In effect, despite the fact that the poor often form a heterogeneous category whose features are only vaguely known, a poverty profile is able, though incompletely, to characterize a phenomenon, thus making it different from others. A

poverty profile may, among other things, be extremely useful in evaluating the way the sectoral or regional structure of economic change impacts on national poverty (Ravallion 1996).

It is useful to note that the elements of poverty must be identified and scrutinized for one to understand the situation of the poor. This thus permits one to grasp the notion of "share contribution." Share contributions give a relatively precise idea of the areas where poverty in concentrated in a country. The outcome may therefore serve as a basis for a dialogue on economic policy decision-making.

Poverty in Burkina Faso has been identified as an essentially rural phenomenon. "The Poverty Profile of Burkina Faso" (INSD 1996) indicates that the poorest regions are the Center-North, Southeast, Center-South, and the North. In the big cities (Ouagadougou, Bobo-Dioulasso), the incidence of poverty is not only very low, but is clearly lower than in secondary cities (i.e. Other Cities). Farmers constitute the poorest group among the socio-economic groups. In particular, the poorest are farmers engaged in subsistence production. Civil servants are less affected by poverty.

For Savadogo et al., the Namentenga province has the lowest per capita income, which amounts to about 140 kg. of grain per year per household for the poorest, and 231 kg for the richest households. The Soum province ranks second, with 186 kg and 608 kg of grain for the poorest and richest households, respectively. Lastly, the Kossi province reveals itself as the richest province with 299 kg grain equivalent per capita for the poorest households and 937 kg for the richest households.

Once poverty groups have been identified, only then can policies be implemented, preferably at minimum costs. One may observe that if P_3 is an objective and the targeting index is P_2, the Côte Moyenne region should be prioritized. Similarly, if the objective is P_2, the targeting index would then be P_1. On the other hand, in case the objective is P_1, the

targeting index would be P_0, and the Volta Basin region would be prioritized over Cote Moyenne for targeting. This means that the implicit value judgment in the choice of α is important, not only in itself, but also from the standpoint of the ordering it determines in priorities for action (Boateng et al., 1990).

This type of decomposition has been carried out as well elsewhere in West Africa. Boateng et al. (1990) have established the rates of moderate and acute poverty at 36 percent and 7.4 percent, respectively for Ghana. Their study also proves that poverty in Ghana is a rural phenomenon mainly concentrated in the North. The Savannah region and the Volta Basin are the poorest regions, whereas the capital city, Accra, contributes very little to national poverty (1.3 percent for P_o). In Cote d'Ivoire, C. Grootaert and R. Kanbur (1990) estimate the rate of absolute poverty to be 30 percent.

Methodology

The Analytical Method

Studies dealing with income distribution clearly distinguish between issues linked to inequality and those relating to poverty. The former are concerned with income distribution taken as a whole, whereas the others are based on the scale of the distribution. In other words, while poverty describes the standard of living of part of the population (the poor) in absolute terms through the poverty line, inequality analyzes differences in relative living standards within a society. The peak of inequality is reached when a single individual possesses everything, which of course, also lifts poverty to its peak. However, minimum inequality or perfect equality (where all people have the same income) may either be that there is (1) no poor people; or (2) that everybody is poor (i.e. have high level of poverty). Thus, it is desirable to study these phenomena jointly.

Poverty Analysis

- Poverty Indices

a) The Headcount Index

The most simple and well-known poverty index is "the poverty ratio or the headcount index", which represents the ratio of the number of poor individuals to the total population. Consider individuals with incomes or expenditures y_1, y_2, y_3 … y_H . Next, rank these individual incomes or expenditures in increasing order such that q of them lie below a certain poverty line. The situation may be described as follows:

$$y_1 \leq y_2 \leq y_3 \leq y_q < z \leq y_{q+1} \leq y_H \quad (3.1)$$

where q individuals have been identified as poor; if P_0 represents the headcount index, the formula may be written as:

$$P_0 = q/H \quad (3.2)$$

where q = number of poor individuals and H = population. This index represents the proportion of poor households or individuals in a given population. The higher this proportion, the higher the index will be.

The index P_0 has been criticized, notably by Sen (1976), because it only indicates the number of poor individuals, and not the extent of poverty. Thus, if a poor individual were to become poorer, the P_0 index would not change, since the number of poor individuals would not have changed.

b) The Poverty Gap or the Depth of Poverty

The depth of poverty indicates the gap between the poverty line and the average expenditures of the poor. For a constant number of poor individuals, the lower the level of the average expenditures of the poor relative to the poverty line, the greater the poverty gap.

$$P_1 = q / H^* (z - y_p)/z \quad (3.3)$$

$$P_1 = P_0 I \tag{3.4}$$

where $I = (z - y_p)/z$; I = the income gap ratio of the poor

If y_p represents the average income of the poor, the extent of poverty is measured by the income gap ratio, I. The latter defines the proportional gap of the average poor individual relative to the poverty line.

If one takes into account the product of P_0 and I, one can take into consideration both the number of poor individuals and the extent of poverty among the poor. The P_1 index is sensitive only to the average situation of poverty. It does not consider inequality in the income distribution of the poor.

c) The Severity of Poverty

However, Foster, Greer and Thorbecke (1984) suggest a new index that may be sensitive to inequality in the income distribution of the poor with the help of the parameter α, or "aversion to the severity of poverty". The greater the dispersion of the poor around their average expenditures, the higher the severity level of poverty:

$$P\ (\alpha; z) = \frac{1}{\sum_{h=1}^{H} w_h} \sum_{h=1}^{H} w_h (z - y_h)_+^{\alpha} \tag{3.5}$$

such that z is the poverty line $x+ = \max(x,0)$ and w_h is the weight attributed to observation h. If $\alpha = 0$, then $P_\alpha = P_0$; if $\alpha = 1$, $P_\alpha = P_1$ and if $\alpha = 2$, $P_\alpha = P2$.

This measure raises the proportional gap relative to the poverty line by a power of α, whose value expresses the degree of concern caused by this gap. It then sums up the poor and normalizes relative to the population as a whole.

The P_α family of indices has one advantage: It can be broken down into sub-groups. The construction of operational poverty profiles requires a partition of areas of state intervention into sufficiently relevant categories to get profiles relating to each sub-category.

Assume that the population is divided into mutually exclusive and exhaustive categories. Assign the subscripts j = 1, 2, 3, … m to these categories. Let $P_{j\alpha}$ be the measure P_α, computed only for group j. If the proportion of the national population in group j amounts to k_j, the national measure (P_α) is a weighted sum of the sector measures $P_j\alpha$. The normalized national population that is equal to unity may be written as:

$$k_1 + k_2 + k_3 + \ldots\ldots\ldots k_m = 1 \tag{3.6}$$

Total poverty is then

$$P_\alpha = \sum_{j=1}^{j=m} k_j P_{j\alpha} \tag{3.7}$$

Recall that k_j is the proportion of the population in group j, and that $P_{j\alpha}$ is the FGT poverty index of the group in question. Group j's share contribution, Cj, may be written as follows:

$$C_j = k_j P_{j\alpha} / P_\alpha \tag{3.8}$$

For each group, there are two components that determine the group's contribution to the poverty index; namely, the size of the group and the poverty index within the group.

Another type of decomposition that complements the one just described is the decomposition between two periods. To what extent are changes in poverty between two periods attributable to income growth or to redistribution? Ravallion and Huppi (1991) have attempted to explain the relative importance of changes observed within sectors, as opposed to changes between sectors such as those resulting from the displacements of the population or the workforce between different sectors. However, the purpose of this paper is not to decompose poverty changes between two periods but to see how decomposition may be affected across different groups within a population.

Targeting makes it possible to fight poverty at least costs. The first series of targeting rules is obtained by assuming the benefits resulting from intervention measures are shared

equally between all the members of the sub-group targeted, meaning that the additional income is distributed equally, and the poor therefore gets proportionally greater benefits. In this case, if the objective is to roll back P_α to a minimum value at the national level, priorities must be fixed in accordance with the values of $P_{j,\alpha\ -1}$, where j refers back to the targeted category. Consequently, if α =1, implying that α -1= 0, the appropriate targeting indicator is P_o. If the objective is to maintain P_2 at a minimum value at the national level, then the categories must be ranked following P_1; if the objective is P_3, then the targeting indicator is P_2, and so on (Grootaert and Kanbur, 1990).

- Poverty Curves

a) FGT curves

The FGT curves indicate the value of the FGT index P_α as a function of the poverty line z. These are graphed below for three values (0, 1, 2) of α (Graphs D1.1 to D5.3 in Appendix 5). In each case, the value of the FGT index is a function of the poverty line. When α=0, comparing the two curves indicates that the curve lying below the other dominates, in the first order of poverty, the curve above. This dominance is of the second order if α=1 and then of the third order if α=2.

b) CPG curves

The Cumulative Poverty Gap (CPG) curve (p, z) indicates the cumulative total of poverty gaps for a given poverty line z and percentage p of poor individuals, divided by the total number of individuals. The expression for the CPG curve is given by the formula:

$$CPG(p\ ;z) = \frac{\sum_{h=1}^{H} w_h.(z - y_h).I(y_h \le z).I(y_h \le Q(p))}{\sum_{h=1}^{H} w_h} \qquad (3.9)$$

where I indicates the indicator function which takes the value 1 or 0 depending on whether the assertion is verified or not.

The CPG curve generates several pieces of information. The coordinates of the curve represent the headcount index on the percentile axis when the curve becomes horizontal, whereas the average poverty gap is found on the vertical axis (or again the non-normalized FGT index) when α is equal to 1. The other piece of information one can draw from the shape of curve is: The more concave the curve (i.e. its slope decreases more rapidly with p), the more pronounced the inequality of poverty within the population.

The CPG curves also serve as tools for robustness tests in the choice of a class of poverty indices (i.e. those that respect the principle of Dalton-type transfers). Comparison between two CPG curves thus allows one to study the second order stochastic dominance in poverty according to the dual approach.

Inequality Analysis

For a long time, statisticians have been concerned with finding a simple numerical measure that reflects the degree of inequality in the distribution income. However, all the classical statistical measures such as the variance, the coefficient of variation and the standard deviation have certain drawbacks. That is why statisticians and economists have turned their attention to distributive and normative weights.

National accounting calculations resort implicitly to the base year income share as the weighting formula to come up with the rate of growth. When measuring gross national product (GNP), statisticians do not subdivide incomes into different income groups but limit themselves to measuring total income for the population as a whole. Thus, given this aggregate measure, if the richest 20 percent of the households receive half the base-year income, the increase in their income will be weighted by 50 percent in the computation of society's GNP growth rate.

Among the normative inequality measures that give more weight to the welfare of poorer individuals are the Gini and Atkinson indices. These measures may be used to adjust the measure of per-capita GNP growth so as to take inequalities into consideration.

- Inequality Indices

a) Generalized Gini Index

This generalized Gini index is not decomposable between groups but can be broken down between sources of income or types of expenditures. In discrete terms, the generalized Gini index Iρ may be written as follows:

$$I_\rho = \frac{\mu - \xi_\rho}{\mu} \text{ such that } \xi_\rho = \sum_{h=1}^{H} \left[\frac{(V_h)^\rho - (V_{h+1})^\rho}{[V_1]^\rho} \right] y_h \text{ and } V_h = \sum_{i=h}^{H} w_h \qquad (3.10)$$

where μ, w_h, y_h and ρ indicate, respectively, the average income/expenditures, sample weight, income/expenditures and the society's level of aversion to inequality. The higher this parameter is, the greater the decision maker's level of aversion to inequality.

b) Atkinson Inequality Index

Unlike the Gini index, the Atkinson index is decomposable between socio-economic groups. This inequality index I_ε, is written in the following form:

$$I_\varepsilon = \frac{\mu - \xi_\varepsilon}{\mu^g} \qquad (3.11)$$

such that

$$\xi_\varepsilon = \begin{cases} \left[\frac{1}{\sum_{h=1}^{H} w_h} \sum_{h=1}^{H} w_h (y_h)^{1-\varepsilon} \right]^{\frac{1}{1-\varepsilon}} & \rightarrow \varepsilon \neq 1 \cup \varepsilon \geq 0 \\ \text{Exp}\left[\frac{1}{\sum_{h=1}^{H} w_h} \sum_{h=1}^{H} w_h \ln(y_h) \right] & \rightarrow \varepsilon = 1 \end{cases} \qquad (3.12)$$

where μ once again indicates average income or expenditures; w_H and y_H, respectively, indicate the weight and the level of income or expenditures of the household or individual. The parameter ε indicates society's level of aversion to inequality. Its choice may depend on the degree of tolerance for the "leakages" that might result from income transfers by the rich to the poor, in order to ensure greater equity at the cost of lower efficiency. If the tolerance for the loss of income due to these leakages is low, then ε would be low and vice versa.

Atkinson (1970) criticized the inequality indices that preceded his own index by saying that his predecessors merely sought to quantify the cardinal difference between the inequality of two distributions. For economists, however, it is often more important to obtain an ordinal ranking of distributions before getting a modicum of consensus on social welfare and inequality comparisons. This is done by comparing Lorenz curves instead of comparing values of inequality indices.

- Inequality Curves

a) Lorenz Curves and Generalized Lorenz Curves

Lorenz curves and generalized Lorenz curves are used to compare the income distributions of populations at various angles, notably in terms of robustness and dominance for inequality, and social welfare analysis.

Lorenz curves are used to compare inequality between two or several distributions. They serve as tools for testing robustness in the choice of indices belonging to a certain class of inequality indices (that is, those respecting Dalton's principle of transfers).

Generalized Lorenz curves may be used to study second order stochastic dominance. They may compensate for deficiencies in comparisons by taking average income into account. This contrasts with Lorenz curves, which only consider normalized income.

The Generalized Lorenz curve indicates the cumulative share contributions of the incomes of the poorest proportion p in the population:

$$GL(p) = \frac{1}{\sum_{h=1}^{H} w_h} \left[\sum_{h=1}^{H} w_h \; y_h \; I(y_h \leq Q(p)) \right] \tag{3.13}$$

where H represents the total number of households in the population sample, and where Q(p) is the highest income in the proportion p of the poorest population (the p quintile). There is also the formula:

$$GL\ (p=1) = \frac{1}{\sum_{h=1}^{H} w_h} \left[\sum_{h=1}^{H} w_h \; y_h \right] = \frac{1}{n} \sum_{i=1}^{n} y_i = \mu \tag{3.14}$$

The Lorenz curve is defined by:

$$L(p) = \frac{GL(p)}{GL(1)} \tag{3.15}$$

for $p \in [0, 1]$, this curve indicates the relative cumulative contribution (in terms of income or expenditure) of a proportion p of the poorest population.

The more the Lorenz curve moves away from the 45° line, the higher the inequality in the distribution of income. The value of the Gini coefficient increases as the surface bounded by the 45° line and the Lorenz curve increases. The theoretical interval of the Gini coefficient goes from zero (perfect equality) to one (perfect inequality).

b) Concentration Curves

For each fraction p of the population, the concentration curve indicates the proportion of total expenditures of this fraction p on any good. Let B_H denote the expenditure of household h on good B. Good B may be a specific purchased good or a government expenditure, a subsidy, a tax, etc. When the concentration curve is represented jointly with the

ordinary Lorenz curve, it permits one to determine the progressive or regressive nature of the expenditure on the good in question. The concentration curve is defined as follows:

$$C_B(p) = \frac{1}{\mu_B \sum_{h=1}^{H} w_h} \left[\sum_{h=1}^{H} w_h \, B_h \, I(y_h \leq Q(p)) \right] \quad (3.16)$$

where μ_B is the average of the B_h

The Database

Variables

To carry out this analysis, INSD data, which covers 65,014 individuals, were used. On the basis of these data, a "master" file was created. This file focuses on variables that can measure and decompose poverty and inequality. In all, 17 variables and 8,642 households were retained[4]. The file was then reduced into smaller files to facilitate the transfer of the data into the DAD software package[5].

Regions

The regions consist of rural and urban areas.

Strata

Five strata have been retained out of the eight selected by INSD. The West, the Center-North, the Center-South, Other Cities, and Ouagadougou/Bobo-Dioulasso.

Socio-Economic Groups (SEG)

Five groups have also been retained out of the seven available. They are: civil servants, private sector wage earners, craftsmen and traders, cash crop farmers, and subsistence farmers.

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[4] An exhaustive list of these variables is given in Appendix 2.

[5] Duclos, Araar and Fortin (2005). DAD software is available for free from www.pep-net.org.

Sex of Household Head

The sex of the household head is a subject that merits analysis. Results are presented separated for households with male heads and those with female heads.

Number of Individuals

Household size may carry a very heavy weight among the determinants of poverty. Five categories of household sizes have been retained for analysis: one individual, two individuals, three individuals, four and five individuals, and six individuals and more.

Choice of the Variable of Interest

The variables of interest are alternative indicators of living standards that will be useful in poverty analysis below. The choice of one or another variable of interest depends on the quality of available data on income and expenditure. In this case, the data on expenditure seem more reliable than those on household income. The variable used here will therefore be consumption per capita, consumption per adult equivalent and household total consumption. After choosing to approach the standard of living through consumption, two questions are usually raised:

- "At which level do we want to measure the standard of living (the individual or the household taken as an entity)?" When the household is taken as an entity without concern for the individuals living in it, the variable of interest is often "total household".
- "Which equivalence scale should we use to distinguish between the different household categories?" This is often the question raised when the individual is chosen for study instead of the household.

There are various types of equivalence scales in the literature, all of which constitute an effort for realism by welfare analysts. They are obtained by taking into account a category of reference (such as adults), which may be thought of as having the highest needs, and then

proceeding to standardize the other types of individuals (such as children and the elderly) by using weights. The weights often range from 0.5 for children aged less than 15, to 0.7 for the elders aged 59 and more. In this way, household members are converted into adult equivalents and the total household expenditure is divided by the number of adult equivalents to obtain expenditure per adult equivalent. The variable of interest, "expenditure per adult equivalent," thus attempts to correct for any underestimation of living standard that results from considering consumption per capita as the relevant variable of interest, even though the former may also be biased due to the choice of equivalence scale. To consider a 15-year old child as half an adult, and another one aged 16 as an adult, may create a significant bias depending on the age structure of household members. There are various nuances in the definition of equivalence scales, but these will not be discussed in this paper for the simple reason that there is generally a lack of specific data or universally accepted methods of evaluating the evolution of expenditures by age. Also, this paper does not propose other types of scales here since they may not necessarily be more realistic.

Even though there is no consensus on the best equivalence scale, consumption per adult equivalent is chosen as a welfare measure in this study since it has the advantage of taking into account both household size and composition by age and sex. This choice is also due to the basic purpose of this study: To analyze the poverty status of individuals and not that of households exclusively. By making normalization possible (through equivalence scales, indicating the number of adult equivalents a household is supposed to be equivalent to), consumption per adult equivalent seems to be more appropriate than the two most commonly used indicators; namely, the household total consumption and consumption per capita.

The use of household total consumption, which simply compares total consumption between households, may give quite a misleading idea of the welfare of different household

members. Because it takes into account only the household size, this indicator will tend to overestimate the welfare of individuals living in large households. On the other hand, while consumption per capita takes household size into account, a major drawback is that it does not consider differences in size and composition by age and sex in households where consumption per capita is observed. It thus assumes that there are no economies of scale within large households. Consumption per capita will therefore tend to underestimate the welfare of individuals living in large households. Moreover, household members who have different ages and biological constitutions (i.e. children/adolescents/adults, women/men) do not obviously have the same consumption needs.

Results indicate that the poverty measure is sensitive to the variable of interest and to the weight used. For instance, if one were to use consumption per capita by counting the number of individuals (which is the method used by the INSD in the priority survey), a significantly higher level of poverty is obtained than if one were to use consumption per adult equivalent. That is, the headcount index (which amounts to 44.5 percent using consumption per capita) falls to 33 percent with consumption per adult equivalent, assuming a poverty line of 41,099 CFA francs.

Weighting procedure

- Which Weights to Use for a Variable of Interest

The problems of weights often seem to be resolved implicitly. Weights, however, play a very important role when the objective is to make a correct assessment of an individual's welfare.

The INSD data bring out two potential variables for weights; namely, size (T) and statistical or sampling weights (POND). The POND provides the statistical means to extrapolate from the number of households in the INSD sample to the total number of households in Burkina Faso. The combination of these two variables yields TPOND, which is

the product of size and the statistical weight. In this study, therefore, the following notations are adopted:

N will represent household size and P, the statistical weight.

N * P = TPOND

1 * P = POND

Two categories of weights will be used in this work (i.e. TPOND = N*P and POND=1*P). To use the weight 1*P, one counts households, whereas N*P counts individuals. The importance of the concept of statistical weight lies in the fact that one can choose to compare the aggregate level of the variable of interest either at the individual level or at the household level.

To get a better understanding of the impact of different weights and of the choice of welfare measures on different indicators, here are some examples:

- What Correction is Brought about by Using Statistical Weights?

Assume that a population is made up of three households, and that each household has only one individual. The first household resides in city V1 whereas the other households (which are assumed to have the same living standards) reside in city V2. Assume, too, that the sample has two households, with one household in each city.

Case	**Weight**	**Consumption of V_1**	**Consumption of V_2**	**Average by weight.**
A	1	170	200	185
B	P	170	200	190

Note that without taking the statistical weight into account, the indicator – which is the average of consumptions – is biased downward since the consumption of the second household in city V2 is not factored into the calculation of this average.

- What Correction Do We Bring About by Taking Household Size into Account?

Now assume that in each city, there is only one household. The first household has only one individual while the second is made up of two persons:

Case	**Weight**	**Consumption per capita in V_1**	**Consumption per capita in V_2**	**Average consumption per capita**
A	1	170	200	185
B	N*P	170	200	190

The introduction of household size in the weight allows one to correct the calculation of consumption per capita. For instance, in case A the consumption of the second individual is not factored into the calculation of consumption per capita.

- What Correction Do We Bring About by Choosing a Corrected Measure of The Living Standard?

Assume that in the two cities, there is only one household. Moreover, assume that the size of both households is the same: Each has three persons. The first household is made up of three adults while the second is made up of two adults and a child. The total consumption of each household amounts to 200 CFA francs. The following are the results:

Case	**Measure of living standard**	**V_1**	**V_2**	**Average**
A	Total consumption	200	200	200
B	Consumption per capita	66.66	66.66	66.66
C	Consumption per adult equivalent[6]	83.33	90.90	87.11

In this example, the choice of total consumption or consumption per capita is without interest, since both households have the same size. On the other hand, the choice of consumption per adult equivalent yields a result different from the other two measures. By using consumption per capita as a living standard measure, one does not take into account the

economies of scale an individual may benefit from within the household or the real needs of the individual depending on household members' ages.

For these reasons, this study has opted to use consumption per adult equivalent with the statistical weight N*P in calculating poverty and inequality. The poverty line evaluated by the INSD (i.e. 41,099 CFA francs) is retained for comparison.

Results of the Study

The priority survey has estimated the population of Burkina Faso as 9.385 million inhabitants. Those less than 15 years old represent 43.8 percent of the population. Also, the rural population attains 84 percent. Average household size is 7.8 persons. In urban areas, this number falls to 6.5; in rural areas, average household size is 8.1 persons.

Density Curves

A powerful descriptive tool in the study of welfare is the estimation of the density function of household income or expenditure levels. In this study, the core method is used to estimate these functions. This takes inspiration from empirical results, which show that the logarithmic distribution of the welfare level, as measured by individual income or consumption, is similar to a normal distribution.

Density Curves by Sex of the Household Head

Figure A_1 show the density curves of consumption per adult equivalent by the sex of the household head. The vertical line expresses the log of the poverty line estimated at 41,099 CFA francs. Several interesting observations may be made from these curves. First, since the density curve of female-headed household lies to the right of that of male-headed households,

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[6] In this example, we give a weight of one to the first individual in the household, of 0.7 for each of the other adults and 0.5 for each child.

the former households' welfare level is higher. Another observation may be drawn from the surface between the density curve and the vertical line: the area of this surface gives the headcount index. One may then conclude that the poverty rate of individuals living in households headed by men will be higher than that of households where women are heads of the family.

Density Curves by Household Size

By comparing the density curves presented in figure A_2, one notes that the bigger the size of households, the more the peak of the curve (which indicates the mode) is skewed to the left. This implies that the bigger the household size, the lower the level of welfare; hence, the more poverty is pronounced. Also note that the density curve for households made up of only one person is flatter (i.e. pulled downward) as compared to the other curves. This suggests that inequality is more pronounced among single-person households.

Density Curves by Stratum

By comparing the different density curves presented in figure A3, note that the living standards in the region of Ouaga-Bobo is higher relative to that in other regions. Poverty is more pronounced in the Center-North and Center-South regions, and less pronounced in the Ouaga-Bobo region, and Other Cities.

Density Curves by Socio-Economic Group

Figure A4 show that subsistence and cash crop farmers' density curves follow each other closely and lie to the left of the other curves. The density curve of civil servants lies to the right of the other curves. All these show that the farmers' average welfare level is the lowest, while that of civil servants is the highest. Private sector wage earners and craftsmen/traders are intermediary.

Inequality Profile

Inequality at the National Level

- Gini Index

Table 1 confirms the fact that when ρ increases, the Gini inequality index rises. Inequality is greater for the aggregate consumption per adult equivalent variable at the household level than for the same aggregate consumption at the individual level. Inequality thus seems to be higher between households than between individuals in Burkina Faso.

Gini indices are almost identical in the case of the consumption per capita and consumption per adult equivalent variables. When ρ rises, Gini indices also rise, but the latter increase less than proportionately. Indeed, in the [2-3] interval, when ρ increases by 10 percent, the generalized Gini index increases by 5 percent, as compared to 3 percent in the [3-4] interval, implying that the increase in the Gini indices is smaller when aversion to inequality is strong. Consumption per capita registers the biggest increase, while household total consumption converted into adult equivalents has the smallest increase.

- Atkinson Index

Table 1 confirms that if ε increases, the Atkinson index also increases. In the case of Gini indices, inequality is greater for the consumption per adult equivalent variable disaggregated at the household level than for the same consumption disaggregated at the individual level. For the Atkinson indices, the values of consumption per capita and consumption per adult equivalent indices are almost identical. As with the Gini index, the Atkinson index seems to be sensitive to household size when the latter is taken into account, but shows very little sensitivity to the choice of welfare variable. When ε increases, the Atkinson indices rise less than proportionately. When ε increases by 10 percent in the [0.25-0.5] interval, the Atkinson index increases by 8 percent, but this increase is only 7.5

percent in the [0.5-0.75] interval, implying that any increase is therefore larger when aversion to inequality is weak. Inequality in household total consumption also registers the highest increase, whereas household total consumption converted into adult equivalents shows the lowest increase.

Are the conclusions of our inequality analysis robust? The Lorenz curves of figure B_1 express:

L_1 consumption per adult equivalent (weight = 1*Poids);

L_2 household total consumptions (weight= N*Poids);

L_3 consumption per capita (weight= N*Poids);

L_4 consumption per adult equivalent (weight= N*Poids).

In Figure B2, there are differences between the L2, L3 and L4 Lorenz curves relative to curve L1. Several observations can be made by comparing these different curves.

- When the weight is equal to 1*P, consumption per adult equivalent shows the highest inequality relative to the three other approaches. This also concurs with the results of the Gini and Atkinson inequality indices.
- Although the Gini index shows that inequality is almost the same for consumption per capita and total consumption (Gini = 0.46), the Lorenz curves indicate that, in the percentile interval going from 0 to 0.65, total consumption displays the greatest inequality relative to consumption per capita, whereas the reverse is true in the second interval.
- Both the Lorenz curves of consumption per capita and consumption per adult equivalent are very similar. This explains why these two distributions have similar values for Gini indices.

The analysis of all the 8,642 households in the sample does not yet allow one to learn how inequality and poverty measures vary between different population groups. In other

words, to target the groups whose consumption expenditures are the most unequally distributed and whose poverty is the most significant, it is necessary to analyze the disparities between these measures by household type. To do this, the sample has been disaggregated into different types of households according to five characteristics: household size, region (stratum), area (or zone), sex of household head and socio-economic group. The next sections now focus the inequality analysis on the "consumption per adult equivalent" variable, while putting emphasis on inequality among individuals.

Inequality by Area

Table 2 shows that whichever indicator is used (Gini or Atkinson index), inequality is higher in urban areas than in rural areas. Two factors explain this result:

- The differences in income are more pronounced in urban areas than in rural areas because employment and occupations are more heterogeneous in urban areas.
- Analysis of sizes of different households grouped by income shows a strong disparity in urban areas, where public and private sector wage earners, craftsmen and traders, and informal sector workers reside. In rural areas on the other hand, a larger part of the population's income have leveled down to around modest agricultural incomes.

On the other hand, the absolute difference in inequality between urban and rural areas is much higher when the Gini index is used (rather than the Atkinson index). The latter might have the tendency to smooth out inequalities between areas. When the value of the aversion parameter is raised, the difference in inequality increases less markedly.

If one were to consider the relative inequality ratios between areas, note that these ratios remain constant regardless of the different parameters considered for the two types of measures. This also means that for high aversion parameters, inequality differences between areas tend to be smoothed out. This may be because inequality in urban areas as well as in

rural areas is roughly the same when one deals with the differences between the poorest individuals and the rest of the population.

Also, inequality is an increasing function of the parameters used, be it for the Gini index or for the Atkinson index. Thus, for the Gini index for instance, inequality rises from 0.43 when the aversion parameter is 2, and to 0.63 for the parameter of 4 in urban areas.

The robustness of the results of the analysis by areas is confirmed by the Lorenz curve results. The Lorenz curves of figures B3 and B4 deal with the cities and the countryside. These curves show a clear-cut dominance in terms of inequality. Rural areas are clearly less unequal in terms of individual consumption.

Inequality by Sex of Household Head

Regardless of the measure used, inequality within the group of female-headed households is higher than the inequality within the group of male-headed household, as may clearly be seen in Table 3. Poverty is more pronounced among male-headed households. This is surprising, particularly to those who assume that women are more disadvantaged than men. These results may be explained as follows:

- A Size Effect

Female-headed household constitute a very small group in the rural area as a whole. Traditional and cultural practices in rural areas are such that a woman is integrated into her social environment and seldom experiences the solitary life of a single person or widow. In the urban areas, on the other hand, one finds many female household heads who are either single, widowed or married to polygamous husbands but live in separate houses. Table 3 shows that a higher number of female household heads live in urban areas where they manage 12.3 percent of all the households (in contrast to 7.2 percent in rural areas). In absolute terms, however, the highest proportion of female-headed households still resides in rural areas. This

is the same demographic characteristics found in Burkina Faso, where most of the population is concentrated in rural areas.

- An Income Effect

This effect is linked to the fact that the incomes of female-headed households are more heterogeneous than those of their male-headed counterparts. This might be explained by the large income disparity between urban and rural female-headed households. In urban areas, living conditions of female-headed households are better than the average of all households. In other words, the high inequality among female-headed households may account for the urban/rural cleavage among female-headed households and might be much more pronounced than the one prevailing among male-headed households. This relative inequality gap between female-headed households and their male-headed counterparts remains constant for both measures across the different parameter values.

After analyzing poverty and inequality by area and sex of the household head, one can conclude that poverty largely accounts for the inequality between these different groups. The contrasting results on inequality and poverty of these groups may be linked to the large income disparity within the population groups studied. As a result of this income disparity, the poorest groups are those where less inequality is found, whereas the least poor groups are those who experience more inequality.

Inequality by Household Size

The two measures of inequality (the Atkinson and generalized Gini indices) bring out large disparities in consumption expenditures by household size. Table 4 indicates that small households experience high inequality, whereas large households display relatively less inequality. Households with only one person and those with two persons have a Gini index (aversion parameter=2) of 59.56 percent and 52.04 percent, respectively. In contrast, note that households with four or five persons, and those with six persons and more, present less

inequality (49.51 percent and 42.97 percent). Consequently, contrary to expectations, one finds that the greater the household size, the lower the inequality. These rather unexpected results might be because a greater proportion of large households are located in rural areas, where inequalities are generally less pronounced.

These results are corroborated by the analysis of inequality curves according to the number of adults within the household. The Lorenz curves in figures B4 and B5 show that inequality in the distribution of consumption decreases with the number of adults. In effect, there is a greater disparity in the consumption level among households that have a small number of adults. This is because large households usually display socio-economic homogeneity. These are households with modest incomes (that is, among the poorest). The social inequality in increasing order of household size is thus ranked as follows:

1 - One individual

2 - Two individuals

3 - Three to five individuals, with greater inequality among households with four to five individuals for 80 percent of the poorest households, and

4 - Households with six individuals and more

Inequality by Stratum

Differentiation by stratum permits a more detailed analysis of inequality and poverty indices (Table 5). Such differentiation is slightly more pronounced in Other Cities than in the Ouaga-Bobo stratum, as their respective Gini coefficients (parameter=2) of 0.455 and 0.423 show. This is because small cities experience a multitude of economic micro-activities and contrasting employment structures. A large part of the active population of these secondary cities is made up of very small traders and informal sector craftsmen as well as a few formal sector employees (the protected private and civil servants) and big traders dealing in grain.

The three regions with the highest inequality in their rural areas are the West, the Center-South and the North. The high inequality observed in the North is not surprising. This region is the main stockbreeding area in Burkina. This is where big stockbreeders, active both in the national and sub-regional West African markets, mix with a mass of small stockbreeders. The West of the country has favorable natural conditions that permit a very diversified agricultural production. Thus, western farmers produce grain (millet, sorghum, maize, rice) and cotton as well as a multitude of all-seasons crops such as fruits and vegetables. This great diversity in agricultural activities induces high levels of income and expenditures, which are also varied and unequal.

Figures B7 and B8 present total expenditures per adult equivalent by geographic stratum. For 90 percent of the poor, the order of expenditure inequalities (from the most unequal to the least unequal) is as follows:

1 - The South-West

2 - Ouaga and Bobo

3 - The West for nearly 90 percent of the poorest households

4 - The Center-South, and

5 - The Center-North

The Center-North situation is the least unequal in terms of consumption. However, for 30 percent of the poorest households, the trend is reversed in the case of the last two strata. Inequality is higher in the Center-North than in the Center-South for this segment of the population.

This brief analysis shows that areas where wealth is found produce more inequality. The poorer the populations are, the less the inequality among them. In effect, the decomposition of FGT indices at the poverty line of 41,099 CFA francs, for instance, shows that the headcount index is 0.0261 for households with one individual and 0.344 for

households with more than six individuals. On the other hand, the headcount index in Ouaga-Bobo and the Center-North is 0.078 and 0.3205, respectively. Therefore, one is tempted to conclude that the poor are more uniformly poor, while the rich are unequally rich.

Inequality by Socio-Economic Group (SEG)

Table 6 presents the Gini and Atkinson inequality indices by socio-economic group. Here, inequality is high among urban dwellers. The decomposition of inequality by SEG confirms this conclusion. Inequality is high among private sector wage earners and craftsmen residing in urban areas. It is lower among subsistence and cash crop farmers, who are essentially rural people. Inequality is between these two bounds for civil servants, who benefit from the GIMS (Guaranteed Inter-professional Minimum Salary). In Burkina Faso, the Civil Service fixes the bounds of its salary scale between 30,000 CFA francs (the GIMS) and 300,000 CFA francs for category A employees.

Figures B9 and B10 show that income distribution is most unequal for private sector wage earners. These are followed by craftsmen and traders, and then civil servants. The least unequal distribution is found among farmers. The quasi-superposition of the Lorenz curves of cash crop and subsistence farmers indicate that they have almost identical income distributions. However, note that there is a slightly more pronounced inequality among the poorest 70 percent of subsistence farmers. Cash crop farmers therefore appear to be the most homogenous socio-economic group in terms of individual consumption per adult equivalent.

A dominance relation may be established among the five socio-economic groups. Here they are in by order of inequality (from the most unequal to the least unequal):

5 - Private sector wage earners

4 - Craftsmen and traders

3 - Civil servants

2 - Subsistence farmers

1 - Cash crop farmers

The first lesson to be drawn from this analysis is that there is no positive relationship between poverty and inequality. In other words, relatively low levels of inequality may coincide with very high poverty indices, and vice-versa. Hence, there is a need to analyze poverty and inequality measures simultaneously.

Inequality is high at the national level when analyzed by households instead of by individuals. It is in Burkina Faso's cities that inequality is highest. It is less acute in large cities (Ouagadougou and Bobo-Dioulasso) than in average cities (Other Cities stratum). Inequality is higher in the SEGs of private sector employees and craftsmen/traders, than in the other SEGs. Finally, the highest inequality is among small households as well as among female-headed households.

- Concentration Curves

For each fraction p of the poorest individuals of a given population, the concentration curve $C_B(p)$ indicates the share of this group's total expenditures on good B. Good B may be a specific purchased good, a government expenditure, a subsidy, a tax, etc. When the concentration curve is represented jointly with the ordinary Lorenz curve, it determines the progressive and regressive nature of the expenditure on good B.

The concentration curves of some household expenditures are graphed and presented in figure C1. These concern expenditures on health, clothing, energy, meat and grain. Some relevant expenditures, such as those on education, have not been taken into account for reasons linked to data quality. The differences between these concentration curves and the ordinary Lorenz curve of total expenditures are given in figure C2. Except for health expenditures, which sometimes show a concentration curve below the Lorenz curve, all the other concentration curves lie above the Lorenz curve, indicating that they are progressive (i.e. they contribute to lower inequality).

Furthermore, when the concentration curve of a good lies above the ordinary Lorenz curve, this indicates that the good is consumed more by the poor. The results of figures C1 and C2 are logical for grain, but not for energy, which is expected to be consumed more by the rich.

The Poverty Profile

Poverty at the National Level

- The Headcount Index (P_o)

To assume that each household has the same statistical weight amounts to ignoring the great variability of household sizes in Burkina Faso when calculating total poverty. To assign the same equivalence scale to all households is to agree that children (younger than 15 years old), who represent 43.8 percent of the total population of the country, have the same needs as adults, thus failing to consider household size in the calculation of the welfare of its individuals. Table 7 presents the results for three equivalence scales: (1) an explicit equivalence scale that takes into account the size and composition of households and leads to consumption per adult equivalent; (2) an implicit equivalence scale equal to household size and that leads to per-capita consumption. This scale overestimates household needs, since it does not consider the scale economies gathered by individuals living within large households; (3) an implicit equivalence scale that considers neither the size nor the composition of households and refers to total household consumption as a welfare measure for the individuals in the household. This scale underestimates the needs of the household since it does not take into account the fact that household needs increase with size.

The different choices of living standard measures have some impacts on poverty. In Table 7, household total consumption indicates that there are almost no poor households in Burkina Faso. In effect, the consumption of the average household in the survey amounts to

about 320,572 CFA francs. This variable is considered by the study as inappropriate for appreciating different poverty indices. Therefore, there are two other equivalence scales for consideration: consumption per capita and consumption per adult equivalent.

Table 7 also indicates that the percentage of the poor is obviously more important to the consumption per capita variable, and less important to consumption per adult equivalent, regardless of the choice of poverty line. The headcount index is therefore sensitive to the choice of equivalence scales. It is also sensitive to the choice of poverty lines. In effect, whatever the equivalence scale, the number of poor individuals changes depending on whether one chooses a poverty line of 30,000, 41,099 or 50,000 CFA francs. Moreover, when the poverty line lies between 30,000 and 41,000 CFA francs, a 10 percent increase in the value of the poverty line leads to a 31 percent rise in the number of poor individuals. This increase in the number of the poor drops to 17 percent when the poverty line lies in the range of 41,099 to 50,000 CFA francs. In terms of variability, consumption per adult equivalent is more sensitive than the other two equivalence scales.

Estimates of consumption per adult equivalent for an individual (weight=N*P) and for households (weight=1*P) diverge, whatever the choice of poverty line and alpha-value. The FGT indices are higher for consumption per adult equivalent for individuals. This difference is due to the fact that large households have relatively low living standards as compared to smaller households. The headcount index is therefore sensitive to the choice of the poverty line, equivalence scale and weight.

- Poverty gap (P_1)

Interpreted as a deficit in average living standards, the value of P1 determines the amount of money necessary to eradicate poverty. In effect, if perfect targeting was possible, only 1,068 CFA francs per capita would be needed – given a poverty line of 30,000 CFA francs – to fill this deficit and eradicate poverty completely. For a population of 9.385 million

inhabitants in 1995, the total amount of money required would be 10.023 billion CFA francs per year. Of course, this is the minimum resources necessary to eliminate poverty. However, since it is not easy to target the exact deficit of each individual without leakages, the real amount of money needed to wipe out poverty would be higher. This result shows why growth is significant in any of Burkina Faso's strategies to reduce poverty. A redistribution policy without growth would require resources that the national economy would be unable to acquire in the short- or medium-term.

The relative gap between the poverty line and the average expenditure of the poor is naturally more important to the consumption per capita variable, and less so to consumption per individual equivalent, at any poverty line. When the poverty line lies between 30,000 and 41,099 CFA francs, an increase of 10 percent in the value of the poverty line leads to a rise of 48 percent in the poverty gap. This rise in the depth index drops to 28 percent when the poverty line lies between 41,099 and 50,000 CFA francs. In terms of variation, individual consumption per adult equivalent is more sensitive than for the other equivalence scales. Whatever the poverty line, the poverty index for individuals is higher than for households. Therefore, the poverty gap is also sensitive to the choice of poverty line, equivalence scale and weight.

- Severity of Poverty (P_2)

The severity of poverty is of course more important for the consumption per capita variable than for consumption per adult equivalent, whatever the poverty line. An increase in the poverty line value implies an increase in the severity of poverty. When the poverty line lies between 30,000 and 41,099 CFA francs, a 10 percent increase in the value of the poverty line leads to a rise of 50 percent in the severity of poverty index. This rise in the latter is 35 percent when the poverty line lies between 41,099 and 50,000 CFA francs. Poverty is also more severe when individuals, rather than households, are considered. As a consequence, the

severity of poverty index is also sensitive to the choice of poverty line, equivalent scale and weight.

Poverty by Area

Table 8 presents poverty indices by area. When the poverty line is raised for a given alpha value, there is an increase in the index of poverty. This increase is greater for high alpha values. Note that an increase in the poverty index following a change in the poverty line is significantly higher for high-income areas. For urban areas therefore, when the poverty line rises from 30,000 to 41,099 CFA francs, the poverty index increased by 189 percent as against 113 percent for rural areas at the same alpha value of zero.

This difference stems from the difference in income distributions in urban and rural areas. A flatter income distribution can be seen in rural areas. Since the urban income distribution is more heterogenous, a rise in the poverty line beyond a certain level leaves many more urban households in poverty than in rural areas, where most household incomes are concentrated at the bottom of the scale.

The difference in poverty between urban and rural areas decreases relative to the alpha value, but increases with the poverty line. That is, the higher the poverty line, the bigger the absolute difference in poverty between rural and urban areas. Hence, for the same zero alpha values, and for a poverty line of 30,000 CFA francs, the difference in poverty between the two areas is 0.16. For a poverty line of 50,000 CFA francs, this difference increases to 0.44.

On the other hand, the more the parameters of aversion to poverty increase, the more the absolute difference between rural and urban poverty decreases. Thus, for the same poverty line of 30,000 CFA francs, the poverty difference amounts to 0.16 for a parameter equal to zero. This difference decreases to 0.141 for a parameter equal to 2.

In relative terms, on the other hand, there is an observed increase in the difference between urban and rural poverty as the parameters rise. The same is true for changes in the poverty line where the relative difference between rural and urban poverty tends to decrease.

The FGT curves confirm the robustness of the result thus obtained. Figures D1.1 to D1.3 present the FGT curves in urban and rural areas. Consumption per adult equivalent with weight N*P remains the living standard indicator. The rural area uniformly remains poorer than the urban area, which is in keeping with the preceding results.

Unlike inequality, the level of poverty is high in rural areas. Taking into account the previous discussion on targeting problems, rural areas should be targeted if the State seeks to reduce the severity and depth of poverty.

Poverty by Sex of the Household Head

By and large, there is a higher level of poverty among male-headed households than among female-headed households (see Tables 10 and 11 and Figures D2.1 and D2.2). The difference in poverty between female- and male-headed households depends, to a large extent, on cultural factors linked to the situation of female household heads, who may be either widows, married or single. The female household head's status in society is such that she usually enjoys a relatively higher living standard than most women do. "The happy widows" story is well known in urban areas. There is therefore a highly sociological explanation of this result.

In analyzing a change in the poverty index resulting from a change in the poverty line, this study makes the same observation as for the rural/urban comparison; namely, that any additional CFA franc has a lesser impact on the level of poverty. This means that when the poverty line is raised, any such additional hike leads to a less than proportional increase in the poverty index.

In analyzing the evolution of the poverty gap between male- and female-headed households, the absolute poverty gap was found to decrease greatly with the alpha value. On the other hand, the relative poverty gap increases at a decreasing rate with the alpha value. This increase is negligible for higher levels of the poverty line. It may be said that for high levels of the poverty line, the relative difference between the poverty of male-headed households and that of their female-headed counterparts tends to remain constant.

Poverty is more widespread among male-headed households, who also comprise the majority of the population. To fight against the severity and depth of poverty as well as reduce the rate of poverty, male-headed households should be targeted. Note too that, contrary to the results found in the preceding inequality analysis, the level of poverty is higher among male-headed households.

Poverty by Household Size

As previously indicated, we are using "consumption per adult equivalent" with a weight equal to N*P. Five size categories are distinguished, based on the number of individuals in the household: one individual, two individuals, three individuals, four to five individuals, and six individuals and more.

Although the inequality is higher among small households, the FGT poverty indices (Tables 13 and 14) show that large households are the poorest. Thus with a poverty line of 41,099 CFA francs, 36.63 percent of the households comprising of six individuals or more are poor. In comparison, the poor comprise 9.72 percent, 13.89 percent and 20.15 percent, respectively, of those with one, two and four-five individuals. Obviously, in the African socio-cultural environment, characterized as it is by sociability and family mutual aid, several persons are supported by the household head, which can only have a downward impact on the level of expenditures per capita.

This is also illustrated in Table 13, which shows the decomposition of the FGT index. Here, the relative contributions of large households to total poverty are the highest. Households with six individuals and more (representing 58.06 percent of the population) are those who overwhelmingly contribute to global poverty (90.47 percent). On the other hand, the share contribution of households with one individual (who make up only 5.54 percent of the population) is highly insignificant (0.2 percent).

Figures D3.1 to D3.3 present the FGT curves. These curves indicate that households with six individuals and more are the poorest, followed (in decreasing order of poverty) by those with four to five individuals, three individuals, two individuals and one individual. In other words, poverty is a large household phenomenon.

Birth rates do not fall in households with many adults. On the contrary, the more polygamous the household, the more children it has. In rural areas, the dependency rate within such households (i.e. the number of dependents per active person) is usually high. In urban areas, women in polygamous families are generally illiterate, earn low and irregular incomes and, more often than not, depend only on the income earned by the household head. These socio-economic factors may partly explain why poverty is so widespread in large households. These results again underscore the need to target large households if one wants to reduce poverty.

Poverty by Stratum

The FGT indices for the different strata considered are shown in Table 14, while the decomposition of these indices is presented in Table 15. According to these results, poverty is more pronounced in the Center-North stratum, followed by the Center-South, the West, Other Cities, and lastly, the stratum comprising the cities of Ouagadougou and Bobo-Dioulasso. The decomposition of the FGT index in Table 15 indicates the same ordering in terms of the share contributions of the different strata to this index.

The FGT curves are presented in figures D4.1 to D4.3 for the five Burkina Faso regions, namely, the Center-North, Center-South, the West, Other Cities and Ouaga-Bobo. The FGT curves generally indicate that the Center-North is the poorest region, followed (in decreasing order of poverty) by the Center-South, the West, Other Cities and Ouga-Bobo. First order dominance in poverty is established by reversing the order of the regions, except for the "Center-South, West" regions. In effect, for alpha equal to zero or to one, the curves for the West and the Center-South intersect, which makes it impossible to establish first and second order dominance in poverty between these two regions.

The Center-North and Center-South regions constitute a zone of transition between the large-scale cattle breeding Sahelian area, and the rain-fed cotton growing area. In these regions, stockbreeding and agricultural incomes are low and precarious, which may explain why their people are so poor. Other studies such as the one by Savadogo et al. (1995) show the same results. Together, the Center-North and the Center-South, contribute nearly 60 percent of Burkina Faso's total poverty.

The share contributions to poverty of the Center-North and Center-South regions rise with the increase in the alpha aversion parameter. It is in these two zones where poverty is really of great concern. Any policy designed to reduce poverty should first target these regions.

Poverty by Socio-Economic Group (SEG)

- Comparisons by Poverty Indices

Table 16 shows that the highest incidence of poverty is found among subsistence farmers, whatever the poverty index used. The ranking remains unchanged: subsistence farmers are the poorest, followed by cash crop farmers. Civil servants have the lowest poverty indices. Between these two groups are the craftsmen and traders, and private sector employees. At the lowest poverty lines (30,000 CFA francs), private sector employees have

higher indices than the craftsmen and traders. When the poverty line rises to 41,099 or to 50,000 CFA francs, the trend is reversed. The share contribution of most SEGs to national poverty drops as alpha (α) increases. Subsistence and cash crop farmers contribute about 90 percent to national poverty. Although poverty is greatest among farmers, one need to be more concerned over the poverty among craftsmen and traders, and the inactive members (not shown in Table 16) of the society.

- Comparisons by FGT Curves

Figures D5.1 to D5.2 present the FGT curves. These curves show that subsistence farmers are the poorest, followed (in decreasing order of poverty) by cash crop farmers, craftsmen and traders, private sector wage earners and, lastly, civil servants. First order dominance in poverty is therefore established by simply reversing the order of socio-economic groups, except between the civil servants, and craftsmen and traders, whose respective curves intersect when the parameter α is equal to zero or to one ($\alpha = 0$ or 1). As such, it is not possible to establish first or second order dominance in poverty between these two groups.

In this case, government efforts should first focus on subsistence farmers if it aims to reduce the severity or depth of poverty. Subsequently, to reduce the depth of poverty, cash crops farmers should be targeted, whereas to reduce the severity of poverty, the inactive population should be targeted.

CPG Curves at the 41,099 CFA Francs Poverty line

CPG Curves at the National Level

The Cumulative Poverty Gap (CPG) curves give the cumulative total of per-capita poverty gaps for each proportion p between 0 and 1 of the poorest population. This cumulative total becomes constant when there are no more poor. The headcount index P_o is

then reached; it is given by the abscissa of the first point on the curve's plateau. Similarly, the index of the average of poverty gaps P_1 is given by the vertical axis as soon as this cumulative total becomes constant, and consequently, as soon as the curve becomes horizontal.

The abscissa in figure E1 shows a headcount index threshold of 44.4 percent of poor individuals for consumption per capita (using N*Poids as weight). This index falls to 33 percent for consumption per adult equivalent (weight = N*Poids). It decreases to only 27 percent when one considers consumption per adult equivalent (weight = 1*Poids). The fall from 33 to 27 percent is due to the household size, which is not taken into account when the statistical weight becomes 1*P.

The area bounded by the CPG curves and the line segments joining the first points on the CPG curves' plateau indicate a decreasing inequality for the following respective variables of interest:

1- Consumption per capita (weight = N*Poids)

2- Individual consumption per adult equivalent (weight = N*Poids)

3- Household consumption per adult equivalent (weight = 1*Poids)

The most unequal distribution among the poor is the one that corresponds to consumption per capita (weight = N*Poids). There is a decline in this inequality when the variable of interest becomes consumption per individual equivalent (weight = N*Poids). After all, to assign to a child or to an individual the same needs would not be fair and would have the effect of appreciably reducing individual consumption in households with many children. The consequence would then be an increase in poverty for this type of household.

CPG Curves by Stratum

Figure E.2 shows CPG curves with a poverty line of 41,099 CFA francs for the five strata considered in this study. The CPG curves for the two urban strata (i.e. Other Cities and Ouaga-Bobo) indicate that poverty is less pronounced than in rural areas, which are

represented by the remaining strata. Also, the second order stochastic dominance in poverty between the West and the Center-South strata is not verified since both their CPG curves cross each other. This conclusion may also be confirmed by referring to figure D4.2, which shows FGT curves with $\alpha = 1$ for different strata. Finally, note that it is in the Center-North stratum where poverty is most pronounced.

Conclusion

While inequality is greater in urban areas, poverty, on the other hand, has been identified as a rural phenomenon, mainly affecting subsistence and cash crop farmers. Poverty also extends to inactive population groups living in the cities.

In implementing poverty alleviation policies, government will therefore have to put emphasis on increasing rural income, and on enhancing the production potential in rural areas. On the other hand, since female-headed households are less poor than their male-headed counterparts, any policy in favor of poor women will have to take this aspect into account.

After analyzing poverty and inequality indices, and the Lorenz, FGT and CPG curves, one may be tempted to conclude that the inequality phenomenon, as far as the population studied is concerned, translates to "non-poverty." That is, the least unequal social strata are those whose contribution to poverty is the most significant. This occurs at all levels: by socio-economic group, household size, stratum, etc. If this study has earlier underscored the lack of correlation between poverty and inequality, note that in this special case, there seems to be a negative correlation. This phenomenon is linked to the numerical weight of poor households and their relative homogeneity, whatever the social group is. Thus, large households are the most numerous in the rural population, notably among farmers, and comprise the majority of the population in the Center-North. These are relatively homogenous from a social welfare standpoint. Small households, on the other hand, are the least numerous, the most unequal and the least homogenous from the social welfare standpoint.

Results also suggest that a reduction in inequality is an objective that can only be achieved in the long term. Any policy that aims to increase rural income will probably lead to an increase in inequality in the rural areas relative to its present level. In the long term, the growth of agriculture in rural areas might eventually have some positive externalities that will reduce rural exodus and somewhat help lessen inequality in urban areas as well as narrow down the difference in inequalities between rural and urban areas. Settling young people in rural areas, for instance, may reduce rural exodus and increase production if they are employed in productive sectors. Situations that lessen the attraction of the cities may stabilize unemployment, and revive employment and production. This conjunction of growth enhancing phenomena reduces the number of poor people in urban areas and reduces inequalities.

Finally, the lesser inequality in urban areas may be accompanied by a decrease in inequalities between rural and urban areas. Such is the case when production increases in the two areas but productivity gains are higher in rural areas. Such scenarios can be realized only if an appropriate policy for distributing the benefits of growth is implemented.

The estimation of FGT curves, Lorenz curves and the CPG curves support the robustness of the results of the indices studied. Lorenz curves confirm, in particular, the soundness of most of this study's conclusions on second order inequality indices.

Implications in Terms of a Strategy to Fight against Poverty

The main conclusion in this study may be summarized in two main points:

- First, the principal characteristic of poor households is their large size.
- Second, a large proportion of poor households are farmers living in rural areas.

Before proposing policies that reduce poverty, one ought to first specify the characteristics that can be correlated to this phenomenon. Only then can one propose policies and study the feasibility of such policies at all levels. The results provided by this study are

mainly relevant to the first phase. To fight poverty efficiently, this study recommends that one targets – in terms of regions – the Center-North and the Center-South, as well as the cities. In rural areas, notably in the Center-North and the South, attention should be paid to subsistence farmers and large households. Once this targeting is carried out, the next step is to identify within these groups those households headed by men.

Underemployment seems to be the main cause of poverty in rural areas. Measures must be taken to curb this problem. In the cities, meanwhile, inactive groups must be targeted and provided with jobs.

The situation of craftsmen and traders is also of great concern. Given the nature of their (liberal) profession, it will however be difficult for the State to intervene directly. It can, nonetheless, provide orientations in terms of minimum wages as well as develop incentives for this group to produce better.

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Appendix 1. Community Questionnaire's Sections

The community questionnaire used in this study consists of 14 sections:

Section 0: Data on the Household Head

Section 1: Demographic Data on Household Members

Section 2: Health (Household Health Status)

Section 3: Education (School Attendance)

Section 4: Literacy and Migration

Section 5: Employment

Section 6: Housing and Comfort (including access to drinking water and sanitation)

Section 7: Livestock and Farm

Section 8: Enterprises and Non-Agricultural Activities

Section 9: Access to Basic Services (primary and secondary schools, health center and market)

Section 10: Household Expenditures

Section 11: Household Income

Section 12: Household Assets

Section 13: Anthropometrics (measures of the size and weight of sampled children less than five years old)

Appendix 2. List of Variables Used

1 – Number of the household

2 – Weight

3 – Household consumption per capita

4 – Expenditures per capita

5 – Adjusted expenditures per capita

6 – Weight taking into account household size

7 – Number of adult equivalents

8 – Household size

9 – Household food expenditures

10 – Household non-food expenditures

11 – Household total expenditures

12 – Household consumption per individual equivalent

13 – SEG socio-economic group the household belongs to

14 – Relationship with the household head

15 – Stratum

16 – Area

17 – Consumption per individual equivalent.

Appendix 3: Number of Observations for Variables Studied

Areas

1 – rural area: 5,924 observations

2 – urban area: 2,718 observations

Strata

Five strata have been retained out of the eight chosen by the INSD :

1 – West : 840 observations

3 – Center-North : 1,959 observations

4 – Center-South : 1,098 observations

6 – Other Cities : 780 observations

7 – Ouaga-Bobo : 1,938 observations

Socio-economic Group (SEG=GSE)

Five groups out of seven were retained:

1 – Civil servants : 675 observations

2 – Private sector wage earners : 482 observations

3 – Craftsmen and traders : 1,026 observations

4 – Cash crop farmers : 486 observations

5 – Subsistence farmers : 5,154 observations

Sex of Household Head

The sex of the household head constitutes a subject of interest for analysis.

1 – Male-headed households : 7,863 observations

2 – Female-headed households : 779 observations

Number of Individuals

Household size can be important in determining poverty:

1 – One individual	:	479 observations
2 – Two individuals	:	519 observations
3 – Three individuals	:	759 observations
4 – Four-five individuals	:	1,867 observations
6 – Six individuals or more	:	5,018 observations.

Appendix 4: Tables

Table 1: Gini Inequality and Atkinson Indices for Different Measures of Living Standards and Statistical Weights

	Generalized Gini Index			**Atkinson Index**		
Parameter value	**2**	**3**	**4**	**0.25**	**0.50**	**0.75**
Consumption per adult equivalent (N*P)	0.4663 (0.0072)	0.5768 (0.0083)	0,6280 (0,0086)	0.0997 (0.0024)	0.1808 (0.0039)	0.2475 (0.0049)
Consumption per capita (N*P)	0.4643 (0.0077)	0.5752 (0.0086)	0.6270 (0.0088)	0.0997 (0.0026)	0.1802 (0.0041)	0.2463 (0.0050)
Total household consumption (N*P)	0.4630 (0.0117)	0.5898 (0.0118)	0.6506 (0.0110)	0.0919 (0.0029)	0.1727 (0.0050)	0.2437 (0.0063)
Consumption per adult equivalent (1*P)	0.5241 (0.0076)	0.6360 (0.0075)	0.6855 (0.0071)	0.1280 (0.0042)	0.2293 (0.0065)	0.3116 (0.0077)

Note:Values in parentheses are standard deviations.

Table 2: Gini Inequality and Atkinson Indices by (Consumption Per Adult Equivalent/N*P)

	Generalized Gini Index			**Atkinson Index**		
Parameter value	**2**	**3**	**4**	**0.25**	**0.50**	**0.75**
Urban	0.4393 (0.0103)	0.5668 (0.0111)	0.6312 (0.0109)	0.0839 (0.0035)	0.1579 (0.0059)	0.2235 (0.0076)
Rural	0.3751 (0.0117)	0.4809 (0.0129)	0.5351 (0.0130)	0.0637 (0.0024)	0.1181 (0.0040)	0.1656 (0.0051)

Note:Values in parentheses are standard deviations.

Table 3: Gini Inequality and Atkinson Indices According to Sex of Household Head

Index	Proportion		Generalized Gini Index			**Atkinson Index**		
Parameter value	Rural	Urban	**2**	**3**	**4**	**0.25**	**0.50**	**0.75**
Female-headed households	92,5%	87,7%	0.4894 (0.0217)	0.6177 (0.0227)	0.6778 (0.0224)	0.1046 (0.0085)	0.1941 (0.0138)	0.2706 (0.0171)
Male-headed households	7,5%	12,3%	0.4618 (0.0079)	0.5714 (0.0089)	0.6225 (0.0091)	0.0982 (0.0025)	0.1779 (0.0041)	0.2435 (0.0050)

Note:Values in parentheses are standard deviations..

Table 4: Gini Inequality and Atkinson Indices According to Household Size (Consumption Per Adult Equivalent/N*P)

	Generalized Gini Index			Atkinson Index		
Parameter value	**2**	**3**	**4**	**0.25**	**0.50**	**0.75**
1 Individual	0.5956 (0.0245)	0.7378 (0.0214)	0.7976 (0.0183)	0.1557 (0.0111)	0.2907 (0.0184)	0.4092 (0.0247)
2 Individuals	0.5204 (0.0221)	0.6504 (0.0227)	0.7055 (0.0221)	0.1152 (0.0069)	0.2157 (0.0119)	0.3024 (0.0155)
3 Individuals	0.5294 (0.0219)	0.6478 (0.0218)	0.700 (0.0205)	0.1255 (0.0097)	0.2285 (0.0159)	0.3126 (0.0196)
4 et 5 Individuals	0.4951 (0.0140)	0.6092 (0.0143)	0.6609 (0.0138)	0.1116 (0.0066)	0.2022 (0.0106)	0.2763 (0.0128)
6 Individuals and more	0.4297 (0.0092)	0.5408 (0.0103)	0.5936 (0.0105)	0.0816 (0.0024)	0.1511 (0.0040)	0.2104 (0.0051)

Note:Values in parentheses are standard deviations.

Table 5: Gini Inequality and Atkinson Indices according to Strata (Consumption per Adult Equivalent /N*P)

	Generalized Gini Index			Atkinson Index		
Parameter value	**2**	**3**	**4**	**0.25**	**0.50**	**0.75**
Ouaga and Bobo	0.4237	0.5478	0.6110	0.0780	0.1468	0.2080
	(0.0122)	(0.0133)	(0.0135)	(0.0038)	(0.0064)	(0.0083)
Others cities	0.4550	0.5815	0.6437	0.0913	0.1698	0.2380
	(0.0202)	(0.0216)	(0.0209)	(0.0079)	(0.0130)	(0.0162)
West	0.3720	0.4867	0.5450	0.0594	0.1127	0.1610
	(0 ;0338)	(0.0376)	(0.0383)	(0.0043)	(0.0076)	(0.0103)
Center-North	0.3246	0.4274	0.4840	0.0476	0.0897	0.1275
	(0.0143)	(0.0163	(0.0169)	(0.0033)	(0.0057)	(0.0075)
Center South	0.3453	0.4413	0.4919	0.0569	0.0142	0.1444
	(0.0153)	(0.0181)	(0.0194)	(0 .0046)	(0.0076)	(0.0097)

Table 6: Gini Inequality and Atkinson Indices according to Socio-Economic Groups (consumption Per Adult Equivalent/N*P)

	Generalized Gini Index			Atkinson Index		
Parameter value	**2**	**3**	**4**	**0.25**	**0.50**	**0.75**
	0.4739	0.5980	0.6570	0.0978	0.1823	0.2555
Private sector wage earners	(0.0278)	(0.0316)	(0.0328)	(0.0090)	(0.0157)	(0.0207)
	0.3758	0.4963	0.5605	0.0601	0.1155	0.1669
Civil servants	(0.0174)	(0.0215)	(0.0215)	(0.0043)	(0.0081)	(0.0116)
	0.4051	0.5306	0.5966	0.0726	0.1369	0.1950
Craftsmen and traders	(0.0209)	(0.0227)	(0.0231)	(0.0071)	(0.0117)	(0 ;0147°
	0.3437	0.4506	0.5066	0.0510	0.0967	0.1384
Subsistence farmers	(0.0124)	(0.0140)	(0.0143)	(0.0020)	(0.0035)	(0.0046)
	0.3417	0.4465	0.5007	0.0499	0.0950	0.1360
Cash crop farmers	(0.0260)	(0.0311)	(0.0325)	(0.0041)	(0.0074)	(0.0101)

Table 7: FGT Poverty Indices for Different Measures of Living Standards and Statistical Weights

	Index								
Poverty line	30000			41099			50000		
Parameter value	0	1	2	0	1	2	0	1	2
Individual consumption per adult equivalent (N*P)	0.1562 (0.0066)	0.0356 (0.0019)	0.0127 (0.0009)	0.3351 (0.0088)	0.0921 (0.0030)	0.0364 (0.0016)	0.4576 (0.0090)	0.1470 (0.0037)	0.06364 (0.0021)
Individual consumption per capita (N*P)	0.2497 0.0081	0.0620 (0.0025)	0.0235 (0.0013)	0.446 (0.0090)	0.1392 (0.0036)	0.0599 (0.0020)	0.5587 (0.0088)	0.2043 (0.0042)	0.0966 (0.0026)
Total household consumption (N*P)	0.0005 (0.0001)	0.0001 (0.0000)	0.0000 (0.0000)	0.0018 (0.0003)	0.0004 (0.0001)	0.0001 (0.0000)	0.0032 (0.0004)	0.0007 (0.0001)	0.0003 (0.0000)
Household consumption per adult equivalent (1*P)	0.1175 (0.0043)	0.0285 (0.0014)	0.0116 (0.0009)	0.2668 (0.0061)	0.0294 (0.0021)	0.0294 (0.0012)	0.3789 (0.0067)	0.1170 (0.0026)	0.0506 (0.0015)

Note:Values in parentheses are standard deviations.

Table 8: FGT Poverty Indices According to s (consumption Per Adult Equivalent N*P)

	Index								
Poverty line	30000			41099			50000		
Parameter value	0	1	2	0	1	2	0	1	2
Rural	0.1833 (0.0078)	0.0419 (0.0022)	0.0150 (0.0011)	0.3909 (0.0105)	0.1078 (0.0035)	0.0428 (0.0018)	0.5290 (0.0104)	0.1715 (0.0043)	0.0745 (0.0024)
Urban	0.0160 (0.0039)	0.0031 (0.0009)	0.0009 (0.0003)	0.0462 (0.0061)	0.0108 (0.0019)	0.0036 (0.0008)	0.0884 (0.0079)	0.0208 (0.0026)	0.0075 (0.0012)

Note: Values in parentheses are standard deviations.

Table 9: Decomposition of the FGT Poverty Index According to s (consumption per Adult Equivalent N*P)

	Index								
Poverty line	30000			41099			50000		
Parameter value	0	1	2	0	1	2	0	1	2
Rural	0.9834	0.9859	0.9888	0.9777	0.9811	0.984	0.9687	0.9771	0.981
	(0.0041)	(0.0042)	(0.0038)	(0.0030)	(0.0034)	(0.0036)	(0.003)	(0.0029)	(0.0032)
Urban	0.0166	0.0141	0.0111	0.0223	0.0189	0.0160	0.0313	0.0229	0.0190
	(0.0041)	(0.0042)	(0.0038)	(0.0030)	(0.0034)	(0.0036)	(0.003)	(0.0029)	(0.0032)

Note:Values in parentheses are standard deviations.

Table 10: FGT Poverty Indices According to Sex of Household Head (Consumption Per adult Equivalent N*P)

	Index								
Poverty line	**30000**			**41099**			**50000**		
Parameter value	**0**	**1**	**2**	**0**	**1**	**2**	**0**	**1**	**2**
Male-headed households	0.1590	0.0365	0.0130	0.3405	0.0937	0.0372	0.4654	0.1496	0.0648
	(0.0068)	(0.0020)	(0.0009)	(0.0091)	(0.0031)	(0.0016)	(0.0093)	(0.0038)	(0.0022)
Female-headed households	0.0972	0.0177	0.0054	0.2184	0.0569	0.0204	0.2904	0.0924	0.0382
	(0.0162)	(0.0032)	(0.0011)	(0.0240)	(0.0070)	(0.0028)	(0.0253)	(0.0096	(0.0045)

Note: Values in parentheses are standard deviations.

Table 11: Decomposition of the FGT Index by Sex of Household Head (Consumption Per Adult Equivalent/N*P)

	Index								
Poverty line	**30000**			**41099**			**50000**		
Parameter value	**0**	**1**	**2**	**0**	**1**	**2**	**0**	**1**	**2**
Male-headed households	0.9722	0.9777	0.981	0.9709	0.9724	0.9750	0.9716	0.9719	0.9732
	(0.0049)	(0.0042)	(0.004)	(0.0037)	(0.0039)	(0.0038)	(0.0030)	(0.0034)	(0.0036)
Female-headed households	0.0278	0.0223	0.0190	0.0291	0.0276	0.025	0.0284	0.0281	0.0268
	(0.0049)	(0.0042)	(0.004)	(0.0037)	(0.0039)	(0.0038)	(0.0030)	(0.0034)	(0.0036)

Note: Values in parentheses are standard deviations.

Table 12: FGT Poverty Indices According to Household Size (Consumption Per Adult Equivalent N*P)

	Index								
Poverty line	**30000**			**41099**			**50000**		
Parameter value	**0**	**1**	**2**	**0**	**1**	**2**	**0**	**1**	**2**
1 individual	0.0348	0.0170	0.0114	0.0972	0.0298	0.0167	0.1392	0.0455	0.0235
	(0.0115)	(0.0078)	(0.0072)	(0.0190)	(0.0088)	(0.0076)	(0.0222)	(0.0099)	(0.0080)
2 individuals	0.0464	0.0116	0.0048	0.1389	0.0324	0.0123	0.2166	0.0571	0.0228
	(0.0109)	(0.0030)	(0.0017)	(0.0195)	(0.0053)	(0.0026)	(0.0239)	(0.0074)	(0.0037)
3 individuals	0.0583	0.0171	0.0072	0.1668	0.0432	0.0175	0.2485	0.0722	0.0306
	(0.0107)	(0.0037)	(0.0018)	(0.0178)	(0.0057)	(0.0030)	(0.0203)	(0.0074)	(0.0041)
4 and 5 individuals	0.0826	0.0175	0.0057	0.2015	0.0496	0.0185	0.3208	0.0878	0.0348
	(0.0081)	(0.0022)	(0.0010)	(0.0119)	(0.0037)	(0.0018)	(0.0140)	(0.0048)	(0.0026)
5 individuals and more	0.1736	0.0395	0.0140	0.3663	0.1017	0.0403	0.4923	0.1609	0.0701
	(0.0078)	(0.0023)	(0.0011)	(0.0104)	(0.0036)	(0.0019)	(0.0106)	(0.0044)	(0.0025)

Note:Values in parentheses are standard deviations

Table 13: Decomposition of the FGT Poverty Index According to Household Size (Consumption Per Adult Equivalent N*P)

	Index								
Poverty line	**30000**			**41099**			**50000**		
Parameter value	**0**	**1**	**2**	**0**	**1**	**2**	**0**	**1**	**2**
1 individual	0.0015	0.0033	0.0062	0.0020	0.0022	0.0032	0.0021	0.0021	0.0026
	(0.0005)	(0.0016)	(0 .0040)	(0.0004)	(0.0007)	(0.0015)	(0.0004)	(0.0005)	(0.0009)
2 individuals	0.0046	0.0050	0.0059	0.0064	0.0054	0.0052	0.0073	0.0060	0.0055
	(0.0011)	(0.0013)	(0.0021)	(0.0001)	(0.0009)	(0.0011)	(0.0009)	(0.0008)	(0.0009)
3 individuals	0.0012	0.0154	0.0182	0.0159	0.0150	0.0154	0.0174	0.0157	0.0154
	(0.0023)	(0.0034)	(0.0048)	(0.0019)	(0.0019)	(0.0028)	(0.0017)	(0.0018)	50.0022)
4 and 5 individuals	0.0623	0.058	0.0535	0.0709	0.0635	0.0601	0.0827	0.0704	0.0644
	(0.0066)	(0.0077)	(0.0097	(0.005)	(0.0054)	(0.0065)	(0.0047)	(0.0047	(0.0054)
5 individuals and more	0.9196	0.9183	0.9162	0.9047	0.9137	0.9162	0.8905	0.9057	0.9121
	(0.0073)	(0.0089)	(0.0121)	(0.0056)	(0.0061)	(0.0075)	(0.0053)	(0.0054)	(0.0062)

Note:Values in parentheses are standard deviations.

Table 14: FGT Poverty Indices by Stratum (Consumption Per Adult Equivalent N*P)

	Index								
Poverty line	**30000**			**41099**			**50000**		
Parameter value	**0**	**1**	**2**	**0**	**1**	**2**	**0**	**1**	**2**
West	0.1268	0.0295	0.0111	0.3227	0.0829	0.0318	0.4363	0.1372	0.0575
	(0.0167)	(0.0050)	(0.0023)	(0.0297)	(0.0084)	(0.0041)	(0.0307)	(0.0112)	(0.0057)
Center-North	0.2346	0.0591	0.0221	0.4672	0.1377	0.0576	0.6222	0.2116	0.0960
	(0.0134)	(0.0046)	(0.0025)	(0.0148)	(0.0063)	(0.0038)	(0.0140)	(0.0071)	(0.0046)
Center-South	0.1646	0.0317	0.0094	0.3754	0.0946	0.0342	0.5290	0.1595	0.0646
	(0.0155)	(0.0039)	(0.0015)	(0.0192)	(0.0066)	(0.0032)	(0.0194)	(0.0081)	(0.0045)
4 Others cities	0.0378	0.0074	0.0018	0.1014	0.0243	0.0082	0.1744	0.0452	0.0167
	(0.0120)	(0.0028)	(0.0007)	(0.0166)	(0.0055)	(0.0023)	(0.0200)	(0.0072	(0.0036)
Ouaga and Bobo	0.0067	0.0013	0.0005	0.0228	0.0050	0.0016	0.0520	0.0105	0.0035
	(0.0021)	(0.0005)	(0.0003)	(0.0047)	(0.0012)	(0.0005)	(0.0070)	(0.0018)	(0.0008)

Note: Values in parentheses are standard deviations.

Table 15: Decomposition of the FGT Index by Stratum (Consumption per Adult equivalent N*P)

	Index								
Poverty line	**30000**			**41099**			**50000**		
Parameter value	**0**	**1**	**2**	**0**	**1**	**2**	**0**	**1**	**2**
West	0.1473	0.1504	0.1594	0.1747	0.1632	0.1585	0.173	0.1693	0.1638
	(0.0179)	(0.0230)	(0.0299)	(0.0171)	(0.0165)	(0.0194)	(0.137)	(0.0148)	(0.0163)
Center-North	0.3451	0.3814	0.4000	0.3205	0.3436	0.3637	0.3125	0.3307	0.3466
	(0.0204)	(0.0267)	(0.0359)	(0.0137)	(0.0170)	(0.0221)	(0.0114)	(0.0139)	(0.0174)
Center-South	0.2532	0.2140	0.178	0.2692	0.2468	0.2257	0.2777	0.2606	0.244
	(0.0220)	(0.0246)	(0.0268)	(0.0151)	(0.0174)	(0.0204)	(0.0128)	(0.0174)	(0.0171)
4 Others cities	0.0117	0.0100	0.0070	0.0146	0.0127	0.0108	0.0183	0.0148	0.0126
	(0.0038)	(0.0038)	(0.0029)	(0.0026)	(0.0030)	(0.0032)	(0.0023)	(0.0026	(0.0029)
Ouaga and Bobo	0.0049	0.0041	0.0041	0.0078	0.0062	0.0052	0.0129	0.0081	0.0064
	(0.0015)	(0.0017)	(0.0023)	(0.0016)	(0.0015)	(0.0016)	(0.0018)	(0.0014)	(0.0014)

Note:Values in parentheses are standard deviations.

Table 16: FGT Poverty Indices by Socio-Economic Group (Consumption Per Adult Equivalent/ N*P)

	Index								
Poverty line	**30000**			**41099**			**50000**		
Parameter value	**0**	**1**	**2**	**0**	**1**	**2**	**0**	**1**	**2**
Civil servants	0.0012 (0.0012)	0.0002 (0.0002)	0.0000 (0.0000)	0.0199 (0.0131)	0.0024 (0.0019)	0.0005 (0.0004)	0.0199 (0.0131)	0.0055 (0.0036)	0.0017 (0.0011)
Private sector wage earners	0.0301 (0.0210)	0.0042 (0.0029)	0.0006 (0.0004)	0.0473 (0.0231)	0.0047 (0.0080)	0.0050 (0.0029)	0.0580 (0.0235)	0.0213 (0.0107)	0.0092 (0.0051)
Craftsmen and traders	0.0238 (0.0063)	0.0054 (0.0016)	0.0020 (0.0006)	0.0504 (0.0100)	0.0143 (0.0030)	0.0057 (0.0013)	0.0872 (0.0133	0.0239 (0.0042)	0.0100 (0.0020)
Cash crop farmers	0.1631 (0.0230)	0.0307 (0.0056)	0.0107 (0.0028)	0.3645 (0.0326)	0.0929 (0.0096)	0/0341 (0.0048)	0.4755 (0.0332)	0.1571 (0.0124)	0.0631 (0.0065)
Subsistence farmers	0.1797 (0.0084)	0.0409 (0.0024)	0.0145 (0.0011)	0.3894 (0.0109)	0 .1064 (0.0038)	0.0420 (0.0020)	0.5369 (0.0110)	0.1709 (0.0046)	0.0736 (0.0026)

Table 17: Decomposition of the FGT Index by Socio-Economic Group (Consumption Per Adult Equivalent /N*P)

	Index								
Poverty line	**30000**			**41099**			**50000**		
Parameter value	**0**	**1**	**2**	**0**	**1**	**2**	**0**	**1**	**2**
Civil servants	0.0003 (0.0003)	0.0003 (0.0003)	0.0001 (0.0001)	0.0026 (0.0017)	0.0011 (0.0009)	0.0006 (0.0005)	0.0019 (0.0013)	0.0016 (0 .0011)	0.0011 (0.0008)
Private sector wage earners	0.0051 (0.0037)	0.0032 (0.0022)	0.0013 (0.0009)	0.0038 (0.0019)	0.0043 (0.0024)	0.0036 (0.0022)	0.0034 (0.0014)	0.0039 (0.0020)	0.0039 (0.0022)
Craftsmen and traders	0.0095 (0.0026)	0.0095 (0.0028)	0.0100 (0.0031)	0.0094 (0.0019)	0.0097 (0.0021)	0.0098 (0.0024)	0.0119 (0.0019)	0.0102 (0.0019)	0.0098 (0.0021)
Other active population	0.0036 (0.0019)	0.0032 (0.002)	0.0027 (0.0019)	0.0022 (0.0009)	0.0028 (0.0014)	0.003 (0.0016)	0.0029 (0.0009)	0.0028 (0.0011)	0.0029 (0.0014)
Cash crop farmers	0.1090 (0.0154)	0.09 (0.0163)	0.0883 (0.0221)	0.1136 (0.0121)	0.1053 (0.0118)	0.0978 (0.0139)	0.1085 (0.0098)	0.1077 (0.0105)	0.1035 (0.0117)
Subsistence farmers	0.7833 (0.0192)	0.7821 (0.0240)	0.7783 (0.0313)	0.7913 (0.0140)	0.7868 (0.0158)	0.7844 (0.0199)	0.7989 (0.0116)	0.7912 (0.0133)	0.7874 (0.0159)
Inactive population	0.0892 (0.0128)	0.1119 (0.0197)	0.1193 (0.0252)	0.0773 50.0082)	0.0901 (0.0115)	0.1008 (0.0158)	0.0725 (0.0071)	0.0826 (0.0091)	0.0915 (0.0120)

Appendix 5: Figures

Figure A1: Density curves of consumption per adult equivalent according to sex of household head

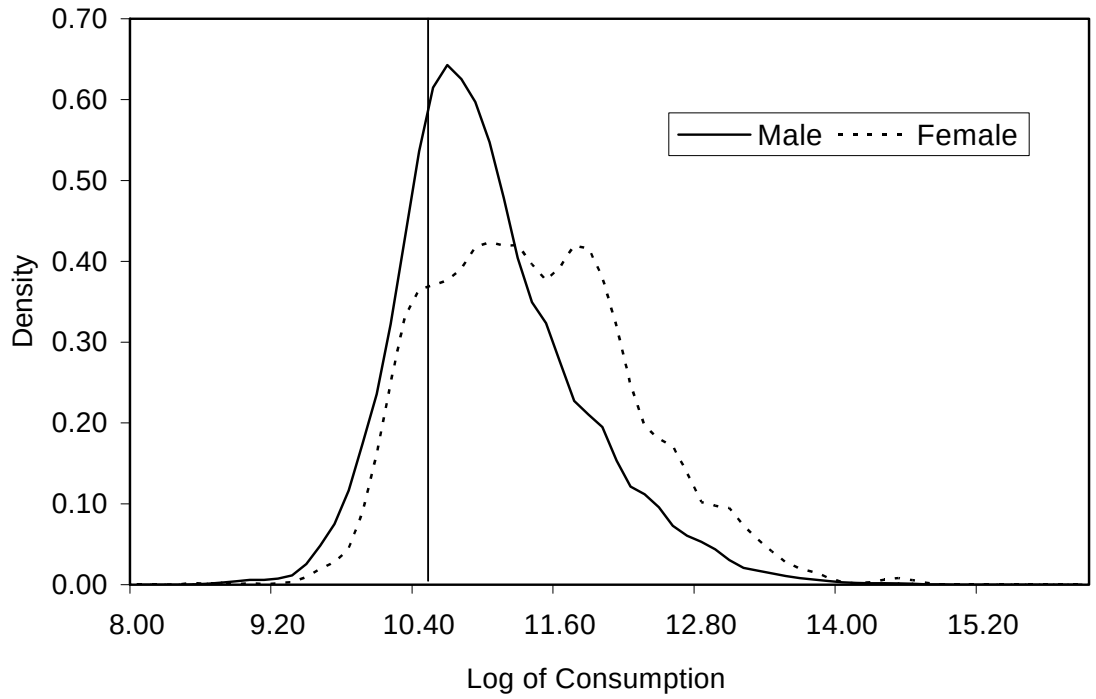


Figure A2: Density curves according to household size

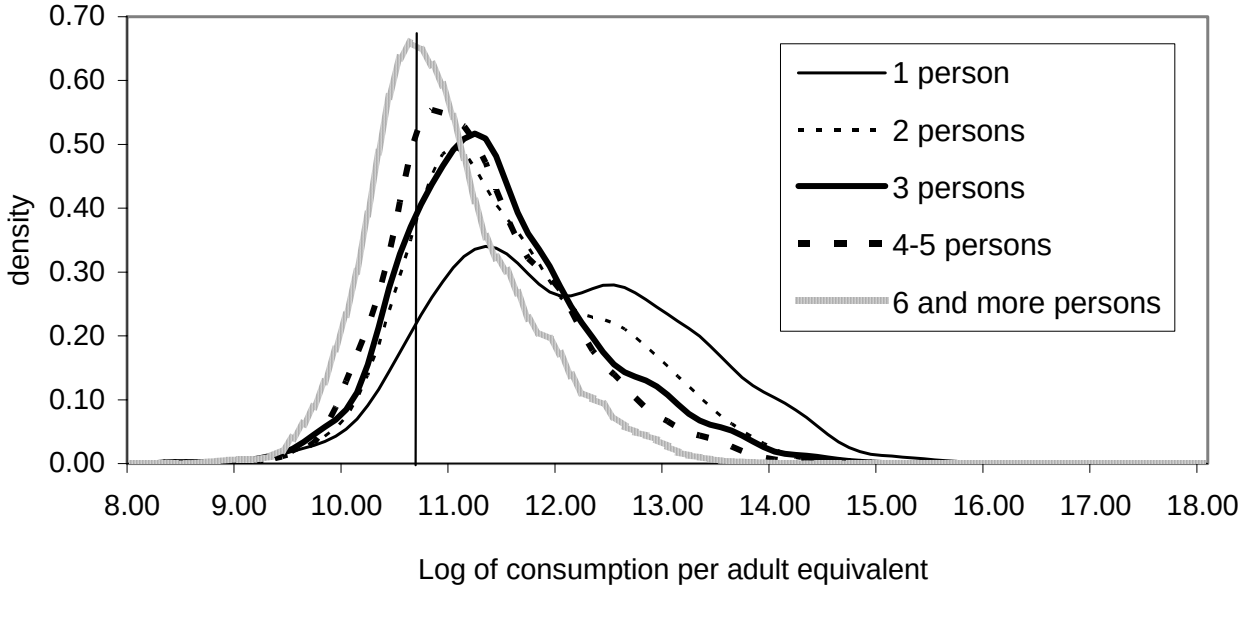


Figure A3 : Density curves of consumption per adult equivalent according to household stratum

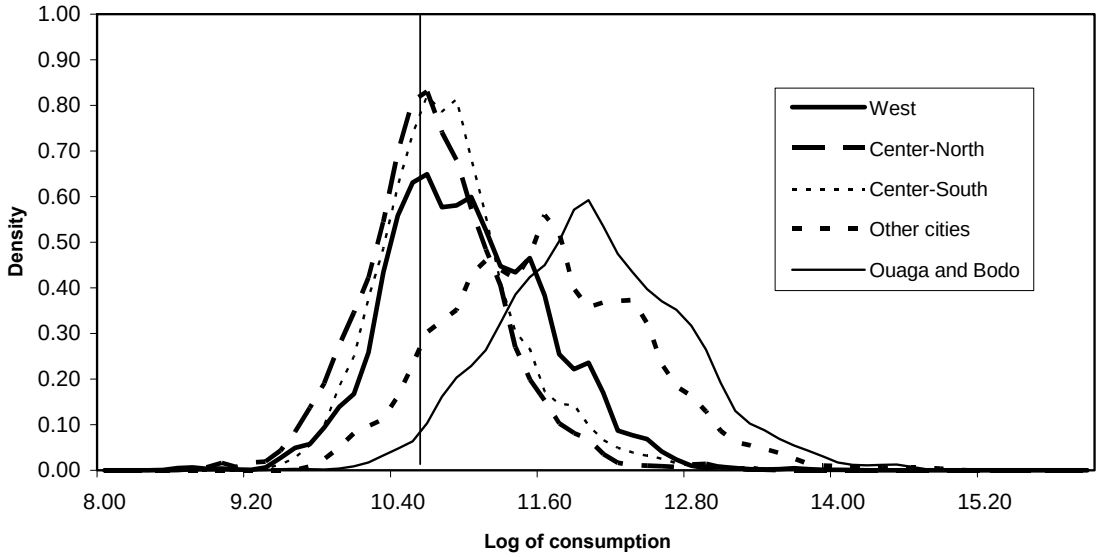


Figure A4: Density curve of consumption per adult equivalent according to socio-eonomic group.

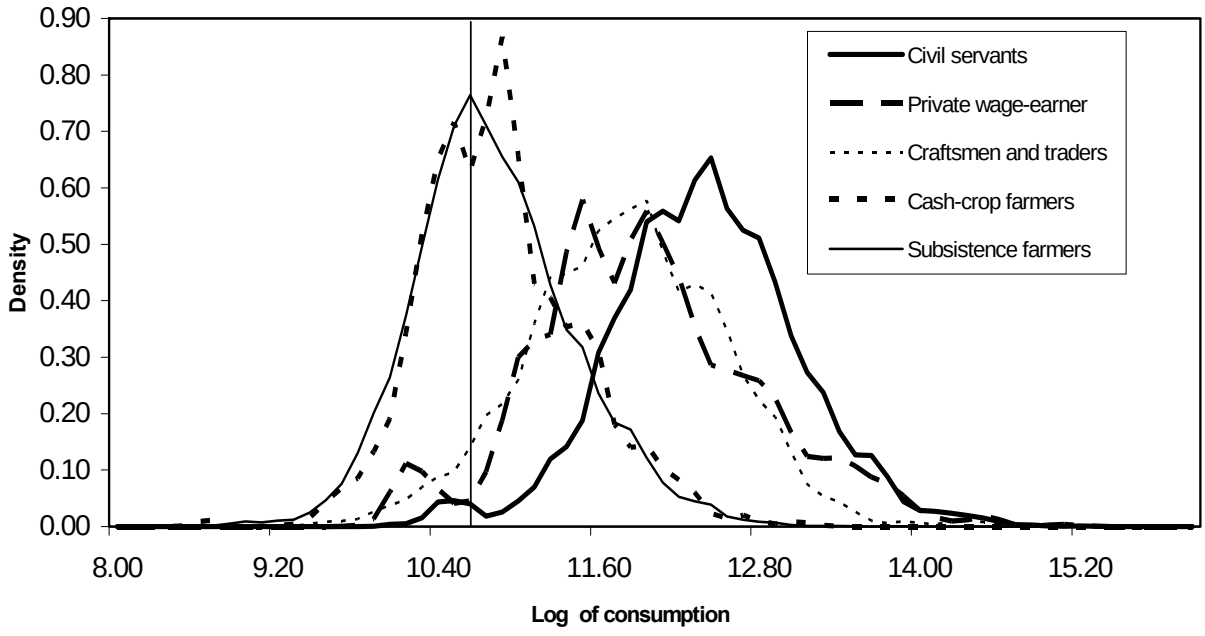


Figure B1: Lorenz curves for different living standard measures

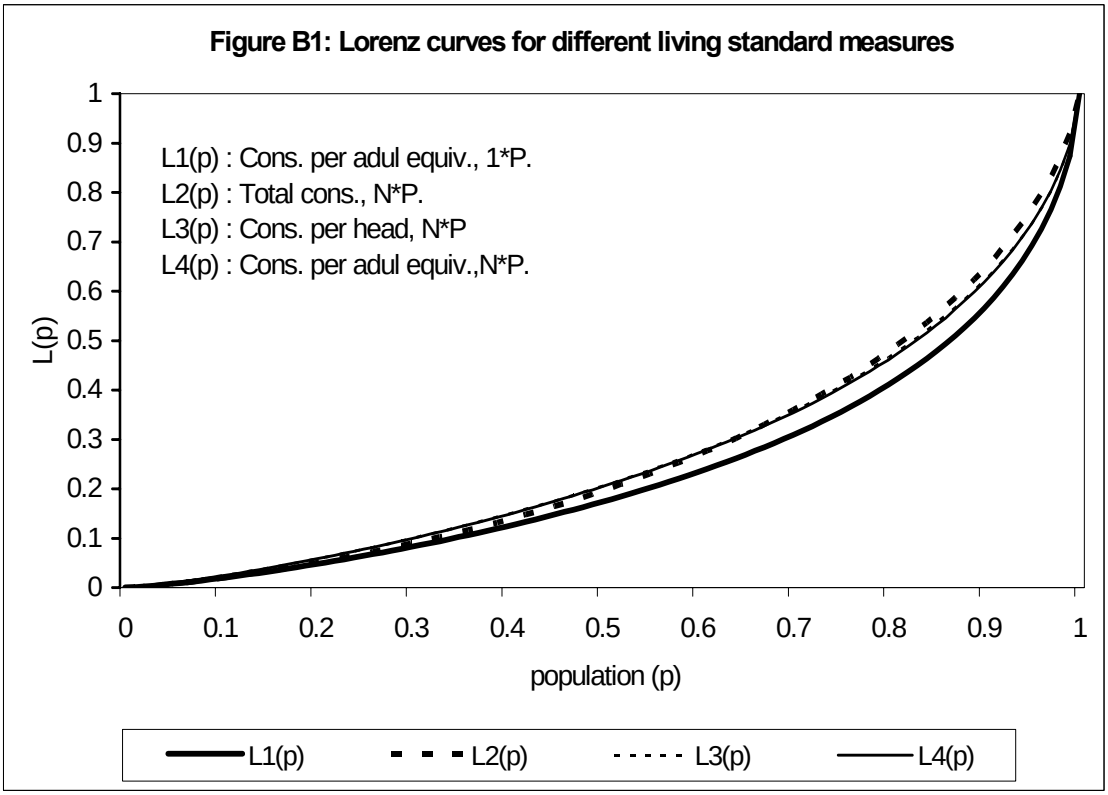


Figure B2 : Difference between Lorenz curves

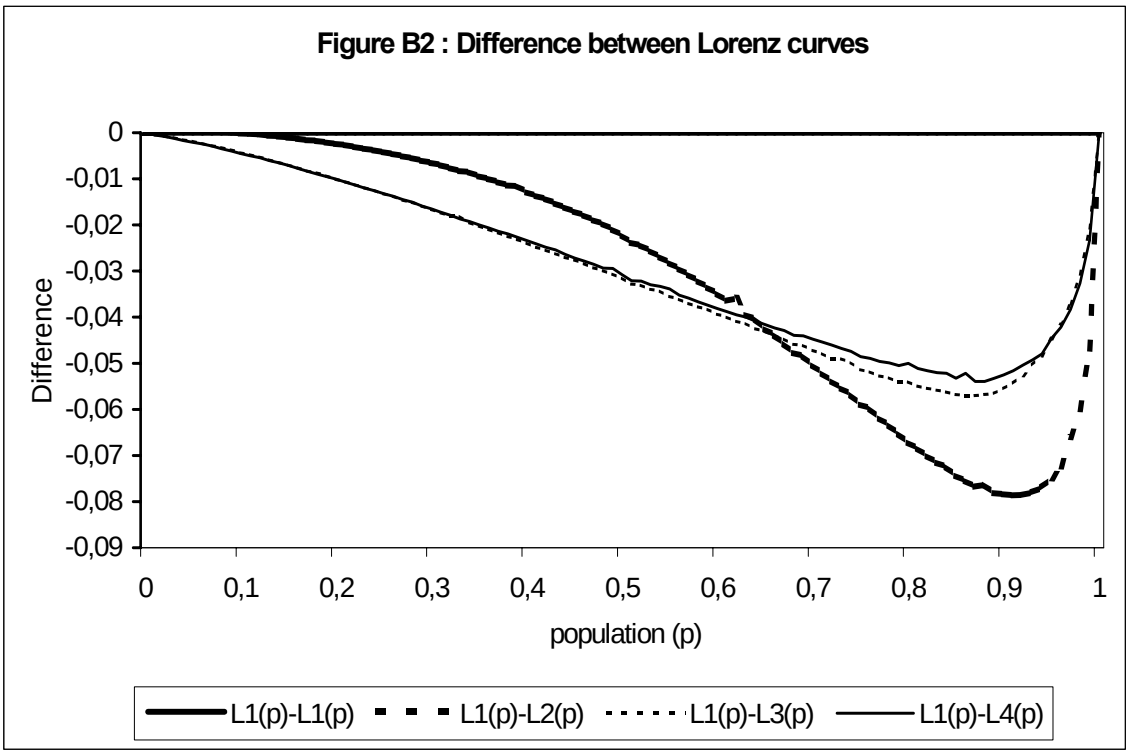


Figure B3 : Lorenz curves for the rural and urban areas, consumption per adult equivalent (N*P)

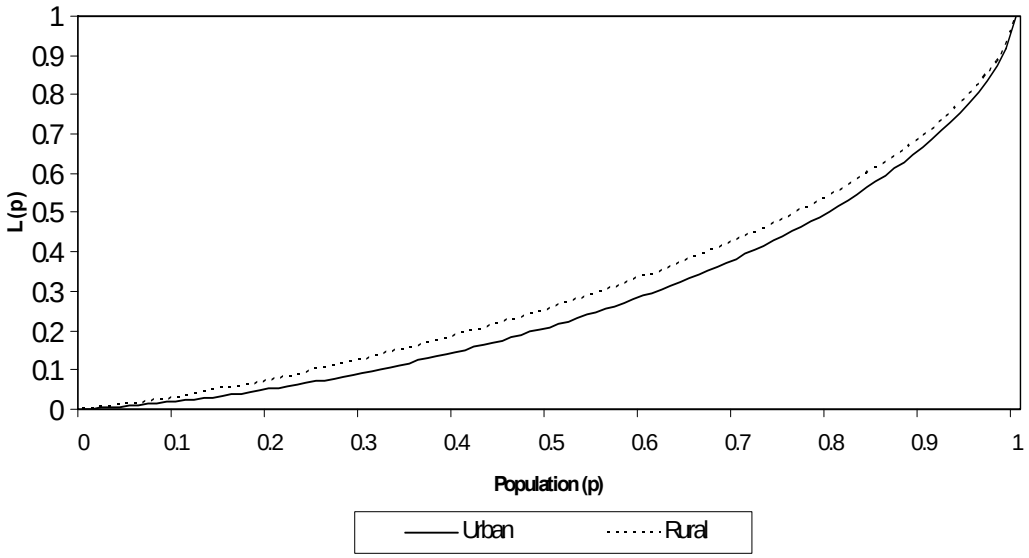


Figure B4 : Differences between Lorenz curves for the rural area (C2) and the urban area (C1), Consumption per adult equivalent (N*statistical weight = N*P)

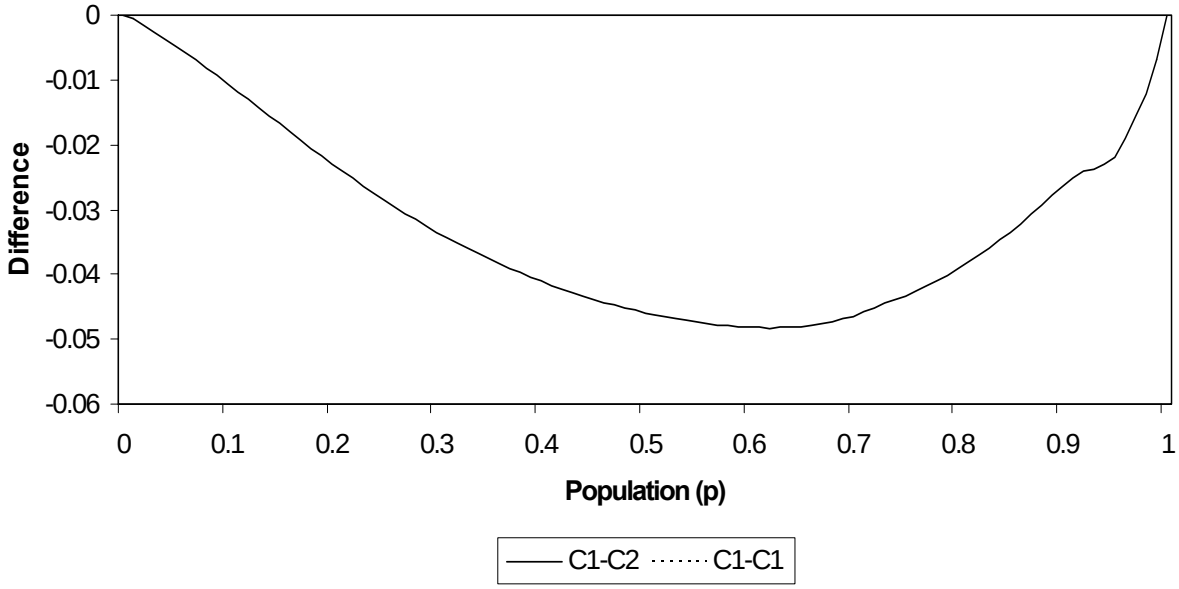


Figure B5 : Lorenz curves for different household sizes, consumption per adult equivalent (N*statistical weight P)

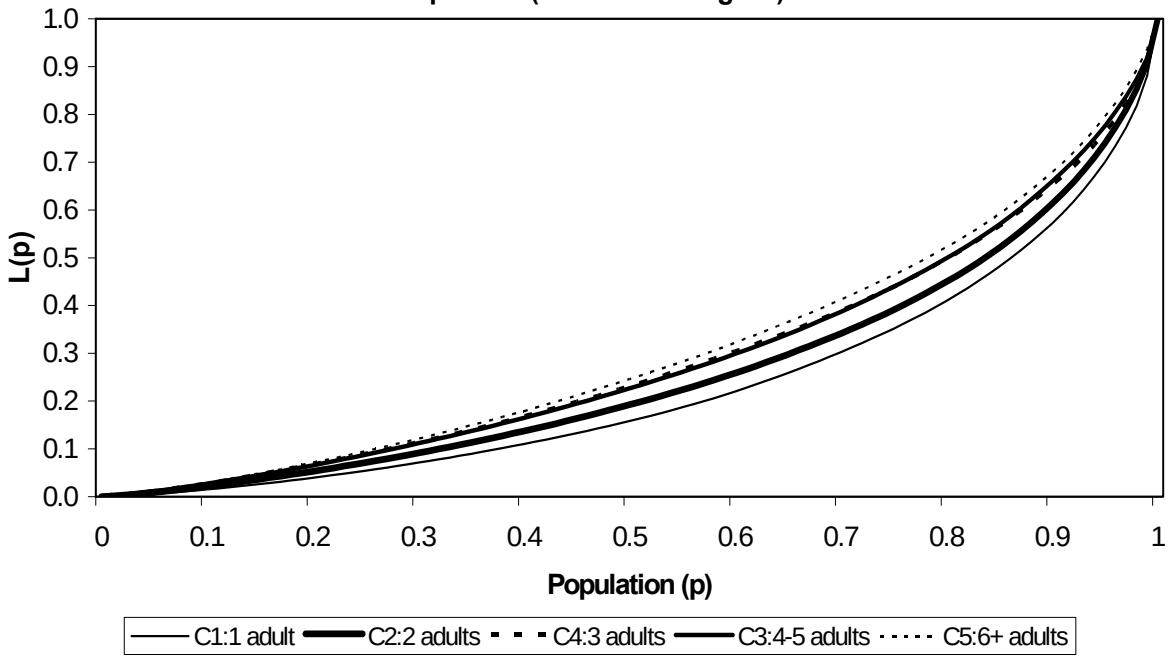


Figure B6 : Differences between Lorenz curves with different household sizes, consumption per adult equivalent (N*statistical weight (P))

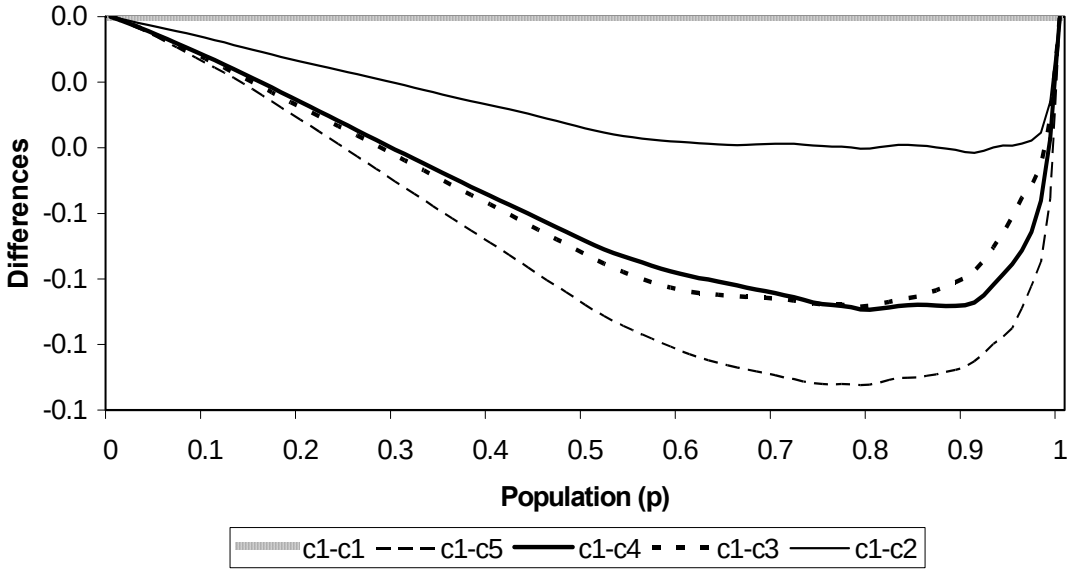


Figure B7 : Lorenz curves for different strata, consumption per adult equivalent (N*statistical weight P)

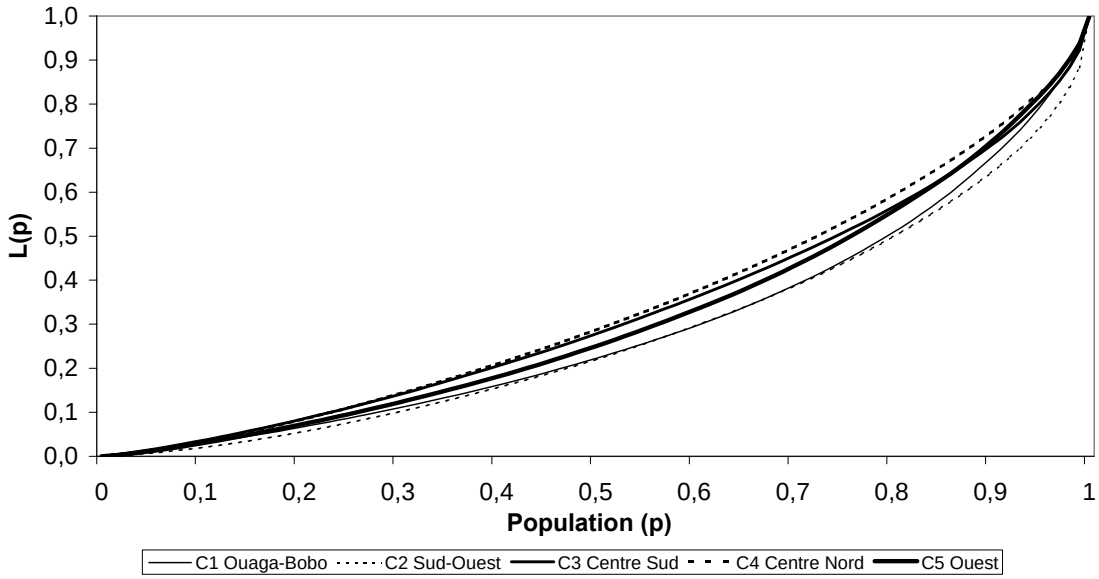


Figure B8 : Differences between Lorenz curves for different strata, consumption per adult equivalent

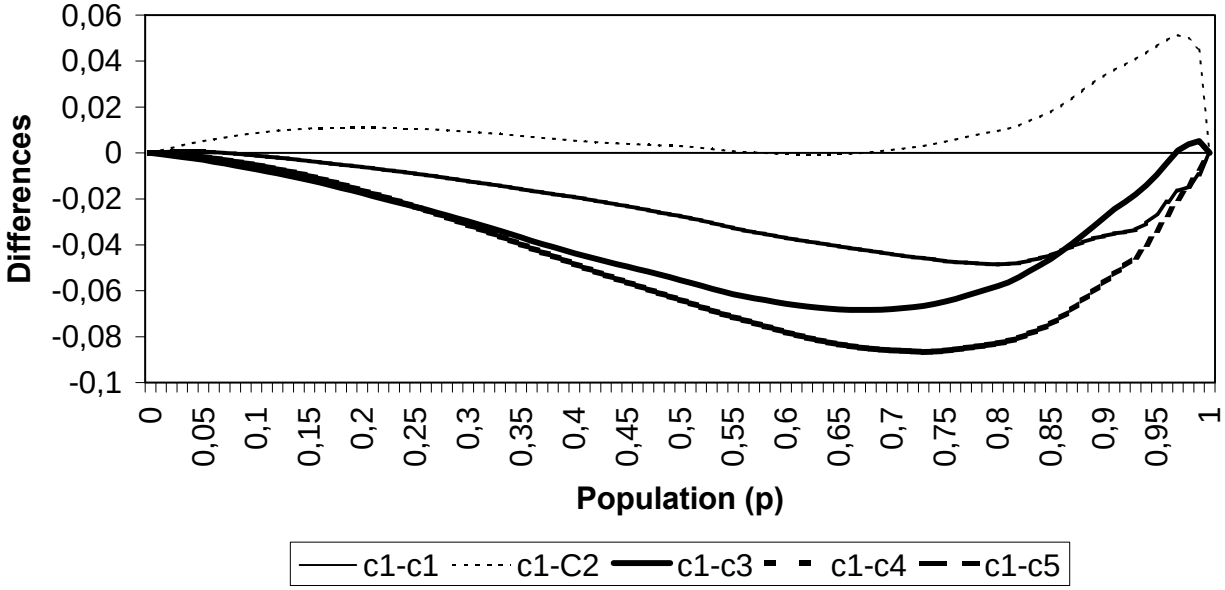


Figure B9 : Lorenz curves for different socio-economic groups, consumption per adult equivalent (N*statistical weight (P))

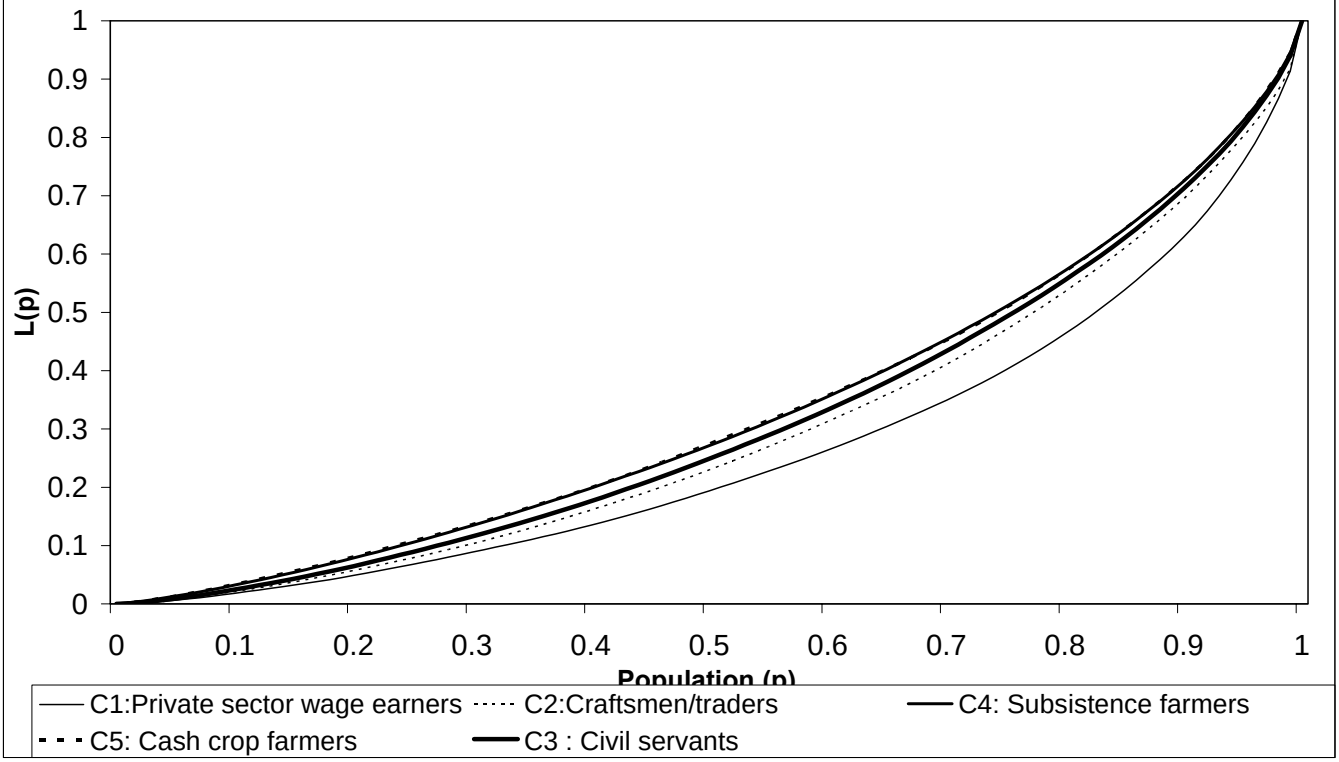
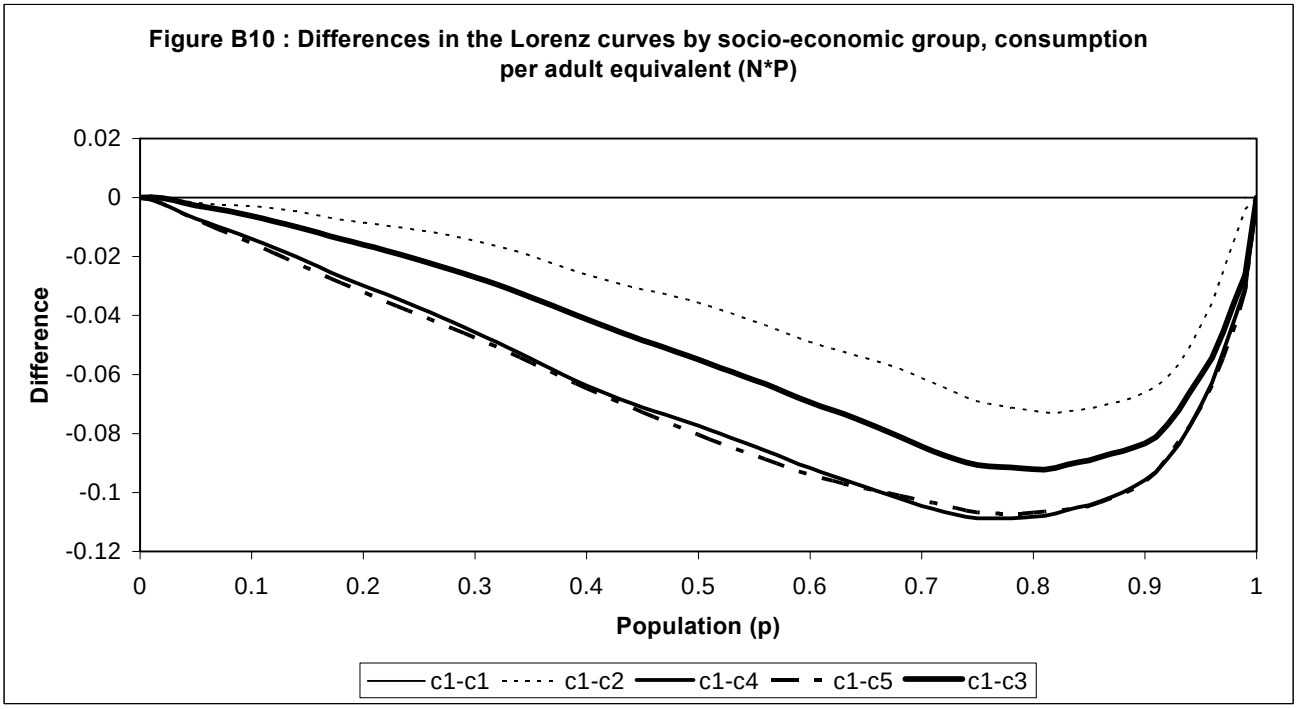


Figure B10 : Differences in the Lorenz curves by socio-economic group, consumption per adult equivalent (N*P)



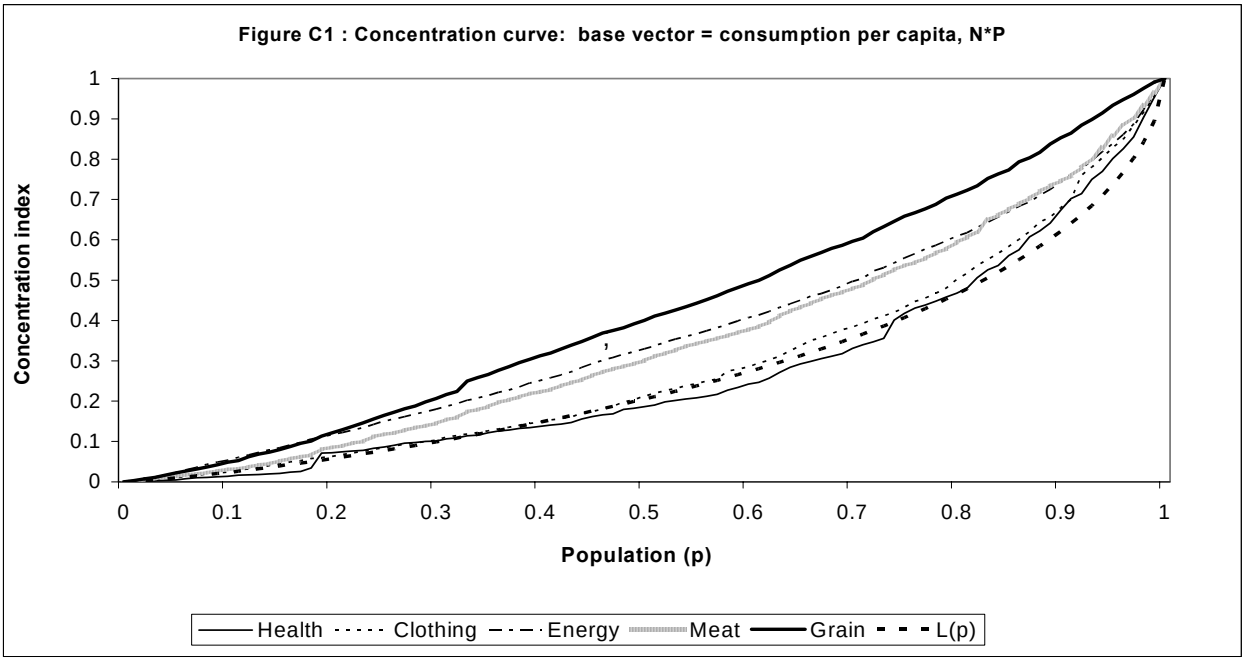


Figure C1 : Concentration curve: base vector = consumption per capita, N*P
Concentration index
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Population (p)
Health
Clothing
Energy
Meat
Grain
L(p)

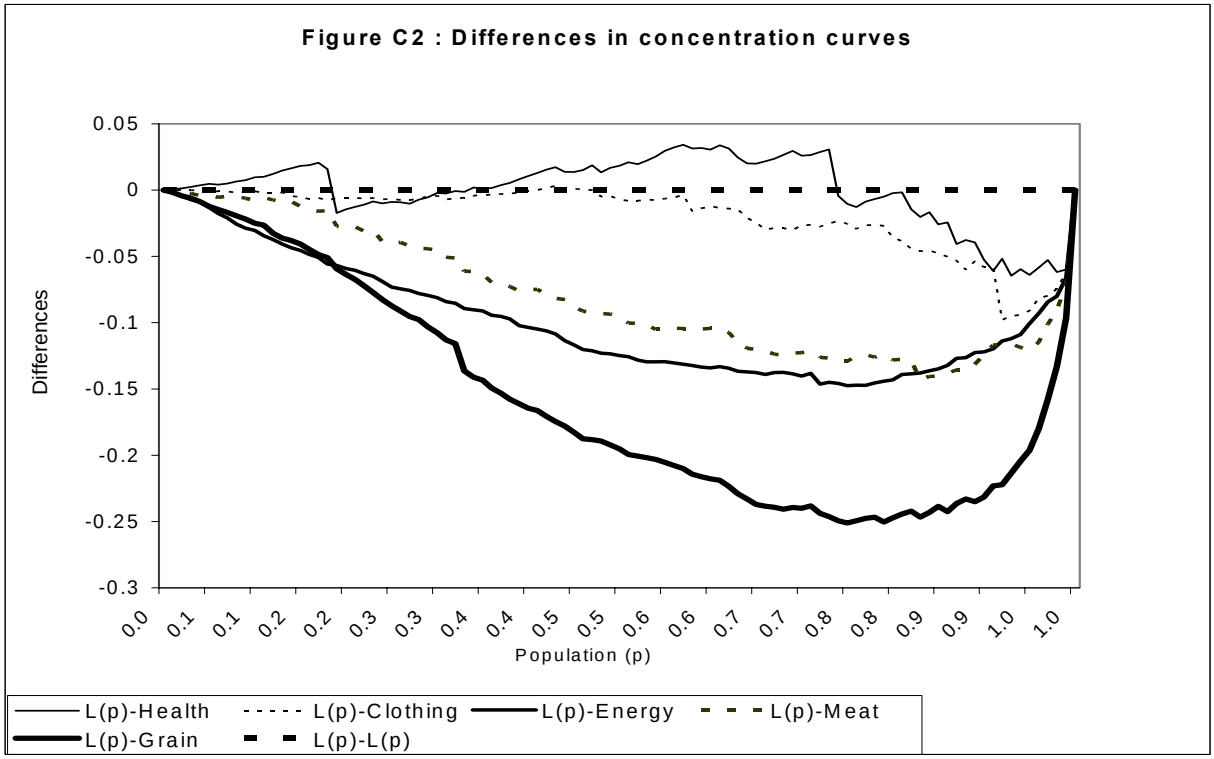


Figure C2 : Differences in concentration curves
Differences
0.05
0
-0.05
-0.1
-0.15
-0.2
-0.25
-0.3
0.0
0.1
0.1
0.2
0.2
0.3
0.3
0.4
0.4
0.5
0.5
0.6
0.6
0.7
0.7
0.8
0.8
0.9
0.9
1.0
1.0
Population (p)
L(p)-Health
L(p)-Clothing
L(p)-Energy
L(p)-Meat
L(p)-Grain
L(p)-L(p)

Figure D1.1: FGT Curves for Rural and Urban Areas (Headcount Index; α=0)

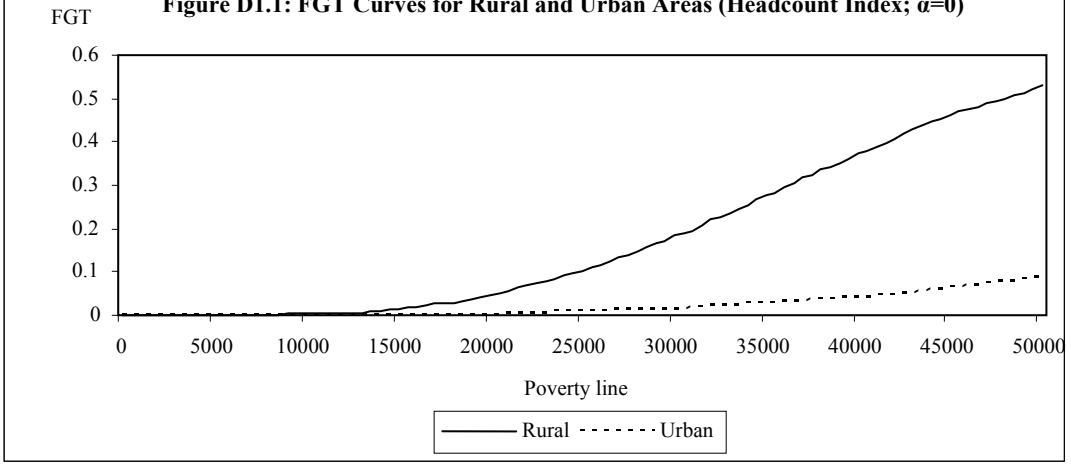


Figure D1.2: FGT Curves for Rural and Urban Areas (Poverty Gap; α=1)

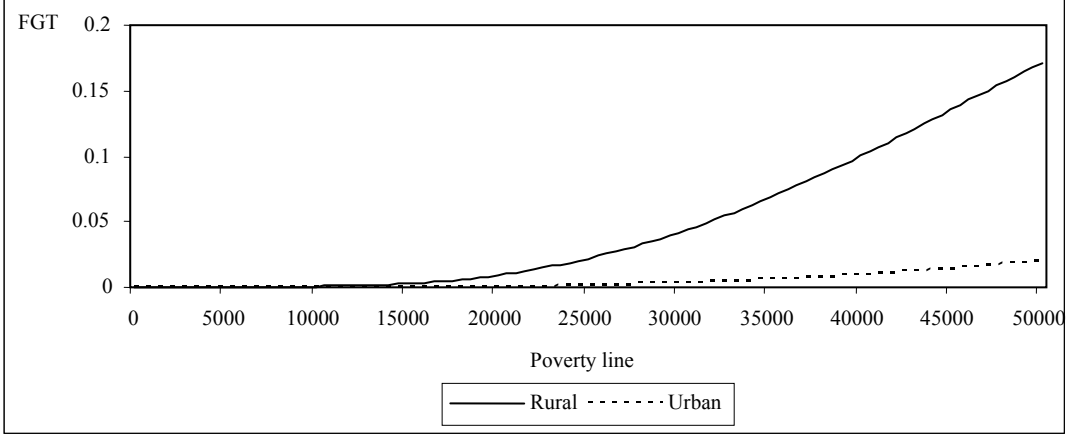
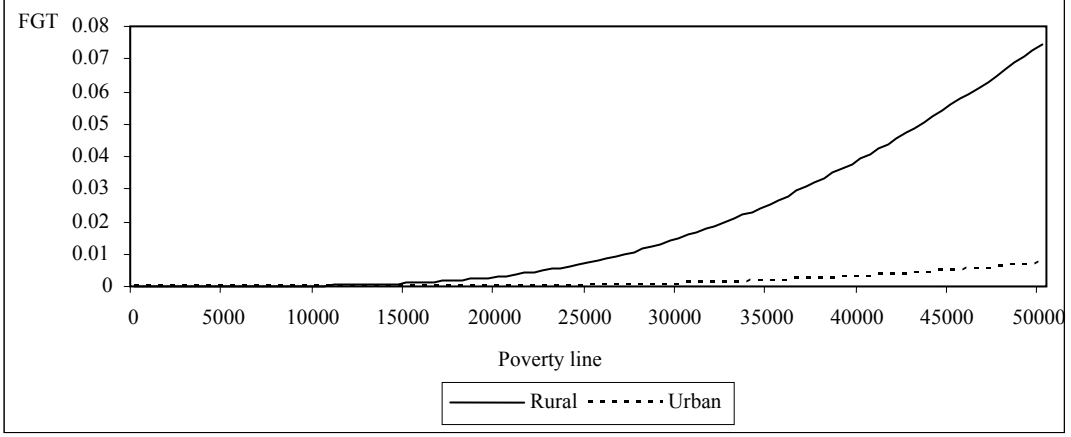


Figure D1.3: FGT Curves for Rural and Urban Areas (Poverty Severity; α=2)



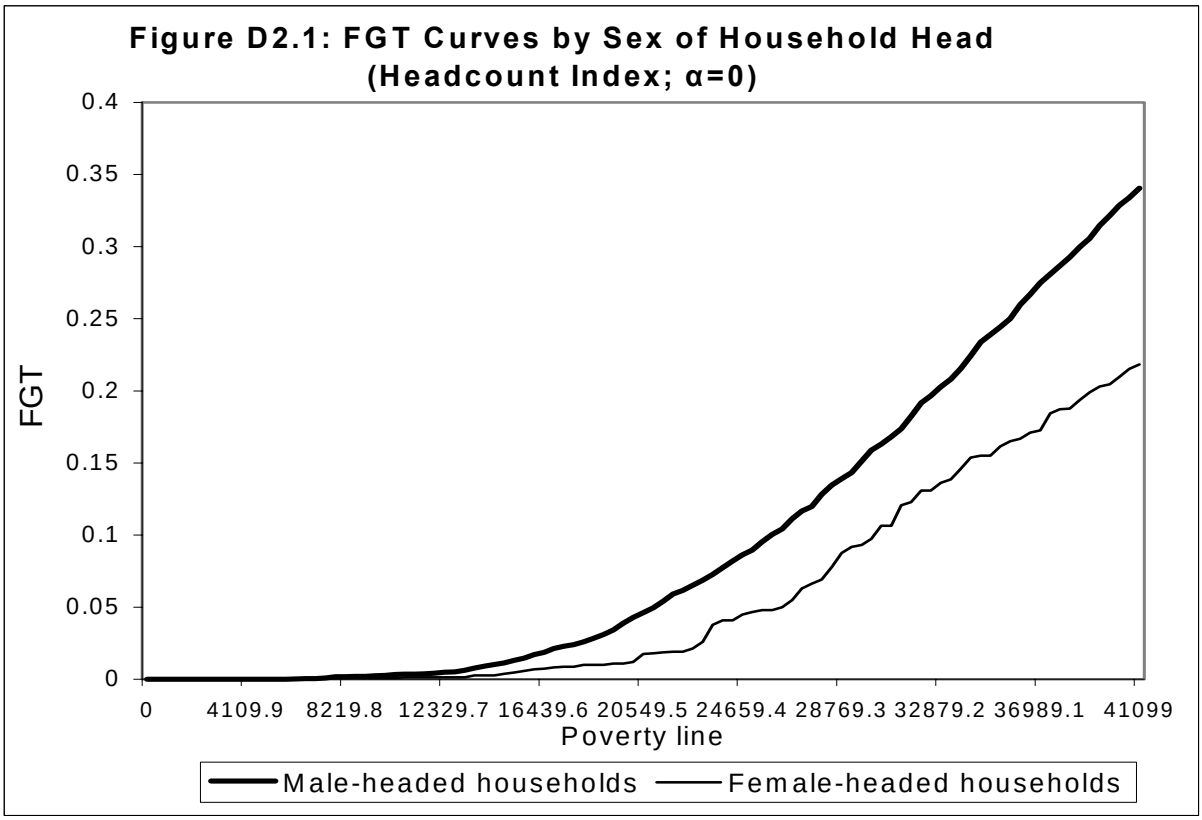


Figure D2.1: FGT Curves by Sex of Household Head
(Headcount Index; α=0)
FGT
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
4109.9
8219.8
12329.7
16439.6
20549.5
24659.4
28769.3
32879.2
36989.1
41099
Poverty line
Male-headed households
Female-headed households

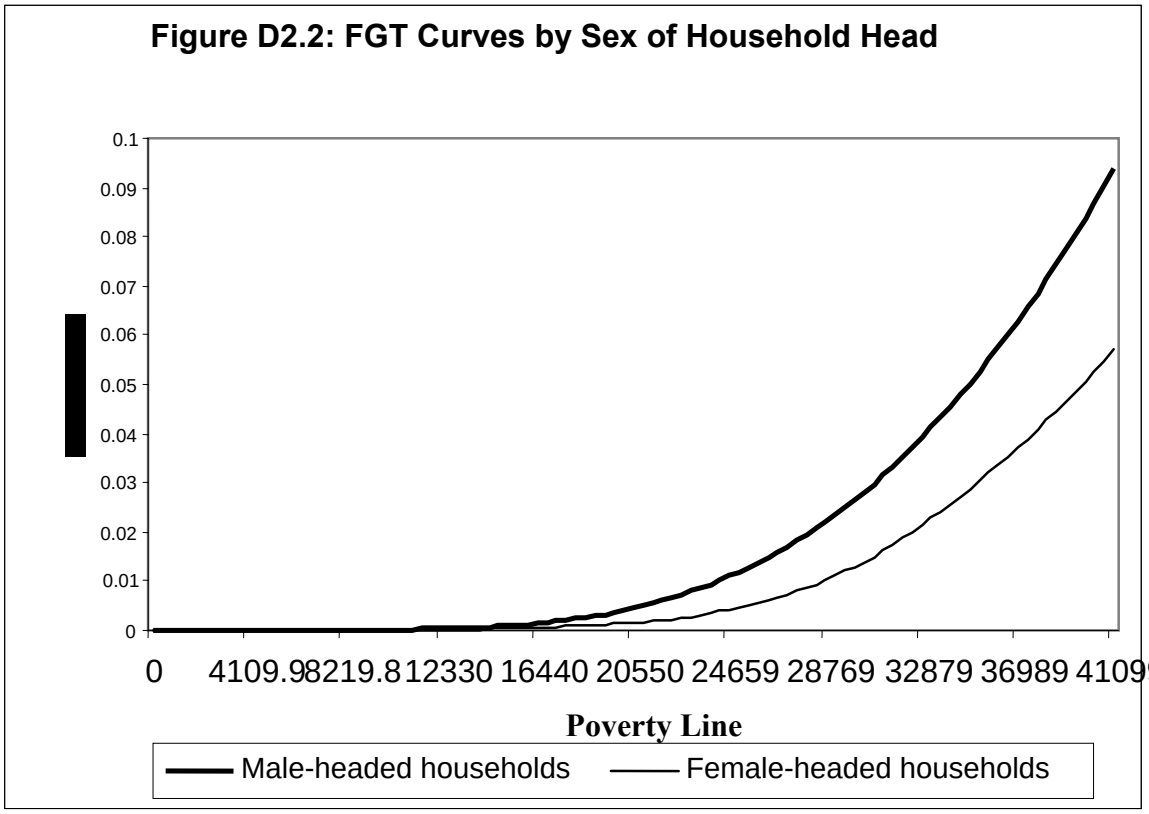


Figure D2.2: FGT Curves by Sex of Household Head
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0
4109.9
8219.8
12330
16440
20550
24659
28769
32879
36989
41099
Poverty Line
Male-headed households
Female-headed households

Figure D3.1 : FGT Curves by Household Size (Headcount Index; α=0)

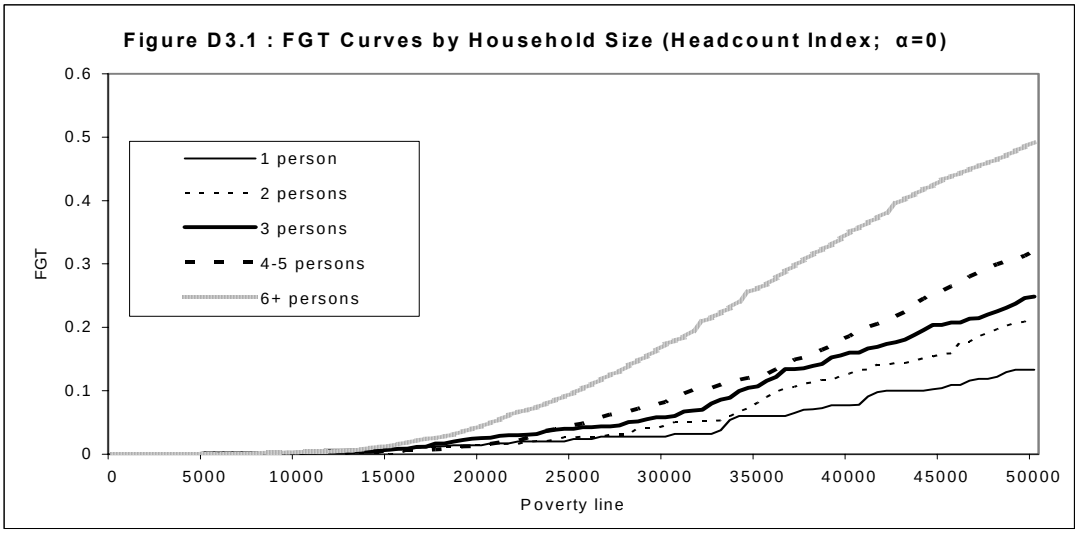


Figure D3.2 : FGT Curves by Household Size (Poverty Gap; α=1)

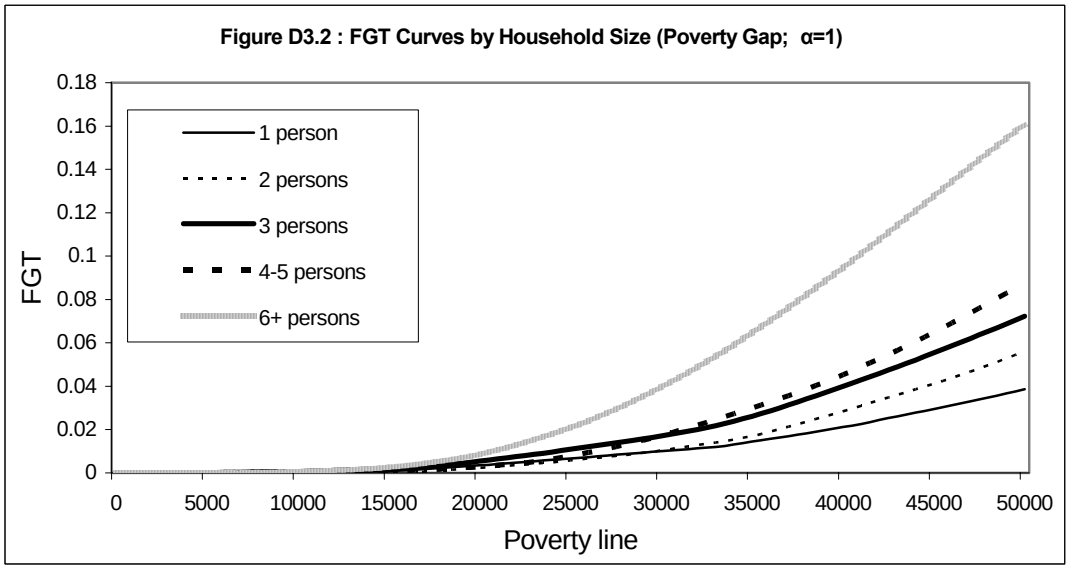
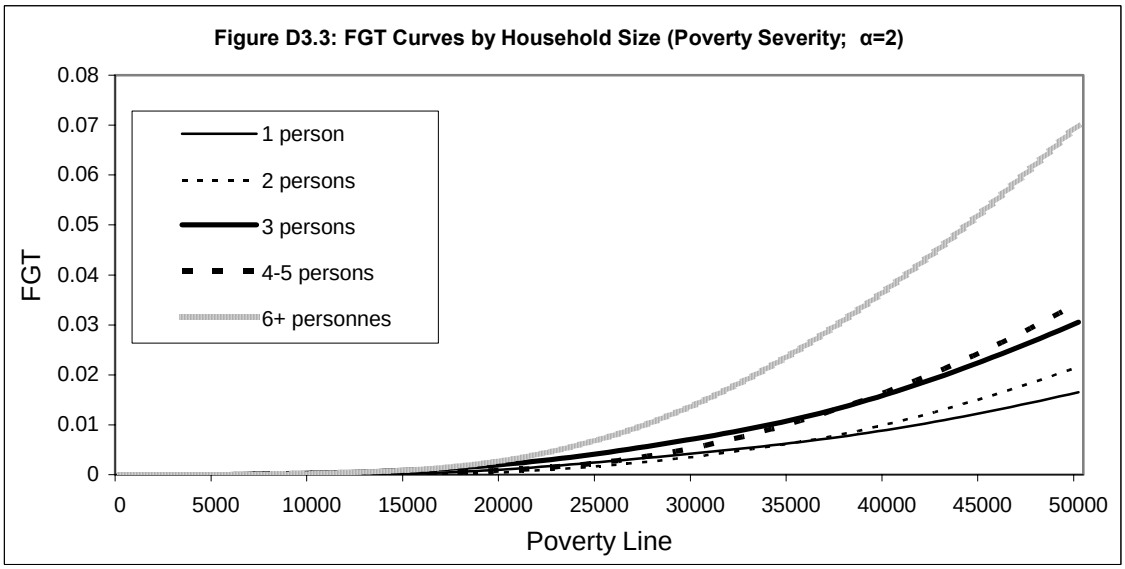


Figure D3.3: FGT Curves by Household Size (Poverty Severity; α=2)



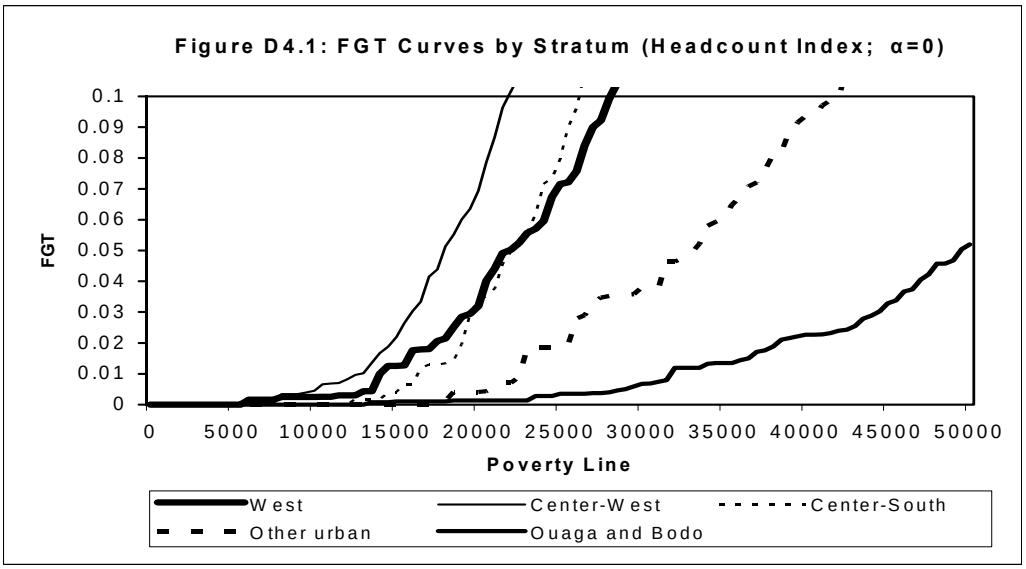


Figure D4.1: FGT Curves by Stratum (Headcount Index; α=0)
FGT
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0 5000 10000 15000 20000 25000 30000 35000 40000 45000 50000
Poverty Line
West
Center-West
Center-South
Other urban
Ouaga and Bodo

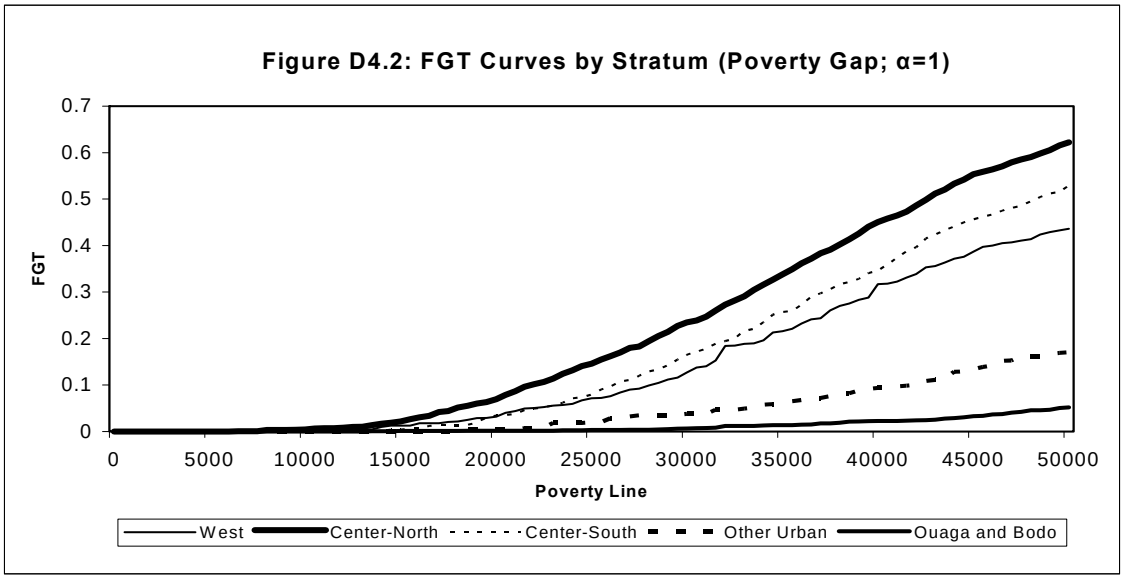


Figure D4.2: FGT Curves by Stratum (Poverty Gap; α=1)
FGT
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0 5000 10000 15000 20000 25000 30000 35000 40000 45000 50000
Poverty Line
West
Center-North
Center-South
Other Urban
Ouaga and Bodo

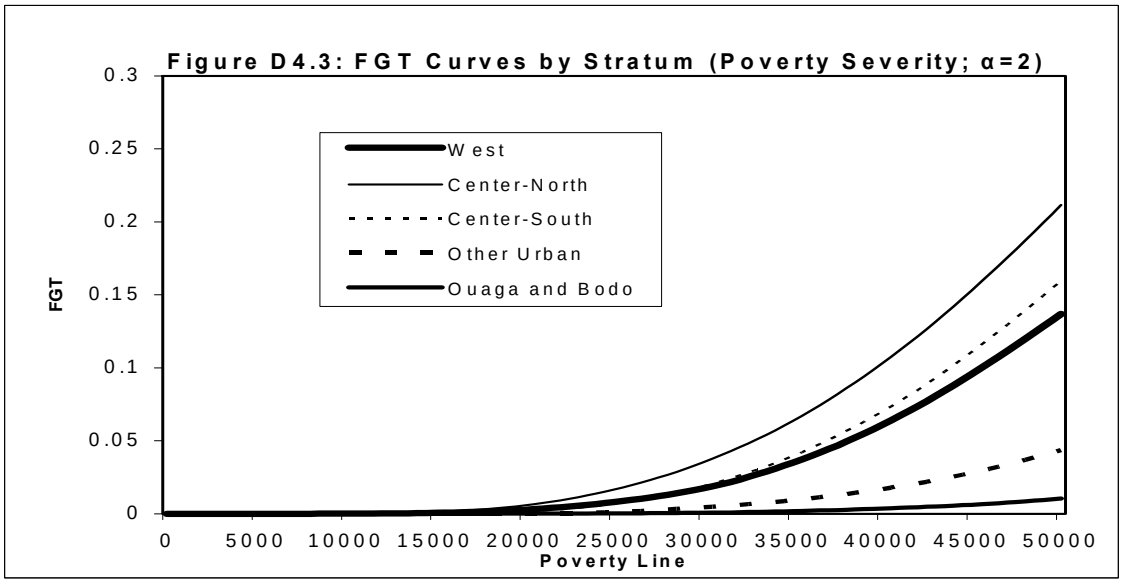


Figure D4.3: FGT Curves by Stratum (Poverty Severity; α=2)
FGT
0.3
0.25
0.2
0.15
0.1
0.05
0
0 5000 10000 15000 20000 25000 30000 35000 40000 45000 50000
Poverty Line
West
Center-North
Center-South
Other Urban
Ouaga and Bodo

Figure D5.1: FGT Curves by Socio-Economic Group (Headcount Index; α=0)

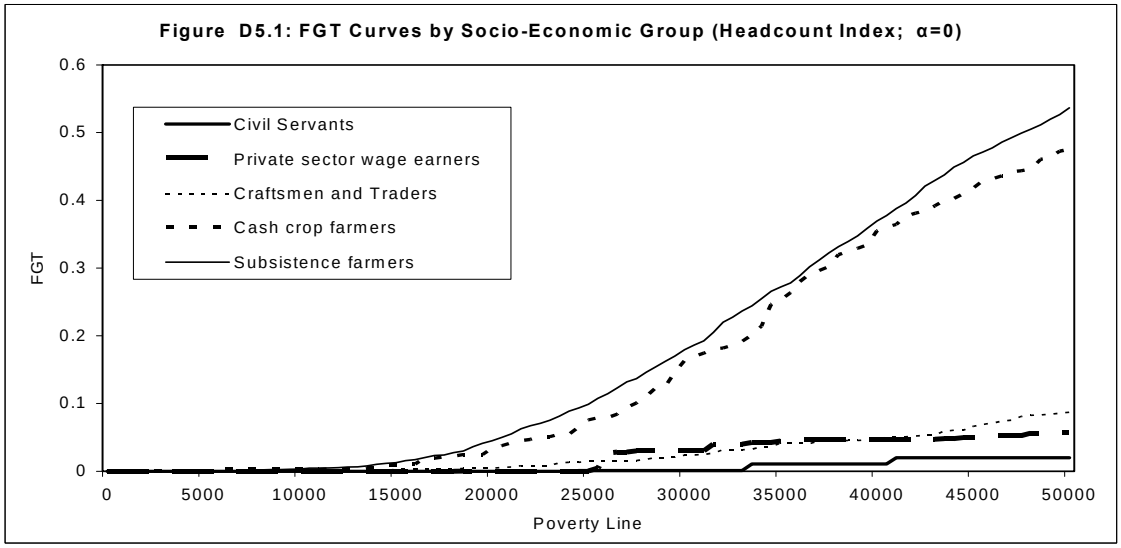


Figure D5.2: FGT Curves by Socio-Economic Group (Poverty Gap; α=1)

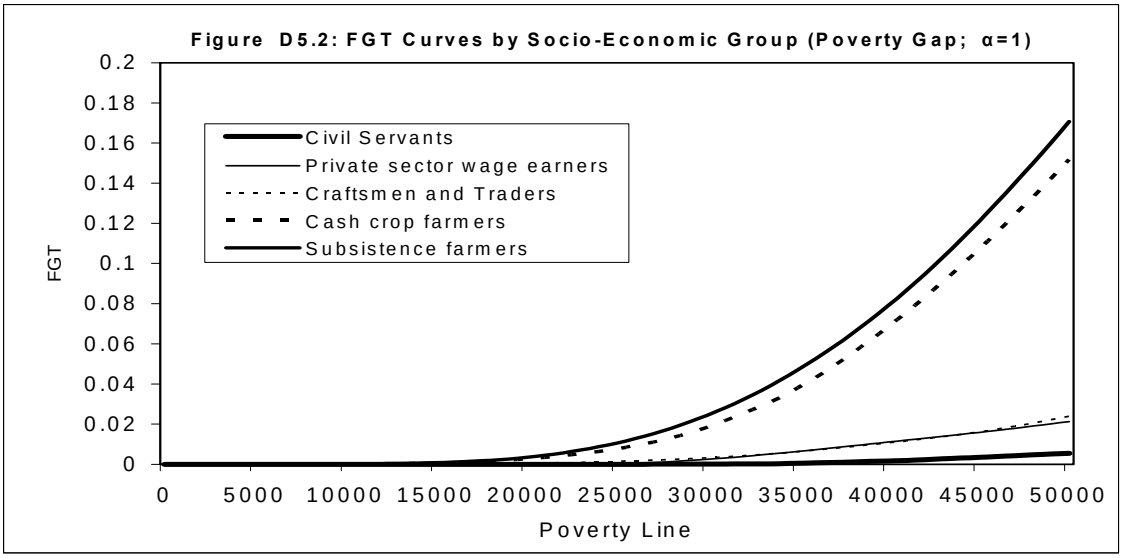


Figure D5.3: FGT Curves by Socio-Economic Group (Poverty Severity; α=2)

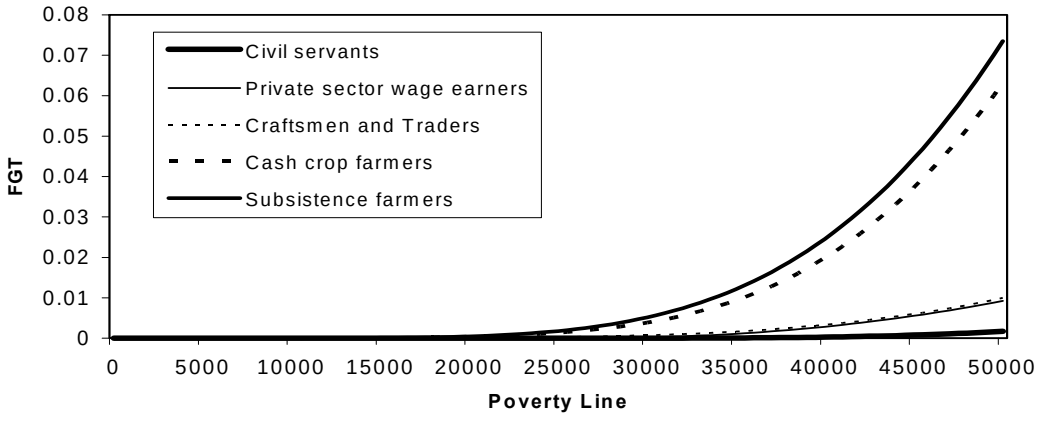


Figure E1: CPG Curves for Different Living Standards Measures

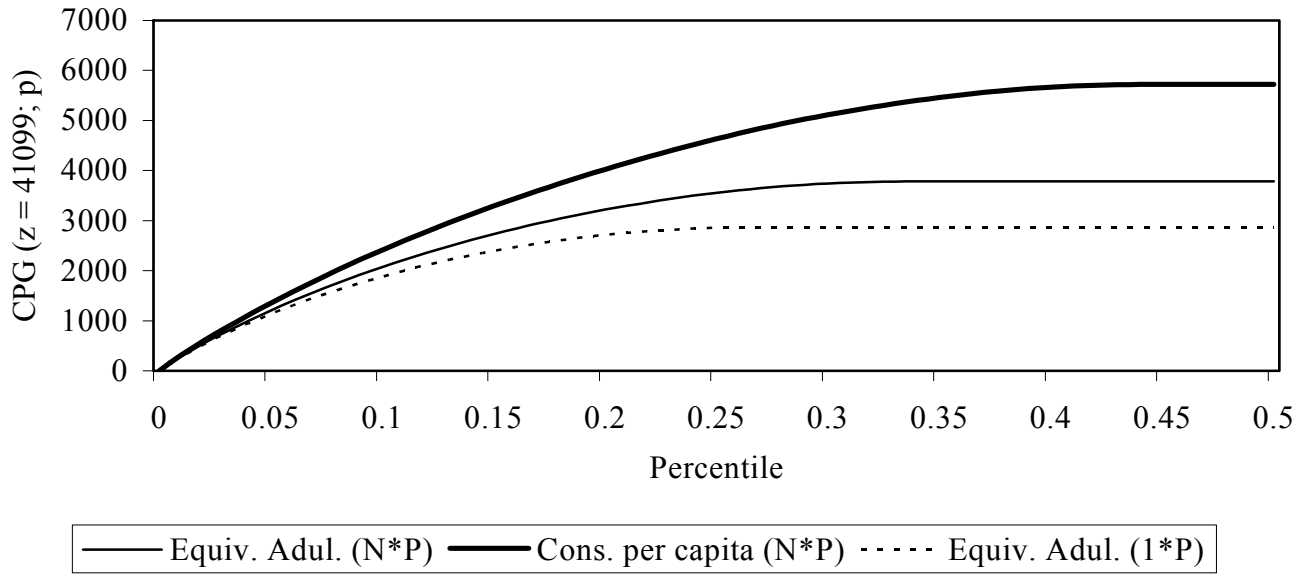


Figure E2 : CPG Curves for Different Strata