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Spatial and Inter-temporal Sources of Poverty, Inequality and Gender Disparities in Cameroon: A Regression-based Decomposition

Epo Boniface Ngah

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To:
PEP Research Network
Department of Economics
Université Laval
Ste. Foy, Québec
G1K 7P4
Tel: 1-418-656-5314

Fax: 1-418-656-7798
pep@ecn.ulaval.ca

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TEAM MEMBERS

Lead researcher

Last name: **Epo** First name: **Boniface Ngah**

Institution: **University of Yaoundé II**

Full mailing address: **FSEG, BP 1365 Yaoundé**

Email addresses: **epongahb@yahoo.fr**

Phone numbers: **(237) 99633797**

Other researchers:

1. Last name: **Baye** First name: **Menjo Francis**

Institution: **University of Yaoundé II/Prime Minister's Office**

Email addresses: **bayemenjo@yahoo.com**

Phone numbers: **(237)7777 92 94**

2. Last name: **Manga** First name: **Nadine Angele T**

Institution: **University of Yaoundé II/Ministry of Health**

Email addresses: **nadyn2002@yahoo.fr**

Phone numbers: **(237) 99004760**

Spatial and Inter-temporal sources of Poverty, Inequality and Gender Disparities in Cameroon: A Regression-Based Decomposition Analysis

Abstract

This study appeals to an alternative approach in explaining poverty and inequality trends in Cameroon, notably it blends regression analysis with traditional decomposition techniques to account for measured income inequality. We identify factor endowments that contribute to income disparities and discrimination along gender lines using regressed income sources. In this endeavour, use is made of some synthetic variables obtained by the Multiple Correspondence Analyses to compute multidimensional indicators associated with household education and health. The ECAM II and ECAM III household surveys collected by the government's statistics office together with STATA 10 and DASP 2.1 software are used to generate results. Variables that explain household economic well-being were the synthetic variables for education and health, working in the formal sector, age cohorts, household size, gender, owning farm land and both urban and rural localities. Additionally, the following synthetic and non synthetic variables education, fraction of active household members, working in the formal sector and household size stands out as the main sources that account for household income inequality and income/expenditure equalizing endowment between male and female headed households. The variables age cohorts, health facilities, and owning farm land also account for inter-household gender inequality. This study has policy implications for public intervention that encourage attainment of higher levels of education, employment and rural development.These results shade some light on our understanding of factors that determine and account for inequality trends in the distribution of living standards and the extent to which inequality affects poverty in Cameroon, thus suggesting some orientations to the ongoing process of enhancing well-being, fostering growth and reducing poverty in Cameroon.

Keywords: Regression-based decomposition, Multiple Correspondence Analysis, Poverty, Inequality, Gender welfare and Oaxaca-Blinder Decomposition.

Introduction

Cameroon with its estimated 20 million inhabitants is at crossroads (DSCE, 2009). Despite its endowments that constitutes significant advantages, it faces major challenges - to diversify its economy, consolidate growth, reduce poverty and decrease inequality either within the population or among regions and bridge disparities along gender lines - that could help improve the socioeconomic status or standards of living and foster development (Government of Cameroon, 2003). Deficits in well-being efforts by the government of Cameroon, will weaken the foundations for sustainable development, undermining the country's social fabric, and act as a potential outlet for violence and disorder because of the highly unequal access to opportunities and asset endowments. In this regard, the 2009 Growth and Employment Strategy Paper (DSCE) acknowledge that relative pro-poor growth and enhanced employment will help boost average standards of living.

Unfortunately, despite the fall in levels of poverty from 53.3% in 1996 (ECAM I) to 40.2% in 2001 (ECAM II) and it's stagnation around 39.9% in 2007, clearly below the objective of 37.1% set by the government of Cameroon in its PRSP document (Government of Cameroon, 2003), inequality instead augmented very marginally. 59.6% of the poor lived in rural areas as compared to 41.4% in urban areas in 1996. In 2001, this stood at 49.9% in rural areas and 22.1% in urban areas. In 2007 while urban poverty fell by 5.7%, rural poverty rose by 3 percentage points (INS, 2008). Regional poverty took three shapes in 2007. The first group (West, Yaoundé, the Centre excluding Yaoundé and the South West) recorded a significant fall in poverty rates. The second group (Douala, the coastline excluding Douala, the South and Northwest) underwent a moderate retreat in poverty rates. The last group (North, Far North, East and Adamawa) rather registered higher poverty rates. Reasons for the decrease in poverty in the first and second groups are accountable to momentum prevailing in both urban and rural areas (INS, 2008). Justification for the relative fall in urban poverty despite high unemployment rate is attributable to the momentum experienced in the urban informal sector, which stood at 80.6% in 2007 despite the precarious and low paid nature of jobs in this sector (See: Survey on Employment and the Informal Sector 2005) and payment of emoluments to some categories of civil servants. This is partly accounted for by the observation that earned income by farmers has not grown enough to dampen the rise in prices of goods and services in Cameroon. In addition, worrying disparities characterized in terms of gender inequality, regional inequality, policy inequality, asset endowment inequality, among others, have slowed down the poverty reduction process (INS, 2008).

Another apparent reason for explaining why despite a fall in monetary poverty there has not been a significant amelioration of the living conditions of the local population, resides in Cameroon's economic history (Baye and Fambon, 2001). To resolve the worsening poverty situation, despite an increase in macroeconomic performance through a consolidation of the benefits of devaluation, the government in August 1997 adopted the Enhanced Structural Adjustment Program with the IMF/World Bank that ended with the admission of Cameroon in October 2000 into the Heavily Indebted Poor Countries (HIPC) initiative. Between 2000 and 2003, the government of Cameroon formulated a Poverty Reduction Strategy Paper (PRSP), which documents guidelines for fighting poverty. Efforts[2] paid-off when in April 2006, Cameroon attained the Completion Point of this initiative after meandering through triggers of the HIPC process.

Effects of the Completion point are still slow to be felt by the grassroots populations despite an average annual growth rate in GDP of 4.5% between 2000-2002 (INS, 2005), with a fall to 3.2 in from 2003 to 2007 attributable to a weak economic performance and in 2008 to the international financial crisis (June 18, 2009 Letter of Intent). Thus, economic growth between 2001 and 2007 can be described as impoverishing in terms of poverty reduction, with Cameroon needing a pro-poor growth rate in excess of 5.7% from 2009 to be able to half poverty by 2015. Overall, indicators of human development that deteriorated considerably during the crisis years, particularly in education and health, have not been ameliorated sufficiently or sustainable enough to fully remedy the situation, despite the retreat in the incidence of poverty.

[2] An outlay of the Debt Burden and the HIPC process is outlined in Epo and Baye (2008).

Gender welfare enhancement constitutes one of the main objectives of the government of Cameroon. At the national level, Cameroon has ratified a number of international conventions related to gender issues, one of which is The Convention on the Elimination of all Forms of Discrimination Against Women (CEDAW). Unfortunately, we still identify gender-bias and gender neutral behaviours that adversely affect women. Since the crisis period of the mid 1980s, household income generating activities have been restructured, giving women a more important role to provide goods and services for family consumption. Although the role of women in understanding welfare is significant, many factors limit the economic growth of women, and are responsible for poverty, especially in the rural areas. Thus, at the root of gender disparities and poverty is unequal access and control of productive resources needed to participate fully in realizing growth aimed at reducing poverty by men and women headed households (Sikod, 2007).

Studies on inequality in Cameroon are pending in the following domains: the impact of incomplete reforms on inequality and poverty; consequences of rising inequality given the increasing coverage of inequality-related incidence by public media (e.g. during the February 2008 hunger strikes); impact of middle class families and the dynamics on inequality in Cameroon; and the dynamics of grassroots inequality in Cameroon within the development strategy set up by the government since 2007. The regression-based decomposition approach incorporates a multidimensional aspect to analysing household economic well-being and inequality because it permits us regress household economic well-being on a wide range of explanatory variables. This is vital for two reasons: firstly, the regression-based decomposition, using econometric techniques, establishes behavioural relationships between the regressand and regressors clearly underpinning specificities of variables that actually explain our welfare indicator. Secondly, after estimating the contributions of the explanatory factors to total income (well-being) we perform the decomposition of inequality by the predetermined income sources.

Associated to this analysis, the Oaxaca-Blinder (1973) method of decomposition is applied to understand how and why female headed households differ from male headed households regarding endowments and returns to these endowments, as well as discrimination faced by a particular sex type. We also carry out an inter-temporal analysis in an attempt to evaluate disparities observed over time in endowments and return to these endowments.

An additional value added of this paper is the use of synthetic variables for education and health, inspired from Araar (2009), as covariates of household economic wellbeing to perform the regression and regression-base decomposition analysis, which attempts to understand both causal relationships with household welfare and their shares in explaining observed inequality in household expenditure. The multidimensional indicators of welfare are constructed using the Multiple Correspondence Analysis and have as advantage the fact that the concept of well-being now encompasses facets that are difficult to be captured uniquely in monetary terms. Multidimensional approaches to distributional issues draw on non-monetary measures. Each of these measures has also come to be used extensively in its own right, with researchers employing a unidimensional perspective but applying the analytical methods typically applied to a monetary measure of well-being.

Heshmanti (2004a) reviewing recent advances in the measurement of inequality and gives attention to the interrelationship between income inequality and the non-income inequality dimensions, insinuates that though inequality can have many dimensions, economists are more concerned specifically with the economics or monetarily measurable dimension related to individual or household income and consumption. However, this is just one perspective and inequality can be linked to inequality in skills, education, opportunities, happiness, health, life expectancy, welfare, assets and social mobility. The effects of inequality in non-income factors on earnings can be summarized variously. In this regards, inequality in education may explain the extent of differences in cross-country earnings inequality, through the prism that, this impact is decreased by the level of education which in turn depends on the economic development and skill-intensive nature of production technologies. It may also negatively affect the investment rate and growth rate of income. Concerning income inequality regarding health, there is no direct link from income inequality to ill health measured as mortality, but a range of mechanism and social arrangements indicate the presence of an indirect link.

The Multiple Correspondence Analysis is the application of the simple correspondence analysis to multivariate categorical data, coded as an indicator matrix or a Burt matrix (Grenacre, 1993; Foko et al, 2007; Ningayé and Ndjanyou, 2007). Araar (2009) recalls that many non-monetized goods can be found in developing countries and where the public sector provides the main part of collective goods. Thus, in keeping with Sen`s (1982) concept of capabilities and functioning, we argue that synthetic variables computed from various modalities that reflect degrees of household welfare, translate more information on household abilities to posses or satisfy social norms.

Which variables account for household economic well-being trends in Cameroon, and how useful are they in inequality and gender issues? This is the main research question in this paper. The specific questions are: (1) which estimated factors explain poverty and inequality in household expenditure? and; (2) How will unequal access in endowments and returns to these endowments along gender lines aid in better explaining household economic welfare? The main objective of this paper is therefore to empirically identify variables that determine well-being and account for income inequality, as well as gender endowment and treatment disparity trends in Cameroon. The specific objectives are: (1) to evaluate poverty determinants and household inequality by regressed income sources; (2) to investigate the nature of gender endowment differences and returns to these endowments observed between male and female headed households in Cameroon; and (3) to formulate policy implications on the basis of the findings.

II. Conceptual Framework

a) The Concept of Inequality

Income distribution topics within the discipline of economics, echoing the call by Atkinson (1997) to bring the study of the income distribution 'in from the cold' is not a far cry. As Atkinson and Bourguignon (2000) have pointed out, this is not a new idea.

David Ricardo himself stated that 'to determine the laws which regulate this distribution is the principal problem in Political Economy' (cited by Atkinson and Bourguignon 2000). The large literature about the 'measurement' of inequality has remained rather separate from theoretical modelling of income determinants and the substantial increase in the analysis of wage inequality in the 1980s by labour economists made little reference to the substantial literature on the measurement of household income inequality. Concerning spatial inequality, Kanbur and Venables (2005) note the growing importance of spatial inequality and their implication for policy relevance in countries such as china, consolidating growing concerns on how geography affects well-being.

In principle, a country pursuing redistributive policies could reduce poverty even if its total income did not grow. This rather difficult scenarios need to be tailored so as to reflect real situations incorporating measures to enhance access to opportunities by the disadvantaged and marginalised individuals. Kanbur (2008) questions the current perception of poverty and inequality issues indicating differences noticed in the domain of poverty and inequality and their impact on development. Most studies that attempt to discuss policies for poverty alleviation tend to stress on income growth rather than the potential role of redistribution.

A number of authors have tried to show how inequality affects poverty reduction (Bourguignon 2004; Cling et al, 2003; Ibrahim and Gray, 2005; Araar and Duclos, 2007; Wan, 2006; WIDER, 2000; Kanbur, 2007). In this regard, Ali (2005) remarks that efficient development policies having as goal poverty reduction will cause a fall in the incidence of poverty and poverty gap attributable to a percentage point reduction in the GINI coefficient. In Cameroon, despite the predominance of growth in accounting for poverty trends, the role of inequality should not be underestimated (Mckay 1997; Kolenikov and Shorrocks, 2001; Buccanfuso and Kaboré 2002; Baye, 2006; Epo and Baye, 2007). Okunmaweda (1999) insinuates that poverty and inequality are often measured to assess how social and economic policies affect programmes geared towards increasing the standards of living of the local population.

Sen (1973, 1976) highlights certain minimum axiomatic requirement[3] raised in the measure of inequality. These are: (1) the mean independence; (2) the population size independence condition; (3) the Pigou-Dalton transfer sensitivity condition (4) the symmetry condition; and (5) the decomposition condition (Foster et al, 1984). According to Fields (1997b) inequality indexes such as the Gini concentration ratio (G), respect the first four conditions, but will fail the decomposability condition if subgroups of the distribution of well-being overlap. Theil's two measures and the coefficient of variation fulfil all the five conditions, Inequality can be perceived in absolute or relative terms. Absolute inequality refers to disparity between incomes and relative inequality indicates disparity between income shares.

To these methods of inequality analysis, many new approaches have been developed to incorporate new patterns and dimensions to inequality analysis. We can identify the regression-based inequality decomposition method, which allows the contribution of the

[3]Other authors include Glewwe, 1986; Shorrocks 1984; Theil 1979.

regressed variables to total inequality to be quantified (Morduch and Sicular, 2002; Wan, 2004, Wan and Zhou, 2005). In addition, since the early works of Kolm (1977), and more recently Lugo (2005) and Araar (2009), multidimensional inequality analysis has been rekindled because of the need to assess inequality encompassing both income and non-income dimensions. In this light, understanding the behaviour of inequality with regards to modalities not captured by monetary indicators can inform policy of whether governmental orientations with regards to particular programmes are profitable for the local inhabitants. Concluding this sub-section, it is important to observe that, the concept and notion of inequality is critical for understanding income patterns, effects of economic growth, globalisation, institutions and poverty. Critical analysis of inequality impacts, causes and trends need to be further investigated with the aim of enhancing growth outcomes.

b) Gender Welfare Analysis

In this study, we analyze gender welfare, particularly the nature of differences observed in access to endowments and returns to these endowments along gender lines. Thus, understanding certain issues on gender endowment disparities will permit us investigate why female headed households are more likely to be affected by poverty and inequality than their male counterparts in Cameroon. Concerning differences in endowments between male and female headed households, this indicates how different levels of access to endowments affect household economic well-being by gender type. Regarding differences in terms of treatment, we investigate the difference with regards to returns in endowment according to male and female headed households with regards to various endowments.

In 2001, the incidence of poverty in Cameroon for men was 39.9% compared to 40.5% for women, with women marginally more affected by poverty than men (INS, 2002a; 2002b; Government of Cameroon, 2003). In 2007, while out of 10 households headed by men at least 4 were poor, this ratio for women headed households stood at 3 out of 10. To some extend this observation is attributable to the smaller number of individuals residing in households headed by women and thus smaller per capita expenditures, or because of transfer payments received from third parties and low levels of expenditure by women outside their household setup (INS, 2008). This can equally result from the fact that only the monetary dimension was considered, considering other dimensions may reveal clearer disparities between male and female headed households.

For example, in terms of levels of human capital, the rate of literacy between men and women stood at 63.7% for men against 40.7% for women in 1996; and in 2001 this stood at 66.5% among men and 46.6% among women. Despite an overall increase in the rate of literacy, access to this endowment disfavours woman than men (Government of Cameroon, 2003). In 2007, the global literacy rate for men stood at 82.1% for men and 77.5% for women (DSCE, 2009). In Cameroon, for instance, fewer women compared to men own land because of certain socio-economic and cultural constraints, particularly, subordination of women within marriages and inadequate economic power to pay land market prices. In addition ownership to land inherited by widows is frequently challenged and encroached into by men in many regions in Cameroon.

As per access to credit facilities, men overwhelmingly have access to these facilities than women because the former are endowed with assets that can enable them borrow money. As concerns access to formal credit, 3.5% of households headed by women had access to credit against 5.5% of household headed by men in Cameroon (Government of Cameroon, 2003). The reason being that women face gender-specific barriers in accessing financial services, including lack of collateral, low levels of literacy, and low bargaining powers. Credit institutions also discriminate against women by complaining of the high transaction cost for the very small amount women usually demand. This pushes women to resort to informal sectors for their financial needs, constraining their ability to expand their economic activities.

Regarding the informal sector, the number of women that resort to carrying out little trading activities is significant. These women generally trade perishable food crops that are locally produced in little shades in the market. This activity experienced an increase between 2001 and 2007, indirectly aiding in consolidating fragile household income/expenditure, because the number of active household member increases and the overall amount of income entering the household for expenditure purposes also increases. These gender disparity traits reveal that Cameroon has been very slow in moving women's empowerment forward. Thus, it is important to understand inequality and poverty along gender lines to effectively influence policy orientations. Concluding this subsection, gender welfare analysis targeting differences in endowments and treatment between male and female household heads constitutes value added with regards to policy recommendation because of the role women now play to buffer household consumption and overall economic growth.

c) Linking the Regression-Based Decomposition approach with Gender welfare and Disparity Analysis

Understanding determinants of household economic well-being in order to better blend the twin concept of poverty and inequality analysis in the desire to achieve pro-poor growth. This study explores determinants of economic well-being econometrically and applies the parameter estimates to compute income sources that are subsequently decomposed to verify their absolute and relative contributions in explaining inequality. Empirical studies on inequality decomposition using Cameroon household survey data are limited (Araar, 2009; Araar, 2006; Chameni, 2006; Baye and Fambon, 2002).

No attempt appears to have been made to apply the regression-based decomposition approach in evaluating income inequality decomposition using Cameroon data, let alone the extensions we propose in this paper. In addition, estimated income sources are obtained along gender lines and use is made of the Oaxaca-blinder decomposition to analyze disparities in endowments and disparities in returns to these endowments between male and female headed households. This is consistent with comments made by Sokoloff and Engerman (2000) that, resource endowments are central determinants of inequality and inequality in turn is affected by bad institutions and redistributive policies, low human capital investment and underdevelopment. The advantage of such a procedure

is the ability to infer policies that contribute in ameliorating household well-being and gender considerations in Cameroon.

III Data

The data used in this study is the ECAM II (2001) and ECAM III (2007) Cameroon household consumption surveys. The ECAM II survey was undertaken from September to December 2001 (National Institute of statistics, 2003). This household survey was carried out to remedy mistakes made in the first household survey and ameliorate information concerning the poverty profiles. This survey was comprised of about 12,000 households, of whom 10,992 were actually visited. In additions, (1) it was conducted to propose an adequate methodology for calculating poverty lines and profiles acceptable to major development partners, and which serves as a reference for further analysis; (2) To analyse monetary poverty, poverty in terms of living conditions of most households and potential poverty, while establishing the correlation between them; (3) Consolidate past analysis at a national and regional level, while isolating the two large towns (Douala and Yaoundé) and also distinguishing area of residence (urban or rural); and (4) To produce an adequate data base to ameliorate different statistics (of the population), notably in establishing household consumption in national accounts and updating data used in calculating price indexes (Institut Nationale de la Statistique, 2002a; 2002b).

The ECAM III survey was effectuated between May and July 2007; and comprised 11391 households. Its aim was to upgrade knowledge on poverty and welfare status in Cameroon by providing indicators that capture the living standards of the local population as to peg poverty profiles and act as a follow up of efforts made towards the implementation of the PRSP and the realization of the MDG objectives. According to the National Institute of Statistics, these data can be used to (1) study all aspects of poverty at national and regional levels (monetary poverty, household poverty, poverty in terms of potentials and subjective poverty), as well as establish correlations between these different types of poverty; (2) study the dynamics of poverty between 2001 and 2007, with the aim of evaluating the effects of macro-economic policies of the last five years on household wellbeing; (3) evaluate the demand for education and identify its principal determinants; (4) evaluate internal tourism in Cameroon and; (5) collect data of child labor in Cameroon (National Institute of Statistics, 2008).

Data used for this analysis incorporates both observed and synthetic variables. Regarding the observed data obtained from the ECAM II and ECAM III household surveys. We selected the following variables; household size, age of household head; fraction of active household members generated as the proportion of active adults living and working in the household, working in the formal sector and owning farmland. Spatially, we choose the variables urban and rural areas, excluding semi-urban areas. The robust estimates are thereon obtained.

Reviewing descriptive statistics for 2001 obtained from the ECAM II survey reveals that 75 percent of those interviewed were men. Regarding urban rural set up, less than 10 percentage of the population interviewed and living in rural areas were women. In urban areas, the value was about 12 percent. Averagely, the age group 30 to 40 years and 40 to

50 years are the most recurrent age groups of household heads. Average household size for 2001 was 5 members, with households headed by men larger than those headed by women. Regarding the formal sector about 5 percent of those interviewed and working in the formal sector (30 percent of the total population) were women. Additionally, 10 percent of female headed household are made up of married couples (monogamy and polygamy; 60% of household interviewed), translating an observation that most household headed by women are mono parental. This has the potential of exposing these households to external shocks, where they do not have the capacity to response and thus rendering them more vulnerable. Regarding land ownership, 21% of households that own farmland (51% of total population) are households headed by women. In rural areas this percentage is about 80%. The fraction of active household members is 0.28 for the general population and about 0.5 for both male and female headed households.

Descriptive statistics for 2007 obtained from the ECAM III survey indicates that 73 percent of household interviewed were male. In rural areas 20 percent of the total (37% of total population) numbers of household interviewed were headed by women. The number of female household in rural areas from the total rural female population (20% of rural population) that owned land was 75%. Regarding urban areas, 26% of the total population interviewed (55% of total population) are women. Concerning owning land, the total number of women owning farm land in the general population (45%) was 26 percent. In 2007, 10% of household headed by women were married. The age cohorts with the highest number of household heads are the age group 30-40 and 40-50 years. Average household size for 2007 was 4 members, with male household having 5 members and female households 4 members. Average fraction of active household members for the general population was 0.3 for both general and gender sub samples.

To construct the synthetic variables via the MCA method that captures the multidimensional notion of household economic well-being, we pooled the ECAM II and ECAM III household surveys and computed synthetic variables for education and health. Modalities used to construct these synthetic variables included a wide range of questions that capture household well-being and translate more information regarding their status, and are expressed in the appendix 2. The ordering of the various scores were generated and normalized to treat for the presence of negative values which may cloud the classification of observations and interpretation of results.

Undertaking a multidimensional poverty analysis of the synthetic variable education and access to health facilities between 2001 and 2007 using the DASP 2.1 software, we note that while access to education increased between 2001 and 2007, access to health rather retreated. Computing multidimensional education and health indices along gender lines, we observe that in 2001, there was a marginal difference between households headed by men and those headed by women, with female headed household being better off with regard to the synthetic variables access to education and health. In 2001 while educational differences between male and female headed households were marginal with women faring good, regarding the synthetic variable health, the female headed households significantly experienced an improvement relative to male headed households. Variables selected for our empirical work alongside their descriptive statistics are hosted in Tables 1-3 in the appendix.

IV. Methodologies, Literature Reviews and Empirical Results

We structure the next two subsections by taking the specific questions addressed as the main background pattern. Specifically, we organized material around issues and introduce: introduction, literature review, method and indices, use of data, empirical results and conclusion as needed per subsection. This forces a more focused writing and a sharper presentation of the issues. Following this format, the regression-based income inequality decomposition analysis is undertaken in 4.1; and analysis of differences in endowment and return to these endowments between male and female household heads is tackled in 4.2.

IV.1 A Regression-Based Decomposition Analysis of Income Inequality Trends in Cameroon

Introduction

A renewed interest in diverse fields in economics has placed the dynamics of income inequality firmly on the forefront of the academic debate. The question currently raised of putting in place income redistribution programmes that equalizes economic opportunities, as well as enhancing welfare entails an indebt analysis. During the last decades, interest in inequality and it various links and impacts in the less developed countries (LDC) has been rekindled with the observation that; sub-Saharan Africa (SSA) has been experiencing an increase in inequality despite the efforts made to implement structural adjustment programmes factoring-in the social dimension. In addition to the factor prices, the distribution of endowments is important to explaining the generation and inequality of income.

In this light, a lot of research has been carried out in trying to quantitatively analyse income distributions, clearly bring out characteristics and drawing policy implications. Since the early 1980s, several measures have been proposed in the literature characterising inequality in income redistribution (Kakwani, 1980; Shorrocks, 1982; Sen, 1973; as well as Atkison, 1970), and recently New and Multidimensional approaches have been developed (Morduch and Sicular 2002; Wan 2002; Fields and Yoo, 2000). In addition to these inequality measures, the issue of polarisation has attracted some attention in discussions on income distribution (Awoyemi, 2006; Baye 2007). Ravallion and Chen (1999) suggest that polarisation and inequality can diverge in a developing country context with the worry that in less developed countries gradually loosing the middle class populations from actively participating in the economy may hamper development efforts.

Enough evidence shows that, despite a fall in the incidence of poverty between 1996 and 2001, after an increase within the period 1984-1996, inequality has at best marginally stagnated in Cameroon (Chameni, 2005; Baye, 2006). Reviewing inequality via the Gini index revealed that: (1) while in 1996 the inequality ratio between the poorest 20%

quintile and richest 20% quintile was 1: 7, in 2001 this ratio was 1: 8; (2) the Gini index marginally increased between 1996 and 2001 (0.406 in 1996 and 0.408 in 2001); (3) disparity is high between the city and countryside; (4) in the cities the gap between the poor and non-poor is more pronounced than the countryside; and (5) while the Gini index for rural areas increased from 0.345 in 1996 to 0.369 in 2001, that for urban areas decreased from 0.449 in 1996 to 0.406 in 2001. Overall between 2001 and 2007 total inequality marginally declined from 0.408 to 0.390, retreating more in cities than rural areas. Unfortunately, the main shortcoming of this result is that it fails to identify the sources that account for welfare and its distribution.

In trying to explain inequality trends in a developing country setting like Cameroon, inequality is perceived as: (1) a logical outcome of the market economy which are made up by different structures, which constitute avenues for socio-economic integrations; (2) the advantages accorded to urban areas relative to rural areas in terms of education, health, infrastructure are overwhelming and; (3) the skewed developmental focus in favour of urban dwellers relative to rural populations. The observations highlighted by Awoyemi and Adekanye (2003) concerning the extent and content of gender inequality in terms of unequal access and utilization of productive resources, social capital and asset endowment also apply to Cameroon. Inequality is believed to have been aggravated by bad governance, corruption, poor institutions as well as inertia. Since these factors dictate inequality patterns that optimize income redistribution programs, it is important for government to resolve inequality problems.

The main concern in this subsection is to explore determinants of welfare and income inequality in Cameroon. Specifically we assess factor endowments that significantly explain economic well-being, evaluate the relative importance of estimated income sources in accounting for income inequality between 2001 and 2007, and formulate policy recommendation emanating from these analyses.

IV.1.1 Brief Review of Literature

Since Glewwe (1991) on the determinants of poverty and well-being, regressions of household expenditure are now widely used in empirical development economics. Among these we have issues such as ethnic discrimination of living standards (Van de Walle and Gunawardena, 2001); evaluation of land distribution (Ravallion and Van de Walle, 2001); spatial inequality (Hertberg, 2003); social and political determinants of poverty (Ruspasingha and Goetz, 2007); geographic determinants of poverty (Audet et al, 2006); determinants of child poverty (Mitrakos, 2008); and the determinants of inequality (Morduch and Sicular, 2002; Wan, 2004 and; Wan and Zhou, 2005).These developments identify both quantitative (Mwabu et al, 2009; Babatunde et al, 2008; Oyekale, et al, 2007; Akhtar and Ahmed,1999) and qualitative econometric methods (Nyugen et al, 2006; Alemayehu et al, 2005; and Oyugi, 2000). In Cameroon, very few studies have attempted to identify determinants of economic well-being. In this regards, Baye and Epo (2009) use a control function approach and the 1996 and 2001 household consumption surveys to tease out determinants of gender disparities in Cameroon, indicating educational level of household head, household size, and residential milieu as elements that account for gender disparities.

An overview of literature indicates that a lot of research is being done to tackle parametric and non-parametric inequality issues into subgroups, income sources, causal factors and other units or characteristics (Heshmati, 2004b). Before now, economists have attempted to develop the regression-based approach to inequality decomposition. We can identify pioneers in this area such as: Oaxaca (1973); Blinder (1973). They focus on the difference in mean income between two groups, attributing it to differences in resource endowment as represented by sample averages of regression variables, and in return to the endowment as represented by parameter estimates of the regression equation. In the early 1990s, Juhn et al, (1993) applied this approach to allow for the decomposition of between-group difference in the full wage distribution rather than the mean of income as in Oaxaca (1973) and Blinder (1973). Bourguignon et al, (2001; 2008) relaxed the requirement of a linear income-generating function of Juhn et al, (1993). Wan (2002) clearly observes that these efforts were devoted to explaining between-group differences in income distribution rather than quantifying contributions of many individual determinants to total inequality.

DiNardo et al, (1996) and Deaton (1997) respectively proposed semi-parametric and non-parametric techniques that sought to model and compare the whole distribution of income in terms of the density functions. However, as is the case with a lot of semi-parametric or non-parametric methods, the results obtained were rather inconclusive thus producing findings that fall short of expectations to both economists and policy makers. Fields (1995) recognized the link between conventional OLS regression and the problem of decomposing income inequality by source, as well as the possibility of explaining changes observed via determinants of income inequality (Fields, 1998). Fields and Yoo (2000) and Morduch and Sicular (2002) developed a framework for inequality decomposition, an extension of Shorrocks approach (1982; 1984; 1999), based wholly and directly on conventional regression equations, and this approach was then upgraded by Wan (2004). This approach has divers' advantages owing to its vast flexibility and accommodating characteristics. Compared with the unconditional approach, the regression-based methods, depending on the modeling strategy, provide possibilities to quantify the conditional roles of various characteristics in a multivariate context and allowing for heterogeneity in responses. Furthermore confidence intervals for disaggregated contributions to the inequality index has be constructed (Heshmati, 2004).

A range of different applications of the income inequality regression-based decomposition literature exist. Among others we note; the extension of the MS (2002) approach to the case where the composition of income by the different sources is observed (Adam, 2001); the case where different income sources are accounted for by different income regimes in Farm-household income (Bardham and Boucher, 1998; Yuko et al, 2006; and kimhi, 2007) via undertaking a regression-based decomposition by determinants of income.

Wan (2002; 2004) remarked that most income inequality regression decomposition usually ignore or treat incorrectly the constant term or residual term. Though seldom but possible to encounter a constant as a source of income inequality in empirical analysis of income distribution, the presence of a constant is rather a rule rather than an exception in regression equation. Questioning the issue of the residual term, which is always assumed

away in conventional decompositions, is pertinent. Although this term or its estimated counterpart is a white noise by definition, which means it does not affect the mean of the dependent variable in the estimated regression equation, nor does it affect the shape of the empirical Lorenz curve, its presence or absence does result in different income density functions and thus influences income distribution of measure inequality. The value added of including this term in decomposition analysis is that it indicates the proportion of the contribution of sources which are not included in the model, but captured by the residual, in explaining inequality. Consequently, the potential and real advantage of this approach will be undermined and further advances in this area will be hampered (prior works have not used the most natural rule of decomposition by Shorrocks (1999) or equivalently the before-and-after approach recommended by Cancian and Reed (1998)), if this term is not appropriately treated. Concluding this sub section, in Africa, there is limited works on income inequality regression-based decomposition analysis. Among these we note the work of Alayande (2003) who applied this analysis to Nigeria. For Cameroon, authors are yet to apply this approach in evaluating income inequality decomposition.

IV.1.2 Methodology

Prior to regression-based decomposition analysis, Shorrocks (1982) established a measure of inequality[4] written as a weighted sum of income:

$$I(y) = \sum_i a_i(y) y_i \qquad (1)$$

where a_i are the income shares, y_i is the income of household i, y is total income, I(y) is the weighted sum of total household income, corresponding to an inequality measure, and $a_i(y)$ is the ethical weight attributed to individual i based on the vector of income y . Since income may be observed as the sum of income from M sources or endowments, $y_i = \sum_{m=1}^{M} y_i^m$, the inequality measure can now be written as the sum-specific component s^m :

$$I(y) = \sum_i a_i(y) \sum_m y_i^m = \sum_m \left[\sum_i a_i(y) y_i^m \right] = \sum_m S^m \qquad (2)$$

The proportional contribution of each income source may be obtained by dividing the sum-specific component by $I(y)$. Thus, the proportional contribution of income source m, s^m can be written as:

$$S^m = \sum_i a_i(y) y_i^m \Big/ I(y) \qquad (3)$$

According to Shorrocks (1982), the weight $a_i(y)$ may be chosen in an arbitrary manner, producing an infinite number of possibilities, and propose a unique decomposition rule that satisfy the following: (a) if a new distribution is obtained by multiplying all incomes by a constant, measured inequality should be the same under both distribution and; (b) if

[4] Pioneers in decomposing inequality by subgroup include Theil (1972) and later on by Bourguiognon (1979), Shorrocks (1980, 1984) and; Foster and Shneyerov (1997) amongst others.

total income is divided into two components whose factor distributions are permutations of each other, their contribution to total inequality are equal.

Morduch and Sicular (2002) extended the decomposition rule (3) to a regression-based decomposition by determinants of household income as:

$$y = X\beta + \varepsilon \tag{4}$$

Where X, is a vector of explanatory variables with the first column made of the n-vector $\alpha = (1,1,.....,1)$, β is a vector of parameters and ε is a vector of residuals. Given the vector of consistently estimated parameters $\hat{\beta}$, income can be expressed as a sum of predicted income and predicted error as in equation (5), and considered as the estimated income source flows of the various (household) explanatory variables:

$$y = X\hat{\beta} + \hat{\varepsilon} \tag{5}$$

We consider a vector of economic well-being as measured by the log of household income expenditure per capita, y, to be accounted for by a set of factors that can be regrouped into individual, synthetic, household, community and regional characteristics and expressed by the vector, X, a vector of the estimated coefficients, $\hat{\beta}$ and the vector of the error terms, $\hat{\varepsilon}$. Since the econometric results yield estimates of the income flows attributed to household variables, they allow us to make use of decomposition by income source (or factor endowments). By construction, total income is the sum of these estimated income source flows (plus the regression residual):

$$y_i = \sum_{m=1}^{M+1} \hat{y}_i^m \tag{6}$$

where $\hat{y}_i^m = \hat{\beta}_m x_i^m$ for m= 1,……,M and $\hat{y}_i^m = \hat{\varepsilon}_i$ for m=M+1

Substituting equation (6) into equation (3), we obtain the share of inequality attributable to the estimated income source flow of the explanatory variable, $\hat{y}_i^m$ as:

$$S^m = \frac{\hat{\beta}_m \sum_i a_i(y) x_i^m}{I(y)} \tag{7}$$ [5]

[5] Yuko et al, (2006) and Kimhi (2007) criticizes Morduch and Sicular (2002) claim that claimed that since the components are linear coefficients, the standard error and residual computation is thus straight forward. They argue that these terms ignores that $\frac{\sum_i a_i(y) x_i^m}{I(y)}$ is a random variable dependent of $\hat{\beta}_m$ (through the dependence of $\hat{\beta}_m$ on y). Mordarres and Gastwith (2006) observes that, at least for the Gini index of inequality, it is not straight forward to compute standard error of the index itself, and it is logical to expect that computing standard errors of components of this index will not be straight forward either.

$\hat{\beta}_m$ are the estimated coefficients, x_i^m the income source m attributable to household *i*, $\sum_i a_i(y)$, the weight attributable to each household and, $I(y)$ is the total income inequality index.

Adopting Wan's (2004) extension of this procedure, we assess the income inequality accounted for by each explanatory factor, the constant term and how much of total inequality is unexplained as gauged by the residual term. Adopting the simple yet powerful procedure proposed by Wan (2002) let the estimated income generating function (regression equation) be:

$$y = F(X) + \varepsilon = \alpha + y^*(X) + \varepsilon \tag{8}$$

where Y= the income generating function or its transformation and X= income (expenditure) determinants of their transformation, α is the constant term, ε is the error term and $y^*(X)$ is estimated income sources. F(X) allows for any form; being linear with the presence of the constant term or highly non-linear with the absence of this term. Also, let $y^*(X) = \sum \beta_m x_i^m = \sum y_m$ *where* $y_i = \beta_m x_i^m$ representing the income flow from the mth factor. Let the deterministic part of (8) be considered as $\hat{y} = \alpha + y^* \equiv \hat{y} = \hat{\alpha} + \sum_i y_i$.

Using $I(\bullet)$ as an indicator of an inequality measure, we compute the inequality measures for the error term $\hat{\varepsilon}$, and following Wan (2002) as:

$$CO_\varepsilon = I(y) - I\left(\hat{y}\right) \tag{9}$$

The difference between $I(y)$ and $I\left(\hat{y}\right)$ is subtle and important. This is simply the case of the expected values of y and $\hat{y}$, since they may be identical. The ranking by y and $\hat{y}$ differs and would be equivalent if and only if there is a good enough fit of the income-generating function[6]. Looking at it from this perspective, the decomposition makes intuitive as well as theoretical sense. Decomposing equation (8) entails that the disturbance term is irrelevant and does not affect income inequality. This is not true because in addition to earlier discussions, one should note that $I(y) \neq I\left(\hat{y}\right)$ unless all $\varepsilon = 0$. One way to treat the residual term is to discard it altogether, because the residuals are not explainable by the structural-income generating function. If this is the

[6] For example, if the Gini index is used, $I(y) = G(y) = C\left(\hat{y}\right)$ must be calculated with y as the ranking variable, while $I\left(\hat{y}\right) = G\left(\hat{y}\right)$ must be calculated with $\hat{y}$ as the ranking variable.

case, one could focus on $\hat{y}$ and obtained further decomposition results. This, however, is not recommended. The residual term, to some extent is sometimes viewed as representing factors or determinants other than those included in the regression model. Ignoring ε is certainly unwise as it does contain useful information. At least, its contribution, once identified, can inform policymakers and others as to how much included factors can explain the overall inequality.

Having identified the contribution of the residual term, the next task is to disentangle the contributions made by the constant term and estimated income factors as:

$$CO_{\alpha} = I\left(\hat{y}\right) - I\left(y^{*}\right) \quad (10),$$

and $CO_{y^{*}(X)} = I\left(y^{*}\right)$ (11),

where all the contributions are simply attributed to the estimated factors used in the decomposition. In summary $I\left(y\right)$ can be decomposed into CO_{ε}, CO_{α} and $CO_{y^{*}}$ (which represents the estimated factor sources), as well as their percentage contributions which add to 100.

As change in the population source share is constant or equal to one, we can compute inter-temporal changes in value of the estimated shares or proportion of the two periods (time t=1 for 2001 and t=2 for 2007), holding same the variable types as:

$$\Delta S_{t}^{m} = S_{2}^{m} - S_{1}^{m} \quad (12)$$

This change between 2001 and 2007 is interpreted as the differences in the values of the absolute contribution (obtained from the RBD results) between the two periods.

IV.1.3 Empirical Results

Table 1 indicates the weighted estimates obtained from the OLS regression analysis of household economic well-being for the years 2001 and 2007, as well as parameter estimates of the male and female sub-samples. Table 2 indicates decomposition results for the OLS estimated income sources. Estimates for both synthetic and non synthetic variables for 2001 (Table 1, column 1) reveals that the synthetic variables education and health associate positively with per capita expenditure. Evidently, access to better education implies the possibility of knowledge enhancement regarding choices made in terms of employment opportunities, sound practices and even how income is spent in the household, with a view to ensuring household welfare. Education depicts an opportunity for employment, thus the ability to generate income and subsequently per capita expenditure in the household. In terms of health, the ability to access a district health center, short distances to these centers and quality services implies a good treatment of diseases that could prevent individuals from undertaking income generating activities. In addition, economies of scales generated from good health in terms of more labor market participation and subsequently income enhance expenditure per capita.

Non synthetic variables that correlate positively with household per capita expenditure are; the age of the household head, fraction of active household members, working in the

formal sector, owning farmland and gender (being a man). Working in the formal sector entails the possibility of earning a steady source of income, as well as other advantages like being able to borrow money and an adequate insurance policy. These tend to positively impact on household economic well-being.

Table 1: Determinants of Household Economic Well-being by Ordinary Least Squares - Dependent variable is log of household expenditure per head: 2001 and 2007

Income Sources	General Samples		Male Sub groups		Female Sub groups	
	2001 Column(1)	2007 Column(2)	2001 Column(3)	2007 Column(4)	2001 Column(5)	2007 Column(6)
Education*	0.1658***	0.2609***	0.1697***	0.2235***	0.1347***	0.4496***
	(8.81)	(15.88)	(7.98)	(11.85)	(3.24)	(13.28)
Health*	0.1902***	0.1801***	0.1513***	0.1679***	0.3734***	0.2202***
	(4.88)	(14.41)	(3.38)	(11.41)	(4.75)	(9.62)
Age Cohorts	0.0125**	0.0111***	0.0149***	0.0091*	0.0081	0.0309***
	(2.56)	(2.76)	(2.66)	(1.92)	(0.79)	(4.12)
Household Size	-0.0249***	-0.0161***	-0.0256***	-0.0140***	-0.0127**	-0.0415***
	(-12.83)	(-10.59)	(-11.97)	(-8.42)	(-2.25)	(-8.56)
Fraction of Active Household Members	1.264***	1.2442***	1.2960***	1.320***	1.3055***	0.9040***
	(27.18)	(38.35)	(23.01)	(33.81)	(15.19)	(14.20)
Sex(1=male and 0=otherwise)	0.1107***	0.0701***				
	(7.05)	(5.76)				
Formal Sector (1=working in the formal sector and 0=otherwise)	0.3863***	0.3816***	0.3867***	0.3748***	0.4168***	0.4569***
	(25.11)	(27.50)	(22.29)	(24.00)	(11.92)	(14.23)
Household own farmland (1=Own farmland and 0=otherwise)	0.0586***	-0.0628***	0.0591***	-0.0662***	0.0662**	-0.0367*
	(3.51)	(-5.13)	(3.02)	(-4.55)	(2.16)	(-1.69)
Regions capturing spatial Sources						
Urban Area	0.2738***	0.3159***	0.2553***	0.3119***	0.3470***	0.3135***
	(11.96)	(17.82)	(9.50)	(14.75)	(8.32)	(10.07)
Rural Area	-0.3207***	-0.1844***	-0.3188***	-0.2006***	-0.3228***	-0.1322***
	(-13.92)	(-10.44)	(-11.84)	(-9.49)	(-7.56)	(-4.25)
Constant	11.40***	11.741***	11.56***	11.84***	11.07***	11.62***
	(165.7)	(333.1)	(151.2)	(302.5)	(79.75)	(164.2)
R-Squared	0.4727	0.5255	0.4735	0.5315	0.4770	0.5132
Fisher(df;p-value)	824 ; 0.00	1141; 0.00	711; 0.00	970;0.00	209; 0.00	304; 0.00
Total number of observation	9202	10317	7127	7710	2075	2607

Source: Computed by Authors using STATA 10 Software and the DASP 2.1 Software developed by Araar, A and Duclos, J. Y. (University of Laval, CIPREE & the Poverty Economic and Policy Research Network). Notes: Income sources with stars are synthetic variables obtained from the MCA approach. ***, ** and * represents 1%, 5% and 10% significance levels.

The fraction of active household member contribute positively to household expenditure per head via the reasoning that an increase in the number of individuals in a given household undertaking income generating activities (the ratio of active household members to the household size) will imply in overall greater income generated by summing the various incomes and consequently the spillover effect on household expenditure that will experience an increase.

Owning land contributes in increasing per capital expenditure with regards to the potential of the household to generate extra-income from the sale of products either grown for consumption or because the are the supplementary food crops that could not be consumed. Likewise, the extra money that could have been spent on buying food for consumption is saved and redirected towards other expenditure circuits, thus increasing household expenditure and consequently household economic well-being.

Spatially, while residing in urban areas tends to increase household income expenditure, the rural areas rather reduces these expenditures. This is because the cost of living in urban areas is generally higher and unemployment is rampant. Also, unlike rural areas where land is available and some form of subsistent agriculture is practiced and aids in reducing household expenditure (food) via auto-consumption, urban areas suffer from poor urbanization, extreme pressure on infrastructure and the development of slumps that may cause diseases.

In 2007 (Table 1, column 2), the synthetic variables education and health contributed in increasing household well-being. Non synthetic variables that increase household well-being included the age of the household head, fraction of active household members, working in the formal sector and gender (being a man). The age of the household head may translate his ability to undertake certain income generating activities and consequently to generate income. Also along gender lines, male headed household tend to increase household income expenditure because of the "possibility" of men to obtain jobs or the discrimination bias in favor of men in the job market.

Variables that rather reduce household expenditure are household size and owning farmland. Unlike 2001, the variable owning a farmland was negative. The relative reason resides in that these agricultural "exploitable" farm lands tended to shrink between 2001 and 2007 as reported by the ECAM III (2007) results, causing a restriction in the improvement of household economic well-being. The relationship between Household size and household expenditure is negative. This indicates that a higher number of "dependents" or individual residing in a particular household will tended to exert a lot of pressure on the meager income generated by the household head and consequently an overall dip in well-being. Spatially, like in 2001, residing in urban areas tend to increase household economic well-being and rural residency rather has the tendency to reduce household welfare.

Examining the determinants of well-being along gender lines for 2001 (Tables 1, columns 3 & 5) and 2007 (Tables 1, columns 4 & 6), we note that in 2001 both synthetic and non-synthetic variables had identical behaviors with the observations recorded for the general sample, except the variable age in the female sub group (column, 5) that that

failed to be significant. In 2007, the behaviors of the gender subsamples were identical to the general sample. Lastly the models were globally significant with R-squares ranging from 0.47 to 0.53.

To decompose inequality in household expenditure, we compute contributions of the various estimated factors using analytical and the Shapley value approaches for 2001 (Table, 2) and 2007 (Table, 3).

Table 2: Decomposition of total inequality by estimated income sources (Analytical and Shapley Value Approaches in 2001)

Income Sources	Analytical Approach		Shapley value Approach			
	Income Shares Column(1)	Gini Index Column(2)	Gini Index Column(3)	Coeffecient of variation Column(4)	Generalized Entropy Theta=0.5 Column(5)	Generalized Entropy Theta=2 Column(6)
Education*	0.0132	0.0225	0.0175	0.0346	0.0113	0.0277
		(0.6507)	(0.0392)	(0.0248)	(0.0323)	(0.0285)
Health*	0.0217	0.0024	0.0036	-0.0006	0.0009	-0.0029
		(0.0696)	(0.0080)	(-0.0004)	(0.0025)	(-0.0030)
Age Cohorts	0.0032	-0.0034	-0.0001	-0.0008	-0.0010	0.0005
		(-0.0990)	(-0.0001)	(-0.0006)	(-0.0030)	(0.0005)
Household Size	-0.0149	0.0311	0.0224	0.0450	0.0142	0.0390
		(0.8991)	(0.0503)	(0.0323)	(0.0405)	(0.0401)
Fraction of Active Household Members	0.0186	0.0936	0.0518	0.1578	0.0362	0.0769
		(2.709)	(0.1163)	(0.1131)	(0.1036)	(0.0791)
Sex(1=male and 0=otherwise)	0.0075	0.0004	0.0023	0.0017	0.0002	0.0015
		(0.0112)	(0.0051)	(0.0012)	(0.0005)	(0.0016)
Formal Sector (1=working in the formal sector and 0=otherwise)	0.0080	0.0777	0.0484	0.1598	0.0372	0.1316
		(2.251)	(0.1087)	(0.1145)	(0.1065)	(0.1352)
Household own farmland (1=Own farmland and 0=otherwise)	0.0065	0.0085	0.0076	0.0181	0.0057	0.0148
		(0.2486)	(0.0171)	(0.0129)	(0.0162)	(0.0152)
Regions capturing spatial Sources						
Urban Area	0.0078	0.0441	0.0403	0.1093	0.0311	0.0987
		(1.2776)	(0.0903)	(0.0783)	(0.0888)	(0.1014)
Rural Area	-0.0151	0.0588	0.0498	0.1236	0.0367	0.1045
		(1.7025)	(0.1117)	(0.0886)	(0.1049)	(0.1074)
Residual	0.0000	0.0105	0.2061	0.7819	0.1911	0.5435
		(0.3039)	(0.4625)	(0.5604)	(0.5464)	(0.5585)
Constant term	0.9407	-0.3965				
		(-11.47)				
Total value	1.000	0.0345	0.4457	1.3952	0.3498	0.9732
		(1.000)	(1.000)	(1.000)	(1.000)	(1.000)

Source: Computed by Authors using STATA 10 and the DASP 2.1 Software developed by Araar, A and Duclos, J. Y. (University of Laval, CIPREE & the Poverty Economic and Policy Research Network).
Notes: Income sources with stars are synthetic variables obtained from the MCA approach. Values in brackets are the relative contributions.

The difference between the analytical approach and the Shapley value approach is that, while the former computes inequality via the Gini index as the product of the income share and the coefficient of concentration, the latter is based on a set of axioms (Shorrocks, 1999) and have the merit of exactly decomposing the observed welfare indicator into subsets that sum up to the considered welfare as well as computing the weighted marginal contributions on the various estimated factors. The income sources, the constant term, health and education had the highest shares. Household size and living in the rural areas had negative shares (Table, 2; columns 1).

According to the analytic decomposition of the Gini index as characterized by the absolute contributions of the estimated income sources for 2001 indicated in Table 2, column 2, the sources fraction of active household members, working in the formal sector, household size and education contributed in accounting for observed inequality. The ratio of active household members to household size contributed most in explaining inequality in the distribution of household well-being. This implies that a larger number of active household members will enhance household chances of labour market participation, which tends to exacerbate inequality in the distribution of living standards. Consequently, its share in explaining household income inequality is highest. Formal sector workers fare better in terms of well-being than informal sector employees and consequently contribute positively to income inequality. The sources household size and the synthetic variable for education also contributed in explaining household income inequality in 2001. The sources with the least absolute Gini values are access to health and owning a farmland. The residual term had a marginal contribution in explaining income inequality. The sources age cohorts and the constant term had a negative absolute to income inequality. The indication is that these sources contribute in reducing income inequality.

Spatially, in 2001, though urban areas had higher income sources shares than rural areas, rural areas contributed more in explaining income inequality than urban areas. This may indicate that in 2001, expenditure patterns along areas of residence, though negatively related to household expenditure per head with regards to rural areas, its share in explaining inequality in household income expenditure was positive and higher than urban areas.

In 2007 (Table 3, columns 1), the estimated income sources that had the highest shares in accounting for households income inequality are the constant term, education, fraction of active household members and health. The income sources household size, owning farmland and rural residency had negative income shares. Decomposing inequality by the Gini index, the absolute contributions with the highest shares are fraction of active household members, working in the formal sector, education and household size. The estimated income source education in 2007 witnessed an increase compared to 2001(Tables 3; columns 2), revealing the key role education plays over time in enhancing well-being and exacerbating inequality if not encourage across the board, consequently increasing household income expenditure as compared to low education.

Household size contributed in accounting for inequality because larger household sizes will tend to impact well-being negatively and reinforce income inequality. As in 2001, owning farmland contributed the least in explaining inequality. The estimated factors: age and gender (being a male) caused income inequality to retreat. The residual term only had a marginal contribution to income. In 2007, urban residency status engendered both a higher share and absolute contribution to income inequality than rural residency status. This implies in 2007, disparities in urban-rural contributed in raising overall income inequality.

Table 3: Decomposition of total inequality by estimated income sources (Analytical and Shapley Value Approaches in 2007)

Income Sources	Analytical Approach		Shapley value Approach			
	Income Sources Column(1)	Gini Index Column(2)	Gini Index Column(3)	Coeffecient of variartion Column(4)	Generalized Entropy Theta= 0.5 Column(5)	Generalized Entropy Theta= 2 Column(6)
Education*	0.0215	0.0485	0.0290	0.0448	0.0168	0.0249
		(1.5510)	(0.0712)	(0.0443)	(0.0604)	(0.0486)
Health*	0.0098	0.0114	0.0117	0.0160	0.0048	0.0090
		(0.3638)	(0.0288)	(0.0158)	(0.0173)	(0.0176)
Age Cohorts	0.0026	-0.0027	0.0001	-0.0020	-0.0008	-0.0012
		(-0.0877)	(0.0001)	(-0.0020)	(-0.0030)	(-0.0023)
Household Size	-0.0084	0.0215	0.0138	0.0245	0.0086	0.0160
		(0.6883)	(0.0338)	(0.0242)	(0.0307)	(0.0314)
Fraction of Active Household Members	0.0209	0.1098	0.0621	0.1987	0.0436	0.0845
		(3.5119)	(0.1524)	(0.1965)	(0.1562)	(0.1654)
Sex(1=male and 0=otherwise)	0.0045	-0.0002	0.0013	0.0002	-0.0001	(0.0001)
		(-0.0057)	(0.0031)	(0.0002)	(-0.0004)	(0.0001)
Formal Sector (1=working in the formal sector and 0=otherwise)	0.0049	0.0600	0.0347	0.0824	0.0236	0.0472
		(1.9174)	(0.0852)	(0.0815)	(0.0846)	(0.0924)
Household own farmland (1=Own farmland and 0=otherwise)	-0.0031	0.0112	0.0079	0.0141	0.0049	0.0078
		(0.3582)	(0.0193)	(0.0140)	(0.0176)	(0.0153)
Regions capturing spatial Sources						
Urban Area	0.0087	0.0706	0.0466	0.0919	0.0304	0.0512
		(2.2571)	(0.1143)	(0.0909)	(0.1088)	(0.1002)
Rural Area	-0.0083	0.0438	0.0279	0.0501	0.0177	0.0284
		(1.4006)	(0.0684)	(0.0495)	(0.0635)	(0.0556)
Residual	0.0000	0.0089	0.1711	0.4641	0.1316	0.2308
		(0.2843)	(0.4196)	(0.4590)	(0.4716)	(0.4515)
Constant term	0.9448	-0.3961				
		(-12.665)				
Total value	1.000	0.0313	0.4077	1.0111	0.2791	0.5112
		(1.000)	(1.000)	(1.000)	(1.000)	(1.000)

Source: Computed by Authors using STATA 10 and the DASP 2.1 Software developed by Araar, A and Duclos, J. Y. (University of Laval, CIPREE & the Poverty Economic and Policy Research Network). Notes: Income sources with stars are synthetic variables obtained from the MCA approach. Values in brackets are the relative contributions.

Using the Shapley value decomposition approach, we compute the contributions of the estimated factors through Gini index, the Coefficient of Variation and the Theil index (0.5 & 2) for 2001 (Table, 2; columns 3, 4, 5 & 6). According to the Gini decomposition (columns 3), the sources that contribute most in explaining observed inequality in household income expenditure are the fraction of active household members, working in the formal sector, household size and education, with their relative contributions summing up to 32% of total inequality. The estimated income sources: owning land, health indicator and gender all marginally contributed in explaining observed inequality in household expenditure. The estimated factor age had a marginal negative contribution. Spatially, the estimated income source - rural residency, had higher relative contributions (11%) than urban residency (9%) in explaining observed inequality. The relative contribution of the residual term stood at 46%. Total Gini was 0.4457.

Table 3 (column 4), which hosts regression-based inequality decompositions using the coefficient of variation, show results of the contribution of estimated income sources that to total inequality that are similar to those given by the Gini. Their overall relative contributions stood at 27%, only 5 percentage points lowers that observed results using the Gini index of inequality. In addition to the estimated income source age, the health indicator also registered a negative contribution in explaining total inequality. The relative contribution of the residual was 56%, 10 percentage points higher than the results obtained via the Gini index.

Using the Theil index (Table 3, columns 5 & 6), we compute contribution for the values of theta 0.5 and 2. Both Theil indexes identify working in the formal sector as being the main estimated factor that explains observed inequality, unlike the Gini and Coefficient of variation indexes that identify fraction of active household members as the factor that explains income inequality most. We observe that the relative portion of estimated sources that contribute in explaining inequality for both Theil indexes sum up to 27%. While the sources age cohort and gender were negative for the Theil index when theta equaled to 0.5, for the Theil index when theta equaled to 2 only the sources age was negative. As with the Gini, rural residency status marginally contributed more than urban residency status in explaining inequality. The residual overwhelmingly contributed about 55% to income inequality in 2001. The total values of the Theil indices were 0.3498 for theta equals to 0.5 and 0.9732 for theta equals to 2.

Decomposing inequality using the Shapley value for the Gini index, coefficient of variation and the Theil index for theta equals 0.5 and theta equal 2 for 2007 (Tables, 3; columns 3, 4, 5 & 6), we note the following: regarding the Gini index, estimated factors that explain inequality are fraction of active household heads, working in the formal sector, the education indicator and household size. The relative contributions of these factors sum to 34%. The factor age has the least contribution with a relative share less than a percentage point. Contrary to results obtained in 2001, urban residency status in 2007 contributed two times as much as rural residency status in accounting for income inequality. For instance, the relative contribution of urban areas was 11% compared to

6% for rural areas. The contribution of the residual term to income inequality was 42%. The Gini index for 2007 was 0.4077, retreating by about 4 percentage from 2001.

In terms of the coefficient of variation (Table 3, column 4), the same sources than were observed for accounting for inequality via the Gini approach also explained inequality in household expenditure. Their relative contributions sum-up to about 35%. The estimated income source age cohort is income inequality reducing. Urban areas contributed more than rural areas in explaining inequality. The contribution of the residual term was 45%, clearly lower than its values in 2001. The total value of the coefficient of variation was 1.0111 and smaller than the value for 2001 which stood at 1.3952.

For the Theil indexes (columns 5 & 6), the fraction of active household heads, working in the formal sector, the education indicator and household size contributed about 33% in explaining observed income inequality. However, while for the first Theil index age cohorts and gender (being male) contributed in reducing inequality in household income, the second Theil index only identified age as income inequality reducing in 2007. Urban areas accounted overwhelmingly in explaining income inequality. The residual term contributed 45% to 47% in accounting for income inequality (column 6). The total values were 0.2971 and 0.5112 respectively lower than their values in 2001.

The marginal contributions of the estimated income sources using the Gini approach are reported in the next section. The Gini index is deemed as the inequality index that behaves the best in reporting our results. These marginal contributions are reported hinging of the notion of the Shapley values concept developed by Shorrocks (1999), were a players (sources) joins a coalition and the marginal impact (gain or loss) is calculated. These contributions are generated by the DASP 2.1 software package.

Analyzing the marginal contributions of some estimated income sources for 2001 (appendix 3, table 4), the factor fraction of active household members, when no other policy in put in place (level 1), has the highest marginal contribution (0.0090). This imply that policies that are aimed at encouraging employment or precisely auto employment via the progressive formalization of the informal sector and the encouragement of small and medium size enterprises are those that account for high level of inequality. Additionally, with subsequent levels or inclusion of other dimensions of well-being this estimated factor still has the highest marginal impact though experiencing a decrease in observed inequality with regards to the factor fraction of active household members.

Regarding working in the formal sector for instance, its marginal impact is second largest at level 1, translating a high degree of inequality of this dimension of well-being. It progressively reduces as we include other policies that target other dimensions of well-being. This entails that policies that encourage employment, amelioration of earnings in the informal sectors by restructuring these sectors of the economy via facilities that can render formal most activities in the primary and informal sectors will help bridge disparities in expenditure between household heads working in both sectors. This trend is observed for the sources, education, household size, owning farmland by households and the residual term.

The above trend is not observed for the estimated income sources gender (male) and age cohorts. The estimated sources gender decreases with the inclusion of other dimensions of well-being. However, this marginal contribution becomes negative from level 7 indicating that, with the blending of different policies, at a certain point gender inequality becomes adjusted and starts experiencing an equalization of its values. Concerning age cohort, equalization of its values is experienced as from the fourth level. Spatially, rural areas have the highest marginal contributions for all levels compared to urban areas. This indicates that spatial development should be biased in favor of the rural areas.

Regarding marginal contribution of the various dimensions of well-being for 2007 (see appendix 3, table5), we observe similar results to 2001 with the source fraction of active household members having the highest marginal contribution at level 1 (0.0099). It subsequent marginal contributions with the inclusion of policies that target other dimensions of well-being are still the highest. The contribution of the other three estimated sources that significantly account for inequality, working in the formal sector, education and household size also behaved similarly to 2001. The well-being dimension education has a marginal contribution that progressively decreases with the inclusion of other sources of well-being, translating a progressive reduction of inequality in the estimated income source. This entails that policies that encourage the reduction of inequality observed as regards to the well-being dimension education should be combined with other policies because solely bridging disparities in education will not substantially decrease inequality in household income expenditures.

The estimated factors gender (male) and age cohorts begin to experience equalization in inequality with the inclusion of other dimensions at the levels 5 and level 4 respectively. This indicates that, with the blending of different policies, at a certain point gender inequality and inequality due to age becomes adjusted and starts experiencing an equalization of its values. Spatially, unlike 2001, in 2007 urban areas have the highest marginal contributions for all levels compared to rural areas. This indicates that over time urban areas have tended to significantly account for inequality (twice the values of rural areas). Thus, including other policies that reflect other dimensions of well-being in addition to policies that ameliorate living standards in rural areas, and ameliorating urban infrastructure, etc in view of bridging the spatial gaps observed will reduce inequality.

An inter-temporal analysis of the estimated factor to gauge for the behavior of these sources of well-being over time and their inter-temporal contributions to household income inequality for the analytical and Shapley value approaches in undertaken in this study (Table, 4). The basic idea is that we calculate the change in absolute values of the factors considered over time as well as their contributions to total inequality.

Table 4: Changes in Estimated Income Sources: 2001-2007

Income Sources	Analytical Approach	Shapley value Approach			
	Change in Gini Index Column(1)	Change in Gini Index Column(2)	Change in Coeffecient of variation Column(3)	Change in Generalized Entropy	
				Theta=0.5 Column(4)	Theta=2 Column(5)
Education*	0.026	0.0115	0.0102	0.0055	-0.0028
Health*	0.009	0.0081	0.0166	0.0039	0.0119
Age Cohorts	0.0007	0.0002	-0.0012	0.0002	-0.0017
Household Size	-0.0096	-0.0086	-0.0205	-0.0056	-0.023
Fraction of Active Household Members	0.0162	0.0103	0.0409	0.0074	0.0076
Sex(1=male and 0=otherwise)	-0.0006	-0.001	-0.0015	-0.0003	-0.0016
Formal Sector (1=working in the formal sector and 0=otherwise)	-0.0177	-0.0137	-0.0774	-0.0136	-0.0844
Household own farmland (1=Own farmland and 0=otherwise)	0.0027	0.0003	-0.004	-0.0008	-0.007
Regions capturing spatial Sources					
Urban Area	0.0265	0.0063	-0.0174	-0.0007	-0.0475
Rural Area	-0.015	-0.0219	-0.0735	-0.019	-0.0761
Residual	-0.0016	-0.035	-0.3178	-0.0595	-0.3127
Constant term	0.0004				
Total value	-0.0032	-0.038	-0.3841	-0.0707	-0.462

Source: Computed by Authors using STATA 10 and the DASP 2.1 Software developed by Araar, A and Duclos, J. Y. (University of Laval, CIPREE & the Poverty Economic and Policy Research Network). Notes: Income sources with stars are synthetic variables obtained from the MCA approach.

Changes in absolute contributions using the analytical approach (Table, 4, column, 1), are computed. Sources that contributed in reducing inequality in household expenditure are household size, gender (Male), working in the formal sector, residing in the rural area, the residual term and the total value of the Gini index. This entails that these sources experience a reduction in their values that contributed in explaining the fall in values of total inequality observed over time. In opposition the sources fraction of active household members, education and health and residing in the urban areas contributed in increasing inequality over time.

Regarding the Shapley value approach for the Gini, coefficient of variation and the Theil indexes (Tables, 4; columns, 2, 3 & 4), evaluating changes in the values of the Gini index (column, 2) revealed identical trends in results with those obtained for the analytical approach. Concerning the coefficient of variation, estimated sources that contributed in

reducing inequality over time are working in the formal sector, owning farmland, household size, gender (Male), age cohorts, and both urban and rural areas. The sources of well-being fraction of active household members, the synthetic variable education and health had an opposite effect.

Estimated sources obtained via the Theil index for theta equals 0.5, indicate that over time the sources household size, gender, working in the formal sector, owning farmland, the residual and living in both urban and rural areas all inter-temporally contributed in reducing observed inequality over time. Regarding the Theil index with theta equals to two, in addition to the above mentioned values, between 2001 and 2007 education and age cohorts also contributed in accounting for change in inequality over time. The variables fraction of active household members and the synthetic health variables fueled inequality within the periods under review.

IV.1. 4 Conclusions

Concluding this section, we observe that the variables that explain household economic well-being also contributed in accounting for observed inequality in household's expenditure. Regarding the regression analysis, all the covariates used in this study significantly explained household economic well-being for both years. While the synthetic variables education and health, as well as the non synthetic variables fraction of active household members, working in the formal sector, age, living in the urban areas and gender all positive relationship with household economic well-being for both years, the variables household size and living in the rural area head a negative relationship. The factors household size and living in rural areas reduce household expenditure per had. Regarding owning farm land we not a switch in sign from 2001 to 2007.

Undertaking a decomposition of these estimated factors, using both the analytical and Shapley value approach, to investigate estimated sources that account for inequality in household well-being, the source that contributed most included fraction of active household members, working in the formal sector, education and household size. Spatially while in 2001 rural areas marginally contributed more than urban areas in explaining observed inequality, in 2007 the urban areas overwhelmingly contributed in accounting for inequality in household expenditure. The relative contributions of the error term ranged from 45 to 56 percent.

Using the Gini index to compute the marginal contributions of the various sources via the Shapley value approach established by Shorrocks (1999), fraction of active household members, working in the formal sector, education and household sizes had significant contributions in explaining inequality. The factors age cohorts and gender at a given level had negative values, indicating an equalization of inequality of these sources of well-being when we include other policies that target these dimensions of well-being.

Over time, analysis indicate that within the period under review sources that contributed in explaining the fall in values of inequality are working in the formal sector, household size, gender, living in rural areas and the residual term. Regarding urban areas, while the analytical Gini and the Gini index obtained from the Shapley values did not record urban

areas as reducing inequality over time, the coefficient of variation and the Theil index identify this source are reducing inequality over time. The variables education and health, as well as the fraction of active household members rather fuelled inequality between 2001 and 2007.

IV.2 Inter-Household Gender Disparities: An Oaxaca-Blinder Approach

Introduction

The contribution of this paper anchors on the application of the Oaxaca (1973) and Blinder (1973) approach, which involves obtaining appropriate parameter estimates of income generating functions, and using them to tease out the partial effects of regressed factor endowments as well as their returns on gender disparities in Cameroon. This is important because studies on gender are still at an emerging state in Cameroon because of limited empirical studies that lead to inadequate evidence-based policy information. In this regards, adequate information is essential because the role played by women in fighting poverty[7] and stirring development is significant (Boserup, 1970; Feldstein and Jiggins, 1994). Lachaud (1997) note a high vulnerability of women regarding well-being, notably as concerns female headed households. Therefore, women are considered to be relatively more vulnerable[8] in the context of changes in money income, health, and education, all of which are supposed to generate the conditions of poverty

New challenges, including globalization and climate change disproportionately affect women with regards to initial endowments and how these affect well-being. For instance, the UN Millennium Development Goals (MDG) Report (2006) notes a failure in gender parity in the attainment of educational objectives as highlighted by the MDG3 which advocates the promotion of gender equality and women's empowerment (Department for International Development (DFID), 2007). Socio-cultural fabric of most traditions in developing countries and Cameroon have out rightly been in favor of men, notably as concerns land inheritance, relegating the women to secondary roles. This prevents them from acquiring and developing assets to participate fully in realizing growth potentials that can aid households break away from poverty and inequality traps (World Bank, 2005; Endeley and Sikod, 2006). These differences or disadvantages that are gender-oriented and skewed in favor of men affect supply responses and resource allocation both at micro (household) and macro levels of well-being (Sikod, 2007).

Gender analysts remark that women and children are more vulnerable[9]. This dampens gender-neutral and gender-bias opportunities to undertake remunerative activities that

[7] In most rural areas in Less Developed Countries Women are the bread winners of most families, and issues that help consolidate their position need to be clearly incorporated into the Poverty Reduction Strategies (Mosse, 1994).

[8] In the 1990s, neither the United Nations Reports nor the World Bank Reports has made a clear distinction between vulnerability and poverty. The contribution of Moser (1998) to the Gender economics literature is precious. Moser (1998) clearly indicates the difference that poverty is a static concept because the measurement of poverty is fixed in time; however, vulnerability is more dynamic because it captures change process.

[9] Vulnerability is considered as a type of asset. It entails defenselessness, insecurity and exposure to risk. Thus it is obvious that the more people are asset endowed, the less vulnerable they will be to protect themselves from poverty (Moser and Felton, 2006).

will help them acquire their own assets, thus, limiting overall household and local community welfare. According to the UNDP Cameroon Office (MDG progress report, 2002; 2003) it seems unlikely, given the progress made for Cameroon to attain most of the MDG3 objectives before the dateline. Bias in government policy-making in favor of men can be explained by weak position of women as a lobby group to push government resolve gender issues.

Applying the Oaxaca-Blinder (1973) traditional decomposition methodology to gender disparities and factors that contribute to differences in household economic well-being with respect to endowments and their return between male-headed and female-headed household in Cameroon, we elicit the contribution of factors that explain gender-neutrality (gender-expenditure discrimination) and gender-bias (personal-specific characteristics) in Cameroon. This technique hinges on the basic premise that in the absence of societal discrimination (considered as a source of inequality), the household income expenditure structure faced by men also applies to women. Measuring the difference in gender expenditure-discrimination and personal-specific characteristics we estimate separate semi-log income expenditure functions for male and female headed households, and decompose the differences in the mean of the log of household income expenditure.

To tackle the inter-household gender endowment disparity questions, our main research concern is: how and why do female headed households differ from male headed households and to what extent do their differences in incomes are due to different endowments or different in returns of these endowments. Specifically; how does the nature of discrimination in access to endowments and treatment along gender lines affect gender disparities in Cameroon?. Our main research objective is, therefore, to investigate the nature of gender endowment differences observed between male and female headed households in Cameroon. Specifically, the paper seeks: (1) to observe discrimination in access to endowments and treatment between male and female headed households' gender-neutral and gender-bias processes in Cameroon; and (2) to suggest policy implications on the basis of the findings.

IV.2.1 Brief Review of Literature

Many studies applying the Oaxaca-Blinder approach focus attention mainly on determining the role of labor market discrimination in assigning men and women to different occupations (Lissenburgh, 2000; González et al, 2005; Chzhen, 2006). An overview of literature pertaining to female headed household welfare reveals that divers' issues have been tackled. Among these we note issues linked to gender and assets endowments, and the impact of these assets on rural welfare (Cheryl, 2005; Duflo, 2003; Fafchamps and Quisumbing, 2002), issues on intra-household inequality (Quisumbing, 2003 and Haddad et al, 1997) and issues linked to gender discrimination in Sub-Saharan Africa using the Oaxaca-Blinder Decomposition (Grun, 2004; Shepherd, 2008 and Nordman et al, 2009). Despite this popularity, to the best of our knowledge, there has been no adaptation of this approach to study differences in gender endowment with regards to male and female headed households in Cameroon.

Other studies that target differences in endowment between male and female headed household include gender issues include for instance, Blackden and Bhanu (1996) who analyze human assets and finds that in sub-Saharan Africa (SSA) gender differentials in reproductive health disfavours women more than men. Regarding social assets, precisely norms, DasGupta (1987) observes that cultural rights and obligations favour sons relative to daughters in rural India. Ahuja and Filmer (1996) identify disparities in male-female educational attainments and enrolments levels in developing countries. Wan and Cai (2005) applying a multinomial Logit regression decomposition note that unequal access to other factors rather than pay are causes of discrimination of gender wages in certain industries (sectors) in China. Klassen (2005) in studying the impact of gender inequality of pro-poor growth recognizes that there is little information on the impact of gender gaps on inequality. In this connection, DFID (2007) reports that, on average worldwide, women represent about 17% in parliaments and remain severely under-represented in political and decision-making positions in many countries. This figure is considerably lower in countries such as Egypt, where just 2% of members or parliament are made of female. In Cameroon, the number is less that 17% of the total number of parliamentarians

There are very little empirically studies that targets differences in endowments along gender lines in Cameroon. In this category, Sikod (2007) using descriptive statistics attempts to distinguish between assets (private and public) that affect labour productivity and its influence on household decision making processes. Endeley and Sikod (2005) using graphs and tables evaluate the impact of the Chad-Cameroon pipeline using data collected from some villages situated along the pipe line routes and try to investigate how this affects gender relations, land resources and community livelihood. The study finds a bias in favour of men in terms of recruitment, and benefits obtained from the construction of the pipeline and the communities that benefited from this process. Ngome (2003) based on descriptive data collected from the south west region show the role of gender division of labour and women's decision making in rural Cameroon. The study finds that in rural areas, socio-economic and cultural constraints cause women to get only secondary roles that impair on their capacity to generate resources and thus they cannot bargain adequately in decision making processes with their male counterparts.

Similarly with the use of secondary data Fonchingong (1999) evaluates the impact of structural adjustment reforms on women and how this affects agricultural output in Cameroon. This study reveals that enhanced agricultural productivity could be observed if adequate government policies that empower women were enacted. Fonjong (2001) questions the role of NGOs in enhancing the participation of women in fostering development aimed at increasing welfare. These studies seek to understand gender issues in Cameroon, but do not evaluate the causal relationships that exist between endowments that may affect either the male or female household's economic well-being or the returns in endowments. They also fail to use econometric methodologies that go beyond descriptive analysis, effectuate a decomposition procedure of these endowments and investigate discrimination outcomes caused by differences in endowments or returns to these endowments between male and female headed households.

IV.2.2 Methodology

Let the male and female geometric mean of household expenditure be denoted by $\bar{Y}_t^M$ and $\bar{Y}_t^F$, we decompose the log-differential of the geometric mean Δ:

$$\Delta \equiv \log\left(\frac{\bar{Y}_t^M}{\bar{Y}_t^F}\right) = \left(\log\left(\bar{Y}_t^M\right) - \log \bar{Y}_t^{0F}\right) + \left(\log\left(\bar{Y}_t^{0F}\right) - \log \bar{Y}_t^F\right) \tag{13}$$

where $\bar{Y}_t^{0F}$ is a hypothetical distortion-free or discrimination-free mean household expenditure for women, the subscript t represents the year or period considered (This could be the initial or final period). Furthermore, summarizing the variation in male-female headed household expenditure cross section sample, we can use the following simple statistical models:

$$In\, y_{i,t,M} = X_t^i \beta_t^M + \varepsilon_{i,t} \tag{14}$$

and

$$In\, y_{j,t,F} = X_t^j \beta_t^F + \varepsilon_{j,t} \tag{15}$$

where $y_{i,t,M}$ is the log of household expenditure of man i at the considered period and $y_{j,t,F}$ is the log of household expenditure of woman j at the considered period; β_t^M and β_t^F are the coefficients that determine the effects of factor endowments on household well-being and X_t^i and X_t^j are the vectors of the mean personal endowments related characteristics of man i and woman j. Since the regression function passes through the sample mean of X and y, taking the arithmetic average of equations (14) and (15), the stochastic ε -term drops out.

Designating arithmetic mean by an over lined variable $\bar{y}_t^\alpha$, where $\alpha = M\, or\, F$ for men and women, and applying a semi-log regression we have:

$$In\, \bar{y}_t^M = \bar{X}_t^M \hat{\beta}_t^M \tag{16}$$

and

$$In\, \bar{y}_t^F = \bar{X}_t^F \hat{\beta}_t^F \tag{17}$$

This simply implies that mean expenditures are predicted by using mean characteristics, and $\hat{\beta}_t^F$ and $\hat{\beta}_t^M$ the vectors of the estimated coefficients of the female and male groups. Since $\bar{y}_t$ is the mean of the log at the considered period, and is the log of the geometric means $\bar{Y}_t$, we then plug equations (16) and (17) into (13), and averaging over the entire spectrum of endowments, we obtain for the male and female subgroups:

$$\Delta_t = \log\left(\frac{\bar{y}_{M,t}}{\bar{y}_{F,t}}\right) = \sum_{z=1}^{Z} 0.5\left(\hat{\beta}_{z,t}^{M} + \hat{\beta}_{z,t}^{F}\right)\left(\bar{X}_{z,t}^{M} - \bar{X}_{z,t}^{F}\right) + \sum_{z=1}^{Z} 0.5\left(\bar{X}_{z,t}^{M} + \bar{X}_{z,t}^{F}\right)\left(\hat{\beta}_{z,t}^{M} - \hat{\beta}_{z,t}^{F}\right) \quad (18)$$

And for the general population we obtain:

$$\Delta = \log\left(\frac{\bar{y}_{t+1}}{\bar{y}_{t}}\right) = \sum_{z=1}^{Z} 0.5\left(\bar{\beta}_{z,t}\right)\left(\bar{X}_{z,t+1} - \bar{X}_{z,t}\right) + \sum_{z=1}^{Z} 0.5\left(\bar{X}_{z,t}\right)\left(\hat{\beta}_{z,t+1} - \hat{\beta}_{z,t}\right) \quad (19)$$

where z= 1,…..Z indicates the endowments attributed to each household. Equation (19) is a decomposition of the effects of difference in average characteristics (the first term) and the effects of difference in returns of characteristics (second term). Distinguishing the contribution of different characteristics on the one hand and of the unexplained differential effect on the other hand, the structural form of equation (19) resolves the critical issue[10] of having to define *a priori* a reference structure - the base and/or final years used in the analysis. This structure (equation 18) emerges by avoiding the arbitrariness in selecting the gender structure of reference by using the Shapley value approach. The first term simply shows the part of the log- expenditure differential between men and women that can be explained by different personal characteristics. The second term is the difference not explained by the difference in expenditure-determining personal characteristics or returns of these characteristics captured by the estimated coefficients. Similar to Takahashi (2007) we can estimate the partial effect of a particular individual endowment or characteristic on differences observed between male and female headed households.

Inter-temporally computing the discrimination in endowment component and treatment component between 2001 and 2007, hinging on the Shapley value decomposition framework; we extend equation (19) to:

$$\begin{aligned} Inter-Temporal_{2007-2001} &= \sum_{z=1}^{Z} 0.25\left(\bar{\beta}_{z,t+1} + \bar{\beta}_{z}\right)\left(\Delta\bar{X}_{z,t+1} - \Delta\bar{X}_{z,t}\right) + \sum_{z=1}^{Z} 0.25\left(\Delta\bar{X}_{z,t+1} + \Delta\bar{X}_{z,t}\right)\left(\bar{\beta}_{z,t+1} - \bar{\beta}_{z}\right) \quad (20) \\ &+ \sum_{z=1}^{Z} 0.25\left(\bar{X}_{z,t+1} + \bar{X}_{z,t}\right)\left(\Delta\bar{\beta}_{z,t+1} - \Delta\bar{\beta}_{z}\right) + \sum_{z=1}^{Z} 0.25\left(\Delta\bar{\beta}_{z,t+1} + \Delta\bar{\beta}_{z}\right)\left(\bar{X}_{z,t+1} - \bar{X}_{z,t}\right) \end{aligned}$$

Having formulated gender disparities regarding endowments and returns to these endowments, we consider the rate of discrimination between men and women based on: (1) the endowments and; (2) on the difference in treatment or returns to these endowments by constructing a discrimination index. This analysis will inform us on gender income disparities by regressed factors using a discrimination or segregation index. Let us denote the discrimination coefficient or index for treatment by:

$$DISC_{treatment\,f,t} = \left\{\exp\left[\left(\hat{\beta}_{t}^{M} - \hat{\beta}_{t}^{F}\right)\bar{X}_{t}^{F}\right] - 1\right\} \times 100 \quad (21)$$

Here $DISC_{treatment,f,t}$ is the percentage change in the expenditure women could undertake given that they have the same attributes as men or if they had the same

[10] A review of literature raises two issues: (1) how do we account for the unexplained part in explaining the considered variable and; (2) how do we choose the reference structure (Oaxaca and Ransom, 1994 and 1997).

income/expenditure as men. The discrimination index for endowment is expressed as:

$$DISC_{endowments,f,t} = \left\{ \exp\left[\left(\bar{X}_t^F - \bar{X}_t^M \right) \hat{\beta}_t^F \right] - 1 \right\} \times 100 \qquad (22)$$

Here $DISC_{endowments,f,t}$ is the percentage change in the expenditure women could undertake given that they have the same returns as men.

IV.2.3 Empirical Results

Data used in this section is obtained from ECAM II and ECAM III plus parameter estimates from the regression results hosted in Table 1. Based on results obtained from the OLS econometric specifications, we compute: (1) gender neutral and gender biased characteristics that account for inter-household gender disparities for the two years; (2) their inter-temporal values and; (3) the discrimination coefficients in terms of endowments and returns to these endowments. Computing values for the general samples for 2001 and 2007 (Table, 5; columns 1 and 2), individual and household neutral endowments that fuel disparities in household economic well-being between 2001 and 2007 are education, household size, fraction of active household members, working in the formal sector and the ability to own farmland, as well as both urban and rural areas, though marginal. Bias determinants that are inclined to worsen inter-household disparities are the education, household size and both urban and rural locality (column, 2).

Table 5: Gender-Neutral and Gender-Biased Characteristics from the OLS regression for 2001 and 2007 in Table 1

Variables	General Survey		2001 Male and Female Sub sample Survey		2007 Male and Female Sub sample Survey	
	Neutral	Biased	Gender Neutral	Gender Biased	Gender Neutral	Gender Biased
	Col (1)	Col(2)	OLS 2001 Col(3)	OLS 2001 Col(4)	OLS 2007 Col(5)	OLS 2007 Col(6)
Education*	0.02010	0.20585	0.00371	0.03602	0.01801	-0.25250
Health*	-0.1255	-0.0212	-0.00795	-0.3100	-0.0250	-0.03875
Age Cohorts	-0.0012	-0.0077	-0.00360	0.01968	-0.0085	-0.06122
Household Size	0.01314	0.08473	-0.02504	-0.0619	-0.0247	0.1178
Fraction of Active Household Members	0.06333	-0.0122	-0.01275	-0.0047	-0.0019	0.14073
Sex(1=male and 0=otherwise)	-0.0021	-0.0605				
Formal Sector (1=working in the formal sector and 0=otherwise)	0.05115	-0.0006	0.00088	-0.0046	0.00229	-0.01096
Household own farmland (1=Own farmland and 0=otherwise)	0.00018	-0.0471	0.00160	-0.0016	0.00038	-0.00449

Regions						
Urban	0.0281	0.04213	-0.00602	-0.0420	0.00763	-0.0009
Rural	0.0038	0.09415	-0.12085	0.00137	0.00100	-0.0232

Source: Computed by authors using STATA. The variables with stars are synthetic variables.

Undertaking a gender-neutral and gender-bias analysis for 2001 (Table 5; column 3 & 4), we observe that in 2001 gender-neutral characteristics that exacerbated inter-household gender disparities are educational level, working in the formal sector and owning farmland by households. Gender-bias inter-household disparities for difference in treatment captured by the estimated coefficients are education, age cohorts and residing in rural areas. Spatially, in terms of gender-neutral characteristics, both urban and rural localities contributed in reducing gender disparities. In terms of gender-bias characteristics, while urban localities curbed down household gender differences, rural areas rather increase observed difference in terms of discrimination in treatment. In 2007 (Table 5), the sources health, age cohorts of household head, fraction of active adult members and household sizes were gender-neutral characteristic with the tendency to decrease inter-household gender inequality (column 5). Personal specific characteristics that fill inter-household gender gaps were education, health, age cohorts, working in the formal sector, owning farmland and both urban and rural areas (column 6).

Computing the Oaxaca-Blinder decomposition for the general samples for both years, as well as decomposing inter-temporally gender disparity (Table, 6) reveals that for the general samples (columns, 1), educational status of the household head overwhelmingly accounts (60%) for inter-household gender differences. This is followed by household size, fraction of active household members and working in the formal sectors. Contributions with negative value are health, age cohorts, gender and farmland owned by households. Regionally, both urban and rural areas also positively impacted on disparities observed between 2001 and 2007. The immerging policy implication suggests that government should skew their policy towards these localities.

An Oaxaca-Blinder decomposition along gender lines (Tables, 6; columns 2) for 2001 reveals that sources that reduce disparity gaps between male and female headed household are health (60%), age cohorts, household size (16%), fraction of active household members, working in the formal sector and owning farmlands. Spatially, both urban and rural areas reduced observed disparity, with the share of rural areas doubling that of urban areas. Regarding total share of income expenditure per head, the Oaxaca-Blinder decomposition for 2001 had a negative value translating a fall in gender disparities for 2001. In 2007 (column 3), household size, fraction of active household members and residing in the urban areas explained income expenditure differences that exist between male and female headed households. Particularly, the role education was overwhelmingly significant in reducing inter-household gender disparities in 2007.

The inter-temporal decompositions (column 4) indicate that education, age cohorts, working in the formal sector and owning farmland accounted for the bridge in income gap disparity between 2001 and 2007. Variables that inter-temporally enhanced differences observed between male and female household heads are health, household size and fraction of active household members. Regionally, both urban and rural areas worsened inter-household gender disparities within the period under review.

Table 6: Decomposition of Gender Well-being via the Oaxaca-Blinder Approach form the Ordinary Least Squares for 2001 and 2007

Variables	General decomposition between whole sets for 2001 and 2007 Column(1)	2001 Survey Column(2)	2007 Survey Column (3)	Inter-Temporal decomposition Columns(4)
Education*	0.22596	0.03973	-0.23449	-0.28137
	(68.77%)	(-7.38%)	(142.83%)	(-92.54%)
Health*	-0.14666	-0.31798	-0.06377	0.26275
	(-44.64%)	(59.12%)	(38.85%)	(86.42%)
Age Cohorts	-0.00896	0.01607	-0.06972	-0.08335
	(-2.73%)	(-2.99%)	(42.47%)	(-27.42%)
Household Size	0.09788	-0.08697	0.09316	0.17997
	(29.79%)	(16.17%)	(-56.74%)	(59.19%)
Fraction of Active Household Members	0.05109	-0.01745	0.13887	0.15088
	(15.55%)	(3.25%)	(-84.59%)	(49.62%)
Sex(1=male and 0=otherwise)	-0.06254			
	(-19.04%)			
Formal Sector (1=working in the formal sector and 0=otherwise)	0.05050	-0.00372	-0.00867	-0.00565
	(15.37%)	(0.69%)	(5.28%)	(-1.85%)
Household own farmland (1=Own farmland and 0=otherwise)	-0.04690	-0.00004	-0.00410	-0.00345
	(-14.27%)	(0.01%)	(2.50%)	(-1.14%)
Regions				
Urban	0.07025	-0.04799	0.00676	0.04793
	(21.38%)	(8.92%)	(-4.11%)	(15.76%)
Rural	0.0979	-0.119472	-0.02220	0.03634
	(29.81%)	(22.21%)	(13.52%)	(11.95%)
Total Share of Estimated sources of Expenditure Per capita gap/ Discrimination Index	0.32855	-0.53782	-0.16417	0.30405
	(100%)	(100%)	(100%)	(100%)

Source: Computed by Authors. Notes: the values in brackets below the Oaxaca-Blinder decomposition and the discrimination coefficients translate the percentage contributions to total gender income expenditure gap.

Discrimination coefficients that captured both differences explained by endowments and treatment in endowments (Table, 7) for the general samples (column 1 and 2) identify that within the period under review, discrimination in treatment for all factors overwhelmingly contributed in increasing household differences with regards to the regressed sources potentially indicating why at most poverty stagnated between 2001 and 2007. Regarding discrimination in endowments, inter-temporally, education, household size, fraction of active household members and locality increased observed inequality in household income expenditure.

For 2001 (Table, 7, columns 3 and 4), with regards to discrimination in treatment, equating male and female educational attainment via policies that bridge inequality in education and schooling schemes will increase income earned by women by about 12%. Likewise, bridging rural disparities will, though marginal increase female income, reduce income disparities along gender lines. Regarding, discrimination in endowments, education, owning a house and working in the formal sector contribute in retreating gender differences that disfavor women. In opposition, fraction of active household members, household size, the synthetic variable health, gender type, and both the urban and rural areas increase discrimination that disfavor women.

In 2007 (Table 7, columns 5 and 6), discrimination in treatment that reduces differences between male and female headed households are household size and fraction of active household member. Regionally, both urban and rural areas fuel discrimination as per treatment. Endowments that discriminate upon women are health, age cohorts, household size and fraction of active household members. Regionally, both urban and rural areas aided in decreasing inter-household disparities observed along gender lines.

Table 7: Discrimination coefficient for Treatment and Endowment of Gender Well-being via the Oaxaca-Blinder Approach for 2001 and 2007

Variables	General Survey		2001 Male and Female Sub sample Survey		2007 Male and Female Sub sample Survey	
	Disc. in Treatment Col. (1)	Disc in Endowments Col. (2)	Disc. in Treatment Col. (3)	Disc in Endowments Col. (4)	Disc. in Treatment Col. (5)	Disc in Endowments Col. (6)
Education*	40.5938	1.5741	3.62288	0.32921	-21.8429	2.4345
	(10.88%)	(30.27%)	(-11.48%)	(-2.07%)	(227.24%)	(-43.05%)
Health*	36.2757	-12.0887	-26.9046	-1.12502	-4.12476	-2.79868
	(9.73%)	(-232.5%)	(85.28%)	(7.10%)	(42.91%)	(49.49%)
Age Cohorts	36.6433	-0.13016	2.09586	-0.25345	-6.37360	-1.30527
	(9.82%)	(-2.50%)	(-6.64%)	(1.59%)	(66.30%)	(23.08%)
Household Size	38.4884	1.60915	-5.21125	-1.64269	11.1441	-3.62252
	(10.32%)	(30.94%)	(16.52%)	(10.37%)	(-115.94%)	(64.06%)
Fraction of	36.5817	6.59133	-0.47406	-1.27124	15.5098	-1.48943

Active Household Members						
	(9.81%)	(126.76%)	(1.50%)	(8.02%)	(-161.4%)	(26.33%)
Sex(1=male & 0=otherwise)	35.6757	-0.25527				
	(9.56%)	-(4.90%)				
Formal Sector (1=working in the formal sector and 0=otherwise)	36.7876	5.28019	-0.45587	0.09173	-1.06731	0.25161
	(9.86%)	(101.54%)	(1.45%)	(-0.58%)	(11.10%)	(-4.45%)
Household own farmland(1=Own farmland and 0=otherwise)	35.7424	-0.50910	-0.15480	0.16962	-0.45855	0.02727
	(9.58%)	(-9.79%)	(0.49%)	(-1.07%)	(4.77%)	(-0.48%)
Regions						
Urban	37.4956	2.64562	-4.19814	-0.69125	-0.08476	0.76787
	(10.05%)	(50.88%)	(13.30%)	(4.36%)	(0.88%)	(-13.58%)
Rural	38.6007	0.48253	0.12988	-11.4496	-2.31413	0.07988
	(10.35%)	(9.27%)	(-0.412%)	(72.27%)	(24.07%)	(-1.41%)
Total Share of Estimated sources of Expenditure Per capita gap/ Discimination Index	372.885	5.19970	-31.5501	-15.8427	-9.61202	-5.65476
	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)

Source: Computed by Authors. Notes: the values in brackets below the Oaxaca-Blinder decomposition and the discrimination coefficients translate the percentage contributions to total gender income expenditure gap.

Concluding this subsection, we investigated inter-temporal and spatial inter-household gender disparity in Cameroon, identifying (1) gender-neutral and gender-bias factors that influence household economic well-being in Cameroon and (2) determine inter-temporal and spatial discrimination coefficients. Overall, both personal-specific and gender-discrimination expenditure characteristics of household heads linked to their gender orientation shapes the patterns of disparity observed between these two groups, as well as the spill-over effects of the gender type on household income.

V. General Conclusion

This study, using both synthetic variables obtained from the Multiple Correspondence analysis and observed variables from the ECAM II (2001) and ECAM III (2007) households surveys, successfully: (1) identified determinants of household economic well-being for both 2001 and 2007; (2) computed the contributions of estimated income sources in explaining inequality through the regression-base decomposition analysis as

well as their inter-temporal contributions and; (3) investigated determinants of inter-household gender disparities in Cameroon.

Regressed variables were consistent with economic literature and significant in determining the global and gender samples determinants of household income expenditure for the Ordinary Least Square. Variables that influence household economic well-being were the variables education, health, fraction of active household members, household size, working in the formal sector, age of household head, owning farmland and both urban and rural localities.

Having obtained significant and unbiased estimates of the household income generating function, we undertake a regression-based decomposition using estimated income sources computed from the regression procedures. We exactly decomposed inequality as well as their inter-temporal values using the Analytical and Shapley value approaches for both years, using the Gini, Coefficient of Variation and the Theil indexes. The marginal contributions are also computed for the Gini index based of the Shapley value approaches that hinged on the decomposition proposed by Shorrocks (1999).

Generally, the variables fraction of active household members, working in the formal sector, education and household size highly accounted for inequality. Other variables include health, owning farmland and age. An inter-temporal analysis of the behavior of the different estimated factors identify, using both the analytical and Shapley value approaches indicate that the variables education, access to health facilities and fraction of active household members over time tended to increase observed inequality whereas the variables working in the formal sector, household size and the residual term rather helped in reducing observed inequality over time. We also identified the Gini index as most appropriate to carry out the computation of the marginal contributions of the different estimated income sources via the Shapley value approach. The variables fraction of active household members, working in the formal sector, education and household size had the highest marginal contribution at all levels of entry.

Spatially, both the urban and rural localities contribute positively in explaining inequality for both years, with urban areas having a higher value than the rural areas. However, inter-temporal analysis identify that for the Gini index, while rural areas contributed in reducing inequality overtime, urban areas rather fueled inequality over time. The other indexes (Coefficient of Variation and the Theil indexes) indicate that both localities aided in reducing observed inequality over time. Regarding the marginal contributions, the urban area overwhelmingly accounted for inequality in 2007, while rural areas marginally had higher values for 2001.

Lastly, using estimates from the OLS specification, we investigated inter-household gender disparity and discrimination in endowments and returns to these endowments between male-and-female headed household for both years, as well as inter-temporally, using the Oaxaca-Blinder approach. The variables education, fraction of active household

members, working in the formal sector and household size tend to account for disparities along gender line when computing either gender-neutral or gender-biased characteristics. Globally personal-specific and gender-discrimination expenditure characteristics of household heads linked to their gender orientations shape the patterns of observed inequalities, as well as the spill-over effects of the gender type on household income.

Although a series of policy conclusion could be drawn from the estimation results, the following policy implications stand out; educational schemes should be biased in favor of rural areas and gender sensitive to women in order to bridge disparities in this factor, and create opportunities for rural residents and women to empower themselves regarding employability and decision taken regarding which expenditure patterns the household should adopt so as to further enhance welfare. Activities or policies that encourage employment or the switch of individual practicing in the informal sector to the formal sector should be encouraged by government, as well as the creation of small and medium size enterprises. This is because the number of individuals' employed and carrying out income generating activities in a household determines both its well-being status and inequality. Family planning schemes should be further enhanced in order to ration family sizes so as to enable adequate human capital investments in terms of education, health, decency, that act as future acquisitions that the individual may use to impact positively on his well-being. Spatially, policies anchored on development plans aimed at enhancing infrastructure in rural areas and inter-rural networking and communication should be consolidated in order to bridge urban rural disparities as well increase standard of living in rural areas.

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Appendix 1:

Table 1: Summary of Descriptive Statistics of Variables for the General Samples

General Sample								
Variable	**Year:2001**				**Year: 2007**			
	Mean	**SD**	**Min**	**Max**	**Mean**	**SD**	**Min**	**Max**
Outcome Variables								
Log Total Expenditure Per Head	12.473	0.7822	9.5488	16.666	12.775	0.7378	11.1851	16.2438
Educational *	1.0352	0.3686	1.69e-16	1.5154	1.1294	0.3422	0.04123	1.5352
Health*	1.3883	0.1529	0.5592	1.656	0.7109	0.3889	0	1.4839
Gender (1=male and 0=otherwise)	0.75609	0.42945	0	1	0.73303	0.44239	0	1
Age Cohorts	2.8135	1.3649	1	5	2.7093	1.3555	1	5
Household Size	5.1349	3.5188	1	38	4.4938	3.068	1	43
Fraction of Active Household Members	0.2839	0.2816	0	1	0.3344	0.3050	0	1
Formal Sector (1= yes	0.0015	0.0014	0	0.0116	0.1347	0.1362	0	1.0721

and 0=otherwise)								
Own Farmland (1= yes and 0=otherwise)	0.2375	0.2262	0	0.6866	0.1504	0.1185	0	0.4628
Regions								
Urban	0.4526	0.4977	0	1	0.54797	0.4977	0	1
Rural	0.3529	0.4779	0	1	0.33789	0. 47301	0	1

Source: Computed by Authors using STATA 10. Variables with stars are synthetic variables obtained from the MCA approach.

Table 2: Summary of Descriptive Statistics by Gender for 2001

YEAR 2001								
Variable	**Sub Sample Male**				**Sub Sample Female**			
	Mean	**SD**	**Min**	**Max**	**Mean**	**SD**	**Min**	**Max**
Outcome Variables								
Log Total Expenditure Per Head	12.465	0.7875	9.548	16.66	12.499	0.7648	10.275	15.941
Educational *	1.0412	0.3685	1.69e-16	1.515	1.0168	0.3684	1.69e-16	1.5154
Health*	1.3808	0.1528	0.5592	1.656	1.4111	0.15100	0.6974	1.6569
Age cohorts	2.7370	1.3439	1	5	3.0503	1.4023	1	5
Household Size	5.453	3.658	1	38	4.1488	2.826	1	28
Fraction of Active Household Members	0.4904	0.2989	0.0370	3	0.5002	0.3006	0.0714	2
Formal Sector (1= yes and 0=otherwise)	0.1540	0.1473	0	1.1643	0.1518	0.1394	0	1.1643
Own Farmland (1= yes and 0=otherwise)	0.2438	0.2285	0	0.6822	0.2182	0.2178	0	0.6822
Regions								
Urban	0.44771	0.4972	0	1	0.4677	0.4990	0	1
Rural	0.36217	0.48065	0	1	0.3245	0.46827	0	1

Source: Computed by Authors using STATA 10. Variables with stars are synthetic variables obtained from the MCA approach.

Table 3: Summary of Descriptive Statistics by Gender for 2007

YEAR 2007								
Variable	**Sub Sample Male**				**Sub Sample Female**			
	Mean	**SD**	**Min**	**Max**	**Mean**	**SD**	**Min**	**Max**
Outcome Variables								
Log Total Expenditure Per Head	12.780	0.7459	11.1851	16.25	12.761	0.7149	11.187	15.76
Educational *	1.1435	0.3380	0.0412	1.5352	1.090	0.3505	0.04123	1.535
Health*	0.67649	0.3818	0	1.480	0.8054	0.3925	0.0284	1.483
Age Cohorts	2.5958	1.3187	1	5	3.0210	1.4058	1	5
Household Size	4.7312	3.2099	1	43	3.8421	2.5306	1	22
Fraction of Active Household Members	0.3300	0.3033	0	1	0.3466	0.3094	0	1
Formal Sector (1= yes	0.1362	0.1391	0	1.072	0.1307	0.1279	0	0.8284

and 0=otherwise)				1				
Own Farmland (1= yes and 0=otherwise)	0.1484	0.1189	0	0.462	0.15583	0.1170	0	0.4628
Regions								
Urban	0.5544	0.4970	0	1	0.5300	0.4991	0	1
Rural	0.33628	0.47246	0	1	0.34232	0.47456	0	1

Source: Computed by Authors using STATA 10. Variables with stars are synthetic variables obtained from the MCA approach.

Appendix 2 Basic indicators of the non monetary well-being dimensions

Dimension 1: ***Education and Basic Infrastructures***
Knowing how to read and write
Already attended schools
First reason for dissatisfaction regarding the closest public primary school
First reason for dissatisfaction regarding the closest private primary school
Distance to go to the nearest public primary school (0,1,2,3,4,5 or 6km and more.)
Distance to go to the nearest private primary school (0,1,2,3,4,5 or 6km and more.)
Required Time to go the nearest primary public school
(0-5min/6-15min/16-25min/26-35min/36-45min/ 46min or more)
Required Time to go the nearest private public school
(0-5min/6-15min/16-25min/26-35min/36-45min/ 46min or more)

Dimension 2: ***Health and Basic Infrastructures***
Sector of consultation
Type of sanitary centre
Appreciation of health status
First reason for dissatisfaction regarding the closest sanitary centre
Distance to go to the nearest sanitary centre (0,1,2,3,4,5 or 6km and more.)
Required Time to go the nearest sanitary centre
(0-5min/6-15min/16-25min/26-35min/36-45min/ 46min or more)

Appendix, 3: Table 4: Marginal contributions of the various estimated income sources based on the Shapley value Approach for 2001

Estimated income Sources	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	Level 9	Level 10	Level 11	Level 12
Education*	0.0039	0.0020	0.0016	0.0014	0.0013	0.0012	0.00119	0.00115	0.00113	0.00111	0.001106	0.00109
Health*	0.0012	0.0006	0.0003	0.00026	0.00020	0.000163	0.000139	0.000122	0.000109	0.00009	0.00008	0.00007
Age Cohorts	0.0007	0.0002	0.0000	-0.00010	-0.0001	-0.00011	-0.00012	-0.000124	-0.000124	-0.000124	-0.000123	-0.000121
Household Size	0.0043	0.0029	0.0022	0.0019	0.0017	0.0015	0.0014	0.0014	0.00136	0.00131	0.00128	0.00124
Fraction of Active Household Members	0.0090	0.0070	0.0058	0.00500	0.00437	0.0039	0.0035	0.0031	0.0029	0.0026	0.0024	0.0022
Sex(1=male & 0=otherwise)	0.0012	0.0006	0.0003	0.00014	0.00005	0.00001	-0.000013	-0.000024	-0.000028	-0.000029	-0.000027	-0.000025
Formal Sector (1=working in the formal sector and 0=otherwise)	0.0066	0.0054	0.0048	0.00434	0.00399	0.00372	0.00352	0.00336	0.00324	0.00316	0.00310	0.00306
Household own farmland (1=Own farmland and 0=otherwise)	0.0010	0.0007	0.0006	0.00058	0.0005	0.000581	0.000579	0.000577	0.000576	0.000574	0.000572	0.000569
Urban Area	0.0052	0.0042	0.0037	0.0034	0.0032	0.0031	0.0030	0.00295	0.00291	0.00287	0.00285	0.00283
Rural Area	0.0066	0.0054	0.0047	0.0044	0.0041	0.00386	0.00370	0.00358	0.00348	0.00339	0.00332	0.00327
Residual	0.0259	0.0231	0.0210	0.0193	0.0179	0.01676	0.01571	0.01477	0.01394	0.01318	0.01250	0.011895

Source: computed using the DASP 2.1 distributive software. Software developed by Araar, A and Duclos, J. Y. (University of Laval, CIPREE & the Poverty Economic and Policy Research Network). Levels indicate the place of entry of the estimated factor.

Appendix 3: Table 5: Marginal contributions of the various estimated income sources based on the Shapley value Approach for 2007

Estimated income Sources	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	Level 9	Level 10	Level 11	Level 12
Education*	0.0046	0.0034	0.0028	0.0025	0.0023	0.00213	0.00203	0.00195	0.00189	0.00184	0.00181	0.001790
Health*	0.0032	0.0019	0.0013	0.00098	0.00077	0.00065	0.00056	0.00050	0.00046	0.00044	0.00041	0.000404
Age Cohorts	0.0006	0.0002	0.00001	-0.00005	-0.00007	-0.00009	-0.000096	-0.000100	-0.000103	-0.000105	-0.000108	-0.000109
Household Size	0.002564	0.001644	0.001241	0.001061	0.000977	0.000936	0.000915	0.000903	0.000895	0.000889	0.000883	0.000877
Fraction of Active Household Members	0.009988	0.008037	0.006790	0.005914	0.005253	0.004729	0.004301	0.003946	0.003646	0.003390	0.003167	0.002972
Sex(1=male & 0=otherwise)	0.000908	0.000372	0.000143	0.000043	-0.000001	-0.000020	-0.000028	-0.000030	-0.000030	-0.000028	-0.000026	-0.000024
Formal Sector (1=working in the formal sector and 0=otherwise)	0.004820	0.004017	0.003511	0.003155	0.002886	0.002677	0.002514	0.002387	0.002289	0.002214	0.002159	0.002119
Household own farmland (1=Own farmland and 0=otherwise)	0.001227	0.000798	0.000657	0.000611	0.000592	0.000582	0.000575	0.000569	0.000565	0.000562	0.000558	0.000555
Urban Area	0.006044	0.005035	0.004468	0.004103	0.003840	0.003639	0.003481	0.003356	0.003257	0.003179	0.003116	0.003067
Rural Area	0.003784	0.002949	0.002553	0.002345	0.002219	0.002133	0.002071	0.002024	0.001987	0.001959	0.001937	0.001919
Residual	0.022749	0.019987	0.017973	0.016371	0.015026	0.013862	0.012836	0.011925	0.011111	0.010381	0.009725	0.009135

Source: computed using the DASP 2.1 distributive software. Software developed by Araar, A and Duclos, J. Y. (University of Laval, CIPREE & the Poverty Economic and Policy Research Network). Levels indicate the place of entry of the estimated factor.