Fambon, Samuel

Conference Paper

Inequality in the Distribution of Household Expenditure in Cameroon

Proceedings of the German Development Economics Conference, Frankfurt a.M. 2009, No. 43

Provided in cooperation with:
Verein für Socialpolitik

Suggested citation: Fambon, Samuel (2009) : Inequality in the Distribution of Household Expenditure in Cameroon, Proceedings of the German Development Economics Conference, Frankfurt a.M. 2009, No. 43, http://hdl.handle.net/10419/40245

Annual International Conference of *Development Economics*
Organized by
The University of Frankfurt and the German Development Bank, KfW
Frankfurt Main, Germany
June 26-27, 2009

Inequality in the Distribution of Household Expenditure in Cameroon[1]

Samuel Fambon
FSEG University of Yaoundé II- Cameroon
Email :sfambon@yahoo.fr
or fambonsamuel@yahoo.com
Tel : (cel.) (237) 9987 43 10

2ND DRAFT APRIL, 2009

Abstract

In the literature, it is generally accepted that consumption is a more appropriate welfare measure than household income or salaries. This paper aims to investigate the evolution of expenditure inequality in Cameroon over the 1984-1996 period, with the help of Lorenz Curves, the Gini coefficient, and two entropy measures of inequality. Total expenditure inequality is decomposed into the within-groups and between-groups components using Theil's decomposition techniques and household expenditure data derived from the 1984 and 1996 National household surveys (i.e. the 1983/1984 Household Consumption Budget (EBC) survey, and the 1996 Cameroonian Household Survey (ECAM1)). Decompositions are carried out according to the residence area (rural, semi-urban, and urban), stratum, age, educational level and the gender of the household head. Policy implications are discussed.

Keywords: Inequality, Expenditure, Decomposition, Household Surveys, Cameroon.

[1] This research is part of Collaborative Project on "Poverty, Income Distribution, and Labor Market in Sub Saharan African Countries" supported by the African Economic Research Consortium (AERC). I would like to sincerely thank the AERC for funding and providing the technical support for the collaborative study. I am grateful to Prof. Erik Thorbecke, Prof. Jean Yves Duclos. Prof. David Sahn, Prof. Germano Mwabu, and Dr. Karim for useful comments on our final collaborative research report. The usual disclaimer applies

1. Introduction

The aim of this paper is to explore the determinants of inequality in Cameroon. The study uses Theil's inequality decomposition techniques. Decomposition itself is performed with the household expenditure data derived from the 1983/1984 Household Consumption Budget (EBC) survey, and the 1996 Cameroonian Household Survey (ECAM1) conducted by Cameroon's Division of Statistics and National Accounting (DSCN). Several factors are assumed to have affected income inequality in the country. In effect, since urban inequality is usually higher than rural inequality, a higher level of urbanization is likely to lead to a higher level of inequality in total income. Therefore, the urban/rural disparity should have a significant impact on income inequality. For similar reasons, a larger proportion of well-educated groups of individuals may also cause higher inequality in total income, if it is assumed that income inequalities within these better educated groups are higher than those of the other groups. Greater income disparities between well-educated groups and other groups may also increase the level of total inequality. In addition to these factors, age distribution, inter-regional income disparities, and gender inequality may also impact upon the total level of inequality. In decomposing income inequality in Cameroon, the above factors are examined in succession.

The rest of the paper is organized as follows. Section 2 examines the measurement and decomposition of income inequality and presents several inequality measures used in the study. In Section 3 we describe the data sets. Section 4 presents the results of the analysis of inequality trends in Cameroon during the 1984-1996 period, and Section 5 concludes the study and discusses the policy implications of these findings.

2. Problems and Methods Linked to the Decomposition of Income Inequality.

When measuring income inequality, one must first choose the level at which inequality should be measured[2]. In other words, should inequality be measured among households or among individuals? In view of the fact that a large amount of sharing is assumed to take place among household members, it is appropriate to choose the individual as the measuring unit under the assumption that household income is uniformly distributed among all household members. In this study however, the analytical unit is the household, since the only data available in the surveys were gathered at the household level.

The second choice to be made is probably the most difficult; and it proves to be the choice of an inequality measure for the one-dimensional characterization of an entire income distribution. Several inequality measures have been proposed in the literature for this purpose[3]. Following Sen (1973) and other authors, the inequality measures used in

[2] For more details, see Glewwe (1985)

[3] Several measures have been proposed in the literature to characterize inequality in the distribution of income. Kakwani (1980), Glewwe (1986), Fields (1980). Sen (1973) and other authors have proposed axioms which any synthetic, simple, and appropriate inequality measure must satisfy.

this study were selected by taking account of the fact that they satisfy the following five axioms: i) independence of the mean; ii) independence of population size; iii) the Pigou-Dalton sensitivity to transfers; iv) symmetry; and v) decomposability.

The independence of the mean condition is met when the multiplication of all incomes by a constant (k) leaves the inequality measure unchanged. The independence of population size condition is met if a decrease or an increase in the population of the same proportion throughout all classes does not affect the inequality measure. The Pigou-Dalton sensitivity to transfers is satisfied when an income transfer from a less poor to a poorer person entails a fall in the inequality measure without changing the relative rank of these persons. The symmetry property posits that the inequality measure must be independent of any characteristics linked to individuals other than their income. Decomposability often means total inequality can be expressed as the sum of two components, namely, between-groups inequality and within-groups inequality. Groups become identified with categories of households defined on the basis of differentiation criteria that may be geographic (regions or ecological areas) or socio-economic (household head's educational level, age, gender, household size, etc). Decomposition can also take the form of decomposability through income sources or income derived exclusively from salaries[4].

Among the inequality measures generally used in the literature which not only satisfy the above axioms, but are also « consistent » in Lorenz's sense, we can mention the Gini coefficient (G), Theil's two measures of entropy, and the coefficient of variation (Fields, 1997). In this respect, we will use the Gini coefficient (G) and Theil's two entropy measures of inequality. In addition to the latter three measures, we will also carry out stochastic dominance analysis and illustrate changes in inequality graphically by means of Lorenz curves.

The Lorenz Curve

For a simple illustration of inequality, we use the Lorenz curve which is not in itself a numerical index of inequality, but which clearly shows how such indices are derived.

The Lorenz curve is the graphical representation of the *L(p)* function which yields the cumulative percentage of the living standards (expenditure per adult equivalents) of a proportion *p* of the population, when individuals are ranked in increasing order according to their own living standard (total expenditure per adult equivalent). The Lorenz curve is defined as follows:

$$L(p) = \frac{1}{\mu}\int_0^p Q(p)\,dq \qquad (1)$$

[4] For more details, see Glewwe (1985).

where, μ is the average standard of living (total expenditure per adult equivalent/income), and $Q(p)$ the q quintile of the living standard distribution[5]. The Lorenz curve is increasing and convex in p .

The Lorenz curve is plotted graphically in a square whose dimension is equal to unity[6]. In a completely egalitarian society where each individual's total expenditure is identical to others, the Lorenz curve would coincide with the perfect 45° equality diagonal line *p*. In contrast, if a single individual enjoys all of society's income or performs all of society's total expenditure, the Lorenz curve would pass through the coordinate points (0, 0), (1, 0) and (1, 1) (i.e. a situation of perfect inequality). Moreover, the Lorenz curve always lies below the principal diagonal and its distance relative to the perfect equality line *p-L(p)* measures the gap between the proportion of the living standard enjoyed by *100p%*. Furthermore, when the Lorenz curve of distribution B lies entirely below another Lorenz curve of distribution A, distribution A dominates distribution B in Lorenz's sense, i.e. distribution A is more egalitarian than distribution B. In fact, this means that it is possible to go from distribution A to distribution B (assuming that their means are equal) by transferring the income of the poor to the rich.

This ranking criterion is not complete however. The fact is that when the Lorenz curves of both total expenditure distributions intersect, nothing can be said about the dominance of distribution A relative to distribution B and vice versa; consequently, it cannot be said that a distribution is more egalitarian than another without making additional assumptions about the manner in which equality at different points of the income distribution is evaluated..

This incomplete ranking of income distributions by means of Lorenz curves has led to the development of a summary inequality index that is used to compare two distributions.

The Gini Coefficient

The Gini coefficient (G) is an inequality index linked to the Lorenz curve, and it is expressed mathematically as follows :

$$G = \int_0^1 \left(1 - L(p)\right) dp \qquad (2)$$

---

[5] If we assume that the cumulative distribution function of living standards, $F(y)$, is strictly increasing in y, and if p is a real number varying between 0 et 1, the *quintile,* $Q(p)$, is defined such that $F\left(Q(p)\right)$ is equal to p , or by using the inverse of the cumulative distribution function*:* $Q(p) = F^{-1}(p)$. $Q(p)$ therefore represents the living standard below which lies proportion p of the population.

[6] The horizontal axis represents the proportion of the population ranked in increasing order of income or expenditure from the lowest to the highest level of income or expenditure, while the vertical axis reports the cumulative proportion of total expenditure incurred by this stratum of the population.

or, $G = \frac{1}{2n^2\mu}\sum_i\sum_j |y_i - y_j|$ (3)

where, μ is the mean income of the population, and y_i and y_j, the incomes of individuals i and j. The Gini index computes the average distance between the cumulative classes of the population and the cumulative living standards. It is equal to twice the area lying between the Lorenz curve and the perfect equality line. The Gini coefficient varies from 0 to unity, and when it is equal to zero, every individual in the population has the same level of income, thus indicating the absence of inequalities or a situation of perfect equality. In contrast, when the Gini coefficient is equal to unity, the implication is that a single individual monopolizes all of society's income, while everybody else gets nothing, thus indicating a situation of perfect inequality[7].

Entropy Indices

The two measures selected for the decomposition of inequality are Theil's entropy measures, the first being $GE(0)$ and the second, $GE(1)$. They belong to the extended class of measures known as general entropy measures $GE(\theta)$ defined as follows:

$$GE(\theta) = \frac{1}{\theta^2 - \theta}\left[\frac{1}{n}\sum_i^n \left(\frac{y_i}{\mu}\right)^\theta - 1\right] \quad (4)$$

where n is the number of individuals in the sample, θ the aversion parameter for inequality, y_i the income of individual i, $i = 1, 2, 3, ..., n$, and μ the arithmetic mean of income[8].

When $\theta = 0$ or $\theta = 1$, we obtain both of Theil's inequality measures, namely, the deviation of the logarithmic mean $GE(0)$, and Theil's index $GE(1)$, given respectively by the following expressions:

$$GE(0) = \frac{1}{n}\sum_{i=1}^n \log\left(\frac{\mu}{y_i}\right) \quad (5)$$

[7]The standard Gini gives equal importance to different gaps between the individuals in a given population. However, it is possible to use other types of weights in accordance with social preferences to aggregate the distance $P - L(p)$ by using the generalized Gini index. The latter uses a weight function which depends on the so-called « ethical » parameter, ρ. The different values of ρ define a class of indices known as S-Gini (for more details, see Duclos and Araar (2006): Poverty and Equity: Measurement, Policy and Estimation with *DAD).*

[8] The generalized entropy (GE) measure varies from 0 to ∞. When $GE(\theta) = 0$, we have an equal income distribution, meaning that all incomes are identical. Higher values of $GE(\theta)$ represent higher levels of inequality.

$$\mu = \left(\frac{1}{n}\right)\sum y_i$$

$$GE(1) = \frac{1}{n}\sum_{i=1}^{n}\frac{y_i}{\bar{y}}\log\left(\frac{y_i}{\mu}\right) \qquad (6)$$

Static Decomposition of the Entropy Index

Both the preceding inequality measures are decomposable into groups which is very useful to our study. In effect, inequality measures that are decomposable into groups have the advantage that they can be used to divide overall inequality into inequalities within different groups and inequalities between these groups. For instance, it is possible the calculate the percentage overall inequality in Cameroon attributable to disparities in average expenditures between the urban, semi-urban and rural areas. This calculation makes it possible to identify the potential impact on overall inequality of the strategies designed to reduce disparities between these three areas. If inequalities between these areas are negligible (e.g. lower than 5%), the strategies designed for the sole objective of reducing differences in living standards between these areas will have but a negligible impact on the whole distribution of living standards, and hence, no significant effect on the level of equity. By contrast, significant inequality contributions from one group to another (e.g. from 20% onward), indicate that it is possible to promote greater equity in Cameroon by reducing regional disparities.

Decomposition of inequality by groups requires that the population be divided into groups or sectors, and that this remains valid if the inequality measure for the whole population may expressed as a weighted average of the same measure for the different groups (within-groups component), the more the inequality measure for all the population in which each member receives the average income of his group (between-groups component). The weight of the within-groups component may be the share of the population (strict decomposablity) or the shares of the incomes of respective groups (limited decomposability). Decomposability of the source (which will not be dealt with in the present study owing to lack of reliable data) does not divide the population into several groups. It does however divide everybody's income into several sources (e.g., farm and on farm income). In this case, overall inequality might be divided into a weighted sum of inequality by income sources, taking into consideration, implicitly or explicitly, the covariance between the sources if income. For group decomposition in this study, we use the GE (θ)-class of generalized entropy measures. More precisely, if I is overall inequality in a given population, general entropy measure of inequality may be expressed as the sum of between-groups inequality (I_b) and within-groups-inequality (I_w)[9]. Assuming that it is possible to break down the population into mutually

[9] The between –groups inequality component (I_b) is captured by the first term in the right-hand side (RHS) of equation (7). This represents inequality in consumption between sub-groups and reflects what the level of inequality in the population would be if everyone within each sub-group had the same (i.e., the group's average) consumption level μ. The second term of the RHS of the equation reflects within-groups inequality (I_w) or what the overall inequality level would be if there were no differences in average

exclusive K sub-groups $k = 1, 2, 3, ..., K$, a GE inequality index $I(\theta)$ is then written as follows:

$$I(\theta) = GE(\theta) = \sum_{k=1}^{K} \phi(k) \left[\frac{\mu(k)}{\mu} \right]_{\theta} I(k;\theta) + I_b(\theta) = I_w + I_b \qquad (7)$$

where $\phi(k)$ is the share of population in sub-group k, and $I(k;\theta)$ its inequality measure. The first term of the decomposition can be considered as the weighted sum of within-groups inequalities. The term $\phi(k)\frac{\mu(k)}{\mu} I(k;\theta)$ can be interpreted as the absolute contribution of sub-group k to total inequality. $I_b(\theta)$ represents overall inequality if within-groups inequality is eliminated (i.e. if each individuals in sub-group k has the mean income of his own sub-group): it can be interpreted as the contribution of between-groups inequality to overall inequality.

It is often easier to obtain a synthetic inequality indicator by using the ratio of I_b to I. Let R_b be this indicator, then $R_b = \frac{I_b}{I}$ or $R_b = \frac{I_b(\theta)}{I(\theta)}$. This indicator measures the share of inequality explained by between-groups inequalities.

3. Data Sources and Choice of the Welfare Indicator

The data used to perform the decomposition of Theil's inequality measures, are derived from the Consumption Budget Survey (EBC), and from the Cameroonian Household Survey (ECAMI) conducted respectively in 1983/84 and 1996 by the Division of Statistics and National Accounting (DSCN) of Cameroon.

The 1983/84 EBC survey covered all of Cameroon's national territory and comprised a sample of about 6000 households. However, survey data were effectively gathered and compiled from only 5474 household questionnaires. The survey used a 4-degree sampling plan. At the first degree, the primary units drawn in proportion to population size were administrative districts. At the second degree, the drawing was based on counting areas proportionally to the number of segments or sub-areas selected independently in the urban and rural areas of each district chosen in the first degree. At the third degree, the operation consisted of carrying out an equiprobable drawing of a segment or sub-area in some units of the second degree whose sizes exceeded a certain threshold. At the fourth degree finally, the selection concerned households from the new files obtained during the updating operation.

---

consumption across groups, while there were inequality within each group. Overall inequality therefore is the sum of (I_b) and (I_w).

On the other hand, the ECAMI survey is a national survey whose sample comprises about 12 000 households selected randomly by a two-step probability in urban regions, and three-step probability in rural regions.

Studies, of the distribution of welfare are concerned with inequality. However, since welfare is not directly observable, a closely related variable, which may reasonably serve as a good welfare proxy, must be chosen. By referring to the standard argument of microeconomic theory, we can maintain that, ceteris paribus, the level of an individual's welfare is determined by his life-cycle income, or permanent income. Given that current consumption is usually considered as a better proxy for life- cycle income than current income, it may be used as a measure of current welfare (Sen (1976), Deaton (1980)). Obviously, this does not mean that individual consumption does not fluctuate over time. Consumption fluctuates and sometimes does so substantially, since consumption needs are not uniformly distributed over the life cycle, and since capital markets are far from being perfect, notably, so far as poor households are concerned, owing to the fact that they often borrow money for current consumption. In this last case, current consumption may be considered as a better proxy for life-cycle income than current income. For that reason, the present paper deals with inequality in the the context of the distribution of consumption expenditure.

Given that households have different sizes in the number of children and adults, we use the distribution of total consumption expenditure per adult equivalent to measure inequality. The adult equivalent scale used by the DSCN is 1 for each adult and 0.5 for each child. Several adjustments were made in the initial data before estimating inequality indices, notably, by deflating the value of the 1984-consumption expenditure with constant 1996 base-year prices.

4. Inequality Measurement and Decomposition Results

4. 1. Changes in Inequality Expenditure in Cameroon between 1984 and 1996

Before presenting the decomposition of the inequality index, it is opportune to note that total household real expenditure per adult equivalent decreased by nearly 40 % in Cameroon between 1984 and 1996, thus depicting the same downward trend as the negative GDP growth rate witnessed by the country during the study period. Moreover, the values of the Gini coefficient and Theil's index, which were respectively equal to 0.42 and 0.297, indicating that Cameroon had quite an equal distribution of expenditures with respect to a country like Côte d'Ivoire with a slightly higher Gini coefficient of 0.44. Furthermore, regardless of the inequality measure used inequality in total expenditure per adult equivalent decreased over the 1984-1996 period.

Table 1: *Total Expenditure per Adult Equivalent and Inequality in Cameroon in 1984 and 1996*

	1983/84	1996	Change in (%)	Difference
Total real expenditure per adult equivalent (1996 prices)	903.71	573.08	-40	

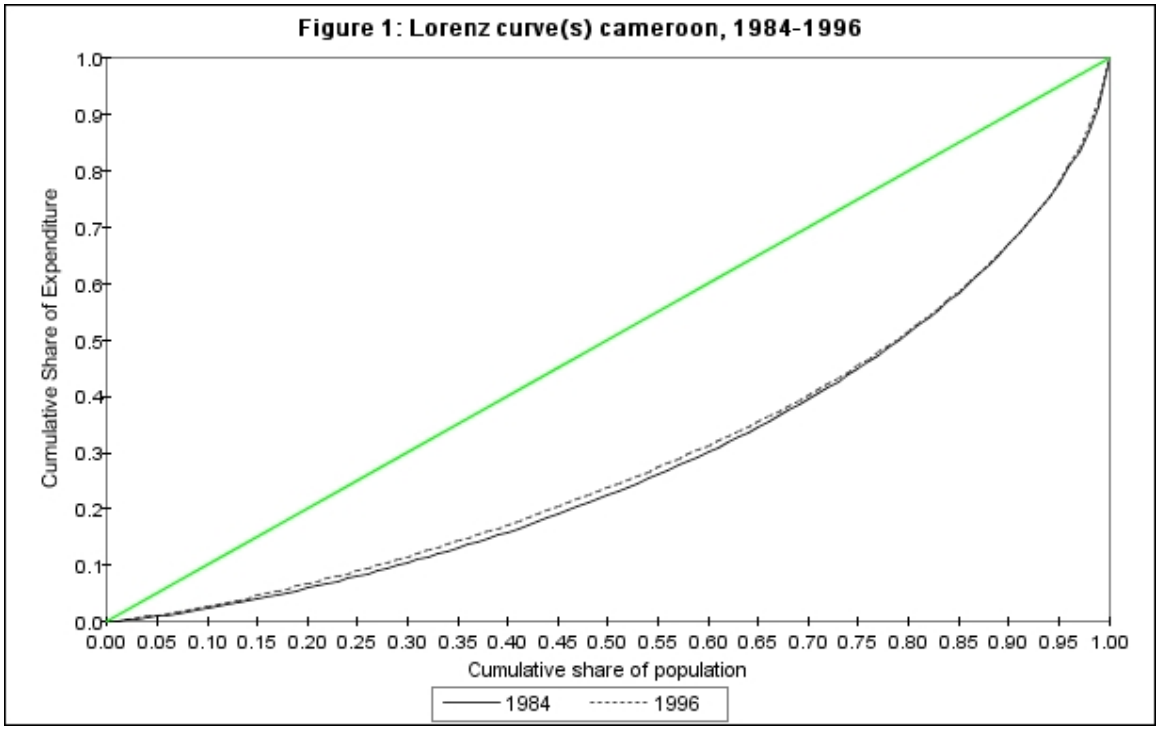
Gini coefficient	0.4224	0.4017	-4.9	-0.0206 (0.0058)
Theil's (GE(0))	0.2984 (0.0116)	0.2694 (0.0201)	-9.54	-0.0291 (0.0943)

***Notes** : 1-. Standards deviations are in parentheses*
2- For a 1983/84 bilateral test=1996, the critical value at the 5 % significance level for the statistic is 1.96.

Figure 1 below shows Lorenz curves for the national distribution of total expenditures per adult equivalent for the years 1984 and 1996. This graph indicates that the Lorenz curve for the 1996 total expenditure per adult equivalent lies everywhere above that of 1984. This result indicates that Cameroon witnessed a general improvement in living standards equality as measured by total expenditure per adult equivalent between 1984 and 1996.

.

If Lorenz curves intersect, then it is difficult to provide a definite opinion on an eventual increase or fall in expenditure inequality. In the present case, the 1996-Lorenz curve always lies above that of 1984, which implies that the fall in inequality that occurred in Cameroon between 1984 and 1996 was robust[10].



4.2. Changes in Inequality According to Residence Area between 1984 and 1996

The data in Table 2 below present the results of Gini coefficient and entropy-class measures for Cameroon, and the three residence areas (i.e. urban, semi-urban, and rural)

[10] Note that using Lorenz curves to compare changes in inequality between different groups over the 1984-1996 period, it is necessary to plot the Lorenz curves for these two years on the same diagram.

of the country. The examination of Table 2 shows that total inequality expenditure captures by Gini coefficient for the whole Cameroon was 42.2 % in 1984 and decreased slightly to 40.6 % by 1996. Otherwise, the values of entropy indices rise naturally with the increase in the aversion to inequality parameter θ, thus indicating more inequality.

Moreover, within-groups inequality is quite higher in the urban and semi-urban areas than in rural areas. Compared to inequality at the national level, the values of the three inequality indices generally indicate that inequality is less prevalent in the three areas than in the country as a whole

In addition, within-groups inequality among the three areas explains the largest share contribution to total inequality. Since a high percentage of inequality is attributed to within-groups inequality, efforts to reduce this type of inequality are likely to contribute more to total equality. This kind of information can provide an important guide for the design of policies that aim at the reduction of inequality and eventually, relative poverty.

The share of inequality attributable to differences in the means of total expenditures per adult equivalent in these three areas is less than 10%. The general conclusion to be drawn from these decompositions is that inequality between these three areas account for a small share contribution to total inequality. Additional comments can be made, but we only mention one. In fact, we note an increase in inequality contributions to the total expenditure distribution for the rural area, and a decrease in contributions for the semi-urban and urban areas between 1984 and 1996.

Table 2: *Decomposition of the Entropy Inequality Index by Residence Area of the Household Head (1984-1996)*

	$GE(0)$				$GE(1)$			
	1983/84	1996	Δ 1996-1983/84 [z-statistic]	%Δ 1996-1983/84	1983/84	1996	Δ 1996-1983/84 [z-statistic]	%Δ 1996-1983/84
Urban								
Average expenditure per adult equivalent	2833.59	1118.39		-60.5				
Gini	**0.3811**	**0.4136**		**0.0325**				
$GE(\alpha)_j$	0.2207 (0.0161)	0.2848 (0.0236)	0.0641	29	0.2782 (0.0331)	0.3091 (0.0334)	0.0309 (0.0470) [0.657]	11
relative Contribution	0.0828 (0.0062)	0.3114 (0.0273)			0.2007 (0.0218)	0.4720 (0.0323)		
Semi-urban								
Average expenditure per adult equivalent	1325.72	708.77		-46.5				
Gini	**0.3474**	**0.3532**		**0.0058**				
$GE(\alpha)_j$	0.2928 (0.0234)	0.2031 (0.0356)	-0.0897 (0.1392) [-0.644]	-31	0.3331 (0.0457)	0.2016 (0.0268)	-0.1315 (0.0529) [2.49]	-39
relative Contribution	0.1790 (0.0280)	0.0390 (0.0178)			0.1986 (0.0350)	0.0359 (0.0168)		
Rural								
Average	773.45	466.31		-39.7				

expenditure per adult equivalent								
Gini	**0.4135**	**0.2996**		**-0.1139**				
$GE(\alpha)_j$	0.2050 (0.0128)	0.1457 (0.0149)	-0.0593 (0.1200) [-0.494]	-29	0.2264 (0.0180)	0.1578 (0.0161)	-0.0685 (0.0241) [-2.84]	-30
Relative contribution	0.4847 (0.0331)	0.3536 (0.0479)			0.3466 (0.0374)	0.2287 (0.0448)		
Within-groups contribution	0.9243	0.9203	-0.0040		0.9109	0.9165	0.0056	
Between-groups contribution	0.0757 (0.0026)	0.0797 (0.0022)	0.0040		0.0891 (0.0030)	0.0835 (0.0017)	-0.0056	
Cameroon								
Gini	**0.4218**	**0.406**		**-0.0158**				
$GE(\alpha)_j$	0.2984 (0.0116)	0.2694 (0.0201)	-0.0291 (0.0943) [-0,309]	-10	0.3510 (0.0189)	0.3170 (0.0289)	-0.0340 (0.0345) [-0,986]	-10

Notes: *1. Standard errors in parentheses, z-statistics in brackets.*
2. For a two- tailed test of 1983/84=1996, the 5% critical value for the z-statistic is 1.96. For a one- tailed test of 1996>1983/84, the 5% critical value for the z-statistic is 1.65.
3. Calculations of the author using expenditure data drawn from the 1983/84 EBC survey and the 1983/1996 ECAM1 survey conducted by the National Institute of Statistics (NIS) of Cameroon and the DSCN.

Figures 2, 3 and 4 present stochastic dominance analysis for the three residence areas. Examination of the 1984 and 1996-Lorenz curves for each area shows that for the semi-urban and rural areas, the 1984-Lorenz curve lies everywhere below that of 1996. This result thus makes it possible to confirm the sharp fall in total expenditure per adult equivalent and the results arrived at for the inequality indices of these areas between 1984 and 1996. On the other hand, the Lorenz curves of urban areas (see Figure 2 below) rather show a net increase in inequality in this area between 1984 and 1996. Indeed, the the 1984-Lorenz curve lies everywhere above that of 1996. This result also confirms the rise in inequality previously obtained in this area with both of Theil's indices.

Figure 2 : Lorenz curves Urban 1984-1996

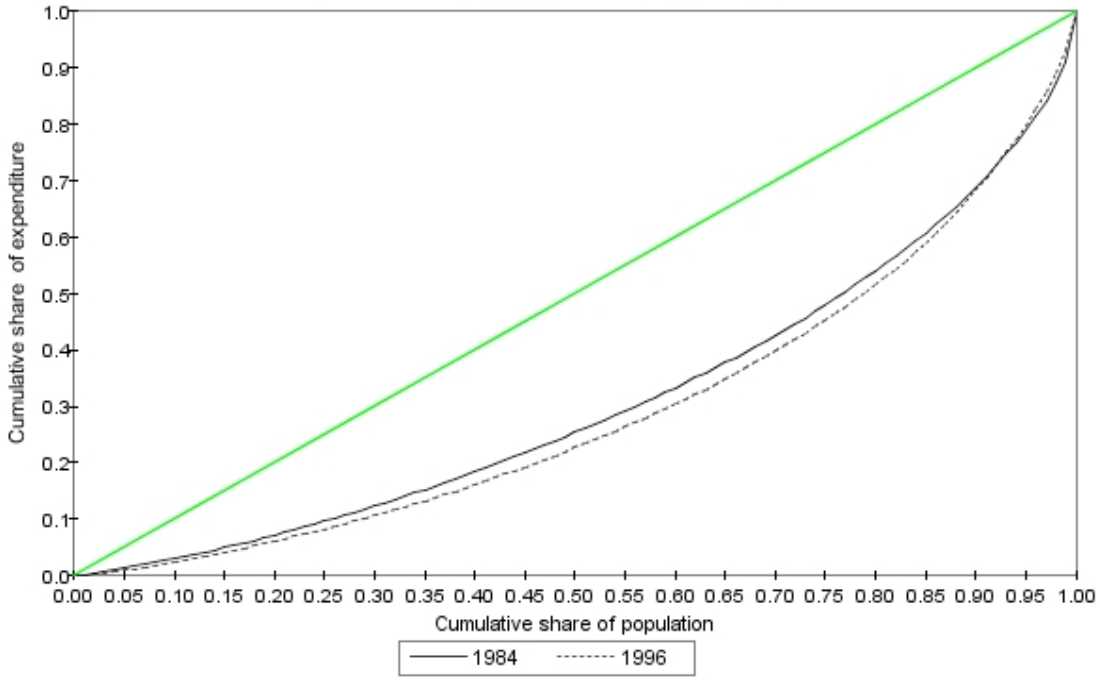
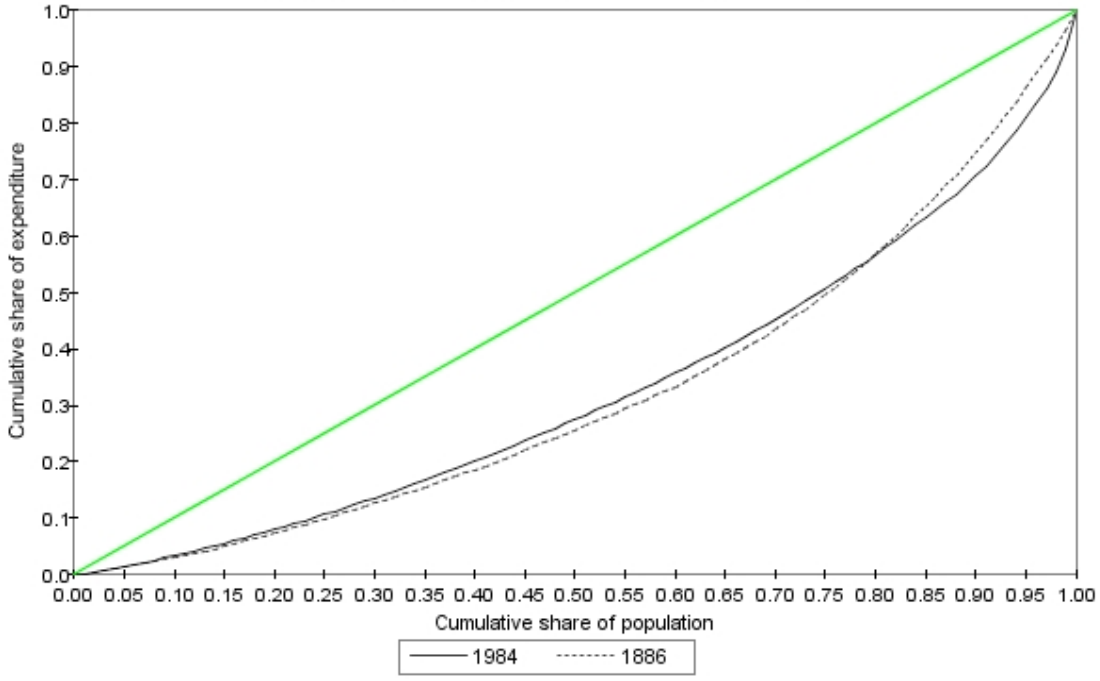
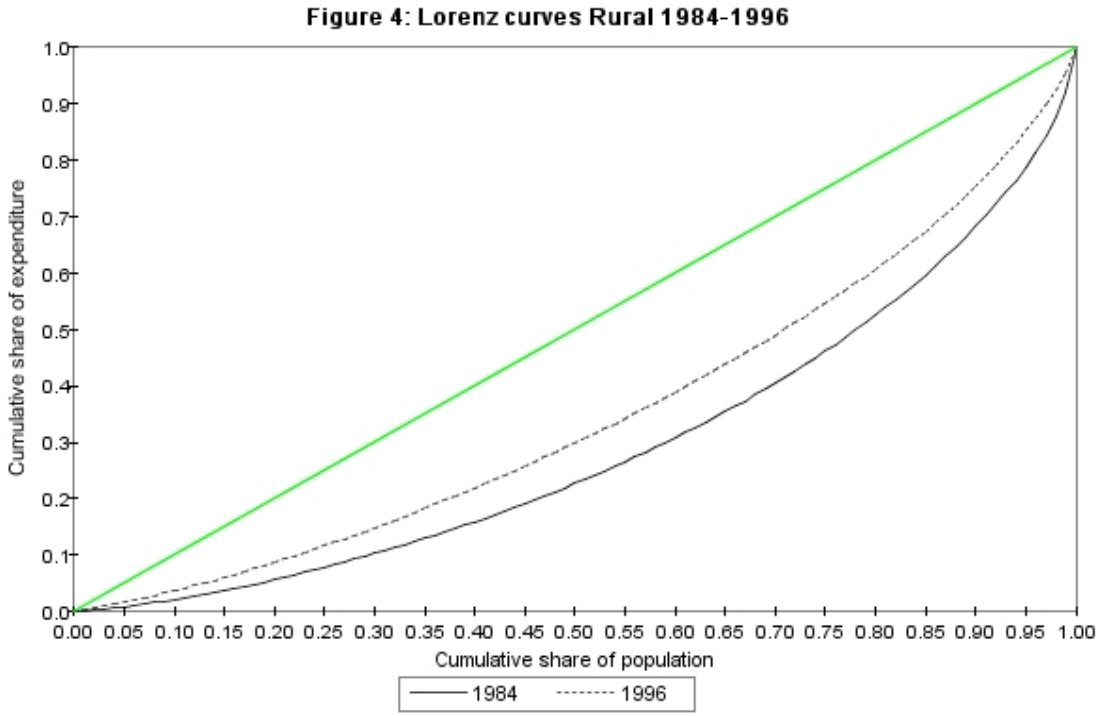


Figure 3: Lorenz curves Semi-Urban 1984-1996





4.3. Changes in Inequality According to Stratum between 1984 and 1996

Trends in the regional decomposition of inequality are captured both by the Gini Coefficient and the class of entropy indices presented in Table 3 below, and which show that inequality increased in the big cities of Yaoundé and Douala, and decreased in the other regions of the country between 1984 and 1996. As noted by Baye and Fambon (2002), the higher inequality observed in urban areas is mainly attributable to the fact that most of the beneficiaries of the huge incomes derived from property, profitable businesses, and government and corporate employment live side by side with very poor people. In particular, this situation may be explained by the rapid urbanization, the limited rural jobs and absorption of migrant workers by urban areas, to which is partially attributed the responsibility of the economic crisis which hit the country from the late 80s to the early 90s, and whose effect was the acceleration of the exodus of a large number of rural poor job-seekers towards large urban centers.

The decomposition of changes in overall inequality into within-regions and between-regions components reveals that the within-regions contributions to inequality unquestionably explain the reduction in inequality during the 1984- 1996 period, with contributions of -106%, - 95.8 %, and – 85.3% for the respective values of the parameter θ. For $\theta = 0$, the within-regions component displayed a trend slowing down the reduction observed in the overall national inequality, with a contribution of 6.9% to changes in the latter. This trend of the within-regions inequality component to slow down the reduction in inequality at the national level vanished when the parameter of aversion to inequality took on values reflecting the lower segments of the living standards distribution.

Table 3: *Decomposition of the Entropy Inequality Index by Residence Stratum of the Household Head (1983/84-1996)*

	$GE(0)$				$GE(1)$			
	1983/84	1996	Δ 1996-1983/84 [z-statistic]	%Δ 1996-1983/84	1983/84	1996	Δ 1996-1983/84 [z-statistic]	%Δ 1996-1983/84
Yaoundé								
Average expenditure per adult equivalent	1121.35	1128.07		0.60				
Gini	**0.3564**	**0.4485**		**0.0921**				
$GE(\alpha)_j$	0.2429 (0.0243)	0.3312 (0.0710)	0.0883	36	0.3190 (0.0579)	0.4060 (0.1116)	0.0870 (0.1257) [0.692]	27
Relative Contribution	0.0446 (0.0049)	0.0872 (0.0191)			0.1154 (0.0214)	0.1524 (0.0482)		
Douala								
Average expenditure per adult equivalent	824.34	1252.90		52				
Gini	**0.3917**	**0.4392**		**0.0475**				
$GE(\alpha)_j$	0.1988 (0.0210)	0.3385 (0.0292)	0.1398	70	0.2366 (0.0299)	0.3215 (0.0294)	0.0849 (0.0420) [2.02]	36
Relative Contribution	0.0381 (0.0037)	0.1213 (0.0207)			0.0851 (0.0118)	0.1902 (0.0296)		
Autres Villes								
Average expenditure per adult equivalent	904.77	962.61		6.4				
Gini	**0.3764**	**0.3422**		**-0.0342**				
$GE(\alpha)_j$	0.2928 (0.0234)	0.1944 (0.0197)	-0.0985 (0.1392) [[0.7076]	-34	0.3331 (0.0457)	0.2032 (0.0204)	-0.1299 (0.0500) [2.60]	-39
Relative Contribution	0.1790 (0.0280)	0.0917 (0.0145)			0.1986 (0.0350)	0.1138 (0.0209)		
Rural Forêt								
Average expenditure per adult equivalent	994.79	471.70		-52.6				
Gini	**0.3374**	**0.2784**		**-0.059**				
$GE(\alpha)_j$	0.1727 (0.0158)	0.1238 (0.0175)	-0.0489 (0.1133) [-0.4316]	-28	0.1839 (0.0189)	0.1323 (0.0198)	-0.0516 (0.0274) [-1.89]	-28
Relative Contribution	0.0911 (0.0129)	0.0849 (0.0099)			0.0677 (0.0115)	0.0521 (0.0086)		
Rural Hauts Plateaux								
Average expenditure per adult equivalent	3044.22	549.01		-82				
Gini	**0.3811**	**0.3185**		**-0.0626**				
$GE(\alpha)_j$								
Relative Contribution	0.2272 (0.0236)	0.1645 (0.0276)	-0.0627 (0.1488) [-0.4214]	-28	0.2528 (0.0342)	0.1811 (0.0280)	-0.0717 (0.0442) [-1.62]	-28
Average expenditure per adult equivalent	0.0911 (0.0130)	0.1697 (0.0259)			0.1476 (0.0269)	0.1175 (0.0263)		
Rural Savane								
Average expenditure per adult equivalent	2630.43	524.98		-80				
Gini	**0.3474**	**0.3224**		**-0.025**				
$GE(\alpha)_j$	0.1992 (0.0222)	0.1715 (0.0276)	-0.0278	-14	0.2244 (0.0310)	0.1827 (0.0294)	-0.0418 (0.0427) [-0.098]	-19
Relative Contribution	0.1828 (0.0262)	0.1544 (0.0270)			0.1299 (0.0264)	0.1068 (0.0255)		
Within-groups	0.7771	0.9217	0.1438		0.9103	0.9153	0.005	

Contribution								
Between-groups Contribution	0.0763 (0.0027)	0.0783 (0.0038)	0.002		0.0897 (0.0030)	0.0847 (0.0032)	-0.005	
Cameroon								
Gini	**0.4218**	**0.406**		**-0.0158**				
$GE(\alpha)_j$	0.2984 (0.0116)	0.2694 (0.0201)	-0.0291 (0.0943) [-0,309]	-10	0.3510 (0.0189)	0.3170 (0.0289)	-0.0340 (0.0345) [-0,986]	-10

Notes *: 1. Standard errors are in parentheses, and z-statistics in brackets.*
2. For a two- tailed test of 1983/84=1996 the 5% critical value for the z-statistic is 1.96. For a one-tailed test of 1996>1983/84, the 5% critical value for the z-statistic is 1.65.
3. Calculations of the author, using expenditure data drawn from the 1983/84 EBC survey and the 1996 ECAM1 survey conducted by the National Institute of Statistics (NIS) of Cameroon and the DSCN.

Figures 5, 6, 7, 8, 9 and 19 present stochastic dominance analysis for the six strata. For the urban strata of Yaoundé and Douala, we may note that their Lorenz curves respectively show an increase in inequality between 1984 et 1996, since their 1984-Lorenz curves lie everywhere above those of 1996, thus confirming the results previously obtained with the Gini and Theil inequality indices for these strata. Conversely, in the strata of Autres villes, Forêt, Hauts-plateaux, and Savane, the comparison of the positions of Lorenz curves taken two at a time show a decrease in inequality in these strata over the study period. For all these strata, the 1984-Lorenz curves indeed lie everywhere below those of 1996. The fall in the Gini coefficient and Theil's indices previously obtained for these strata over the study period, conform to the respective positions of the Lorenz curves.

Figure 5: Lorenz curves Yaoundé 1984-1996

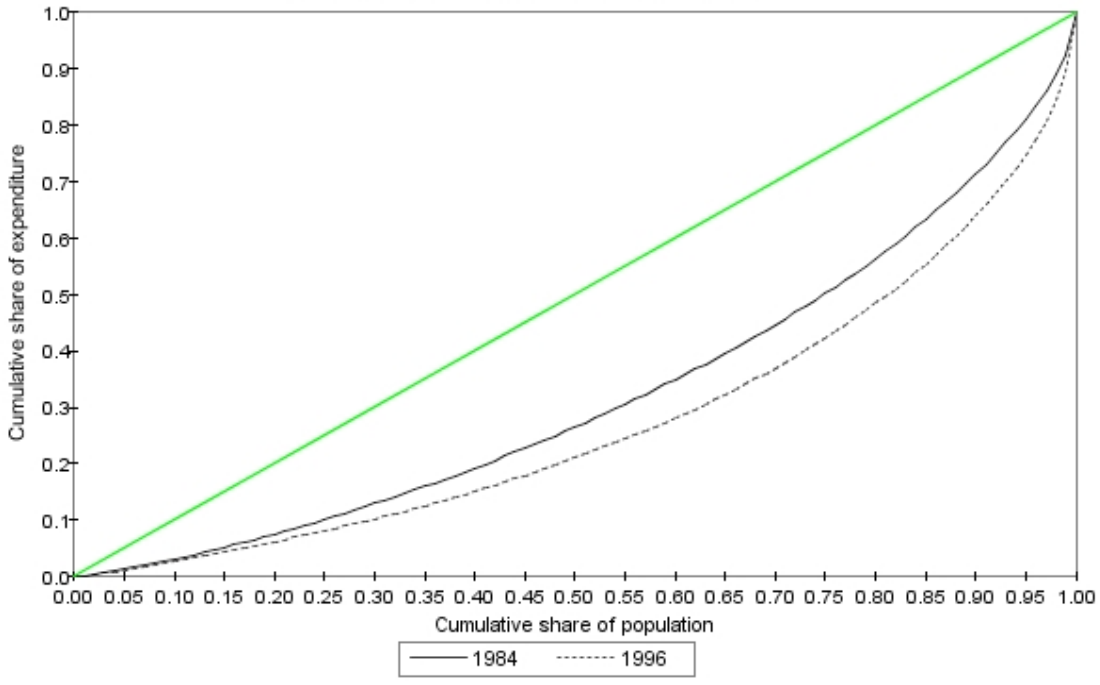


Figure 6: Lorenz curves Douala 1984-1996

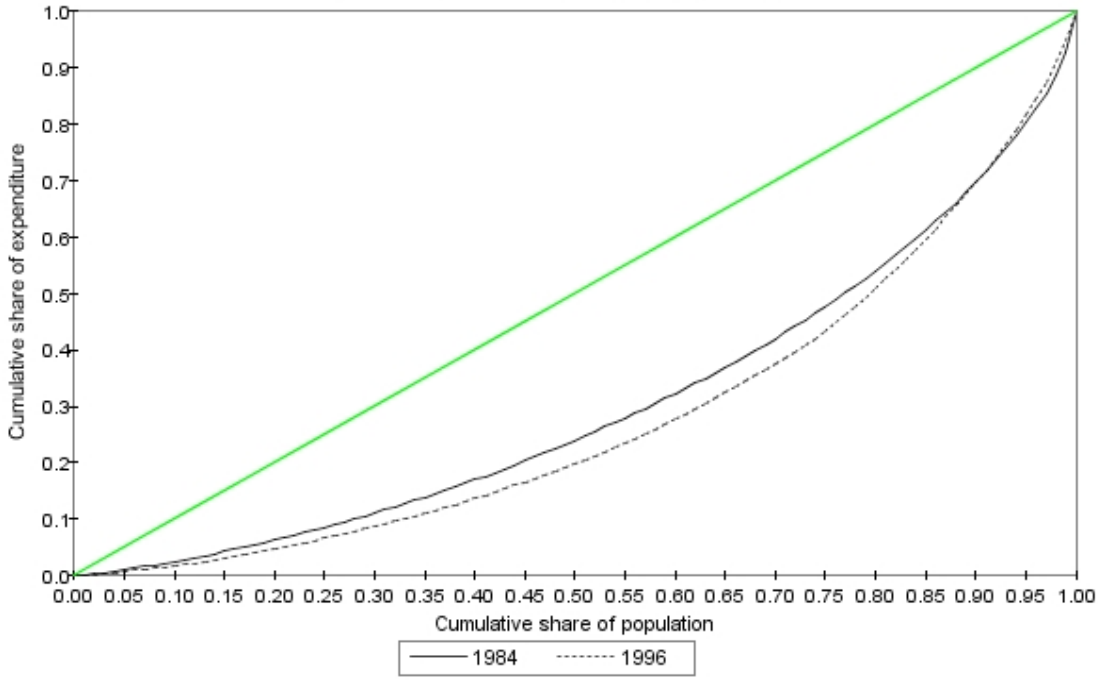


Figure 7: Lorenz curves Autres Villes 1984-1996

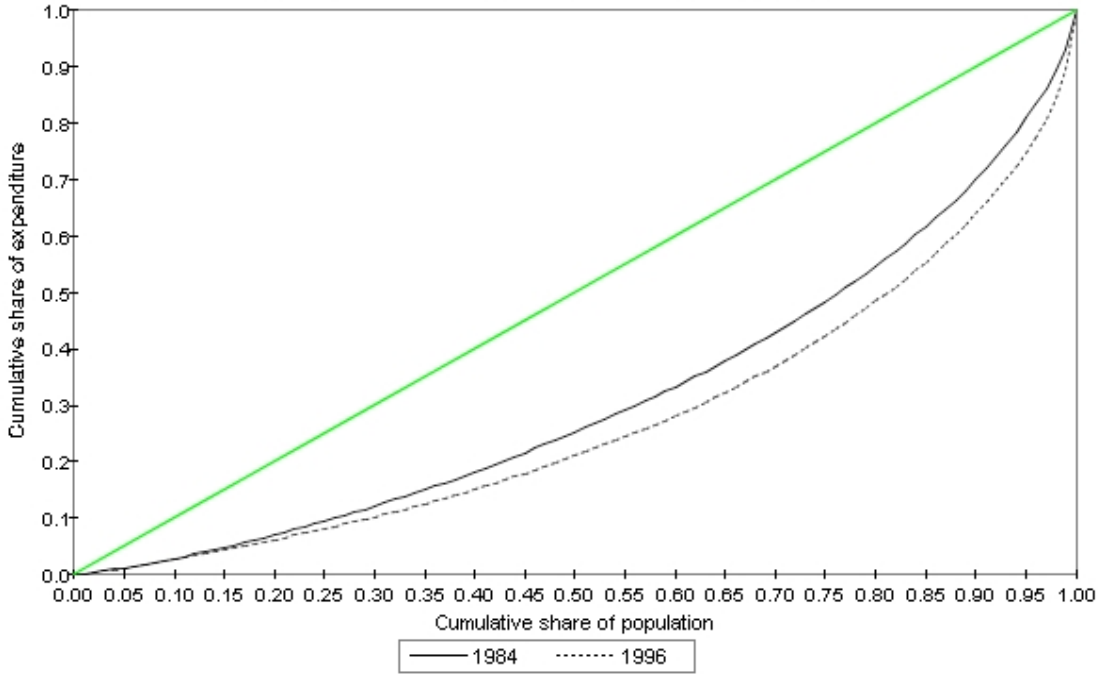


Figure 8: Lorenz curves Rural Forêt 1984-1996

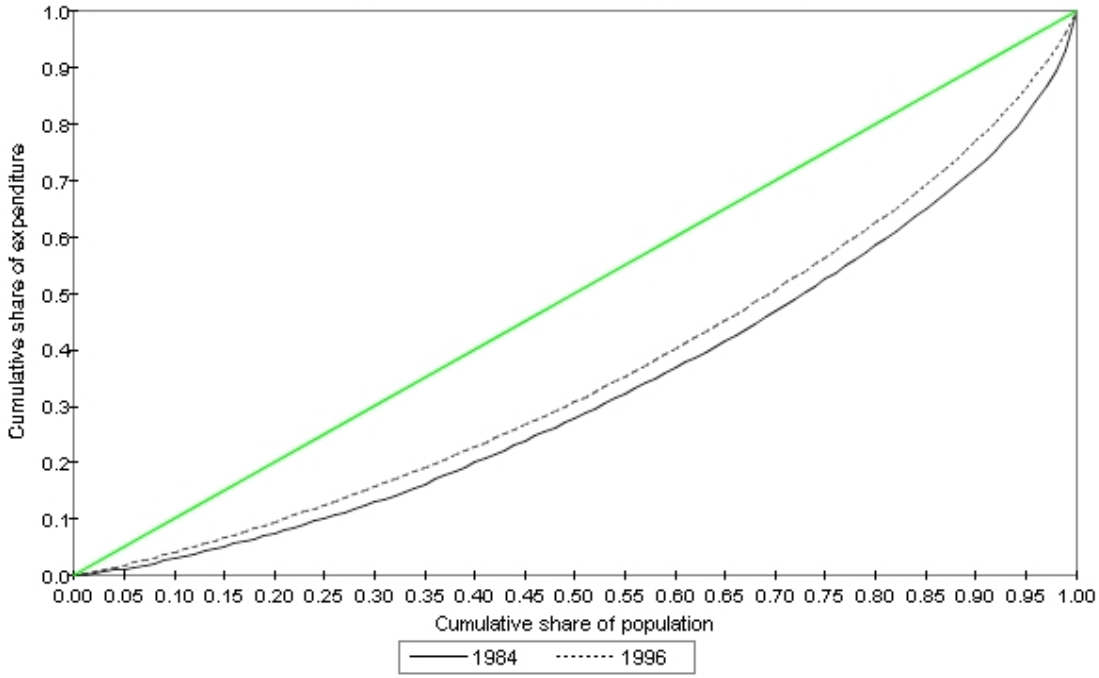
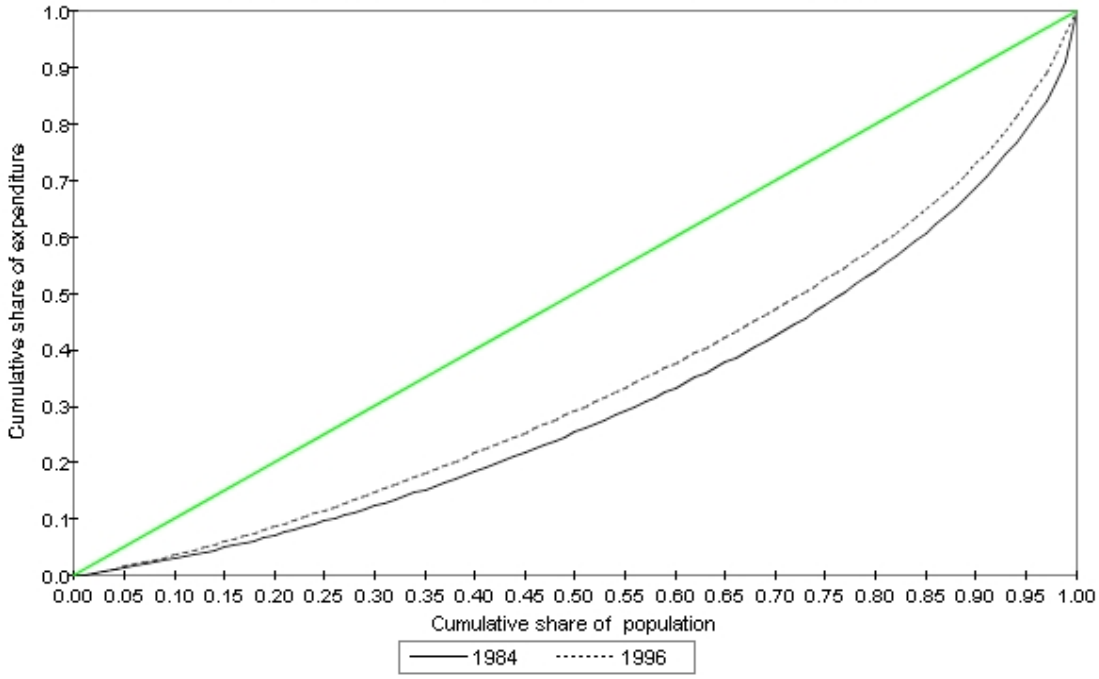
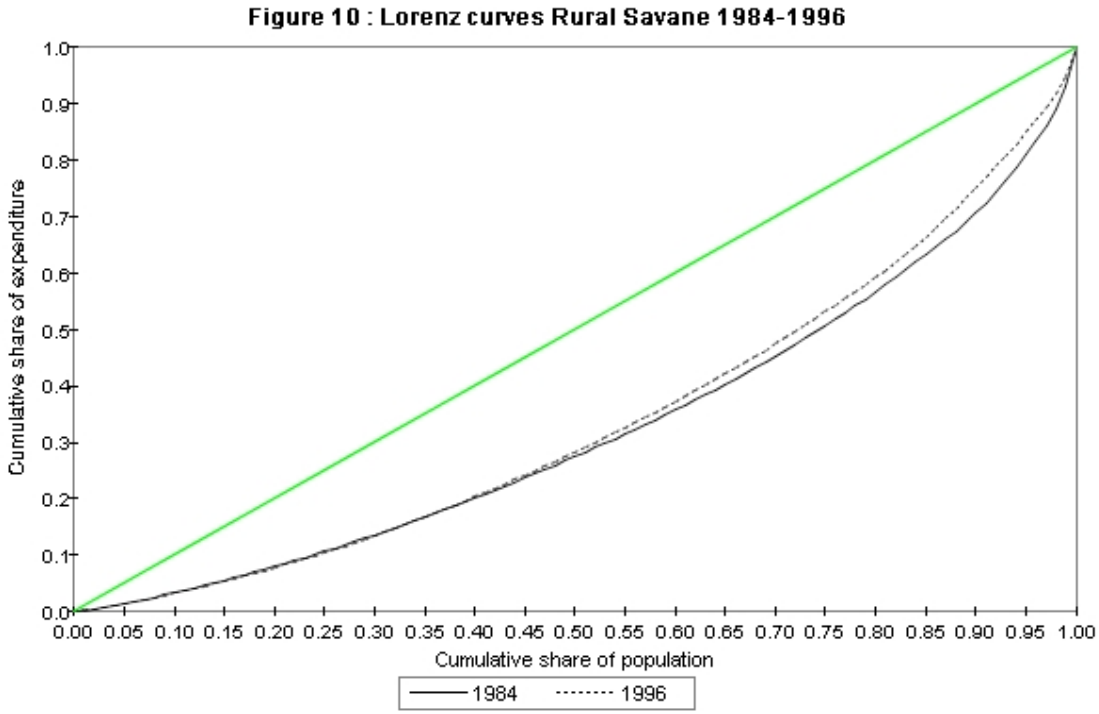


Figure 9 : Lorenz curves Rural Hauts-Plateaux 1984-1996





4.3. Inequality According to Education of the Household Head

We expect the educational level of the household head to play a significant role in determining the welfare level of a household. In 1984, inequality in the distribution of living standards measured by the standard Gini coefficient was moderately high. As concerns the evolution of inequality between 1984 and 1996 such as measured by the Gini coefficient, the general trend is that inequality fell for most educational sub-groups, except for students leaving secondary education or that inequality remained unchanged or that it only increased by a few 3.3 percentage points.

Inequality measured by entropy indices seems to have decreased among household heads for all levels of education between 1984 and 1996. A systematic behaviour pattern does not appear to emerge between levels of education and inequality. This situation is perhaps due to the fact that employment is a phenomenon that affects all students who leave school at all levels of education in Cameroon.

Educational levels are directly associated with the distribution of all the average living standards standardized by their mean. More than 50% of the household heads in the survey could not be ranked in one of the specified levels of acquired education. About 30% of the household heads, who had an educational level slightly over the national mean, contributed for 27 percentage points to within-groups inequality whose mean was about 81% for the given values of parameter θ. The indication here is that, in spite of disparities in living standards between different levels of education, the within-groups

components were much more likely to explain national inequality. Nevertheless, the between-groups component to total inequality was not negligible, with a mean of 19%.

The implication of this situation is that one must examine the distribution of education and the determinants of economic returns that result from it, if the distribution of living standards in Cameroon is to be understood.

As concerns the evolution of inequality between 1984 and 1996 as measured by entropy indices (see Table 4), the general trend shows that inequality fell for most educational sub-groups, except for cases where students either left secondary education, or inequality remained unchanged, or it only increased by a few 3.3 percentage points. The contribution of within-groups inequality to total inequality fell from 80-81% to 67-69% between 1984 and 1996 respectively, thus showing a reduction of 12.3 to 13.3 percentage points in within-groups inequalities. Other sub-groups witnessed a lower reduction in within-groups contribution to total inequality, save for pupils leaving primary school. Although within-groups inequality also remained significant in 1996, its contribution fell in 1984 to the advantage of between-groups components. The fall in total inequality between 1984 and 1996 in terms educational levels (from 2.84 to 3.37 percentage points according to the values of θ), is therefore marginal thanks to within-groups components.

***Table 4**: Decomposition of Entropy Inequality Indices according to the Educational Level of the Household Head (1984-1996)*

	$E(0)$				$E(1)$			
	1983/84	1996	Δ 1996-1983/84 [z-statistic]	%Δ 1996-1983/84	1983/84	1996	Δ 1996-1983/84 [z-statistic]	%Δ 1996-1983/84
Primary school								
Average expenditure per adult equivalent	1473.61	637.61		-56.7				
Gini	**0.4007**	**0.3224**		**-0.0783**				
$GE(\alpha)_j$	0.2718 (0.0185)	0.1694 (0.0181)	-0.1024 (0.0950) [-1,078]	-38	0.3184 (0.0381)	0.1859 (0.0215)	-0.1324 (0.0438) [-3,02]	-42
relative Contribution	0.2621 (0.0181)	0.2204 (0.0266)			0.2737 (0.0309)	0.1679 (0.0269)		
Vocational training								
Average expenditure per adult equivalent	2348.27	963.80		-59				
Gini	**0.3835**	**0.3306**		**-0.0529**				
$GE(\alpha)_j$	0.2652 (0.0294)	0.1908 (0.0281)	-0.0744 (0.1634) [-0,45]	-28	0.2753 (0.0342)	0.1904 (0.0296)	-0.0849 (0.0453) [-1,87]	-31
relative Contribution	0.0347 (0.0050)	0.0504 (0.0084)			0.0473 (0.0074)	0.0565 (0.0104)		
Secondary 1er cycle								
Average expenditure	2757.40	878.11		-61.1				

per adult equivalent								
Gini	**0.4423**	**0.3958**		**-0.0465**				
$GE(\alpha)_j$	0.3427 (0.0294)	0.2564 (0.0295)	-0.0863 (0.5116) [ ]	-25	0.3438 (0.0322)	0.2768 (0.0344)	-0.0670 (0.0471) [ ]	-19
relative Contribution	0.0633 (0.0082)	0.1019 (0.0172)			0.0840 (0.0124)	0.1029 (0.0195)		
Secondary ,second cycle								
Average expenditure per adult equivalent	3421.62	1231.13		-64				
Gini	**0.3891**	**0.3803**		**-0.0088**				
$GE(\alpha)_j$	0.2701 (0.0434)	0.2445 (0.0277)	-0.0256 (0.3638) [-0,17]	-9	0.2593 (0.0382)	0.2441 (0.0319)	-0.0152 (0.0152) [-1,00]	-6
relative Contribution	0.0087 (0.0018)	0.0520 (0.0079)			0.0179 (0.0033)	0.0705 (0.0109)		
Higher Edu.								
Average expenditure per adult equivalent	5272.59	1954.20		-62.9				
Gini	**0.4337**	**0.3859**		**-0.0478**				
$GE(\alpha)_j$	0.3501 (0.0501)	0.2516 (0.0502)	-0.0984 (0.3961) [-0,267]	-28	0.3181 (0.0444)	0.2639 (0.0635)	-0.0542 (0.0775 [-0,7]	-17
relative Contribution	0.0123 (0.0027)	0.0442 (0.0087)			0.0377 (0.0069)	0.1232 (0.0286)		
Not defined								
Average expenditure per adult equivalent								
$GE(\alpha)_j$	0.2333 (0.0128)	0.1640 (0.0183)	-0.0694 (0.1019) [ ]	-30	0.2708 (0.0242)	0.1845 (0.0227)	-0.0863 (0.0332) [ ]	-32
Relative contribution	0.4675 (0.0214)	0.2233 (0.0304)			0.3753 (0.0315)	0.1526 (0.0292)		
Within-groups contribution	0.2533	0.1865	-0.0665		0.2933	0.2133	-0.0789	
Between-groups contribution	0.0451 0.0030)	0.0829 (0.0076)			0.0577 (0.0041)	0.1035 (0.0090)		
Cameroon								
Gini	**0.4218**	**0.406**		**-0.0158**				
$GE(\alpha)_j$	0.2984 (0.0116)	0.2694 (0.0201)	-0.0291 (0.0943)	-10	0.3510 (0.0189)	0.3170 (0.0289)	-0.0340 (0.0345)	-10

***Note** : 1. Standard errors are in parentheses, z-statistics in brackets.*
2.For a two-tailed test of 1983/84=1996 the 5% critical value for the z-statistic is 1.96. For a one- tailed test of 1996>1983/84, the 5% critical value for the z-statistic is 1.65.
3. Calculations of the author using expenditure data drawn from the 1983/84 EBC survey and the 1996 ECAM1 survey conducted by the National Institute of Statistics (NIS) of Cameroon and the DSCN.

4.4. Inequality According to Gender of the Household Head

The design of gender-sensitive policies requires the breakdown of inequality according to the gender of the household head. In Table 5 below, and between 1984 and 1996, the Gini coefficient decreased for households managed by both men and women, but much more so for those managed by women.

Moreover, between 1984 and 1996, the Theil indices decreased for households managed by both men and women, but much more so for those managed by women. As indicated by the data in Table 5, the contribution of changes in within-groups inequality between genders is very negligible in explaining the evolution of total inequality. This result shows the ineffectiveness of policies that focus mainly on the equalization of average capacities between genders. The reduction of total inequality is explained by the differences observed within households headed by men. The contribution to within-gender inequality remained a significant factor in explaining inequality between 1984 and 1996.

***Table 5**: Decomposition of the Entropy Inequality Index according to Sex of Household Head (1984-1996)*

	$GE(0)$				$GE(1)$			
	1983/84	1996	Δ 1996-1983/84 [z-statistic]	%Δ 1996-1983/84	1983/84	1996	Δ 1996-1983/84 [z-statistic]	%Δ 1996-1983/84
Male								
Average expenditure per adult equivalent	1382.92	876.28		-36.9				
Gini	**0.4213**	**0.4034**		**-0.0179**				
$GE(\alpha)_j$	0.2977 (0.0128)	0.2662 (0.0224)	-0.0315 (0.1067) [-11.88]	-11	0.3525 (0.0215)	0.3194 (0.0331)	-0.0332 (0.0395) [-0.84]	-9
relative Contribution	0.8444 (0.0116)	0.8782 (0.0200)			0.8452 (0.0159)	0.8747 (0.0257)		
Female								
Average expenditure per adult equivalent	1527.87	978.91		-35.9				
Gini	**0.424**	**0.4086**		**-0.0154**				
$GE(\alpha)_j$	0.3022 (0.0173)	0.2784 (0.0290)	-0.0238 (0.1013) [-0.23]	-8	0.3422 (0.0272)	0.2865 (0.0297)	-0.0557 (0.0403) [-1.38]	-16
relative Contribution	0.1552 (0.0116)	0.1143 (0.0177)			0.1545 (0.0157)	0.1186 (0.0220)		
Within-groups contribution	0.9999	0.998	-0.0019		1	0.9979	-0.002	
Between-groups contribution	0.0001 (0.0000)	0.0020 (0.0002)			0.0000 (0.0000)	0.0021 (0.0002)		
Cameroon								
Gini	**0.4218**	**0.406**		**-0.0158**				
$GE(\alpha)_j$	0.2984 (0.0116)	0.2694 (0.0201)	-0.0291 (0.0943) [-0.309]	-10	0.3510 (0.0189)	0.3170 (0.0289)	-0.0340 (0.0345) [-0.986]	-10

Notes *: 1. Standard errors are in parentheses, z-statistics in brackets.*
2. For a two tailed test of 1983/84=1996 the 5% critical value for the z-statistic is 1.96. For a 1 tailed test of 1996>1983/84, the 5% critical value for the z-statistic is 1.65.
3. Calculations of the author using expenditure data drawn from the 1983/84 EBC survey and the 1996 ECAM1 survey conducted by the National Institute of Statistics (NIS) of Cameroon and the DSCN.
.

4.5. Inequality according to Age of Household Head

Inequality in the distribution of living standards according to the household head's age between 1984 and 1996 is presented in Table 6. Inequality such as defined by the Gini and the entropy classes of indices seems to decrease with the age of the household head. Table 6 breaks down the entropy class of indices according to age of the household head. The results show the overwhelming contribution of within-age groups inequalities to the explanation of total inequalities for different aversion parameters to inequality. The age group between 35 and 50 contributes the most to within-age groups inequality for all the values of parameter θ. The contribution of the « more than 50 » age group comes in second position; and the contribution of between-groups inequality to total inequality is very marginal, i.e. less than 3 percentage points for the different values of the θ parameter.

Table 6 shows the decomposition of changes in the entropy class of indices. The more-than-50 age group is instrumental in the explanation of total inequality between the two periods. The evolution of within-age groups inequality contributed substantially to the explanation of the reduction in total inequality between 1984 and 1996, whereas changes among adult age groups rather slowed down the reduction in within-age groups inequalities between the two years under consideration.

Table 6: *Decomposition of the Change in Theil's Inequality Index by Age Group (Living standard measure – Total food expenditure per adult equivalent)*

	$GE(0)$				$GE(1)$			
	1983/84	1996	Δ 1996-1983/84 [z-statistic]	%Δ 1996-1983/84	1983/84	1996	Δ 1996-1983/84 [z-statistic]	%Δ 1996-1983/84
Less than 35								
Average expenditure per adult equivalent	1944.86	1090.28		-43.9				
Gini	**0.4479**	**0.4266**		**-0.0213**				
$GE(\alpha)_j$	0.3355 (0.0172)	0.3013 (0.0334)	-0.0341 (0.1422) [-0.24]	-10	0.3727 (0.0208)	0.3306 (0.0375)	-0.0421 (0.0429) [-0.98]	-11
relative Contribution	0.2566 (0.0126)	0.2054 (0.0273)			0.2734 (0.0185)	0.2492 (0.0362)		
35-50								
Average expenditure per adult equivalent	1434.36	898.75		-37.3				
Gini	**0.4332**	**0.4164**		**-0.0168**				

$GE(\alpha)_j$	0.3171 (0.0181)	0.2860 (0.0291)	-0.0311 (0.1511) [-0.20]	-10	0.3879 (0.0366)	0.3286 (0.0470)	-0.0593 (0.0596) [-0.99]	-15
relative Contribution	0.4140 (0.0165)	0.4172 (0.0304)			0.4475 (0.0286)	0.4328 (0.0454)		
More than 50								
Average expenditure per adult equivalent	73.21	701.09		-28.0				
Gini	**0.3821**	**0.3506**		**-0.0213**				
$GE(\alpha)_j$	0.2446 (0.0128)	0.2015 (0.0183)	-0.0430 (0.0706) [-0.60]	-18	0.2761 (0.0176)	0.2459 (0.0270)	-0.0302 (0.0322) [-0.94]	-11
relative Contribution	0.3131 (0.0152)	0.3164 (0.0272)			0.2654 (0.0200)	0.2661 (0.0302)		
Within-groups contribution	0.9551	0.9836	0.0306		0.9952	0.9836	-0.012	
Between-groups contribution	0.0049 (0.0001)	0.0164 (0.0005)	0.0115		0.0048 (0.0001)	0.0164 (0.0005)	0.012	
Cameroon								
Gini								
$GE(\alpha)_j$	0.2984 (0.0116)	0.2694 (0.0201)	-0.0291 (0.0943) [-0.309]	-10	0.3510 (0.0189)	0.3170 (0.0289)	-0.0340 (0.0345) [-0.986]	-10

Notes *: 1. Standard errors are in parentheses, z-statistics in brackets.*
2. For a two-tailed test of 1983/84=1996 the 5% critical value for the z-statistic is 1.96. For a one- tailed test of 1996>1983/84, the 5% critical value for the z-statistic is 1.65.
3. Calculations of the author using expenditure data drawn from the 1983/84 EBC survey and the 1996 ECAM1 survey conducted by the National Institute of Statistics (NIS) of Cameroon and the DSCN.

5. Conclusion and Policy Implications

The objective of this study was to investigate the evolution of household expenditure inequalities in Cameroon over the 1984-1996 period. To achieve this, we concurrently used the graphic approach (i.e. Lorenz curves) and the numerical approach, i.e. the Gini index and Theil's entropy class of indices, which are decomposable into population sub-groups and make it possible to examine the importance of movements in the contributory factors of changes in inequality in the different areas and socio-economic groups of the country. The results of this investigation are briefly summarized in four main points:

i) Between-areas inequality was not a determining factor in the evolution of overall national inequality in Cameroon during the study period, for it contributed but about 24% to overall inequality. In contrast, more than 66% of total expenditure inequality was explained by within-areas inequality components. It follows from this result that policies designed to reduce expenditure inequality should focus on within-areas disparities in the distribution of income through considerations within areas, although between-areas inequalities should not be neglected. Moreover, since urban inequality is likely to play an increasingly significant role in the determination of overall inequality, the reduction of urban proves to be an additional key factor that

must be taken into account in policies whose aim is to achieve some equity in Cameroon.

ii) Education is a determinant both food expenditure and total expenditure. Even though the within-groups inequality components are much more likely to explain national inequality, the contribution of the between-groups component to overall inequality, whose average hovered around 19% over the study period, is not negligible. The average expenditure of household heads with a secondary level of education is 3.8 times higher that that of household heads with a primary level of education. In view of the fact that 35% of household heads only had a primary level education, improving the general level of education would constitute a significant contribution to the reduction of overall inequality in Cameroon, other things being equal. However, it should be noted that the educational systems of developing countries may cause an increase in the level of inequality since the opportunity costs of elementary education are usually higher for poor pupils than for rich ones.

iii) Contrary to education, gender inequality appears to be insignificant in Cameroon, for the ratio of average total household expenditure per adult equivalent for men household heads to that of women household heads was about 0.98 in 1984 and 0.82 in 1996. Changes in the between-groups gender inequality component contributed little in explaining overall inequality during the study period. Consequently the elimination of inequality between the sexes in terms of average total household expenditure per adult equivalent will have but a negligible impact on the reduction of overall inequality. However, this result seems to be an exception to the rule, for in most developing countries, women household managers are usually among the poorest of the poor owing to the lack of access to better job opportunities and capital.

iv) As concerns age, the study shows that disparities in expenditures between age groups were not significant in explaining the general level of inequality, since the between-age groups inequality component had a marginal contribution (less than 3%) to total expenditure inequality per adult equivalent between 1984 and 1996. In the final analysis, the evolution of within-age groups inequality contributed substantially in explaining the reduction in total inequality during the period, while changes among the age group of adults was rather slowing down the reduction of within-groups inequalities between the two years under consideration.

6. References

Abdelkrim, A,. (2003), Décomposition de l'indice d'inégalité de Gini, une approche exacte, CIRPEE, Université Laval

Adams, R., and Alderman, H. (1992). Sources of Income Inequality in Rural

Pakistan: A Decomposition Analysis. *Oxford Bulletin of Economics and Statistics*, 54(4): 592 - 608.

Baye, M.F. et Fambon, S., (2002). Decomposition of Inequality in the Distribution of Living Standards in Cameroon. African Journal of Economic Policy, Vol. 9, No. 2, December.

Bourguignon, Francois. 1979. "Decomposable Income Inequality Measures." *Econometrica* 47, no. 4: 901–20.

Cameroun / MINEFI/ DSCN (1984). *Enquête Budget Consommation* (EBC),

Cameroun / MINEFI/ DSCN (1996). *Enquête camerounaise auprès des ménages* (ECAM), Vol. 1 : Méthodologie (tomes 1 et 2), Yaoundé, 44 pages.

Cameroun / MINEFI/ DSCN (1996). *Enquête camerounaise auprès des ménages* (ECAM), Vol. 2 : Résultats (tomes 1 et 2 : 81 pages ; tomes 3, 4 et 5 : 95 pages), Yaoundé.

Davidson, R, Duclos, J.-Y. (1998). Statistical inference for stochastic dominance and for the measurement of poverty and inequality, Laval, Department of economics-CREFA, Canada.

Deaton, A. et J. Muellbauer (1980), *Economics and Consumer Behaviour*, Cambridge : Cambridge University Press.

Deaton, A. (1997). The Analysis of Household Survey: A Microeconometric Approcach to Development *Policy*, Whashington D.C. and Baltimore: The World Bank and Johns Hopkins University Press.

Duclos, J.Y. (2004). Poverty and Equity: Measurement, Policy and Estimation with *DAD*.Preliminary version, CIRPEE, Université Laval, May.

Duclos, J. Y., Araar, A. et C. Fortin, (2003), "DAD: A Software for Distributive Analysis / Analyse distributive", MIMAP programme, International Development Research Center, Government of Canada and CIRPEE, Université Laval.

Fambon, S., Ajab Amin, A., Menjo Baye, F., Noumba, I. , Tamba, I, and Tawah,R., (2000). *Réformes économiques et pauvreté au Cameroun durant les années 1990.* Rapport final projet collaboratif sur la pauvreté AERC, Nairobi, Kenya, May.

Fields, G. (1980). *Poverty, Inequality and Development*. New York: Cambridge University Press.

Glewwe, P. (1986). The Distribution of Income in Sri Lanka in 1969-70 and 1980-81: A Decomposition Analysis. *Journal of Development Economics* 24: 255-274.

Glewwe, P. (1991). Investigating the determinants of household welfare in Côte d'Ivoire, *Journal of Development Economics* 35: 307-337.

Kakwani, N. (1980). *Income Inequality and Poverty. Methods of Estimation and Policy Applications.* Oxford: Oxford University Press.

Kuznets, S., (1955), Economic Growth and Income Inequality, American Economic Review, vol. 45, pp. 1-28

Lynch, S. G., (1991). Income Distribution, Poverty and Coonsumer Prefences in Cameroon Cornell Food and Nutrition Policy Program, Washington D,C.

Morrisson, C. (1996). Les inégalités de revenus. Paris: Collection Que sais-je? Presse Universitaire de France.

Sen, A. K. (1973). *On Economic Inequality*. Clarendon, Oxford.

Shorocks, A.F. (1983). Ranking Income Distribution. *Economica 50*: 1 - 17.