MAPPING OUT MULTIPLES DIMENSIONS OF WELL BEING BY ETHNICITY IN CAMEROON

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Abstract

This work compares physical, human, financial and social assets endowment in 2001 and 2007 by ethnic groups in Cameroon. To do this, ethnic groups were reconstituted using the second and third Cameroon household's surveys; indicators of asset endowment were constructed using the polychoric principal component analysis; and stochastic dominance tests used to effectuate comparisons. Results indicate that: (1) overall, all ethnic groups experienced a deterioration in their asset endowment between 2001 and 2007; (2) the Bantus of forest recorded the smallest decline; (3) the Bantus of coast seem better endowed by assets than others groups, followed respectively by the semi-Bantus, Bantus of forest and peulhs and associated ethnic. These results suggest that irrespective of ethnicity, assets endowments of all groups should encourage for the poorest groups.

1. Introduction

In the field of social sciences, interest in non-monetary analysis of well-being is not recent. In 1962, Richard Titmuss already recommended that studies about the concepts of equality and inequality go beyond conventional analyze that focuses on income. We also have authors such as Rawls (1971) with his major work entitled "Theory of Justice", which devotes Renewal of the welfare of the economy. However, it was only in the 1980s with the work of Sen (1981; 1982; 1985) that non-monetary analysis of wellbeing truly integrates the sphere of the economy. The concept of assets initiated by Sherraden (1990; 1991) reinforces this vision. Indeed, the different categories of identified assets (financial, human, natural, physical, social)[1] clearly allows one to understand the different dimensions of well-being. Also as

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[1] See Moser (2008), Moser and Stein (2011).

pointed by Moser and Stein (2011), the concept of assets is consistent and seamlessly integrates aspects of well-being included in the Millennium Development Goals (MDGs).

The concept of ethnicity also appears to be important in the analysis of well-being because, as pointed out by some authors (Alesina and Spolaore, 1997; Goldin and Katz, 1998; Caselli and Colleman II, 2013), it can be crucial in the process of production and distribution of assets. Bollinger and Hofstede (1987), Davidson and Jordan (1996) show that because culture influences the perception and interpretation that we have in society and the world, it can affect the well-being of populations. In Cameroon, as in many other south Saharan's African countries, membership of an ethnic group is an important aspect of the identity of an individual. In a context where resources are limited, so it is common for individuals or groups to be in competition for control of these resources.

The rise in interest today for the non-monetary dimensions of well-being is enhanced by the development of measurement instruments to quantify it. Usually, if a composite indicator[2] can capture the non-monetary aspects of well-being, most of the developments here concerns the determination of the weights used in the construction of these indicators. These weights can be uniform, determined on the basis of value judgments, determined using mathematical techniques (fuzzy sets), statistics (multivariate statistical analysis) or econometric or be a combination of several of these criteria. The OECD (2003, 2008) presents an extensive comprehensive review of the literature of techniques commonly used.

Interest for non-income dimensions of well-being in Cameroon is perceptible through a number of works. Can be mention in this regard the work of Foko et al. (2006), Njong and Ningaye (2008), Araar (2009), Njong (2010), Manga and Epo (2011), Epo and Baye (2011) and Mpenya (2012), all based on the Sen's capability approach. The composite indicators developed by these authors use either multiple factor analysis (Foko et al., 2006) or the principal component analysis (Njong and Ningaye 2008; Manga and Epo, 2011), or multiple correspondence analysis (Araar, 2009; Njong, 2010; Epo and Baye, 2011; Mpenya, 2012) or the fuzzy sets approach (Njong and Ningaye, 2008).

Njong and Ningaye (2008) analysis particularly caught our attention because they compare the composite indicators obtained from three different methodologies: the fuzzy sets approach, the multiple correspondence analysis (MCA) and the polychoric principal

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[2] A composite indicator of well-being is defined for each unit in the population and represents the aggregate value of several primary indicators using a functional form.

component analysis (PPCA). This study remains one of the few to implement the PPCA to measure well-being of households in Cameroon. It also shows that the results obtained by this method may be significantly different from those provided by the two others (MCA and fuzzy sets). Although it is difficult to say exactly which of these methods provided better results, the relevance of it[3] and the fact that it can be distinguished from the others certainly merits our attention. In addition, there is an absence of work on the concept of ethnicity and household assets endowment in Cameroon.

We therefore propose in this work to analyze the welfare of households through the concept of asset. The fundamental question of our analysis is the following: what is the ethnic structure of the multiple dimensions of well-being (assets) in Cameroon between 2001 and 2007? This main question implies two secondary questions:

1- How is the distribution of welfare between different ethnic groups in 2001 and 2007?
2- How has well-being evolved within different ethnic groups between 2001 and 2007?

The purpose of this work is to analyze the ethnic structure of the multiple dimensions of well-being in Cameroon between 2001 and 2007, and will require that:

1- We identify and measure the assets endowment of households of different ethnic groups;
2- We compare these ethnic groups in terms of their assets endowment in 2001 and 2007 ;
3- We analyze the evolution of assets endowment for each of these ethnic groups between 2001 and 2007.

The rest of the paper is organized as follows, section 2 is devoted to the developments on the concept of assets and measures of well-being as well as on the work taking into account the concept of ethnicity, Section 3 will be devoted to methodology, we will present results in section 4 and the conclusion in section 5.

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[3] The principle of polychoric correlations is ideal for discrete categorical variables unlike Pearson correlations. The implementation of the CPA to the matrix of polychoric correlations is therefore a method entirely appropriate and justified.

2. Concept and measurement of assets

2.1. The concept of asset

Theoretical developments on the asset concept are fairly recent. This concept is inspired from both: Sen's capability approach (1981, 1982) and developments of Chambers (1992, 1994) on vulnerability[4]. The original work on the concept of asset was Sherraden (1990, 1991). It is indeed one of the first researchers to introduce the concept and propose that it was in the future the new approach on which public policies on welfare are forged. A starting point was the lack of effectiveness of social policies implemented by the US government. Policies focused primarily on income or consumption of households/individuals. The same observation is done by Dani and Moser (2008) against developing countries which, despite their impressive growth since the late 1990s, struggling to translate these good performance in improving the well-being and development.

Concerning income, Sherraden (1991) points out that "Even if there is a strong relationship between income and assets, these concepts are very different." Indeed, for him, the assets are similar to a stock of wealth held in the household. While in contrast, income refers to the flow of outstanding resources within the household, concept he associated with the consumption of goods and services and the living standard. He emphasized that policies to improve the welfare of poor households were exclusively constructed on the basis of flows (income, expenses), which are permanently in movement and thus unstable. He then proposed that the policy to improve the well-being should be built on the households stock of wealth (assets) much more stable, and based on the concepts of savings, investment and asset accumulation.

Bebbington (1999) argues that assets improve individual's self-perception and their capacity to act. Paraphrasing Sen (1997), he noted that the possession of human capital not only allows the individual to produce more and to be more efficient, it also gives him the ability to invest more successfully and discernment in the world, and more importantly gives him the ability to change the world. He argues that this is also true for other types of capital (physical, cultural, social, natural). He also further points out, referring to Giddens (1979), that the theory not only considers those assets as a means of survival, adaptation, and the fight against poverty, but they are also the source of the power of agents, their ability to act and play, to oppose or change the rules that govern society, use and transform resources. Finally referring to

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[4] Vulnerability is defined as exposure to risk and chance or skill/ability to manage risk resulting from this exposure (Moser, 1998; Sabates-Wheeler and Haddad, 2005).

Habermas (1971), he noted that these assets can be considered as means of transmission of the executed action (to life), interpreted action (make life more pleasant) and the action of emancipation (fight against the structures that limit our blossoming).

Dani and Moser (2008) study how attention to the concept of assets may increase the effectiveness of public policies and facilitate economic and social development by increasing capacity of individuals to accumulate and consolidate their assets, obtain high profits of these assets and secure their source of income, so as to reduce their exposure to shock and other hazards that may affect the economy.

Moser (2008) observed that Households/Individuals asset-building strategy is influenced by the institutions (Laws, norms, regulatory framework) and the opportunities offered by the Political and Economic Context. She recommended that public interventions to support asset accumulation strategies also attach importance to strengthening institutions and opportunities. She distinguishes among asset accumulation strategies, first-generation policies and those of the second generation. First-generation policies consist to production of economic and social infrastructures for human, physical and financial assets without guaranteeing their accumulation. Second generations policies were characterized by public action that facilitate the consolidation of accumulated assets and protect them against possible damage.

So for Moser (2008), weak capacity of the administrative and legal system, political instability, violence and crime, as well as the lack of effective disaster management systems in developing countries can limit the accumulation of assets. Second generation policies for their establishment require the conditions of good governance (ensure the rights and safety of citizens, build reliable and responsible institutions). Moser (2008) uses assets endowment as indicators of the means available to individuals or groups.

Many international researchers and institutions today are favorable to Asset building approach. The World Bank, in its strategy for Social Development in 2005 (World Bank, 2005) we read: "development interventions require both to build assets and improve the benefits of these assets by the transformation of economic and social institutions". In its 2000 Human Development Report, the World Bank notes that empowerment and capacity building is directly related to the expansion of assets. Narayan (2005) following the same logic as the World Bank said: "Empowerment is the expansion of assets and capabilities of the poor in order to participate, negotiate, influence, control and take over the responsibility to the institutions that affect their lives". Alsop et al. (2006) measured the empowerment and found

that it is mainly influenced by the resources[5] available, the environment and the opportunity[6] structure.

If since Sherraden (1990, 1991) several assets have been identified, the literature today allows to classify them into five major groups: physical assets, financial assets, human assets, social assets, natural assets. The definition and classification of these assets result of the work of many researchers, the main ones Putnam (1993), Narayan (1997), Carney (1998), Moser (1998) Doors (1998) and Bebbington (1999).Physical assets denote a stock of plants, equipment, infrastructure and other productive resources owned by individuals, companies or state. Financial assets include the financial resources available to individuals (savings, credit offers). Human assets consist of investments in education, health and nutrition of individuals. Labor is related to investments in human capital. The health status determines the ability of individuals to work, while training and education determine the benefits they derive from their work. Social assets are intangible assets, defined as rules, norms, obligations, reciprocity and trust that characterize social relations, social structures and functioning of social institutions. It is present both in the microstructures (communities, households) in the regulatory rules and systems that govern the formal institutions in the market, the political system and civil society. Moser (2006) points out in this connection that the trust and cooperation that form the basis of the share capital of a community is essential for poor households. Natural assets represent the stock of natural assets such as land, atmosphere, forests, minerals, water and marshy areas. In rural communities, land is an extremely important productive asset for the poor, while in urban areas the land needed to build housing is also a very important asset.

In addition to these five clearly identified assets, we also found other assets in literature. These assets are related to individuals aspirations (Appadurai, 2004), their psychology (thinking) (Alsop et al., 2006), production (Moser and Felton, 2007), political and human rights man (Ferguson et al., 2006). And even if their definition and identification have yet to be perfected, these developments reflect the interest and energy of researchers and scientific community in this field of research.

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[5] The means (agency) refer to the ability/capacity of actors to make coherent choices (Alsop and Heinsohn, 2005).

[6] The opportunity structure is defined as the formal and informal context within which the actors operate. This context includes laws, the regulatory framework, norms governing the behavior of individuals (Alsop and Heinsohn, 2005).

Today as the Santiago emphasizes (2011), the main limitations of asset based approach concern the lack of empirical studies and critics in the field. This is indeed a field of research still under construction.

2.2. Ethnicity and Well-being

Many researchers are interested in the effects of the inclusion of ethnicity on the economy. Studies that have examined the economic impact of trust (Fisman, 2003; Tong, 2005) have shown that trust facilitates the achievement of certain economic transactions such as long-term contracts (Guiso, Sapienza and Zingales, 2001). Trust can be established precisely by ethnic ties or membership in a region. Other studies have shown that ethnic networks facilitate the acquisition and dissemination of knowledge, and Kerr (2005), for example, concludes that "scientific ethnic community" plays an important role in the international diffusion of technology.

Kalnins and Chung (2006) in the United States show that immigrant entrepreneurs originally from the Indian state of Gujarat and working in the industrial sector of the rental housing have benefited from the social capital from their ethnic group, when group members are already firmly located in the sector. Agrawal et al. (2007) in their study on access to knowledge have shown that the closeness and belonging to the same ethnic group contribute to the dissemination of knowledge and the marginal benefit from the proximity is less than that resulting from the belonging to the same ethnic group (ethnic group here refers to the inventor community).

Nopo et al. (2004) analyze the relationship between ethnicity and participation in the labor market in Peru. The ethnic group is defined here with respect to several variables, which are: the mother tongue, religion, migrant status and race. To understand the racial differences in the context of what the racial diversity of Peru, the authors use the scores to understand the racial characteristics. They find that the multidimensional indicator of the race is correlated with human capital, physical assets and access to public services.

Other studies have shown that there is a negative relationship between racial diversity and ethnicity and social cohesion that can be measured by the collective trust between individuals (Stolle and Harrell, 2012; Putnam, 2007; Marshall and Stolle, 2004) . Putnam (2007), short-term ethnic diversity may reduce social solidarity, social capital and especially social trust among citizens. Stolle and Harrell (2012) show that the participation of people from different

cultures collective activities requiring physical exchanges and contacts has positive effects on social cohesion and collective trust.

3. Methodology

This section is devoted to the presentation of the method of construction of the composite indicator, stochastic dominance, and data used.

3.1. Composite indicator of wellbeing (CIW)

It is generally agreed that the use of CIW allow to summarize in a single value information about one or more wellness dimensions. The aggregation is done through a functional form, the most widely used functional form that is the one we used for the construction of various composite indicators is as follows:

$$C_{nt}^l = \sum_{j=1}^{J} w^{l,j} d_{nt}^{l,j} \qquad (1)$$

With C the CIW, l the type of assets (physical, financial, human, social), n the number or value of the household, t the period (year) considered, $d^{l,j}(j=1,2,...,J)$ the variables that make up the asset l, $w^{l,j}(j=1,2,...,J)$ the weights associated with variables of asset l. C_{nt}^l represents endowment in assets l of household n for the year t.

If the $d^{l,j}$ for different households and different periods are known, it is not the same for $w^{l,j}$. These weights are determined using polychoric principal analysis (PPCA) as initiating and by Kolenikov Angeles (2004).

3.1.1. Asset Index: A Polychoric Principal Component Analysis Approach

Assuming a household's welfare portfolio can be measured in terms of a number of assets endowments, composed of J types of assets. Each of these's assets may be measured using a binary, ordinal, or cardinal variable. The idea here is to assign a weight, w, to each item and then sum up the weighted variables to obtain a household asset endowment. Since these weights are not observed, they can be determined by applying the PCA on household assets (Filmer and Pritchett, 2001). Given that variables used in this study are not continues, Pearson's correlation principle do not produce adequate results. This correlation is replaced by the polychoric correlation adapted to categorical variables obtained via the Polychoric PCA (Kolenikov and Angeles, 2004). Olsson (1979) explains in detail how to calculate the

polychoric correlations using the maximum likelihood method. In adapting the polychoric PCA approach, we use a simple procedure in two phases: (1) adopt the methodology as in Kolenikov and Angeles (2004), in which they develop an approach to compute the polychoric correlation between two ordinal variables and (2) introduce recommendations on implications of extending this approach to multivariate analysis (Joreskog, 2004a).

In a multivariate setting with more than two variables, the estimate of the correlation matrix is obtained by combining the pair wise of the polychoric correlation in the estimation procedure. Jöreskog (2004a) refers to methods of this type as "bivariate information maximum likelihood" (BIML). The full information likelihood obtained by writing out the full multivariate likelihood and maximizing it over the thresholds and correlation coefficients (Kolenikov and Angeles, 2004; Joresborg, 2004b). Having estimated the polychoric correlations we will then proceed to determine the asset welfare index in the standard manner as the Principal Component Analysis (PCA), by solving the eigen problem for the estimated correlation matrix. This index equates itself to the first Polychoric PCA component which translates the factorial axis that reveals the greatest amount of information, same for the second.

3.2. Stochastic dominance test

The principle of stochastic dominance is very useful when we want to compare two distributions. The first application of this method in economics dates back to Atkinson (1987), Foster and Shorrocks (1988a; 1988b). The relevance of this method is that it allows us to compare two distributions based on overall points. The results obtained are more robust than those based on single indicators (average for example) (Davidson and Duclos, 2009).

If we consider two distributions A and B and their cumulative function F_A and F_B. From the point of view of the first order stochastic dominance, B dominates A if for all belonging to the domain of definition of these functions. We say that the expected utility as well as the social welfare is higher in B compared to A for all functions of utility and welfare symmetric and increasing social. On the other hand all poverty indices checking the symmetry properties and decay have a lower value B relative to A.

The empirical cumulative distribution function can be defined as follows:

$$\hat{F}_k(z) = \frac{1}{N_k} \sum_{i=1}^{N_k} I\left(y_i^k \leq z\right) \qquad (2)$$

With I (.) an indicator that takes value 1 if the condition is true and 0 otherwise.

We then say from the point of view of the first order stochastic dominance that A dominates B if $\forall z \in A \cup B, \ F_A(z) \geq F_B(z)$. By integrating these functions we obtain the second order stochastic dominance.

3.3. Data

The data used are from the second and third Cameroon household survey (ECAM II and III) conducted respectively in 2001 and 2007 by the National Statistics Institute (INS). Both databases have enough information (variables) for the four selected types of assets (physical, financial, human and social).

Physical assets inform about the type of household housing, goods equipment they have, and their access to certain amenities and public goods (electricity, water) (see Table 1). These assets are of paramount importance for households and most policies aimed at improving the welfare of the poorest populations are targeted primarily those aspects of their lives.

Human assets provide information about the household health, their education levels, ease of access to health and education infrastructure (see Table 1). The emphasis on the human asset has increased dramatically in recent years, improving the health, education occupied an important place in the Poverty Reduction Strategy Poverty government (Government of Cameroon, 2003) and now occupies an important place in the government's policy to stimulate growth and employment (Government of Cameroon 2009).

Financial assets are apprehended through the information on household savings, access to financial services, ownership of durable goods and food expenditures (see Table 1). With the development of micro-finance institutions, they are now expanding because it allows access to financial services to a segment of the population that had previously been excluded. Its importance stems largely from the positive effect it can have on other types of assets, the latter being increasingly financed access to financial assets can therefore facilitate the acquisition.

Social assets are the last studied, are also those on which we have less information. Only three variables were selected (see Table 1) due to data availability. But the growing importance of the latter, the few studies on the subject, and the ability to link to all other types of assets, has led us to maintain in the analysis.

Data in this study has been pre-treated, they were recoded and terms were stored in an ascending order of importance for all assets. The Cronbach alpha test then allowed us to ensure the appropriateness of coding and internal consistency. Finally missing values were deleted.

Table1: Variables used in the study

Capital Type	Asset index categories	Index components
Physical capital	Housing Quality	Roof material; Walls material; Floor material; Lighting source; Main source of energy for cooking; Toilet type; Waste Disposal; Access to portable water
	Household Consumer Durables	Telephone mobile; Iron; Gas Bottle; Household owns Television; Household owns Radio; Refrigerator
Financial/productive capital	Financial security	Access to Credit in the last twelfth month; Household owns savings; Household owns actions, Household owns land
Human capital	Education	Level of education; Distance to the nearest (public/private) primary school; Time to the nearest (public/private) primary school
	Health	Distance to the nearest health center; Time to the nearest health center
Social capital		HHH practices some Religion; Household head belongs to an association; Being married

Sources: Compiled by authors using the ECAM II and ECAM III surveys

Using two databases we have to take certain precautions. To ensure the relevance of comparisons to be made between 2001 and 2007, the two databases were merged for the purposes of calculating the weights associated with each variable. Thus, the same weights were used to calculate the CIW in 2001 and 2007. Also in order to facilitate comparisons between different types of assets, CIW are standardized. The normalization method used here is that of the Min-Max, it allows to leave the values of the CIW in the meantime, the value being assigned to households with welfare lowest corresponding to the households with the well-being higher. The procedure is as follows:

Construction of ethnics groups

To carry out the analysis suggested in this proposal, the variable reflecting ethnic identity will be constructed because the current data sets do not include this variable. To construct this variable, we use the administrative organization at departmental levels and given the high numbers of ethnics in Cameroon, we limit our analysis to the four main ethnic groups in Cameroon. They include: the bantus from the coastal region, the bantus from the forest region, the semi-bantus and the peulhs and associated ethnic (TAFAG)[7]. The administrative maps will enable us localize these different ethnics and the administrative organization of the country will help us outline the ethics by departments. By superposing both sets of

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[7] Peulhs and associated ethnic (TAFAG) regroup five subgroup: Tikar (T), Arabs Choas (A), Fulhani (F) or Peulhs, Adamawa (A) and Gbaya (G).

information we will be able to identify the department or departments in which we find the different ethnics. Furthermore, using variable in the CHCS I and II that indicate the department of residence, we will identify households belonging to that ethnic group. In a situation where there are several ethnics in a department, we chose the main dominant ethnic group. To reduce mixed races, we do not include households residing in urban centers because these areas are generally cosmopolitan in nature.

4. Results

4.1. Description of different types of assets

The results of the ACP and the scores of the various assets on the first factorial axis allows for some comments.

Physical assets

Table 2 shows first factorial axis results for physical capital. All coordinates on the first factorial axis are positive and relatively low. This is indication that having access to an endowment does not necessarily entail being endowed with another modality. This implies that facilities that make up physical assets are heterogeneous. Endowments that largely contribute in explaining physical assets are those relative to housing characteristics (type of floor, roof and sanitary installations), equipments such as owning a gas bottle, television, refrigerator, main source of cooking energy, owning an iron and the principal source of lighting (Table 2). Housing quality contributes most in accounting for the construction of physical assets. This result corroborates findings by Ford Foundation (2002, 2004), Moser (2006) and Moser and Felton (2007a).

Table 2: physical assets

Variables	Number of households		Frequencies (%)		Min	Max	Scores	
	2001	2007	2001	2007			1st Axis	2nd Axis
Access to portable water: pmae	**8671**	**9225**	**100**	**100**	**1**	**5**	**0.2623**	**-0.1699**
1 : Wells/rivers/lake/streams/non sanitized sources			24.08	21.36				
2 : Electric wells/sanitized sources			14.73	17.52				
3 : Public taps/forages/other types of taps			13.69	20.36				
4 : Sold water SNEC/CAMWATER			27.26	23.49				
5 : Collective or individual taps/mineral water			20.24	17.28				
Principal lighting source : ecla	**8671**	**9225**	**100**	**100**	**1**	**4**	**0.2736**	**0.2136**
1 : Petrol			36.03	36.95				
2 : Collective electric meter without a dividing meter			2.12	23.61				
3 : Collective electric meter with a dividing meter			26.78	20.93				
4 : Individual electric meter AES SONEL			35.07	18.50				
Principal source of cooking energy: psec	**8671**	**9225**	**100**	**100**	**1**	**4**	**0.2826**	**-0.1862**
1 : Gathered firewood/others			37.64	39.71				
2 : Bought firewood			31.14	27.34				
3 : Petrol/charcoal/sawdust			13.12	14.68				
4 : Cooking gas/ electricity			18.09	18.28				
Mode of waste disposal: ordu	**8671**	**9225**	**100**	**100**	**1**	**3**	**0.1996**	**-0.4016**
1 : Disposed in nature			67.92	68.78				
2 : Buried/burnt/recycled/others			10.49	9.40				
3 : Collected by truck/garbage collection			21.59	21.82				
Type of toilet: tpwc	**8671**	**9225**	**100**	**100**	**1**	**4**	**0.2751**	**0.0105**
1 : No toilet			2.55	5.4				
2 : Non sanitized latrine			41.76	50.42				
3 : Sanitized latrine			45.52	34.42				
4 : Water system toilet			10.17	9.63				
Wall type: murs	**8671**	**9225**	**100**	**100**	**1**	**4**	**0.2273**	**-0.2117**
1 : Ground/ mats/leaf/others			18.67	10.03				
2 : Ground bricks			33.51	39.99				
3 : Wood			14.17	10.71				
4 : Cement bricks/concrete/stone/baked ground bricks			33.64	39.27				
Roof material : toit	**8671**	**9225**	**100**	**100**	**1**	**2**	**0.2998**	**-0.0593**
1 : Mat/leafs/others			8.72	11.21				
2 : Zinc /cement			91.28	88.79				
Floor material: sol	**8671**	**9225**	**100**	**100**	**1**	**2**	**0.3097**	**-0.0828**
1 : ground/wood/others			35.58	35.23				
2 : Cement/tiles			64.42	64.77				
Own a mobile phone : equipe2	**8671**	**9225**	**100**	**100**	**1**	**2**	**0.2291**	**-0.2491**
1 : No			90.51	42.89				
2 : Yes			9.49	57.11				
Own a radio : equipe3	**8671**	**9225**	**100**	**100**	**1**	**2**	**0.1698**	**0.7107**
1 : No			36.71	45.95				
2 : Yes			63.29	54.05				
Own a refrigerator : pofrig	**8671**	**9225**	**100**	**100**	**1**	**2**	**0.2869**	**0.1455**
1 : No			87.01	89.90				
2 : Yes			12.99	10.10				
Own a television : equipe14	**8671**	**9225**	**100**	**100**	**1**	**2**	**0.2971**	**0.0757**
1 : No			73.13	59.44				
2 : Yes			26.87	40.56				
Own an iron: equipe15	**8671**	**9225**	**100**	**100**	**1**	**2**	**0.2774**	**0.2832**
1 : No			54.66	67.89				
2 : Yes			45.34	32.11				
Own a Gas bottle : equipe17	**8671**	**9225**	**100**	**100**	**1**	**2**	**0.3077**	**0.0038**
1 : No			73.53	73.12				
2 : Yes			26.47	26.88				
Les scores ou pondérations représentent les coordonnées des variables sur le premier axe factoriel de l'ACP polychoric.								

<u>Source:</u> Constructed by authors using data from the second and third Cameroon household consumption survey.

Human assets

Table 3: Human assets

Variables	Number of households		Frequencies (%)		Min.	Max.	Scores	
	2001	2007	2001	2007			1st Axis	2nd Axis
Level of education of household head: nivinscm 1 : No education 2 : Primary 3 : Secondary 1st cycle 4 : Secondary 2nd cycle 5 : tertiary	8671	9225	**100** 22.70 32.73 22.21 13.87 8.49	**100** 21.75 32.96 21.25 15.93 8.11	1	5	**0.2401**	**-0.2123**
Distance from household to the nearest public primary school: dist_1 1 : Above 4 km 2 : Between 2 and 3 km 3 : 1 km 4 : Less than 1 km	8671	9225	**100** 6 21.12 36.77 36.12	**100** 4.05 19.91 37.22 38.81	1	4	**0.3073**	**0.6284**
Distance from household to the nearest private primary school: dist_2 1 : Above 4 km 2 : Between 2 and 3 km 3 : 1 km 4 : Less than 1 km	8671	9225	**100** 18.63 15.25 26.93 39.20	**100** 17.97 14.45 25.41 42.17	1	4	**0.4235**	**-0.3399**
Distance from household to the nearest health district centre: dist_6 1 : Above 4 km 2 : Between 2 and 3 km 3 : 1 km 4 : Less than 1 km	8671	9225	**100** 20.49 27.16 26.97 25.37	**100** 20.52 24.89 26.81 27.78	1	4	**0.4093**	**-0.1078**
Average time needed to arrive at the nearest public primary school: temp_1 1 : More than 30 minutes 2 : Between 16 and 30 minutes 3 : Between 6 and 15 minutes 4 : Less than 5 minutes	8671	9225	**100** 10.15 25.42 43.55 20.89	**100** 6.89 17.89 49.37 25.76	1	4	**0.3405**	**0.5880**
Average time needed to arrive at the nearest private primary school: temp_2 1 : More than 30 minutes 2 : Between 16 and 30 minutes 3 : Between 6 and 15 minutes 4 : Less than 5 minutes	8671	9225	**100** 17.61 19.87 39.22 23.30	**100** 15.01 16.20 40.68 28.11	1	4	**0.4402**	**-0.2884**
Average time needed to arrive at the nearest health district centre: temp_6 1 : More than 30 minutes 2 : Between 16 and 30 minutes 3 : Between 6 and 15 minutes 4 : Less than 5 minutes	8671	9225	**100** 17 23.69 40.35 18.96	**100** 14.58 18.37 42.96 24.09	1	4	**0.4373**	**-0.0625**

Source: Constructed by authors using data from the second and third Cameroon household consumption survey.

Endowments that make the welfare composite index (WCI) for human capital indicate that endowments linked to health (distance between households and integrated health district centres and the average time necessary to go to these centres) and schooling (distance between households and the nearest public (private) primary school, and the average time necessary to go to these schools) infrastructures largely explain this asset (Table 3). The question of access (see Bebbington, 1999) to infrastructure constitutes the main problem associated to human asset. Households better endowed with this asset are households having easy access due to their proximity to these infrastructures and therefore take less time to

access this asset, thereby gaining some economy of scales in terms of time which they can use for other income generating activities.

Financial assets

Table 4: Financial assets

Variables	Number of households		Frequencies (%)		Min.	Max.	Scores	
	2001	2007	2001	2007			1st Axis	2nd Axis
Obtain a bank credit during the last 12 months: obcra 1 : No 2 : Yes	8671	9241	100 95.58 4.42	100 95.67 4.33	1	2	0.4810	0.1262
Own land title or business shares: poact 1 : No 2 : Yes	8671	9241	100 98.71 1.29	100 99.02 0.98	1	2	0.6436	-0.1066
Own savings: poepa 1 : No 2 : Yes	8671	9241	100 59.62 40.38	100 69.07 30.93	1	2	0.5627	-0.3097
Own land: potrr 1 : No 2 : Yes	8671	9241	100 46.42 53.58	100 48.92 51.08	1	2	0.1945	0.9364

Source: Constructed by authors using data from the second and third Cameroon household consumption survey.

Scores obtained from the Polychoric PCA for financial asset indicate relatively higher values than physical or human assets. These scores had average values of 0.57, the indication is that households who are well endow for one component of this asset, tend also be endowed with the others and vice versa. We also observe that only few households obtained a bank credit or own land title or business share. These results indicate that a small number of household are well-endow with all components of this asset and, a large number of households do not own any financial endowments.

Social assets

Table5: Social assets

Variables	Number of households		Frequencies (%)		Min.	Max.	Scores	
	2001	2001	2001	2007			1st Axis	2nd Axis
Type of religion: religion 1 : Atheist/other 2 : Christian/Moslem	8671	9225	100 6.03 93.97	100 7.48 92.52	1	2	0.1132	0.8889
Household member belongs to an association: association 1 : No 2 : Yes	8671	9225	100 40.30 59.70	100 51.28 48.72	1	2	0.7281	0.2297
Married: marié 1 : No 2 : Yes	8671	9225	100 41.39 58.61	100 43.77 56.23	1	2	0.6760	-0.3963

Source: Constructed by authors using data from the second and third Cameroon household consumption survey.

Whereas two endowments that explain this asset have high scores (member of an association and marital status), a third have a low score (belonging to a religious community). This may indicate that in general, household heads that are married also belong to an association

(37,24% and 29,5% of households in 2001 and 2007 are married and belong to an association, whereas 18,93% and 24,55% do not fulfil these two conditions). These two assets are more representative of the WCI of the social asset (See Table 5).

4.2. Comparison of asset type by ethnicity

A comparison of the different types of assets allows us to rank them according to their level of importance within households. Thus, households seem better endowed with social assets, followed by human assets, physical assets and finally financial assets (see Table in Appendix 2). Note however that this ranking does not necessarily reflect their importance to the well-being of households. If we look, for example, the correlations between these different types of assets and the monetary dimension of well-being captured by the expenditure per consumption unit, we observe that physical assets are more highly correlated with spending, followed by financial assets, human assets and finally social assets (see table in Appendix 1).

It is also observed that physical assets are highly correlated with human assets and vice versa, financial assets strongly correlated to physical assets, and social assets highly correlated to financial assets.

Expenditure per adult equivalence

The analysis of the cumulative distributions of expenditures per adult equivalence for the different ethnic groups shows that in 2001, the Bantu coast dominates all other groups. Then follow respectively Semi-Bantus, Bantus from Coast Ethnic and peulhs and associated ethnic (TAFAG). However, the differences between these groups are very low. In 2007, there has been a clear domination of the Bantus from Coast while Ethnics from the north are dominated by other groups. It is also observed that unlike 2001, in 2007 the Semi-Bantus were slightly dominated by Bantus of Forest. On the other hand, the welfare (monetary) of all these groups deteriorated between 2001 and 2007. Furthermore, the peulhs and associated ethnic appears to have suffered the greatest form of deterioration between 2001 and 2007. This may explain the fact that the gap between this group and the other ethnic groups increased over the period.
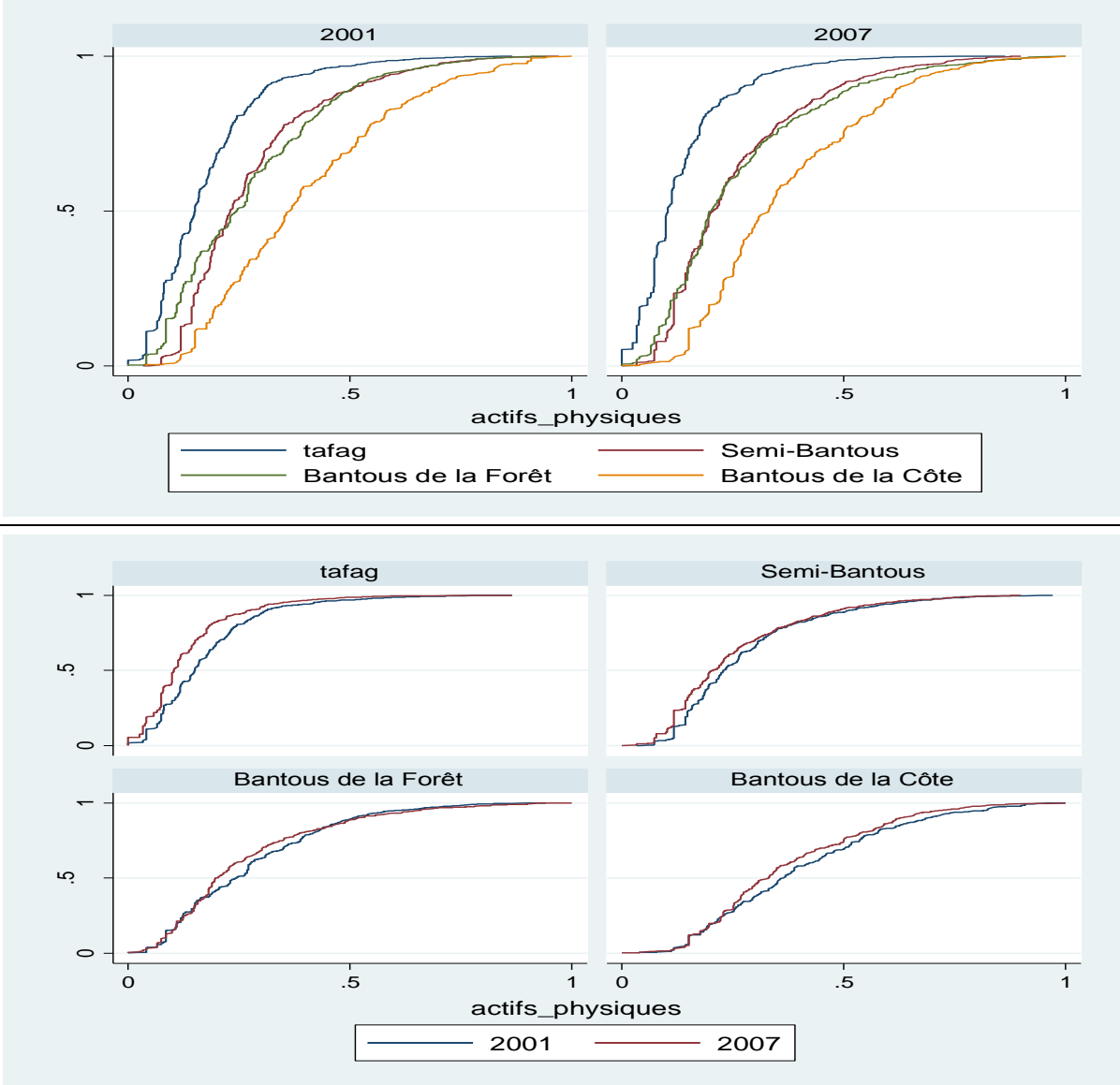
Graphs 2a and 2b:
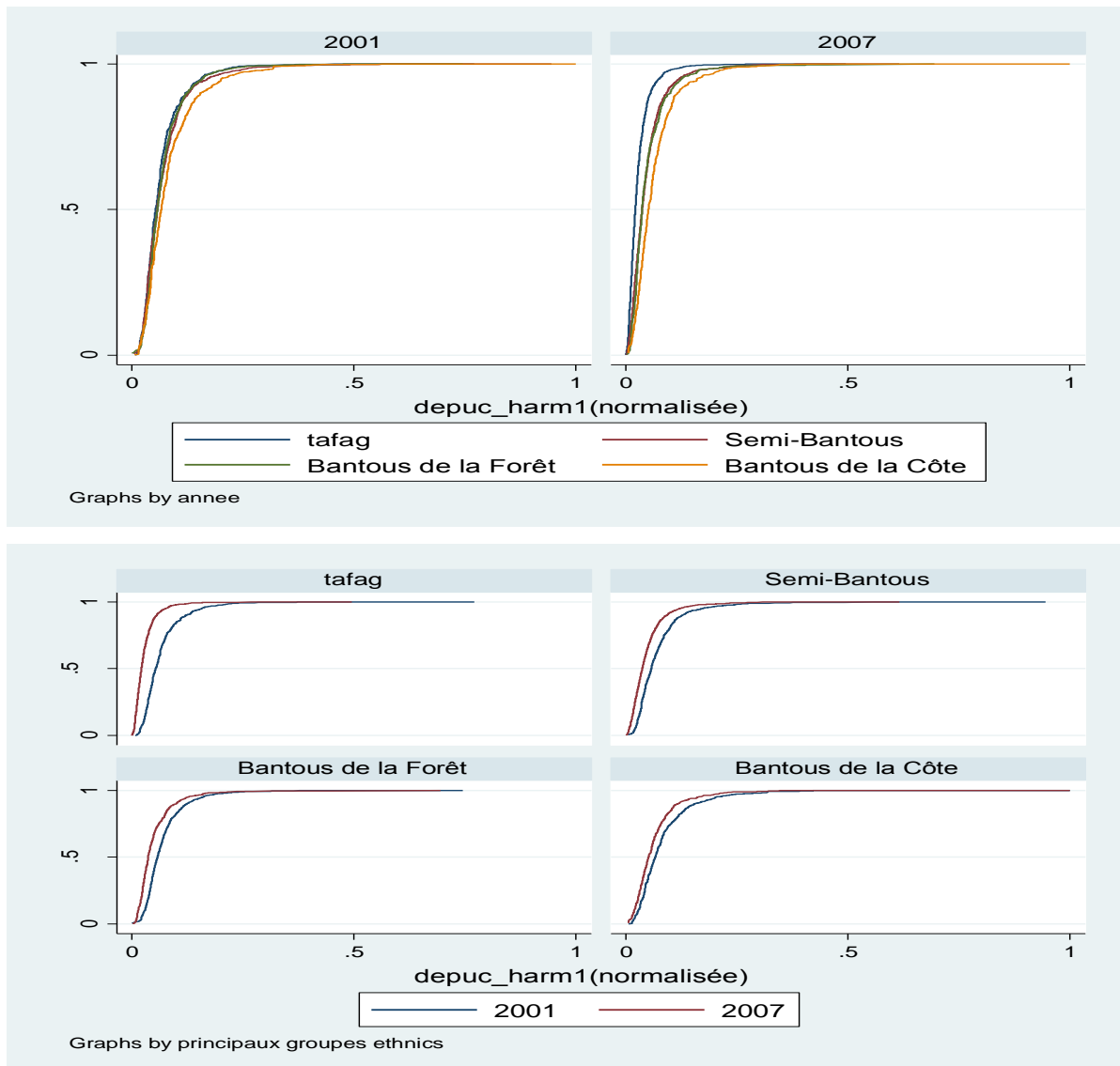
Source: Computed by authors using the second and third Cameroon household consumption survey and DASP 2.2.

Physical assets

An analysis of the cumulative distributions of expenditures per consumption unit of different ethnic groups (charts) shows that in 2001, the Bantus of coastal ethnic group dominated all other groups. Then follow respectively Semi-Bantus, Bantus of forest, peulhs and associated ethnic (TAFAG), although the differences between these groups are very low. In 2007, there was a clear domination of the Bantus from Coast, while peulhs and associated ethnic were dominated by all others groups. It is also observed that unlike 2001, in 2007 the Semi-Bantu were slightly dominated by Bantus of Forest. On the other hand, the welfare (monetary) of all these groups has deteriorated between 2001 and 2007. Peulhs and associated ethnic (TAFAG)

appear to have suffered the greatest damage. This may explain the fact that the gap between this group and the others is increased over the period.
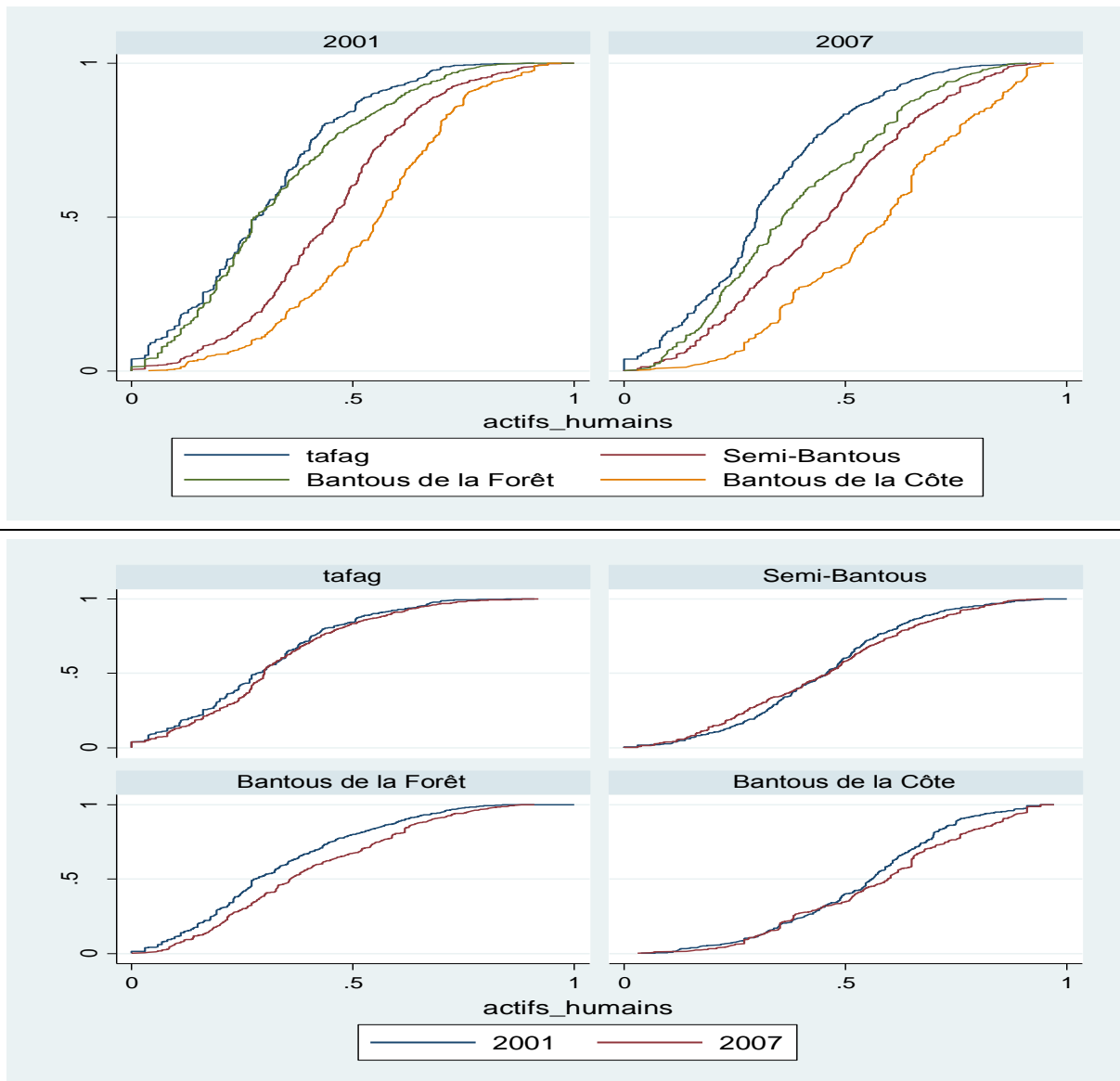
Graphiques 3a et 3b:

Source: Computed by authors using the second and third Cameroon household consumption survey and DASP 2.2.

Human assets

Distributions relating to human assets by ethnic groups in an ascending order, and based on their level of ownership of the different assets, show that we have: peulhs and associated ethnic, the Bantus of the Forest, the Semi-Bantu and Bantu from the Coast. In addition, peulhs and associated ethnic and especially the Bantus of Forest recorded an improvement in terms of human assets. Regarding the other groups (Bantu from the Coast and Semi-Bantus), their respective improvements were mainly observed at the top of the distribution.
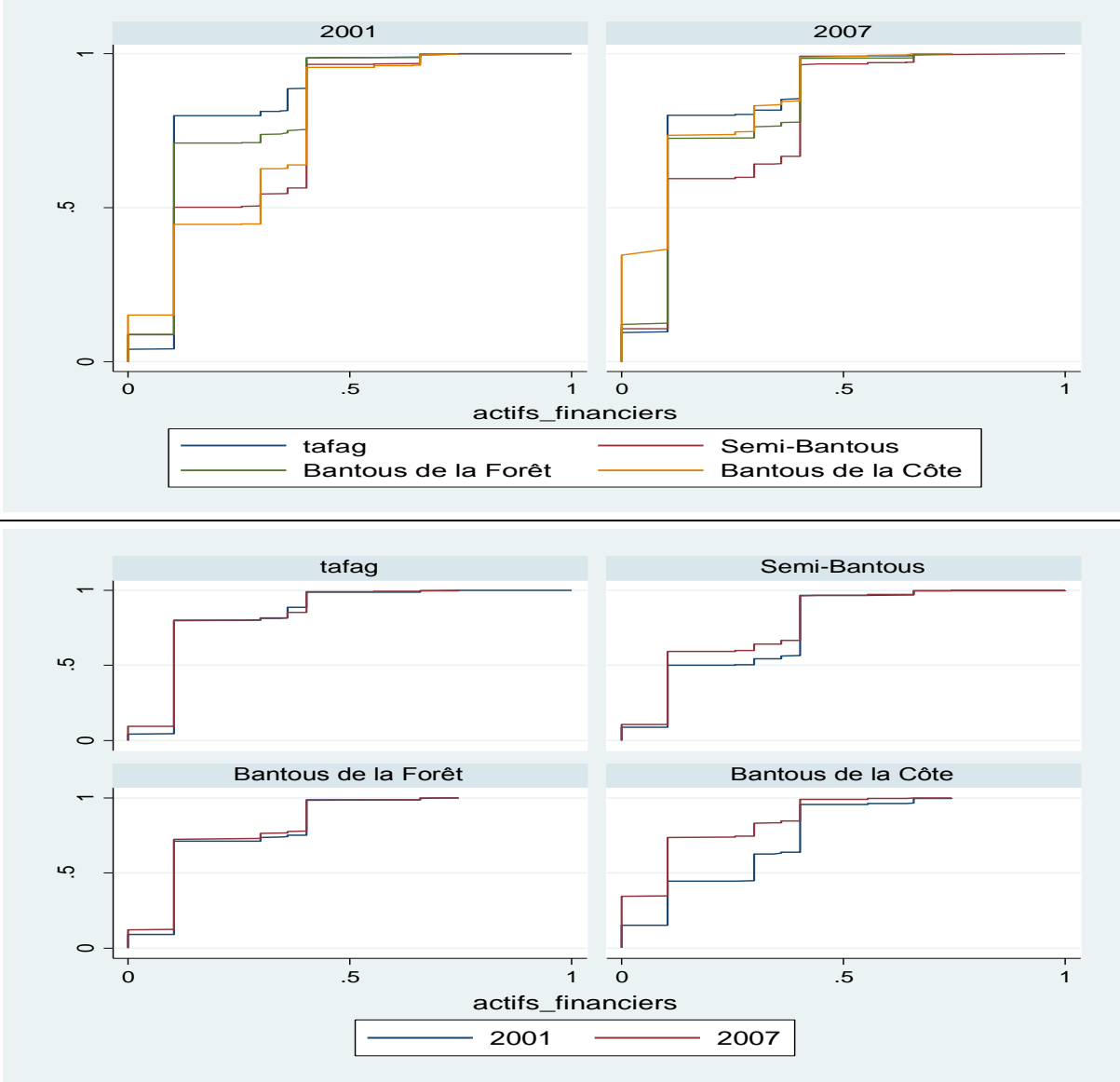
Graphs 4a and 4b:

Source: Computed by authors using the second and third Cameroon household consumption survey and DASP 2.2.

Financial assets

Here we observe a downward trend for financial assets held by the different ethnic groups (the largest decrease was observed for the Bantus from Coast). The configuration of the cumulative curves does not take a clear position on the relationship between the different groups. For these reasons, we resort to the second order dominance. This gives the results in Table 6. We observe that in 2001, peulhs and associated ethnic were dominated by all other groups, while in 2007 they dominate the Bantus of the Coast. Semi-Bantus dominate all other groups in 2007, while in 2001 they were dominated solely by the Bantus of the Coast. In 2001, only the Bantus of Forest dominated peulhs and associated ethnic, while in 2007 they dominate peulhs and associated ethnic and Bantus from Coast. In 2001, while the Bantus from

Coast dominate all other groups in 2007 they were dominated by the other groups. Thus, except for the Bantus from the Coast the situation of all ethnic groups compared to the other seems to have improved slightly.

Graphs 5a and 5b:

Source: Computed by authors using the second and third Cameroon household consumption survey and DASP 2.2.

Table 6

Are dominate / Dominate	2001				2007			
	TAFAG	Semi-bantus	Bantus of Forest	Bantus of Coast	TAFAG	Semi-bantus	Bantus of Forest	Bantus of Coast
TAFAG		Non	Non	Non		Non	Non	Oui
Semi-bantus	Oui		Oui	Non	Oui		Oui	Oui
Bantus of Forest	Oui	Non		Non	Oui	Non		Oui
Bantus of Coast	Oui	Oui	Oui		Non	Non	Non	

Source: Computed by authors using the second and third Cameroon household consumption survey and DASP 2.2.

Social assets

An analysis of distributions for social assets for each ethnic group between 2001 and 2007 indicates a downward trend. By cons, the cumulative distributions for 2001 and 2007 do not allow us to establish an order relation between different groups and we once again appeal to the dominance of the second order. The results are shown in Table 7.

Graphs6a and 6b:
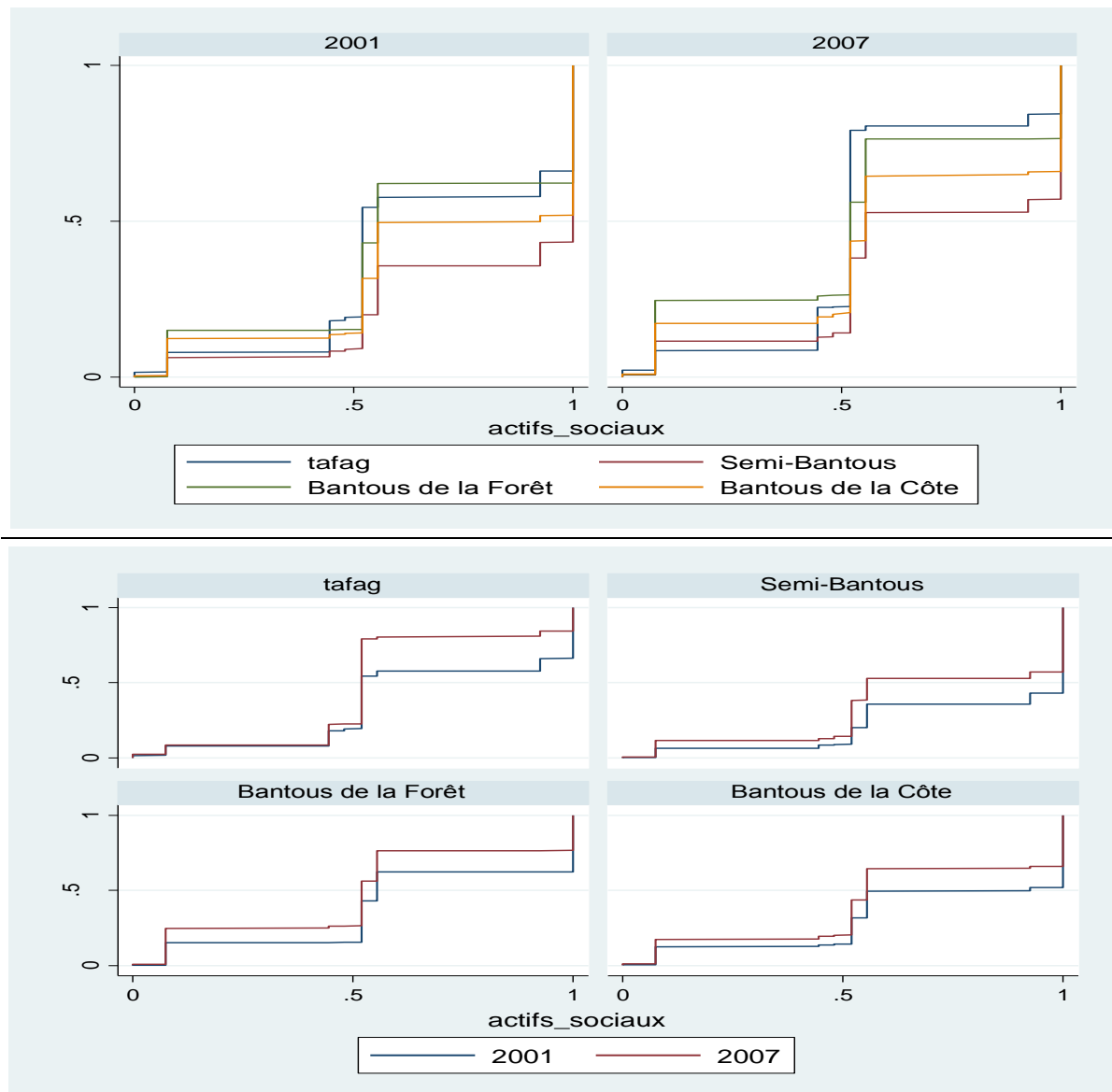
Source: Computed by authors using the second and third Cameroon household consumption survey and DASP 2.2.

These results show that between 2001 and 2007, the situation of peulhs and associated ethnic was every way better than Bantus of Forest. In 2001, Semi-Bantus dominate all other groups, while in 2007 this domination was solely by Bantus of Forest and Bantus from Coast. Bantus

from the Coast in 2001 as in 2007 dominated those of the Forest. This shows that in terms of social assets, the Bantus from Forest are less well endowed.

Table 7 :

| Are dominate / Dominate	2001				2007			
	TAFAG	Semi-bantus	Bantus of Forest	Bantus of Coast	TAFAG	Semi-bantus	Bantus of Forest	Bantus of Coast
TAFAG		Non	Oui	*		**	Oui	***
Semi-bantus	Oui		Oui	Oui	(**)		Oui	Oui
Bantus of Forest	Non	Non		Non	Non	Non		Non
Bantus of Coast	(*)	Non	Oui		(***)	Non	Oui	
* Indicates that before the abscissa point 0.576 endowments in social assets of Bantus from Coast are higher than those of TAFAG and beyond the situation is reversed. (*) Is the contrapositive of the previous situation. ** Indicates that before the abscissa point 0.527 endowments in social assets of Semi-Bantus are higher than that of TAFAG and beyond the situation is reversed. (**) Is the contrapositive of the previous situation. *** Indicates that before the abscissa point 0.833 endowments in social assets of Bantu from Coast are higher than of TAFAG and vice versa beyond. (***) Is the contrapositive of the previous situation.								

Source: Computed by authors using the second and third Cameroon household consumption survey and DASP 2.2.

Aggregate welfare

Graphs 7a and 7b:
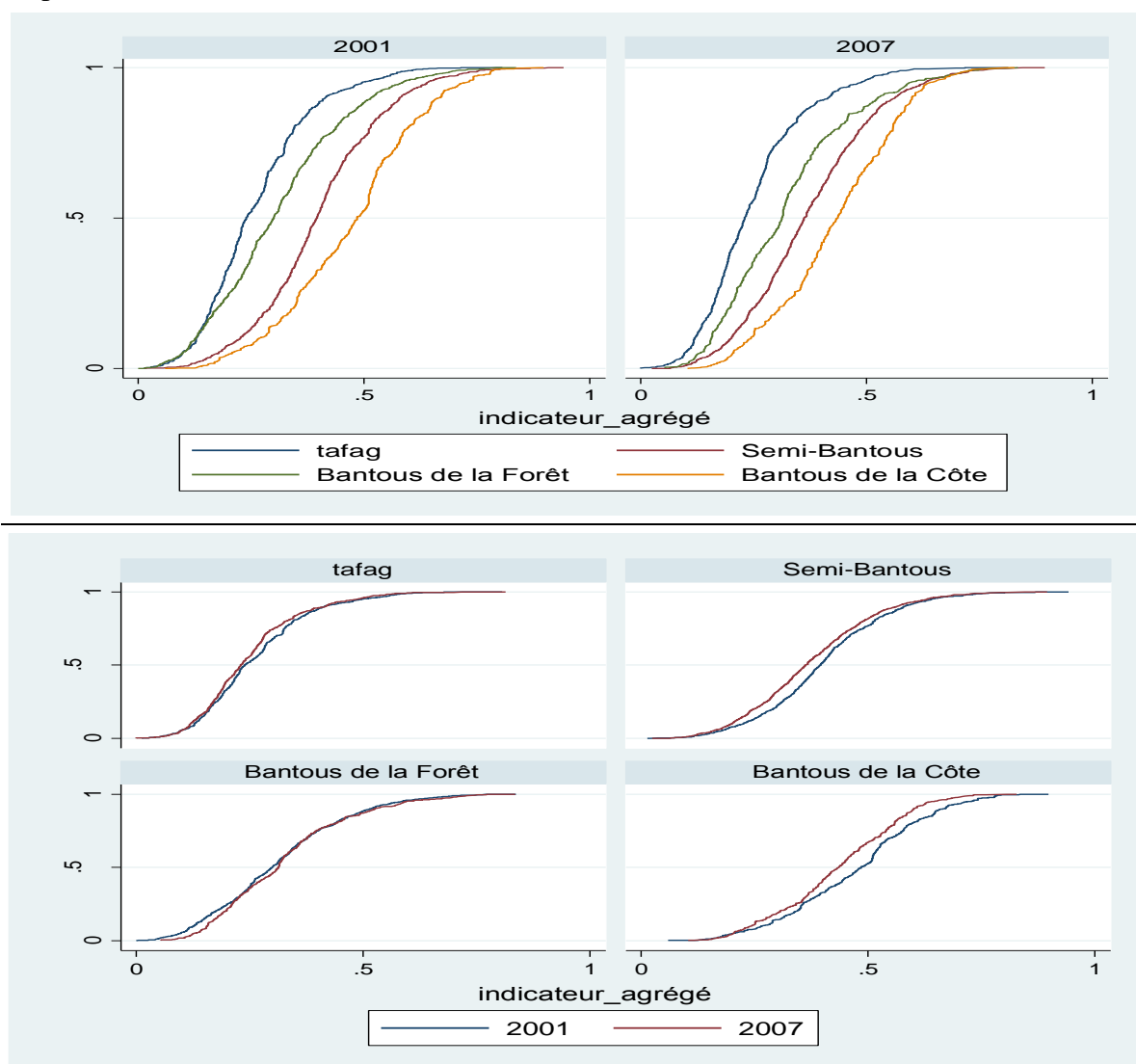
Source: Computed by authors using the second and third Cameroon household consumption survey and DASP 2.2.

The cumulative distributions for the aggregate indicator show that there is an ordered relation between ethnic groups. In ascending order we have peulhs and associated ethnic, the Bantus of the Forest, the Semi-Bantus and Bantus from the Coast. These curves also show that overall, except for the Bantus of Forest for whom a slight improvement is observed (for households at the bottom of the distribution), all other groups seem to have recorded a deterioration of their asset endowment.

5. Conclusion

The results from this study indicate the supremacy of the Bantus from the Coast in terms of household expenditure per adult equivalence, human and physical assets. The structure of financial assets endowments is that for which the most significant changes were observed. Indeed, while in 2001, in terms of financial assets, the Bantus from the Coast dominate all other groups, in 2007 they were in turn dominated upon by the same groups. In terms of social assets, the Semi-Bantus appear as the best endowed while Bantus of Forest the least. The aggregate indicator that gives an overview of the different assets establishes that in an ascending order we have: peulhs and associated ethnic, the Bantus of the Forest, the Semi-Bantus and Bantus from Coast. These results show that the measures to improve the assets of these groups should give priority to peulhs and associated ethnic (TAFAG).

These results also indicate that the asset endowment of different ethnic groups have declined between 2001 and 2007, they are verified for most ethnic groups and types of assets. The exception is for human assets where the Bantus of Forest register a positive evolution. The aggregate indicator also shows a slight upward trend for this group (Bantus of Forest), while for others, a downward trend is observed. Thus, it is important to pay special attention to peulhs and associated ethnic groups (TAFAG) in implemented measures to permit the reversal of the downward trend observed for most groups in terms of asset endowments.

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Appendixes

Appendix 1: Correlations between the different assets and expenditure per adult equivalence

	Expenditure per adult equivalence	Physical Asset	Human Asset	Financial Asset	Social Asset	Aggregated indicator
Expenditure per Adult equivalence	1					
Physical Asset	0.4215	1				
Human Asset	0.2545	0.6265	1			
Financial Asset	0.1249	0.1352	0.0511	1		
Social Asset	-0.0302	0.1187	0.0348	0.3318	1	
Aggregated indicator	0.3566	0.8614	0.8122	0.4019	0.3746	1

Source: Constructed by authors using data from the second and third Cameroon household consumption survey.

Appendix 2: Mean and standard deviation by sector of activity for different assets and expenditure per adult equivalence

Ethnics Groups	Expenditure per adult equivalence		Physical Asset	
	2001	2007	2001	2007
TAFAG	289682.5	297601.9	0.2463	0.2012
	(190707.5)	(221260.7)	(0.1638)	(0.1603)
Semi-Bantus	508154.2	496307.6	0.5299	0.4893
	(514893.9)	(388716.3)	(0.2362)	(0.2521)
Bantus of forest	578007.3	608158.1	0.5878	0.5847
	(732829.4)	(515942.5)	(0.2301)	(0.2366)
Bantus of coast	465330	571754.7	0.5334	0.5706
	(475021.8)	(493353.9)	(0.2448)	(0.2581)
Total	0.0155	0.0351	0.4208	0.3831
	(0.0196)	(0.0404)	(0.2604)	(0.2755)
	Human Asset		Financial Asset	
TAFAG	0.3831	0.3933	0.1293	0.0979
	(0.2127)	(0.2180)	(0.1782)	(0.1650)
TAFAG	0.6007	0.6006	0.1972	0.1402
	(0.1881)	(0.2032)	(0.1909)	(0.1785)
Semi-Bantus	0.6279	0.6593	0.2086	0.1557
	(0.1786)	(0.1861)	(0.2009)	(0.1876)
Bantus of forest	0.5943	0.6354	0.1367	0.0956
	(0.2066)	(0.2029)	(0.1766)	(0.1569)
Bantus of coast	0.5103	0.5192	0.1627	0.1213
	(0.2304)	(0.2412)	(0.1906)	(0.1758)
	Social Asset		Aggregated indicator	
TAFAG	0.7139	0.6045	0.3244	0.2925
	(0.3030)	(0.2924)	(0.1518)	(0.1412)
Semi-Bantus	0.7353	0.6706	0.5257	0.4756
	(0.3042)	(0.3283)	(0.1655)	(0.1623)
Bantus of forest	0.7412	0.6664	0.5598	0.5306
	(0.2980)	(0.3151)	(0.1610)	(0.1539)
Bantus of coast	0.6712	0.5240	0.4978	0.4848
	(0.3360)	(0.3533)	(0.1761)	(0.1619)
Total	0.7196	0.6264	0.4422	0.4034
	(0.3065)	(0.3109)	(0.1929)	(0.1864)
Values in brackets represent standards deviation				

<u>Source:</u> Constructed by authors using data from the second and third Cameroon household consumption survey.