EuroEconomica

Issue 3(31)/2012 *ISSN: 1582-8859*

The change in Inequality in the Distribution of Living Standards

Mbu Daniel Tambi

Department of Agricultural Economics, Cameroon, tambimbu@yahoo.com

Francis Menjo Baye

Department of Quantitative Economics, Cameroon, bayemenjo@yahoo.com

Abstract

This study attempts to carry out a comprehensive analysis of the evolution of inequality trends using CHS I and II collected in 1996 and 2001 respectively. The theoretical decomposition frameworks propelling the study are motivated mainly by the Shapely value while empirical estimates are obtained from DAD 4.4.

As concerning the result, we observed the dominant contribution of the Within-group inequality in the distribution of living standard in Cameroon and the Between-group contribution to inequality trends was found to be non negligible. On the global scale, inequality retreated at the national level, Yaounde, Douala and Rural savannah regions in the period 1996-200 and got worse in Rural forest, Rural highlands and other towns.

We recommend that, policies and strategies for reducing inequality should place particular emphasis on the countryside (increase employment avenues through potential investment) and on a region-by-region approach (decentralisation, equal distribution of the national cake).

Keywords: Change, Shapley value, Inequality, Standards of living, Distribution,

1.0 Introduction

Issues concerning inequality are a major worry of most international organisations and humanitarian societies; it's also a major concern for all governments while the struggle for equality is leaving no government indifferent. Inequality and poverty are actually a world wide phenomenon which is spreading in rich and underdeveloped countries in different ways and is destined to worsen unless new approaches are developed and new scientific knowledge about its causes is discovered (Townsend, 1993). Transparency international, (1998 and 1999) state that the index for the cost of living in Cameroon rose by 60% within 1998 and 1999, however, nominal wages remained unchanged. From December 1992 to December 1995, real wages of senior civil servant fell by 75/80 %, and this had a deleterious impact on civil servants motivation and fuelled corruption that in turn increase inequality and poverty respectively.

As a result overall poverty deepened within the period 1984/1996 with rural poverty remaining more widespread, deeper and more severe than urban poverty (see Baye 2005a, Fambon et al, 2004). Despite the improve macro economic situation, public education and health indicators have remained poor and Cameroon is still perceived as a very corrupt country on the basis of surveys undertaken in 1998 and 1999 by transparency international. The Poverty Reduction Strategy Paper PRSP, (2003) also confirms that, nearly four out of every ten Cameroonians in 2001 were living with an annual income below the poverty line of CFAF 232.547. This represents the estimated annual income necessary for an individual in Yaounde to buy a ‘minimal basket’ of essential food and non food items. In 2001, eight poor people out of ten were living in the country-side and the incidence of poverty there is more than double the incidence in the cities.

As observed by Baye and Fambon (2001), the increasing level of poverty in rural communities induced many young people to migrate to large towns where they expected to find better conditions. They ended up in a net work of relatives and friends who initially support them against the worst hardships; eventually some succeed in making ends meet, while others are exposed to unemployment or under-employment, crime and social-behaviour, which posed insecurity problems to both the authority and other city dwellers.

More generally, as argued by Baye and Fambon, (2002), the joint effects of the economic crises and structural adjustment programmes (SAPs) forced many Cameroonians to adopt coping devices such as moonlighting, seeking for survival in the informal sector. Also, they engaged in occupational and geographical mobility, changing regional patterns of activities and productivities, and adopting ‘‘behavioural innovations’’ like corruption and other malpractices for survival. These adaptations are thought to have modified the pattern of welfare among households in the different regions and sectors of activities.

In all these, the adverse International environment as reflected in the overvaluation of the CFAF against the dollar and the sagging world market prices of commodity exports in the late 1980s and early 1990s, and its implications for government revenue, production, consumption and relative prices, led to 50% of devaluation of the CFAF in January 1994. Being a centre-piece of adjustment, the devaluation was intended to perform two functions: (1) reduce expenditure on imports and (2) re-allocate resources away from non-tradable commodities with a view to propping up the global competitiveness of the economy subsequent to the 1994 devaluation of the CFAF, Cameroon achieved macro-economic stability. Yet, rural incomes were slow to improve because much of the acreage under coffee and Cocoa had been abandoned, in addition to the typically low short run elasticities of supply of these commodities, thus increasing the prevailing inequality gap.

Analysing the demographic variables of 1996 revealed that poverty rates differ according to household size, gender and age of members. The incidence of poverty increases as household size increases with poor household having an average of 3.9 persons, compared to non-poor household job with an average of 2.1 persons. Women represented about 51 percent of the total population and 52 percent of the poor. The incidence of overall poverty among the female headed households was lower (55%) than that of their male counterparts (70%) (Baye and Fambon (2001).

Considering official data from World Bank (2001), CAS (1996), PRSP (2003) and Household consumption Survey data I and II; Cameroon suffers from very high transportation costs, in particular for transiting through the port of Douala which is the key entry and exit point for international trade. About half the population fell below the poverty line and 86% of the poor live in rural areas. It is clear that inequality/poverty increased massively during the depression and with the drastic wage cut in public services, pushed urban poverty to become a major problem. While less than 1% of households in Yaounde and Douala fell below the poverty line in 1983, 20% of households in Yaounde and 30% in Douala did so in 1993. The rural environs had no sizable investment in agriculture, research and infrastructure (fewer feeder roads). The agricultural sector (forestry and fisheries included) received only 5% of budgetary allocations in 1995/96 and 8% in 1999/2000, even the approved agricultural projects of 1999, accounted for only 5% of international development authority (IDA) commitment on active projects. The deterioration of the purchasing power of civil servants and rising unemployment caused urban inequality to increase considerably since 1992. The problem was aggravated by the dilapidated state of urban infrastructure resulting from the collapse of public investment in the last 15 years.

Bank lending was very small, HIV prevalence was estimated at 7% of the adult population in 1998 and an experience in South Africa indicates that once prevalence has reached such a level, HIV spread very rapidly and the epidemic can reach catastrophic proportions within 5 years. .

As a subject of debate, the objective of this study include; i) to examine the evolution of inequality between 1996 and 2001, ii) to evaluate the relative Contributions of the Within and Between sector effects to levels and changes in inequality, ii) to derive policy implications on the basis of the analysis. This work is therefore building on existing knowledge in the sense that it performs exact decomposition of changes in aggregate measured inequality into within and between sector components that hinge on the Shapley Value, a solution concept that is well known in the theory of cooperative games.

2.0 Theoretical Review of Inequality – Gini Coefficient

As outlined in other studies (Baye 2007, Litchfield 1999, Shorrocks 1984), the popularity and attractive properties of the Gini coefficient makes it an indispensable measure in any study of inequality. These axioms are; 1) the mean independence condition, 2) the population size independence condition, 3) the Pigou-Dalton transfer sensitivity and 4) the symmetry condition however, it fails the decomposability condition if subgroups of the distribution of well-being overlap.

According to Donaldson and Weymark (1980) and Duclos (2002), after ordering living standards in a Lorenz consistent manner, the class of S-Gini inequality indices can be shown to be equal to the covariance formula:

$$G(p) = \frac{-\operatorname{cov}[Q(P), \rho(1-P)^{(\rho-1)}]}{\mu} \qquad (1)$$

Where Q(P) is the level of living standard below which we find a proportion P of the population. $P \in [0, 1]$ is the proportion of individuals/households in the population who enjoy standards of living that are less than or equal to the quantile Q(P). ρ is a parameter of inequality aversion that determines our ethical concern for the deviation of quintiles from the mean at various ranks in the population. The larger the value ρ, the more weight is given to the deviation of living standards from the mean, μ, at the lower tail of the distribution. When ρ becomes very large, the index G(ρ) equals the proportional deviation from the mean of the lowest living standard. When ρ=1, the same weight is given to all deviations from the mean, which then makes the inequality index G(ρ=1) always equal to 0, regardless of the distribution of living standards under consideration.

The conventional Gini index is then obtained by letting ρ=2

$$G(\rho = 2) = \frac{2\,\mathrm{cov}[Q(P), P]}{\mu} \qquad (2)$$

Which is just a proportion of the covariance between living standards and their ranks? An interesting property of the conventional Gini index is that it equals half the mean-normalized average distance between all living standards. Thus, if the standard Gini index is found to be 0.3 the interpretation is that the average distance between the living standards of that distribution is of the order of 60 per cent of the mean. The Gini coefficient for ρ=2 can be portrayed graphically as twice the area lying between the lorenz curve and the 45° line divided by the total area in such a diagram (see Baye, 1998). The denominator ensures that this measure will vary between 0 (perfect equality) and 1 (perfect inequality).

As noted in Litchfield (1999), there are ways of decomposing the Gini by group but the component terms of total inequality are not always intuitive or mathematically appealing. Introduced by Bhattacharaya and Mahalanobis (1967), the analytical decomposition of the Gini coefficient of inequality into between-group and within-group contributions raises a legitimate concern because it generates a troublesome and little understood residual term if subgroup well-being ranges overlap.

Let G(y) be the Gini coefficient and let the population subgroups be indexed by k=1,2,…,n. The decomposition takes the form.

$$G(y) = \sum_{k \in K} a_k G_k + \overline{G} + \varepsilon \qquad (3)$$

where Gk is the Gini coefficient for well-being within subgroup k, $\sum_{k \in K} \overline{G}\ G$ is between-group Gini coefficient, defined as the one which would result if every income in every subgroup were to be replaced by the relevant subgroup mean, $a_k = f_k\left(\frac{\mu_k}{\mu}\right)$ is the product of the population share f_k and income share $\left(\frac{\mu_k}{\mu}\right)$ accruing to subgroup k, and ε is the residual which will not vanish if subgroups expenditure ranges overlap (see, Lambert and Aronson 1998, Araar 2006, Baye 2007):

3.0 Methodology and Data Requirement

The methodology proposed here, performs exact decomposition of changes in aggregate measure inequality into Within and Between sector components that hinge on Shapley value (as concerning the exposition of the Shapley value submitted here, see the succinct discussion in Baye, 2007). An important issue in distributive analysis would be how to assign weights to the factors that contribute to an observed level or change in a measure of living standards. For instance, the level and/or change of a distributive index between two dates may be attributable to factors such as Within-sector and Between-sector effects and analysts are interested in quantifying the relative importance of each component. There are different methods to perform the attribution, all of which must have to deal with the fact that the contribution of a factor depends on the presence of the other factors. This issue is similar to problems that arise in cooperative game theory and recent literature in distributive analysis is proposing and applying an attribution according to the Shapley Value (see Shorrocks, 1999; Kabore, 2002; Rongve, 1995; Chantreuil and Trannoy, 1997; Baye, 2006b). We first appeal to cooperative game theory before applying the solution set to decomposed changes in inequality.

A typical question to address is what each player might reasonably expect to receive (or pay) as his or her share of the reward (or cost) in a cooperative game. The solution concept widely used in the theory of cooperative games to answer such questions is the Shapley Value (see Owen, 1977, Moulin 1988), which provides a recommendation for the division of the joint profits or costs of the grand coalition, while satisfying some reasonable properties.

For instance, let K = {1, 2, …, k,…, m} be a finite set of players. Non-empty sub-sets of K are called coalitions. To accomplish the division process, the players may form coalitions and the strength of each coalition is expressed as a characteristic function v. For any coalition or sub-set $S \subseteq K$, v(S) measures the share of the surplus or loss that the coalition, S, is capable of appropriating without resorting to agreements with players belonging to other coalitions.

For each player k, $K \notin S$, Shapley (1953) proposes a value based on the player's marginal contribution – defined as the weighted mean of the marginal contributions v(S $\cup$ {k}) - v(S) of player k in all coalitions S $\subseteq$ K- {k}. That is, player k is attributed the extra amount that he brings to the existing coalition of players (Baye 2006b). To identify this value, we imagine that the m players are randomly ranked in some order, or join the game in a random order, defined by σ:

$$\sigma = \left\{ \underbrace{\sigma_1, \sigma_2, ..., \sigma_{k-1}}_{s}, \sigma_k, \underbrace{\sigma_{k+1}, ..., \sigma_m}_{m-s-1} \right\} \qquad (4)$$

and then successively eliminated in that order. The elimination of players reduces the share accruing to the group of those not yet eliminated. When the coalition, S, is composed of s elements, we can only find the value they will obtain, v(S), when the first s elements of σ are exactly the elements of S. The weight of the coalition S is measured by the probability that the first s elements of σ are all elements of S. This probability is found by dividing the number of ordered arrangements of which the first s elements are all in S by the total number of possible ordered arrangements. The numerator can be obtained by imagining that the first s players are orderly arranged in a sequence and the remaining m-s-1 players are also orderly arranged in another sequence (Baye, 2007).

The number of possible ordered arrangements is the number of permutations of m players taken m at a time, which is m!. By the same reasoning, since the first s players yield s! number of permutations, the remaining m-s-1 players would yield (m-s-1)! number of Permutations. The number of ordered arrangements in which the first s players are all elements of S is thus given by s!(m-s-1)!.

The weight (or probability) that the first s elements of σ are all elements of S is thus defined by s!(m-s-1)!/m!, where s is the size of the coalition S. This weight also measures the probability that the player before player *k* will be in S. The Shapley Value of player *k*, denoted by $\varphi_k^{sh}(K,v)$, is thus the weighted mean of his marginal contributions v(S ∪ {*k*}) -v(S) over the set of coalitions S ⊆ K- {*k*} given by:

$$\varphi_k^{sh}(K,v)=\sum_{s=0}^{m-1}\sum_{\substack{S\subseteq K-\{k\}\\ |S|=s}}\frac{s!(m-s-1)!}{m!}\left[v(S\cup\{k\})-v(S)\right] \qquad (5)$$

by convention, 0! = 1 and v(ϕ) = 0

To apply the Shapley Value in distributive analysis instead; of considering m players as in cooperative game theory, we now consider m factors that contribute in the explanation of an observed phenomenon. The Shapley Value given in Equation 5 satisfies all three of Shapley's axioms. They state that: (1) the expression $\varphi_k^{sh}(K,v)$ should be symmetric (or anonymous) in the sense that the contributions assigned to any given factor should not depend on the way in which the factors are labelled or listed. In order words, $\phi_k^{sh}(K,v)$ should be independent of the factor's label, 1, 2, …, m; and (2) the decomposition should be efficient, that is, it should be exact and additive, so that, for $\forall_k \in K$ and $\forall_{k+1} \in K, \phi_k^{sh}(K,v)\cap\phi_{k+1}^{sh}(K,v)=\phi$ and $\sum_{k=1}^{m}\phi_k^{sh}(K,v)=v(K)$. That is, the intuitively appealing contributing factors should form a partition, so that there is no need for vague concepts such as residual or interaction terms to secure the identity of the decomposition.

Since by the additivity axiom the set of factors completely determine the aggregate indicator, which could be at levels or changes, it is convenient to assume that v(ϕ) = 0, in the sense that the aggregate indicator is zero when all the factors are extracted (see, Baye 2007).

The Shapley Value decomposition rule has been used to obtain exact decomposition of the Gini coefficient into between-group and within-group components that sum to the total inequality with no residual (Araar, 2006). The application of the Shapley value involves two steps. The first step is to decompose total inequality into Between-group and within-group contributions. The second step is to express global within-group contribution as a weighted sum of the within-group contributions by the different subgroups. Let us denote the Within group inequality by Wg and the Between group inequality by Bg, so that total Gini index G(y) = v(Wg,Bg), expressed in terms of the characteristic function v.

In the first step, we suppose that the two Shapley contributions that account for the overall Gini coefficient G(y) are Within-group inequality component ((G_W^{sh})) and Between-group inequality component (G_B^{sh}), given by: $G_W^{sh} + G_B^{sh}$. The basic rules followed to compute the marginal contributions of each of these factors are: (1) eliminate the Between-group inequality and compute the Within-group inequality by using a vector of well-being where each household's well-being has been multiplied by the ratio μ/μk. This operation renders the average well-being of each group to equal μ; (2) eliminate the within-group inequality and compute the Between-group inequality, G(μ1,…, μk), by using a vector of income were each household has the average income of its group, denoted by μk; (3) eliminate between- and Within-group inequality simultaneously and each household remains with the average well-being. In this case, G(μ) = 0. The elimination order of factors following these rules is arbitrary and the arbitrariness is removed when the Shapley Value approach is used as demonstrated above.

From the Within-group contribution to total inequality expressed in equation 4**,** the second step consists in decomposing global Within-group inequality as a sum of Within-group inequality across groups. Note that the term G(μ) = 0, which implies that the Within-group contribution is based on three inequality indices. The same rule is used for determining the impact of eliminating the marginal contribution of group k, notably the attribution of group k's average income to all its members in order to eliminate the group's contribution to global Within-group inequality. This gives the Shapley Value of group k's contribution to total Within-group inequality.

To illustrate this procedure, we suppose that there are only two groups, A and B and restate the equations as follows;

$$G_W^{sh} = 0.5[G(y) - G(\mu_A, \mu_B) + G(y_{Ai}(\mu/\mu_A, Y_{Bi}(\mu/\mu_B))] \qquad (6)$$

The Shapley Value contribution of group A to global Within-group inequality is given as:

Issue 3(31)/2012 ISSN: 1582-8859

$$G_{WA}^{sh} = 0.25[[G - G(\mu_{A,} y_B) + G(y_A, \mu_B) - G(\mu_A, \mu_B)]$$
$$+ [G(\mu_A, \mu_B) - G(\mu_A, \mu_B) + G(\mu_A, \mu_B) - G(\mu_A, \mu_B)] \quad (7)$$
$$+ [G(y_{Ai}(\mu/\mu_A, y_{Bi}(\mu/\mu_B)) - G(\mu, y_{Bi}(\mu/\mu_B)) + G(y_{Ai}(\mu/\mu_A, \mu) – G(\mu,\mu)]]$$

This procedure can be applied symmetrically for the second group. Fortunately, this decomposition is already generalized to include more than two groups and programmed in the software DAD 4.4. This procedure is also applicable to inter-temporal changes in Gini indices of the distribution of well-being (see, Baye 2006b, 2007 for more details).

Data and Data Setting

Our approach to inequality in this study is based on the method of basic food and non food needs, identified using data from the two Cameroonian household Consumption surveys (CHS) I and II that were conducted nationwide by the national institute of statistics in 1996 and 2001 respectively. They provided a clear picture of poverty, inequality and living conditions in Cameroonian households. This statistics is defined as a snap shot of activities (economic, social, demographic…) in a particular place at a particular time. The household prices of CHS 1 and CHS 11 were harmonised in other to make them comparable.

The 1996 total expenditures were scaled up, employing consumer price indices, to express them in terms of 2001 prices to enable us use the poverty line computed from the 2001 survey for the two periods (See, NIS 2002). The welfare indicator used is expenditures per adult equivalent. Since the composition of households by age was captured by the surveys, we followed previous studies in Cameroon to adopt a hybrid of the Oxford Equivalent Scale by attributing adult equivalent scales of 0.5 for household members aged below 15 years and 1 for those aged 15 and above. This adult equivalent scale is consistent with 2400 kcal per adult per day to exercise normal activity (Araar 2006). The standard of living indicator used for determining the poverty threshold is annual household consumption. The poverty threshold was thus set as 232547CFAF in 2001 versus 148000 in 1996. For purposes of comparing the poverty situation between 1996 and 2001, a new threshold of 185 490CFAF per year per adult equivalent was estimated by the National Institute of Statistics. This is the poverty line used in the computation of our inequality study.

4.0 Results and Discussion

Evolution of inequality: Gini coefficient

Table one presents the evolution of inequality in terms of Gini coefficient for the period 1996-2001. At the national level income inequality increased by 0.2% points; in Yaounde, inequality retreated about 5.4%, Douala 7.4% points, Other towns 1.9% points, it increase in Rural forest by 9.0% points, Rural highlands by 5.2% but inequality decline in Rural Savannah by 2.4% points. The significant increase in Rural forest was more than the overall change and much more than for other regions. What should be noted from the results is that Rural forest and Rural highlands experienced worsening inequality in income in the period under review. However, trends in inequality are more of a Rural forest and Rural highlands worry in Cameroon as compare to other regions. As shown in table one below:

Table 1: Evolution of inequality: Gini coefficient

Region	S-Gini Income Inequality (P=2)		
	1996	2001	Change
Yaounde	0.487 (0.048)	0.433 (0.020)	-0.054 (0.052)
Douala	0.484 (0.030)	0.410 (0.020)	-0.074 (0.036)
Other towns	0.397 0.022)	0.378 (0.009)	-0.019 (0.024)
Rural forest	0.287 (0.017)	0.377 (0.018)	0.090 (0.025)
Rural highlands	0.346 (0.026)	0.398 (0.015)	0.052 (0.030)
Rural Savannah	0.354 (0.038)	0.330 (0.011)	-0.024 (0.040)
Cameroon	0.406 (0.017)	0.408 (0.008)	0.002 (0.019)

Source: Computed by the author from ECAM I and ECAM II Survey Data.

Notes: Figures in parenthesis represent standard errors, p is parameter.

Issue 3(31)/2012 *ISSN: 1582-8859*

Inter-temporal decomposition of inequalities

As shown below, the income Gini for 1996 and 2001 is 40.6% and 40.8% points giving an estimated change of 0.2%. It should be noted that in both years (1996 and 2001), the Rural highlands is estimated to have the most income Gini coefficient of 7.7% points giving a relative contribution of about 19.1% for 1996 and 8.9% income Gini with a relative contribution of 21.8%.

The region of Yaounde has the least income Gini of 3.4% and a relative contribution of 8.3% in 1996 while in 2001 it was 3.3% in terms of estimated income Gini and 8.0% terms of contribution. On the whole, income inequality retreated in Yaounde by 0.3%, Douala by 2.5% and Rural savannah by 1.8% while it increase in Other towns by 2.0%, Rural forest by 1.9% and Rural highlands by 2.7% points.

Still in table below, we observed that in 1996, of the income Gini of 40.6%, the Within-group contribution was much more 76% compared to the between-group component of 24%. By 2001, the within-group contribution was slightly reinforced (78.1%), while the between-group contribution retreated (21.9%). The 2.1% points change in income inequality was over accounted for by the between-group contribution (-2.1% points), while the within-group component (2.1% points) worked contrary to the decline. The bulk of the within-group income inequality was captured in Other towns, Rural forest and Rural savannah in both 1996 and 2001.

This confirms the dominant contribution of Within-group inequality in the distribution of well-being in Cameroon while the Between-group contribution is non-negligible in income inequality. These results reveal that considering the income, adopting an optimal-mix of Within- and Between-group considerations appears to be more appropriated in scaling down income inequality.

Table 2: Inter-temporal decomposition of inequalities

Zone	Shapley value decomposition of the S-GINI Coeficient (p=2)					
	1996		2001		Change	
	Estimate	RC_i	Estimate	RC_i	Estimate	RC_i
Yaounde	0.034	0.083	0.033	0.080	-0.001	-0.003

Douala	0.044	0.109	0.034	0.084	-0.010	-0.025
Other towns	0.045	0.110	0.053	0.130	0.008	0.020
Rural forest	0.036	0.089	0.044	0.108	0.008	0.019
Rural highlands	0.077	0.191	0.089	0.218	0.011	0.027
Rural savannah	0.073	0.179	0.065	0.161	-0.007	-0.018
Cameroon	0.406	-	0.408	-	0.002	-
Group Decomposition						
Inter Group		0.240		0.219		-0.021
Intra Group		0.760		0.781		0.021
Cameroon		1.000		1.000		0.000

Source; computed by author from ECAM I and ECAM II Survey Data using DAD4.4; Software for distributive Analysis, Notes; RC_i is relative contribution to total inequality; P is parameter.

Conclusion

As seen from above, this study attempts to carry out a comprehensive analysis of the evolution of inequality trends using CHS I and CHS II collected in 1996 and 2001 respectively. The theoretical decomposition frameworks propelling the study are motivated mainly by the Shapely value while empirical estimates are obtained from DAD 4.4.

As concerning the result, we observed the dominant contribution of the Within-group inequality in the distribution of living standard in Cameroon and the Between-group contribution to inequality trends was found to be non negligible. On the global scale, inequality retreated at the national level, Yaounde, Douala and Rural savannah regions in the period 1996-200 and got worse in Rural forest, Rural highlands and other towns.

Basing on our result, we suggest that policies and strategies for reducing inequality should place particular emphasis on the countryside (increase employment avenues through potential investment) and on a region-by-region approach such as decentralization, regional equality, increase provision of rural extension services (roads, electricity, markets, portable water………).

Bibliography

Araar, A (2006); On the Decomposition of the Gini Coefficient; an Exact Approach with an illustration using Cameroonian data. Working Paper 06-02.

CHS (1996): Database of Budgetary and Consumption Survey, Government of Cameroon.

CHS (2001): Living conditions and poverty profile in Cameroon, 2001. Main report of the CHCS II, Yaounde.

CAS (1996): Cameroon, Country Assistance Strategy: Evolution of Economic and Social Indicators, World Bank, 1996.

Baye, M, F (2007); Exact Configuration of Poverty, inequality and Polarization Trends in the Distribution of well-being in Cameroon. *Final report submitted to African Economic Research Consortium.*

Baye, M, F (2006b): Growth, Redistribution and Poverty changes in Cameroon: A Shapley Decomposition Analysis, *journal of African economics,* Vol. 15, N° 4 pp 543-570.

Baye, M, F (1998): Inequality and the Degree of poverty among Public Sector Workers in Cameroon. *Nigerian Journal of Economic and Social Studies*. Vol 40, No 3. PP 433-452.

Baye, M, F (2005a): Structure of Sectoral Decomposition of aggregate. Poverty changes in Cameroon. Paper presented at the international conference on shared Growth in Africa-Accra. *Organised by Cornell University/ISSR*/The WORLD Bank, PP21-22.

Baye, M, F and Fambon, F (2002): Decomposition of Inequality in the Distribution Living Standard in Cameroon, *African journal of economic policy,* Vol. 9, N° 2, pp 51-75

Baye, M, F and Fambon, S (2001): The impact of macro and sectoral policies on the extent of poverty in Cameroon, in *globalization and poverty: the role of rural institutions and poverty.* Background paper submitted to Fasid, Tokyo, Japan.

Bhattacharaya, N and Mahalanobis, B (1967): "Regional Disparity in Household Consumption in India" *Journal of the American Statistical association, 62*

Chantreuil, F and Trannoy, A (1997): "Inequality Decomposition Values" mimeo, universitè de Cergy – Pointoise..

Donalson, D. and J. A. Weymark (1980): A single parameter generalization of the Gini indices of Inequality, Journal of Economic Theory, 22, 67-86..

Duclos, J, Y (2002): *Poverty and equity: theory and estimation.* CREFA, Universitè Laval, Canada, Preliminary Version, January 2002.

Fambon, S, Baye, F, M, Noumbar, J, Tamba, I, and Amin, A, A (2004): Dynamique de la pauvreté et de la Répartition des Revenues au Cameroun Durant les Années 80 et 90. Final Report, AERC, Nairobi, Kenya.

Kabore, T, S (2002): "The Dynamics of Poverty: A Review of Decomposition Approach and Application to Data from Burkina Faso", mimeo, UFR-SEJ-University of Ouagadougou.

Lambert, P, J, and Aaronson J, R, (1993): "Inequality Decomposition Analysis and the Genie Coefficient revisited," *economic journal*, 103, 1221-27.

Litchfield, J, A (1999): Inequality: Method and Tools. The World Bank, Washington D. C

Moulim, H, (1998): *Axions of cooperative decision making,* Cambridge University Press, Cambridge available on htt://www.worlbank.org/poverty/inequality/index.htm

NIS (2002): Living conditions and poverty profile in Cameroon, 2001. Main report of the CHCS II, Yaounde.

Owen, G, (1977): "Values of games with priori unions", in: R, Hein and O, Moeschlin, eds, essays in mathematical economics and game theory in honour of OskarMorgenstern, Springer Verlag, New York.

PRSP (2003): Cameroon: Poverty Reduction Strategy Paper IMF Country Report N° 03/249 ©2003 International Monetary Fund, 2003. ‹www.imf.org/external/country/cmr/index.htm›

Rongve, I (1995): "A Shapley decomposition of inequality indices by income source, discussion *paper* N° 59, department of economics, University of Virgina.

Shapley, L (1953): A Value for n-person Games, Vol 2, Princeton University of Press

Shorrocks A F (1984): Inequality Decomposition by Population Subgroups, *Econometrica vol 52, 1369-1385*.

Shorrocks, A, F (1999): Decomposition Procedures for Distributional Analysis; A Unified based on the Shapley Value; Department of Economics, University of Essex.

Townsend, P (1993): "The international analysis of poverty." Harvester wheatsheaf. New York.

Transparency International (1998): Corruption and poverty Evaluation, Country report, Cameroon, November 1998.

Transparency International (1999): Corruption Assessment, Country report, Cameroon, December 1999.

World Bank (2001): Country Assistance Evaluation, Cameroon. 24 January 2001