Wokia-azi Ndangle Kumase

Aspects of Poverty and Inequality in Cameroon

PETER LANG

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Poverty and inequality remain extremely high for Cameroon despite improvements
in poverty figures between 1996 and 2001. To understand the dynamics of poverty
and inequality between 1996 and 2001, this book develops a poverty and inequality
profile, investigates the sources of inequality along spatial lines and simulates
some policies which could be used in the reduction of poverty and inequality. The
book also addresses two major sectors of the Cameroonian economy with a special
focus on gender bias in agriculture and linkages between the formal and informal
sector. The empirical analyses show that there are large spatial differences in
poverty in Cameroon and that sources of inequality vary by location. Regardless of
the definition used, the informal sector in Cameroon is extremely large but closely
linked to the formal sector. The gender bias experienced by women in access to
productive assets in agriculture reduces the efficiency of agricultural production.

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Dedicated to Mum and Dad

Editor's Preface

The importance given to poverty and inequality reduction in Cameroon can be seen in the commitments made by the Government of Cameroon to the Millennium Development Goals. Through a mix of national and multinational contributions, Cameroon has been able to make progress in some regions and sectors of its economy in reducing poverty and inequality as well as stimulating growth. However, other regions or sectors remain unattended or have not been given the same attention. This is particularly the case with the Northern regions (Extreme North, North and North West) which have poverty rates far above the national average, the agricultural sector that still suffers from low productivity due to an inefficient allocation of resources and an ever-growing informal sector that erodes into the government's tax base. Without a better understanding of the dimension of poverty and inequality and their determinants and the interdependence between the different sectors of the economy in Cameroon, it remains difficult to generate reliable policy interventions.

This book contributes to analysing important issues in the fight against poverty and inequality in Cameroon from different perspectives in four different essays. In the first essay, Kumase develops a poverty and inequality profile which identifies that despite the drop in national poverty over the past decades, the northern parts of the country still suffer from extreme poverty with poverty rates far above the national average. Inequality remains very low in areas of extreme poverty. The poverty and inequality analysis also contributes to understanding why poverty persists in certain areas. Average higher education levels and higher income in certain regions correlate positively with higher per capita expenditure, thus signifying lower poverty.

In the second essay, the covariance method for decomposing the Gini coefficient by factors is used to know how much of total consumption inequality is explained from a particular source. In particular, Kumase uses consumption data for Cameroon and shows that overall inequality in Cameroon is characterized in particular by the inequality in the expenditure to four major components: food, transport and communication, housing and health. The author also develops a demand system (LES) which permits him to simulate the impact of taxes and subsidies on consumption and consequently on poverty and inequality. The difference in impact observed in rural and urban households as well as between the poor and the rich shows that certain areas or sectors will require separate consideration of policy interventions.

The third essay is concerned with the measurement of the size of the informal sector and its links to the formal sector. Kumase postulates in this essay that the

definition used when dealing with informal sector matters and should assume a central role with regards to the subsequent analysis. Using three distinct definitions of informality to measure the size of the informal sector, results indicate variations in size thus confirming his view. A multivariate analysis with demographic as well as household characteristics further indicates that the likelihood of informality varies across the three definitions used and using these results, certain generalities often used to describe the informal sector are refuted or confirmed. In the second part of this essay, Kumase is able to show using households as observation units as opposed to most studies that use enterprises and individuals as observation units, that formal sector earnings are in many ways related to informal sector earnings, occupational status and sector of employment of other household members. The author estimates the magnitude of the links between both sectors which he considers as weak and would be inefficient in implementing policies in the informal sector via the formal sector.

In the fourth essay, Kumase focuses on another very important issue, precisely the question of gender bias in Cameroon and its impact on growth. There is abundant literature which estimates the negative consequences of gender gaps on growth but no such study has been carried out in Cameroon. Using data from a self-conducted survey in the cocoa growing areas of southern Cameroon, Kumase highlights the bias that exist in having access to productive assets necessary for cocoa cultivation. Productivity analyses suggest that the gender bias experienced by women in accessing productive assets in agriculture reduces the efficiency of agricultural production and this certainly has a negative impact on the growth of the entire economy which is highly dependent on agriculture.

Wokia Kumase thus addresses a number of issues important for Cameroon's fight against poverty and inequality and draws the attention of all those concerned in this endeavor to the following key areas: poverty in the Northern provinces, the informal sector and gender and growth.

Prof. Stephan Klasen, Phd.
Göttingen, October 2009

Author's Preface

"If I have seen further than most men, it is because I stood on the shoulders of giants."
-Isaac Newton-

This dissertation is the outcome of frustrating but often very exciting work at the Department of Economics at the University of Göttingen. Motivated at the beginning by the desire to analyse, understand and answer the multiple development problems my country (Cameroon) was and is still facing, it was an uphill task to filter my ideas into a good topic and the complexity of doing this did not help to reduce the doubts I had to ever complete the work. After a very difficult first year also marred by financial constraints, I gradually found pleasure in what I was doing thanks to some of those giants upon whose shoulders I have been standing to see this far.

I am grateful to Prof. Dr. Michael Grimm who accepted me as a doctoral student and gave me the opportunity to write this dissertation and without his excellent supervision, intellectual guidance and permanent support this dissertation would not have been completed. Your motivating words always came at those moments when I needed them most and I remain forever grateful. Many thanks for the position of research assistant you offered me in the DFG project "Driving forces of rural poverty in Sub-Saharan Africa." I would also like to thank my second supervisor, Prof. Dr. Stephan Klasen, for the helpful comments and evaluation of this dissertation as well as the opportunity he gave me to work as a research associate in the Diagnostic Facility for Shared Growth in Cameroon project. It was very enriching working with you and I learned a lot which will help me in future. Special thoughts and thanks go to Prof. Dr. Wolfgang König through whom I discovered and developed the interest for development economics. Special thanks also go to Dr. Herve Bisseleua for his support and expertise in the data collection phase of this work.

I would like to address a word of gratitude to all my colleagues of the Development Economics Research Group at the University of Göttingen for interesting and helpful discussions, friendship and moral support during my stay at the faculty. I particularly have to thank Johannes Gräb for helpful comments and discussions of my work. I also thank Babara Häming, Abdoulaye Seck, Laura Winter and the staff at the GTZ office in Cameroon for helpful comments and assistance.

My heartfelt gratitude also goes to all past and present members of the CCUG for their collaboration, friendship and tolerance as well as the very conducive family environment it provides to Cameroonians studying in Göttingen. Particularly thank Dr. Tchigio Innocent, Dr. Ngomba Rose, Tomte Edmond, Kouematchoua Ghislain, Massock George, Kwegna Robert, Konde Roger, Karaliute Jolanta, Dr. Chicgoua Noubactep, Bell Jean Marcial, Nkowah Jones, Awah Dorine, Gwandiku Anthony, Batupe Fokam, Montie Zakari, Fotso Lucien, Abam Abraham and Fotsing Stephan for their collaboration and who have contributed in making me who I am.

I also extend my deep gratitude to Akebom Loh, Akum Richard, Anchang Pascal, Fuh Ngwa Innocent, Mayi Cyprain, Sede Adeline, Siewe Alain and Tubuo Benedict for their immense financial and moral support during my stay in Germany. Special thanks also go to Gweji Nora for her support, encouragement and patience especially during the final stages of this study.

Above all, I would like to express my sincere thanks to my uncle Kumase Godfred, Prof. Dr. Mbangwana Moses, Pastor Kanjoh Genesis, Mofor Victor, Nkwati Emmanuel, Seraphine Atia, Dr. Suh Vincent, and the Ndangle Kumase family. I particularly extend my heartfelt gratitude to my Mum and Dad for the sacrifices made, their moral and financial support and to them I dedicate this study.

Wokia-azi Ndangle Kumase
Göttingen, March 2009

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List of Acronyms and Abbreviations

ADB	African Development Bank
AEO	African Economic Outlook
CNPS	Caisse Nationale de Prévoyance Sociale
ECAM	Enquête Camerounaise Auprès des Ménages
EDU	Education
EESI	Enquête sur L'Emploi et le Secteur Informel
ESAF	Enhanced Structural Adjustment Facility
EUSI	European System of Social Indicators
FGT	Foster Greer Thorbecke
FPRG	Facility for Poverty Reduction and Growth
FAO	Food Agricultural Organisation
FCFA	Franc de la Communauté Française-Africaine
GDP	Gross Domestic Product
HHSIZE	Household Size
HIPC	Heavily Indebted Poor Country
ICLS	International Conference of Labour Statisticians
ILO	International Labour Organization
IMF	International Monetary Fund
INS	Institut National de la statistique

LES	Linear Expenditure System
MAR	Married
MDG	Millennium Development Goal
MDRI	Multilateral Debt Relief Initiative
NIS	National Institute of Statistics
PLI	Price Level Index
REF	Reference
SAP	Structural Adjustment Program
SIN	Single
SUR	Seemingly Unrelated Regressions
UNDP	United Nations Development Programme
USD	United States Dollar
WHO	World Health Organization
WID	Widow

Introduction and overview

Overcoming poverty and inequality is still one of the biggest development challenges facing economists and politicians both in developing and developed countries. It is universally acknowledged that success can only be guaranteed by a mix of national and multinational contributions. It is for this reason that at the Millennium Summit held in September 2000 in New York, USA, 191 countries with Cameroon present adopted the Millennium Declaration. The declaration which focussed on issues of peace, security and development and covered areas including environment, human rights and the sound management of public affairs was worked out into eight major goals and eighteen quantitative targets to be achieved before 2015 and now popularly known as the Millennium Development Goals (UNDP, 2002). Among the eight goals, three of them (eradication of extreme poverty and hunger, achieving universal primary education and promoting gender equality and empowerment) occupy a central part in this dissertation either as important factors determining Cameroons progress in meeting up the MDGs or as the goals per se under analysis.

Soon after adoption, monitoring of progress towards the MDGs is being carried out at global and country level. In the context of Cameroon, much has been reported on the trend of poverty and inequality (see INS (2002, 2003 and 2004); Fambon and Baye (2002); Baye (2004); Emini et al.; (2005)) but more is still to be done empirically on issues concerning poverty and inequality as well as particular sectors of the economy. Because appropriate understanding based on proper empirical analysis of country or group specific determinants of poverty and inequality, gender bias and employment issues is required for the formulation of policies needed to attain the MDGs. Besides poverty and inequality analysis carried out in this dissertation, I also look at issues related to the formal and informal sector and gender in agriculture because of the pivotal role they assume in Cameroons economic growth and development process.

This dissertation therefore goes beyond estimating poverty and inequality rates by addressing issues related to the formal and informal sector because of the discrepancy in poverty and inequality related issues between both sectors. Poverty rates estimated in this study corroborate perfectly with those estimated by the NIS (2004), confirming a reduction in poverty of 13 percent between 1996 and 2001. Despite this reduction in poverty, inequality remained constant between 1996 and 2001. Therefore the average growth of 4.5% experienced by Cameroon during this period contributed to a reduction of the national poverty rate but the benefits from growth did not contribute to a reduction of inequality. To better understand the issue of inequality in Cameroon, consumption

inequality and gender constraints in agriculture are further issues analysed in this dissertation with the hope of informing policy makers on the causes, effects and consequences of some of the policies applied.

For the purpose of this dissertation, I make use of the most recent data surveys for Cameroon collected by the Statistics and National Accounts Department in Cameroon (ECAM II and EESI 2005) as well as a field study carried out in the cocoa growing regions of Southern Cameroon.

Geography and demography

Geographically, Cameroon is located in Central Africa and is the meeting point of Equatorial Africa to the south and Tropical Africa to the north. Cameroon is bordered by Nigeria to the West, Chad to the North-East, Central African Republic to the East, Congo, Gabon and Equatorial Guinea to the South. Cameroon covers a total surface area of 475, 650 Km² with a 402 Km long coastline bordering the Gulf of Guinea (UNDP, 2002).

Demographically, Cameroon has a relatively young population with about 71 % of its inhabitants being younger than 30 years. Since independence, Cameroon's population moved from 5 million in 1963 to 7.6 million in 1976, 10.5 million in 1987 and 13 million in 1995. Cameroons population growth is better appraised when emphasis is rather laid on the average annual population growth which stood at 2.9 % between 1976 and 1987[1] whereas during the same period, the world population was growing at an average annual rate of 1.7 % (Kobou et al., 2002). The rapid growth in population was also accompanied by rapid rural-urban migration. At the time of independence (1960) and the years thereafter, the Cameroonian population was essentially rural since 84 % of individuals resided in agglomerations of less than 5000 inhabitants, excluding administrative centres. In 1963, only 16 % of the population lived in urban areas and this later on moved to 29.6 % in 1976 and reached 38.6 % in 1987. In 2000 it was about 50 % and will be around 70 % in the year 2020 if nothing is done (Kobou et al., 2002). This rapid growth in urban population is accompanied by the emergence of new problems, magnified by the economic crisis of the mid eighties and the in ability of public institutions in playing its role.

The economy

Since obtaining its independence, Cameroon's real GDP per capita between 1960 and 2000 evolved at an average annual rate of 1.1 %. This rate is more than 2.5 times the evolution rate of Sub-Saharan African countries but three

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[1]   1976 is the year of the first general population census while the second took place in 1987.

times less than that registered by South-East Asian countries[2] (O'Connell and Ndulu, 2000). The evolution has not been regular and there are contrasts between the four major periods that best characterise Cameroon's growth process. The period from 1960-1975 marked the first phase of growth with an average annual per capita GDP of 1.2 %. This period was marked by the organisation of the productive structures of the economy. The discovery and exploitation of petroleum in the mid seventies introduced the second growth phase which lasted until 1985. During this period, the average annual GDP per capita was about 7 %. From 1985-1995, it is the third phase also known as the decline phase of the GDP per capita. During this period, Cameroon experienced an unprecedented economic crisis blamed on poor macro-economic performance, occasioned, at least in part, by a slum in world market prices of its export commodities (petroleum, cocoa, coffee, rubber and timber) that exposed the structural deficiencies of the country, and by overvaluation of the CFA franc against the dollar – a currency in which most of Cameroon's exports are quoted (Baye, 2004). The devaluation of the CFA franc[3] in 1994 put Cameroon back on the path of growth and ushered in the fourth phase starting 1995. The Cameroon economy is now relatively well balanced between three traditional sectors, namely agriculture, industry and services. Since the return to growth in 1994/1995, the primary sector, industry and services have regularly contributed respectively 23 to 25 %, 26 to 30 % and 40 to 45 % to GDP.

Before the return to growth, the economic crisis had taken a heavy toll on the economy with the main symptoms being: drastic declines in incomes, economic and social infrastructure, in the supply of social services and loss of jobs. Restructuring of public and para-public enterprises, a freeze on recruitment to the public service and staff redundancies created a surge in unemployment which affected most of all women and young people.

In a joint effort with international donors, the government of Cameroon applied a combination of policies to put the economy back on the path of growth. Since signing the First Triennial Programme with the IMF in 1997 which was supported by an Enhanced Structural Adjustment Facility (ESAF), growth became perceptible. Positive economic performances have been noticed at the macro-economic level and at the structural and sectoral reform levels. GDP in real terms has grown at an average rate of 4.5 % and inflation has been held at less than 4 % (UNDP, 2002; UNICEF, 2006). The progress recorded later on qualified Cameroon for eligibility for the Heavily Indebted Poor Country (HIPC) initiative in October 2000. Cameroon's admission enabled it to sign a second program with the IMF supported by a Facility for Poverty Reduction and

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[2]   The average annual growth rate of per capita product is 0.4 % between 1960 and 1997 for all sub-Saharan African countries; it is 3.86 % for South-East Asian countries during the same period

[3]   On the 12 January 1994, the CFA franc was devaluated by 50 % in relation to theFrench franc (FF)

Growth (FPRG). This was to allow Cameroon to embark on a poverty reduction strategy before reaching the point of completion at the end of the program. At the point of completion, attained in 2006, Cameroon benefitted from the full implementation of the HIPC and Multilateral Debt Relief Initiative (MDRI) Initiatives which reduced Cameroon's stock of debt (in net present value terms) from US$5.7 billion in 2005 to US$525 million 2006. In 2006 alone, debt service relief was estimated at US$128 million. Resources freed up by debt relief where expected to be used in accordance with a clear and well-defined strategy in line with the government's poverty reduction strategy (IMF, 2006).

Although stabilization and structural adjustment programs have perceptibly improved GDP growth and strengthened macro-economic balances in recent years, this has not stopped them from being the target of much criticism owing to the fact that they paid more attention on economic efficiency to the detriment of equity considerations. In 1996, the poverty rate of Cameroon was estimated at 53.3 % and dropped to 40.2 % in 2001 indicating a reduction in the average incidence of poverty in monetary terms at the national level (DSCN, 2002). This means that the impact of the economic recovery on the living conditions of the population has been slight. Recent figures for 2007 published by the National Institute of Statistics of Cameroon indicate that the poverty rate has remained constant at 39.9 % (NIS, 2008). The indicators of access to basic social services and of the level of incomes are still very low. In the labour market, there is still chronic unemployment with the majority of the active population in the informal sector.

This stagnation in Cameroon's progress towards attaining the MDGs fortifies the argument in favour of a more disintegrated analysis of the economy. Because disparities in poverty rates between and within provinces as well as rural and urban areas are masked by the progress registered in poverty reduction at the national level in Cameroon. Secondly, the dangers of operating in the informal sector as well as the nuisance it poses to the government by eroding a sizeable portion of its tax base is blurred by its increasing importance to the Cameroonian economy. Finally, gender discrepancies and its harm to the Cameroonian economy and impacts on poverty reduction cannot be properly established by looking only at national poverty figures. This dissertation answers this request by addressing four different topics sub-divided into four different papers summarised below.

Profile and determinants of poverty and inequality in Cameroon

Since the adoption of the MDGs, economic development has witnessed an increasing interest on issues of poverty and inequality. At the centre of interest have been issues of counting the poor, reducing the inequality and poverty reduction strategies in order to meet the MDG of halving the proportion of people living in extreme poverty by 2015. Growth has been the most

recommended approach but whether growth is "pro-poor" depends on the impact of growth on inequality and on how much it affects poverty.

Growth, inequality and poverty put together form one of the most contentious issues of development economics with regards to their links to one another. Between 1990 and 2005, approximately two thirds of the countries experienced an increase in income inequality. That is, the incomes of richer households have increased relative to those of the middle class and poorer households. In about the same period, the World Bank says that the number of people in extreme poverty (living on an income of less than US$1 a day in Purchasing-Power-Parity terms) has fallen from 1.4 billion in 1980 to 1.2 billion in 1998 (Wolfensohn, 2002). If one focuses solely on the same period, there are signs that a positive correlation exist between rising inequality and economic growth.

It should remain clear that absolute poverty and inequality are two different concepts. Poverty referring to the fraction of the population, or the number of people, whose income falls below a designated amount intended to reflect some minimally acceptable standard of living. To be meaningful, the standard must remain fixed over time; two common ones are thresholds of $1 or $2 per day (in 1985 dollars). Inequality on the other hand refers to the gap between the rich and the poor people in a region, country or the entire world. Statisticians have come up with many ways to measure income inequality (see Salai-i-Martin, 2006).

This paper focuses on poverty and inequality in Cameroon. Following Sen (1976); Forster et al. (1984); Atkinson (1987) and Bourguignon (1979) a poverty and an inequality profile for Cameroon is constructed that captures several concepts of poverty and satisfies various poverty and inequality axioms. That is beyond the head-count index, the poverty gap and severity of poverty are presented in the profile and estimations made on the amount required to close the poverty gap. The profile is established across the national territory by provinces, sector of employment (formal, informal and agricultural) and urban, semi-urban and rural demarcations. Using the estimation of the head-count index, a poverty map for Cameroon is also developed. Estimations from the profile indicate that there exist a link between the extent of poverty and the level of inequality in Cameroon. There is an inverse relationship which seems to exist between poverty and inequality in Cameroon. That is, the lower the degree of poverty, the higher the level of inequality. With this in mind, the question of an existing trade-off between poverty and inequality cannot be ignored.

I precede the standard Gini decomposition in the later section of the paper with an approach to inequality decomposition that is based on simple regression analysis. This approach provides a flexible and efficient way of quantifying the roles of different determinants of expenditure, such as land possession, sex, age and level of education of household head and other variables on the level of expenditure inequality. That is, instead of speculating on the historical, cultural and economic causes of inequality, this approach answers the question of how much a given determinant of expenditure contributes to expenditure inequality, given a certain level of inequality.

I conclude the paper by postulating that Cameroon derailed from the track of growth and development when the crisis struck in the mid 80s. And that despite improvements in growth due to measures put in place by the government with the assistance of donor nations and institutions, poverty remains a household word in the country and the gap between the poor and the non-poor is still very wide. This is not to say the government and the international community got it all wrong in their endeavours to reduce poverty and inequality, but a hint to pause and revise certain issues as well as re-enforce existing ones. This work provides a base for such analysis and policy development.

Understanding expenditure inequality in Cameroon

Knowledge on overall inequality as well as within and between group inequalities in Cameroon as presented in 'paper 1' is important to policy makers but this may be insufficient to properly target public policies. Policies may have very differentiated impacts on different expenditure or income sources. This therefore makes the case for the splitting of overall inequality among different expenditure or income sources. Therefore as a follow up to the first paper, I explore the sources of inequality using the Lerman and Yitzhaki (1984, 1985; Yitzhaki, 1983) covariance method for decomposing the Gini coefficient by sources of expenditure. This method has been applied previously to study income inequality by income source in the U.S. (Lerman and Yitzhaki, 1985) and to assess the progressivity of commodity taxation in Israel (Yitzhaki, 1990). Garner (1993) used this same method to examine inequality in U.S. consumption expenditures while Lazaridis (2000) used it to examine the effects of 16 food items on the overall food expenditure inequality in Greece. Empirically, this is a widely accepted method in estimating the sources of inequality as well as evaluating the impact of policy measures (taxes or subsidies) put in place to redistribute income.

Using the 2001 household survey data for Cameroon (ECAM II), I disintegrate total expenditure into ten sources in order to estimate the driving sources of expenditure inequality in Cameroon. Beyond the national decomposition by source, I also do decomposition by income groups and across regional demarcations' (urban, semi urban and rural). This is because expenditure on particular sources is determined to a great extent by location and ones purchasing power. This implies that, different groups of people will contribute differently to total inequality via their expenditure outlets.

I continue the paper by estimating a complete system of demand equations making full use of the theoretical model based on the Klein-Rubin Linear Expenditure System (LES) which was first estimated by Stone (1954). LES yields for each income group the proportion of supernumerary income devoted to supernumerary expenditure of each of a variety of commodity groups, along with the amount of committed expenditure on each commodity group. Unlike most of the usual demand systems, it is advantageous in that it is able to

replicate the complex variation in the expenditure weights of various commodity groups as income (total expenditure) varies. The estimated LES parameters are used to compute expenditure and own-price elasticity. Using the estimated LES parameters and the calculated elasticities, urban and rural households are expected to show different reactions to unit increases or decreases in household income via taxes or subsidies. I conclude the paper by simulating some changes in tax and subsidy.

It is observed in the early section of the paper that overall inequality in Cameroon is driven by expenditure on four major components: food, transport and communication, housing and health. The overall Gini based on household total expenditure for Cameroon is 0.46. The relative marginal effects obtained from the decomposition identified some components as inequality decreasing when expenditure on them increased. The findings in the later section of the paper reveal that rural households generally allocate the largest share of supernumerary income on food meanwhile urban households allocate the largest share of their supernumerary income on transport and communication. Committed expenditure is higher for all commodity groups in urban areas as compared to rural areas and roughly follows the same pattern set by the average budget shares. The difference in impact and consequence of certain policies (e.g. food price reduction) in rural and urban households shows that, certain areas or sectors will require separate consideration of policy interventions.

The informal and formal sector in Cameroon

The informal sector has suffered a lot of prejudices and was stigmatised in the past as mainly marginal, a transient phenomenon, a modern day nuisance and consisting of people uninterested in being law-abiding citizens. Beyond this stigmatisation, many were of the opinion that a large informal sector has serious consequences for private sector activity, economic growth and the consolidation of democracy. It weakens democracy, hinders necessary reforms and contributes to misguided policies due to the illegality of the 'informals' preventing them from voicing their concerns to government officials and holding them accountable. Therefore, reforms that would increase private sector activity and growth are not implemented. Because informal activities are not reported, policy makers do not have the necessary information to make adequate decisions. The supporters of this view have now revised their positions as it has been proven that this is not always the case as not all who work in the informal sector are poor and miserable, not all will rather be somewhere else and not all are barely educated.

Hope was that the informal sector will disappear as growth improves but contrary to this expectation, the informal sector is not only persisting in Cameroon but has actually grown over the years in which Cameroon has experienced growth by dominating the economy in terms of employment. The informal sector employs more than 50 % of the active population in Cameroon

and its contribution to growth is becoming more and more significant (Merceron et al. (2007) and Becker, (2004)). Despite the increase in importance and acceptance of the informal sector as a composite sector of the economy, working and employment conditions within the sector are poor and insecure to the detriment of its participants and governments continue to complain of a shrinking tax base resulting from an expansion of this sector.

Whether we appreciate or dislike the existence of the informal sector, given its growing importance in developing countries and Cameroon in particular, the scale seems to be tipping in favour of its maintenance. Effective co-existence of the informal sector alongside the formal sector can only be achieved if the right answers are found to the following questions.

- What is exactly the informal sector and how do we define it?
- How is it related or linked to the formal sector - symbiotic or parasitic?
- How does it function and what do we do with it - formalise or maintain it the way it is?

The heterogeneity of the informal sector between and within countries makes it difficult to find universal responses to these questions. In this paper, I address the first two questions by dividing the work into two chapters.

In the first chapter of this paper (3), I argue that the use of different definitions most often leads to differences in measurement and size thus raising important questions about the comparability of informal sectors when they are defined and measured differently. So the main purpose of this chapter of the paper is to show using the same method like Henley et al. (2006) that the precise definition of informality matters and this intends affect the size of the informal sector. Furthermore, a descriptive investigation of the different definitions as well as a multivariate analysis will be carried out to reveal which characteristics are more strongly associated with which definition and measure of informality.

In the second chapter (4) of the paper, I address the issue of linkages by attempting to find answers as to how the informal and formal sectors are linked to one another in Cameroon. Identification of linkages between both sectors and their magnitude is important because it determines the nature and scope for intervention either to influence the informal sector or to attain other objectives like poverty reduction or increase tax revenue. I limit myself to analysing only forward and backward linkages and argue that the informal and formal sector in urban Cameroon are linked to one another and that these linkages are in certain cases "symbiotic"- mutual benefit between both sectors and in some cases "parasitic"- one sector exploiting the other. The analysis in the paper is based on the same concept used by Grimm and Günther (2006) to estimate informal and formal sector linkages for urban Burkina Faso.

Using three distinct definitions of informality, results indicated variations in size of the informal sector thus buttressing the view that in any study dealing with informality, the definition matters and should assume a central role with regards to the subsequent analysis. Magnitudes obtained for factors contributing to

informality from the multivariate analyses, indicate that the likelihood of informality varies across the three definitions used. This confirmed or refuted some of the generalities often made about the informal sector. The youthfulness, insecurity and poor working condition often used as characteristics to define the informal sector are confirmed.

In the second chapter (4) of the paper, results obtained indicate that formal sector earnings are in many ways related to informal sector earnings, occupational status and sector of employment of other household members. The magnitudes of the links via earnings are relatively low (less than one) but those of intra- household linkages show a higher magnitude as compared to the inter-household magnitudes. Using selected informal business units in place of households, the magnitude of the results corroborated perfectly with the argument made that the informal business units are strongly linked to the formal sector in their quest for raw materials but weakly linked to the formal sector as a market for their finished products. The quality of the link (symbiotic or parasitic) is determined by the sector of the informal business unit's main client and main supplier.

Opportunities and constraints in agriculture: a gendered analysis of cocoa production in Southern Cameroon[*]

The argument for addressing gender inequality is not simply that it is sizable in Cameroon but that it has negative consequences for efforts to promote growth and poverty reduction. It is now common knowledge that men and women both play substantial – though different – economic roles in African economies; and that gender inequality in education and employment directly and indirectly limits economic growth in Africa (Klasen (2002); Klasen and Lamanna (2008); World Bank (2001); Blackden et al, (2007)). Therefore if Cameroon is to meet up with its objective of halving the proportion of people living in extreme poverty and eliminating gender disparity in education as well as other sectors of the economy, it will have to properly analyse the issues of gender bias. According to Zuckerman (2002), gender inequalities have been insufficiently captured in conventional poverty analyses, designs and monitoring systems, thus weakening the chances of success of poverty reduction interventions. The issue of gender equality therefore needs to be at the centre of development policies - both at the national and international level. Just because gender inequality is inextricably linked to societal norms, religion or cultural traditions, it should not be either a deterrent or an excuse to gender sensitive development planning.

In a bid to support government effort in reducing the gap between males and females which appear to be stifling all efforts aimed at fostering growth and reducing poverty, this dissertation also devotes a section to the opportunities and constraints women face in agriculture in Cameroon. The choice of the

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[*] Based on joint work with H. Bisseleua and S. Klasen

agricultural sector and cocoa in particular to measure the impact of gender inequality on growth is due to its importance in the Cameroonian economy. The agricultural sector takes the front stage when one examines the economic and poverty situation in Cameroon. The main cash crops providing about 40 percent of Cameroon's exports are cocoa (Cameroon is the world's fifth-largest producer), coffee and cotton. Before Cameroon began exporting oil in 1977, cocoa and coffee was the mainstay of the economy, contributing about 80% of the country's GDP (Amin, 2001).

In this paper, we draw on results from a 2007 survey of male and female cocoa producers in Southern Cameroon to investigate to what extent there are gender differences in access to land, inputs, extension services, productivity, and control of proceeds. Using gender as an analytical approach, that is, viewing resources and benefits as being distributed within society and its institutions, including the family, market and the government on the basis of gender (roles, relations), the specific objectives of this paper is to:
a) identify the influence of gender in different aspects of cocoa production,
b) assess the impact that gender disparities have on productivity,
c) study gender differential in cocoa marketing and control over proceeds,
in order to arrive at recommendations for promoting a more gender-equitable "pro-poor growth" in the agricultural sector.

We find that women farmers have access to land (of similar size to men), but through different mechanisms than men. They are strongly disadvantaged when it comes to access to extension services and marketing and control of proceeds. Despite these disadvantages, the productivity in terms of output per unit of land is similar to that of their male colleagues. Productivity analyses suggest that a slight disadvantage in productivity on female plots turns into a slight advantage when controlling for all the factors affecting productivity.

Profile and Determinants of Poverty and Inequality in Cameroon

Abstract: Following Sen (1976); Forster et al. (1984); Atkinson (1987) and Bourguignon (1979) a poverty and inequality profile for Cameroon is constructed that captures several concepts of poverty and satisfy various poverty and inequality axioms. Using the estimated head-count index, a poverty map for Cameroon is also developed. Estimations from the profile indicate that there exists a link between the extent of poverty and the level of inequality in Cameroon. There is an apparent inverse relationship between poverty and inequality in Cameroon. That is, the lower the degree of poverty, the higher the level of inequality. Regression based decomposition of inequality also shows that some household characteristics as well as demographic variables assume a very important role in determining inequality and poverty.

1.1 Introduction

The Cameroonian economy enjoyed an extended period of prosperity after independence with an annual average growth rate of 7 percent until crisis struck during the 1985/86 fiscal year. The crisis lasted a decade before the economy regained the path of growth in the mid 90s, but not without haven taken a heavy toll on the economic and social status of Cameroonians (see Fig.1.1). Notably, it led to a drastic decline in public, business and household revenues, as well as a drop in farm income. There was also a rise in unemployment due to the closing of many enterprises as well as deterioration in the provision of basic social services and essential infrastructure. Wages for both civil servants and private sector employees also fell (IMF, 2000). The crisis was blamed on poor macro-economic performance, occasioned, at least in part, by dual factors which included a slump in world market prices of export commodities (cocoa, coffee, rubber and timber) from 1986 thereby exposing the economy's structural deficiencies, as well as the overvaluation of the CFA franc against the dollar – a currency in which most of Cameroon's exports are quoted (Baye, 2004).

Measures undertaken by the government to rectify the damage caused by the crisis where geared towards stimulating the economy through Structural Adjustment Programs (SAP), designed to achieve macroeconomic stabilisation and maintain a high rate of economic growth that would ensure an increase in per capita income and a reduction in poverty. While growth remains the main source of poverty reduction, the change in the macro-economic framework can lead to a new focus on the social side of macro-economic policies. This is due to the countervailing relationships that exist between growth, income inequality and poverty (Amin and Dubois, 1999; Ssewanyana et al., 2004). Although stabilization and structural adjustment programs have perceptibly improved GDP growth and strengthened macro-economic balances in recent years, this has not stopped them from being the target of much criticism owing to the fact that they focused on economic efficiency to the detriment of equity considerations. Although these improvements remain tentative, most governments and international institutions now agree on the fact that adjustment efforts can only be sustainable if they fully reflect concerns for the poor (Baye, 2004). This means fighting poverty through growth in income or equitable distribution of income or both.

Detailed and continuous observation with the goal of obtaining information on the socioeconomic situation of households, business sectors and geographical regions is required to track the evolution and determinants of poverty within an economy. The availability of such information will help the government of Cameroon as it designs policies to combat poverty and inequality. Realising that growth alone was not enough to reduce poverty; the government of Cameroon in

1998 issued an official declaration for a strategy to fight poverty which cites improvement of the standard of living and reduction of poverty as top priorities (quoted by Amin and Dubois, 1999). Since then, there have been various publications on poverty and inequality in Cameroon aimed on the one hand at putting the necessary tools required to design proper policies at the disposal of the government and on the other hand at measuring the degree of success of the government in its campaign against poverty and inequality (Amin and Dubois 1999; Baye, 2004; Fambon and Baye, 2002; NIS, 2004).

Figure 1.1   Cameroon, GDP per capita, current US Dollars
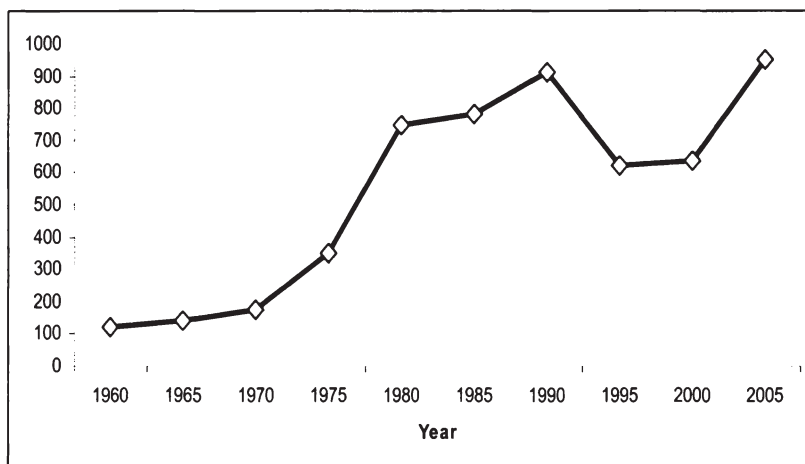
Source: Authors' computation using World Bank, 2008 World Development Indicators

As a contribution to the campaign against poverty and inequality, this chapter seeks to examine the incidence of poverty and the level of inequality in Cameroon with a view to informing on the effectiveness of government policies and creating a new poverty and inequality profile for Cameroon based on ECAM II (Cameroon Household Consumption Survey) data set of 2001. An additional objective of this chapter is to develop a poverty and inequality profile for Cameroon and establish the determinants of inequality using the most recent household survey data (ECAM II).

1.1.1 A Profile of Cameroon and its Provinces

Cameroon is regionally divided into ten provinces with varying population distribution across these ten provinces. Due to differing opportunities and factors, poverty and inequality also vary accordingly between the provinces. Profiling poverty and inequality will therefore be done on provincial bases rather than just looking at the much often used urban-rural divide. The availability of a profile (provincial base) therefore puts at the disposal of

government important information as to which province is most hit by poverty. Table 1.1 presents the evolution and distribution of the population by province since 1976.

Table 1.1   Distribution of the Population per province

	1976		1987		2001	
PROVINCES	Population	%	Population	%	Population	%
Adamawa	359 334	4.7	495 185	4.7	723 626	4.6
Centre	1 176 743	15.3	1 651 600	15.7	2 501 229	15.9
East	366 235	4.8	517 198	4.9	755 088	4.8
Far-North	1 394 765	18.2	1 855 695	17.7	2 721 463	17.3
Littoral	935 166	12.2	1 352 833	12.9	2 202 340	14.0
North	479 158	6.3	832 165	7.9	1 227 018	7.8
North-West	980 531	12.8	1 237 348	11.8	1 840 527	11.7
West	1 035 597	13.5	1 339 791	12.8	1 982 106	12.6
South	315 202	4.1	373 798	3.6	534 854	3.4
South-west	620 515	8.1	838 042	8.0	1 242 749	7.9
CAMEROON	7 663 246	100	10 493 655	100	15 731 000	100

Source: Cameroon Statistical Yearbook, 2004.

Cameroon experienced a steady growth in population of about 3% over the years from 1978 – 2001 enabling its population size to more than double within this time period (see Table 1.2). In 2001, the population appeared to be more equitably distributed between urban and rural areas contrary to earlier years when the majority of the population was based in rural areas.

As Cameroon recovered from its crisis in the mid 90s, regaining a steady growth path and an annual GDP growth rate of roughly 4.5 percent, the country was also expected to experience a decline in poverty. According to (Emini et al., 2005), the headcount index (share of poor population) fell from 53.3 percent to 40.2 percent between 1996 and 2001. In spite of this claim, the prevalence of poverty still remains high and widespread in Cameroon. Indicators of human development had considerably deteriorated during the crisis years as Cameroon experienced an increased infant mortality rate from 65 to 77 per thousand, a rise in malnutrition from 32 to 44 percent and maternal mortality which remained

stable at 430 per 100 000 births between 1991 and 1998. Recent economic improvements have not been sufficient and sustained enough yet to fully remedy the situation though education indicators improved between 1996 and 2001 with enrolment growing from 76.3% to 78.8% and literacy from 61.5% to 67.9% (African Economic Outlook, 2003/04).

Table 1.2   Basic demographic indicators

INDICATORS	1976	1987	2001
Population			
Urban	2 184 242	3 968 919	8 023 000
Rural	5 479 004	6 524 736	7 708 000
Total	7 663 246	10 493 655	15 731 000
Rate of Urbanisation (%)	28.5	37.8	51.0
Population density per Km²	16.4	22.5	33.8
Annual growth rate (%)	3.0	2.9	2.8
Mortality			
Crude death rate (per 1000)	20.4	13.7	10.1
Infant mortality rate (per 1000)	156.5	82.9	69.8
Life expectancy at birth			
Men	43.2	52.4	56.7
Women	45.6	56.2	61.3
Total	44.4	54.3	59.0

Source: Cameroon Statistical Yearbook, 2004.

1.2 Identifying Cameroon's Poor

Existing studies on the evolution of poverty and inequality in Cameroon are descriptively and empirically rich, but they essentially focus on decomposition along an urban-rural divide in determining the impact of factors like growth, redistribution and tax policy (Baye, 2004; Emini et al., 2006; Sikod, 2001). Early studies on profiling poverty in Cameroon were done by Ngassam and Roubaud (1994) and the World Bank (1995). Using a relatively new data survey (ECAM I), a poverty profile for Cameroon was drawn using the following regional divide Yaoundé, Douala, Other cities, Savannah, Forest and High Plateaux, (Amin and Dubois, 1999; Fambon and Baye, 2002). To the best of my knowledge, there is no study which profiles poverty and inequality in Cameroon

along the provincial line and establishes its determinants making use of the most recent ECAM II data survey. Some provinces have been picked out as particular case studies but not the entire country. Profiling poverty based on the provincial divide will not only provide the central administration with the much needed information in the fight against   poverty but also puts very important information at the disposal of the local authorities like governors, divisional officers and mayors of the various provinces in light of the new decentralization plan which gives them more authority. This information could prove to be very important in the designing of policies aimed at combating poverty.

1.2.1 Presentation of Household Data

The analysis of poverty in this paper is based on Cameroon Household Consumption Survey data of 2001 (ECAM II), collected by the Department of Statistics and National Accounts. Though the ECAM II data survey is a follow up to ECAM I done in 1996, the conceptual differences embedded in both surveys presents a major hindrance to any comparative study. Both surveys do differ in quality and methodology used to calculate some indicators by the national institute of statistics.

In terms of quality, there is a difference in duration and recall periods of both surveys. ECAM II lasted three months meanwhile ECAM I was done over a period of two months. The recall periods for ECAM II doubled from 7 to 15 days for urban areas and increased from 7 to 10 days in rural areas for the collection of household expenditure data. These changes in recall periods cause differences in reporting expenditure figures which influence the poverty and inequality rate. Shorter recall periods lead to higher reported expenditure and other things being equal, this decreases measured poverty and vice versa (Deaton and Kozel, 2005). Comparisons with daily estimates show that the longer recall period estimates are more accurate than the shorter recall period estimates for many important commodities. Though reference will often be made to poverty and inequality rates obtained using ECAM I (1996), it is never legitimate to compare measured poverty and inequality across surveys with different reporting periods without some sort of correction (Deaton and Kozel, 2005).

The sample size of ECAM II is also larger than that of ECAM I. In ECAM II, a total of 10992 households were surveyed meanwhile in ECAM I only 1780 households where covered. There is also a big difference in the structure of the strata. In ECAM I, the survey distinguished six strata or areas for data collection which were Yaoundé, Douala, Other cities, Forest, High Plateau and the Savannah whereas in ECAM II, the survey distinguishes twelve, namely, Douala and Yaoundé which are the two major cities and the ten provinces. The 1996 poverty line is constructed from a basket of three commodities arbitrarily chosen

and which does not reflect the choice of consumers. The 2001 poverty line is calculated from a combination of commodities capable of delivering 2900 calories per day and takes into consideration the choice of consumers. It is this poverty line that is would be used in this study.

Total consumption is composed of monetary consumption (goods and services purchased in the market place), auto consumption, received transfers and imputed rents. The calculation of total expenditure from consumption data is complex and based on a number of assumptions. For example, the inclusion of expenditure on tobacco in total expenditure is often criticised because it does not contribute to calorie intake. Expenditure on tobacco is included in total expenditure calculations because it is only 0.3 % of total expenditure and its impact on average total expenditure is insignificant. Besides, salt which assumes an important role in food consumption cannot be ignored because it does not contribute to calorie intake. Access to public goods is treated in terms of opportunity cost with monetary value imputed to those households with access to some chosen public goods. Accessibility measured in terms of distance and time required to reach them. Transfers are captured and valorised at their market prices. Monetary transfers are not taken into consideration because they are considered as money to be spent and are captured at the point of expenditure. More than half of households in Cameroon own their houses (63 %) but this figure is in decline since it was 88 % in 1983 and 71.4 % in 1996 (INS, 2002). A hedonic regression is used to predict rental values for these households. Auto consumption which was highly recorded among rural households was valorised at their market prices. Several adjustments have been made to the data, especially as concerns the unit prices of products consumed in rural areas in the calculation of total expenditure per household.[1]

1.2.2 Per Capita Expenditure
Per capita expenditure gives a misleading picture of welfare since consumption needs vary by age and sex. Poverty thresholds based on a percentage of median consumption should somehow account for these differences. An equivalence scale allows the poverty status of families of various sizes and compositions to be compared on an equal basis. Adult equivalence scale gives the consumption requirements of different groups as a proportion of those of an adult male. The application of these scales can make quite a difference to both the level and pattern of poverty (White and Masset, 2005).

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[1]   For more details, see Presentation des Bases de Donnees de l'enquete (INS, 2002).

Reflecting the concerns of economies of scale and the demographic composition of households, an equivalence scale is used which simply defines the number of adult equivalent in the household as;

$$AE = (A + \alpha K)^{\theta}$$

Where A is the number of adults in the household, K is the number of children, α is the cost of children and θ determines the degree of economies of scale. The challenge now is then reduced to determining appropriate values for α and θ. Deaton and Zaidi (2002), proposed values in the region of 0.3 – 0.5 for α in developing countries (higher in developed countries), and near unity for θ, given the large proportion of food consumption in these contexts. In this paper, an α-value of 0.5 and a θ-value of 0.9 are used to generate the equivalent scale. No particular distinction is made on the sex variable. That is, no attempt was made to attribute more weight to males than females.

1.2.3 Measuring Poverty
The analysis of poverty and the construction of a poverty profile for Cameroon begins with the establishment of a poverty line. This is the line below which persons are considered to be poor and above which they are not poor. The poverty line used in this paper will be the one developed by the National Institute of Statistics explained below and considered as the official poverty line for Cameroon. The Cost-of Basic-Needs methods is used by the National Institute of Statistic in Cameroon to develop the poverty line. This approach considers poverty as a lack of command over basic consumption needs, and the poverty line as the cost of those needs. A food component of basic needs is calculated and is added to an amount corresponding to a non-food component of basic needs. The basic food basket is usually set in order to enable an adult to reach 2900 calories[2] per day. Considering a basket of n-products, representing a structural national food preference, the food poverty line for an individual per year was obtained as follows with Yaoundé as region of reference:

$$D_m^v = 29 \times \frac{\sum_{i=1}^{n} \frac{Vi}{Pi} Pi^v}{\sum_{i=1}^{n} \frac{Vi}{Pi}(1-di)Ci} \times 365$$

Notes:

$V_1, V_2, \cdots, V_n,$ Consumption value of the different products.

$P_1, p_2, \cdots, p_n,$ National average prices of products per kg as sold in the market.

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[2]   Standards defined by specialized organizations (WHO, FAO) and could vary from 1800 to 3200 calories.

$P_1^y, P_2^y, ..., P_n^y$ Average prices per kg in Yaoundé.

$C_1, C_2, ..., C_n,$ Calories per 100g of the different products.

$d_1, d_2, ..., d_n,$ Proportion of waste contained in the different products.

Using the formula above, the cost of basic food needs was calculated as 151 398 FCFA. The total cost of basic needs is obtained by adding the cost of basic non-food needs calculated by using the procedure below. Basic non-food needs are considered here as those products whose purchases necessitate the desire to reject or reduce expenditure on basic food needs. It is assumed that households have enough resources to satisfy their basic food needs but prefer to transfer a certain percentage of these resources to obtain basic non-food needs. For a household that has the possibility to satisfy only its food needs (Z_F), its expenditure on non-food needs is (N_F).

$$N_F = Z_F - Z_F \ \alpha = (1-\alpha) Z_F$$

The poverty line (Z) is therefore a composition of Z_F (food poverty line) and N_F (non-food poverty line), which can be represented as follows:

$$Z = Z_F + N_F = Z_F + (1-\alpha) Z_F = \mathbf{Z_F \ (2-\alpha)}$$

α is the proportion of average food expenditure from total expenditure. With Z_F known, α can be obtained by resolving the equation below:

$$s_i = \alpha + \beta_1 \ln(y_i/Z_F) + \beta_2 [\ln(y_i/Z_F)]^2 + u_i$$

(E)

notes:

i = chosen household

s_i = proportion of food expenditure from total expenditure

y_i = total expenditure

The poverty line thus obtained is the lower bound of the overall poverty line (Z_L) and to distinguish between poor and non-poor by introducing intermediaries, we could obtain the upper bound of the overall poverty line. The upper bound of the overall poverty line (Z_U) is a sum of the cost of basic food needs and the cost of basic non-food needs. In this case, cost of basic non-food needs refers only to cost of basic non-food needs of households whose cost of basic food needs is equal to the poverty line. The upper bound of the overall poverty line can be written as follows:

$$Z_U = Z_F / E(s)$$

Resolving (E) enables the lower bound of the overall poverty line to be obtained as 232 547 FCFA and the upper bound of the overall poverty to be 345 350 FCFA[3].

Table 1.3   Cameroon poverty lines

Region	Food Poverty Line	Non-Food Poverty Lines		Overall Poverty Lines	
	Z_F	ZNF-	ZNF+	Z_L	Z_U
Yaoundé	151 398	81 149	193 952	232 547	345 350

Source: Authors' calculation from INS figures

Z_F = Food poverty Line
Z_L = Lower bound of the overall poverty line
Z_U = Upper bound of the overall poverty line
ZNF- = Z_L . Z_F = Non-food component of the lower bound of the overall poverty line
ZNF+ = Z_U - Z_F = Non-food component of the upper bound of the overall poverty line

Poor households will be aggregated into a provincial poverty statistic along the lines of the axiomatic approaches suggested by Sen (1976) and Forster, Greer and Thorbecke (FGT) (1984). For ease of computation and interpretation, the FGT measure will be used in capturing the number of poor, depth and severity of poverty. Preference is given to the FGT measure because it meets the requirements of decomposability across sectors or sub-groups. FGT measure of poverty indices takes the form:

$$P\alpha = \frac{1}{n} \sum_{i=1}^{q} \left(\frac{Z - Y_i}{Z} \right)^{\alpha} \tag{1}$$

Where

Y_i = Consumption expenditure per adult equivalent
Z = Poverty line
n = Total population
q = Number of individuals below the poverty line (i.e. the poor)
α = Poverty aversion parameter

As α varies, P_α also changes to give an indication of the depth of poverty.

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[3]   There is a detailed presentation of the calculation of the poverty lines in "Deuxieme enquête Camerounaise aupres des ménages". Document de méthodologies (2002).

When $\alpha = 0$, 1 or 2 then P_0 is the head-count index, P_1 is the poverty gap and P_2 estimates the severity of poverty. Though the head-count index is easy to interpret, it tells us nothing about the depth or severity of poverty (Ravallion and Bidani, 1994). P_1 takes into account the number of individuals who are poor and the depth of their poverty. Using P_1, nZP_1 provides an estimate of the total amount of resources needed to eliminate poverty. It therefore gives a lower bound to the budgetary outlays needed to eliminate poverty. P_2 can be broken down into two parts; an amount due to the poverty gap and an amount due to inequality amongst the poor. Unlike the poverty gap index, this measure reflects the severity of poverty in that it is sensitive to inequality among the poor (Forster, Greer and Thorbeck, 1984).

The $P\alpha$ measure is sub-group decomposable. If the population is divided into m mutually exclusive and exhaustive groups and $P\alpha$ calculated for each group, then the $P\alpha$ measure for the entire population is obtained as:

$$P_\alpha = \sum_{i=1}^{m} X_i P_{j\alpha} \tag{2}$$

Where,

X_j = Proportion of population in group j

$\sum X_j = 1$

$P_{j\alpha}$ = Poverty measure for group j

The contribution of each group or sub-group to national poverty (Cj) can be derived from:

$$C_J = X_j \frac{P_{j\alpha}}{P\alpha} \tag{3}$$

The decomposition of national poverty into provincial, rural-urban, formal-informal sector will be used to develop a poverty profile for Cameroon.

1.2.4 Poverty Profile by Regions

The incidence of poverty (P_0) indicates that about 41 percent of the population of Cameroon lived on an annual adult equivalent expenditure less than 232 547 FCFA in 2001. 18.5 percent of the urban as well as 43 percent of semi-urban population lived below the poverty line. As expected, the incidence of poverty was highest in the rural areas with about 69.3 percent of the population living below the poverty line. With a population share of 33.62 percent, the rural population contributed 57.12 percent to national poverty (P_0). Due to the high incidence of poverty and the depth of poverty existing among the rural poor, rural areas accounted for about 64.05 percent of the total poverty gap though they only had a population share of 33.62 percent.

Poverty depth analyses indicate that, with a national P_1 index of 0.14, it would require 32 556 FCFA (0.14 * 232 547) per person per annum to close the poverty gap. Meanwhile, an income transfer of about 11 127 FCFA per person per annum is needed to push the urban poor out of poverty and almost six times that amount is required to get the rural poor out of poverty (62 208 FCFA per person per annum). Severity of poverty values (P_2) highlights the fact that poverty is again more severe in the rural areas as compared to the urban and semi-urban areas. Results obtained here confirm the perception that poverty is a particularly rural phenomenon.

Table 1.4   Poverty distribution by regional classification

Region	Pop. Share (%)	P_0	P_1	P_2	P_0 contribution to national poverty (%)	P_1 contribution to national poverty (%)	P_2 contribution to national poverty (%)
Urban	45.12	0.18529 (0.0024)	0.04785 (0.0007)	0.01779 (0.0003)	20.49	15.38	12.42
Semi-Urban	21.26	0.42979 (0.0045)	0.13590 (0.0018)	0.05862 (0.0010)	22.39	20.57	19.29
Rural	33.62	0.69304 (0.0033)	0.26751 (0.0017)	0.13115 (0.0011)	57.12	64.05	68.26
Cameroon	100.00	0.40801 (0.0020)	0.14043 (0.0008)	0.06459 (0.0005)	100.0	100.0	100.0

Poverty line = 232 547 FCFA per adult equivalent expenditure per annum

Note: Figures in parentheses represent standard error

Source: Own computation from the ECAM 2001 household survey data.

Rural poverty is commonly linked to agriculture, low education and land tenure system meanwhile urban poverty tends to be more heterogeneous due to modes of income generation. The structure of rural areas in itself is a hindrance to development. Rural areas are normally made up of small groups or villages of about 5000 inhabitants with very high illiteracy rates and little or no skills in any profession. The majority of activities are centred on agriculture, which is labour intensive and subsistent in nature with cultivation geared towards meeting the needs of local households. Lack of proper land tenure systems have been a constant cause of inter-tribal conflicts, making it very difficult for local farmers to –access small credit facilities from credit institutions, to acquire prepared seeds, fertilizers or modern tractors. This also reduces their incentive to invest on such land.

The economic crisis which started in the mid 80s, forced the government to implement an externally-driven SAP. Among other measures, the SAP recommended laying-off workers and stopping recruitment into the public sector. These measures enabled the government to meet up with some of its macroeconomic obligations but were not sufficient to create new jobs and assist

the poorest of the poor. The 50 percent currency devaluation of the FCFA, which ensued in 1994 and salary cuts in the public service affected many individuals and communities directly and indirectly. Lack of money in the pockets of many, slowed down economic activities and forced the closure of many small businesses. Despite recent increases in activities in the urban areas partially due to the 4.5 percent growth rate which the country has been experiencing over the past decade, poverty is still very visible in Cameroon.

1.2.5 Poverty Profile by Provinces

Douala and Yaoundé are not provinces. However, being the two major cities in Cameroon, they dispose of opportunities that enable the inhabitants to escape the poverty trap. This explains why the poverty figures for both cities are far below the national average. Only 6 and 7.2 percent of the inhabitant of Douala and Yaoundé respectively live below the poverty line. Both cities contribute less than 4 percent to national poverty.

Table 1.5 below indicates that the incidence of poverty is highest in the North and Extreme North provinces with 63.5 and 63.3 percent of the population living below the poverty line respectively. The North-West province comes in third position with a poverty index of 62.3 percent. The incidence of poverty is lowest in the South (27.5 percent), followed by the East and Centre provinces (35.6 and 39.3 percent respectively). P_1 and P_2 values confirm the trend lay out by P_0 with the depth of poverty (P_1) being highest in the North-West province closely followed by the Extreme-North province (26.9 and 25.4 percent respectively). The severity of poverty (P_2) is also highest in these two provinces with 14.9 and 12.8 percent for the North-West and Extreme-North province respectively.

Poverty is highest in the northern provinces of Cameroon (Extreme-North, North and North-West), and combining the high poverty rate and the deep poverty that exists within these three provinces, they contribute the most to national poverty. Severity of poverty is also highest in these three provinces. It is also worth noticing that, these three provinces constitute almost 30 percent of the total population.

The poverty map by provinces (fig.1.2) shows the areas of concentration of poverty with the red colour indicating areas of extreme poverty and the green indicating low poverty rates.

Table 1.5   Poverty distribution by provincial classification

Douala /Yaoundé/ Provinces	Pop Share (%)	P_0	P_1	P_2	P_0 contribution to national poverty (%)	P_1 contribution to national poverty (%)	P_2 contribution to national poverty (%)
Douala*	9.43	0.06036 (0.0033)	0.01259 (0.0008)	0.00418 (0.0004)	1.39	0.85	0.61
Yaoundé*	9.63	0.07226 (0.0035)	0.01472 (0.0009)	0.00461 (0.0004)	1.71	1.01	0.68
Adamawa	7.35	0.46676 (0.0077)	0.13242 (0.0029)	0.05275 (0.0016)	8.41	6.93	6.00
Centre	8.68	0.39271 (0.0069)	0.11775 (0.0026)	0.04825 (0.0015)	8.35	7.28	6.48
East	6.81	0.35628 (0.0077)	0.10607 (0.0028)	0.04227 (0.0015)	5.95	5.14	4.45
Extreme-north	13.45	0.63280 (0.0055)	0.25426 (0.0029)	0.12811 (0.0019)	20.86	24.35	26.67
Littoral	5.78	0.48892 (0.0087)	0.17454 (0.0039)	0.08014 (0.0023)	2.83	7.18	7.17
North	8.22	0.63541 (0.0070)	0.24034 (0.0034)	0.11202 (0.0020)	12.80	14.07	14.25
North-west	7.20	0.62253 (0.0076)	0.26987 (0.0043)	0.14853 (0.0031)	10.99	13.84	16.55
West	10.17	0.45268 (0.0065)	0.14030 (0.0026)	0.05839 (0.0014)	11.28	10.16	9.19
South	7.24	0.27509 (0.0069)	0.06130 (0.0019)	0.02005 (0.0009)	4.88	3.16	2.24
South-west	6.04	0.43501 (0.0085)	0.13976 (0.0034)	0.06025 (0.0019)	6.44	6.01	5.63
Cameroon	100.0	0.40801 (0.0020)	0.14043 (0.0008)	0.06459 (0.0005)	100.0	100.0	100.0

Poverty line = 232 547 FCFA per adult equivalent expenditure per annum

Note: Figures in parentheses represent standard error

* Douala and Yaoundé are not provinces but just the two major cities in Cameroon.

Source: Own computation from the ECAM 2001 household survey data.

Figure 1.2   Poverty map for Cameroon

Poverty incidence (P0) 2001

0.63541   0.27509
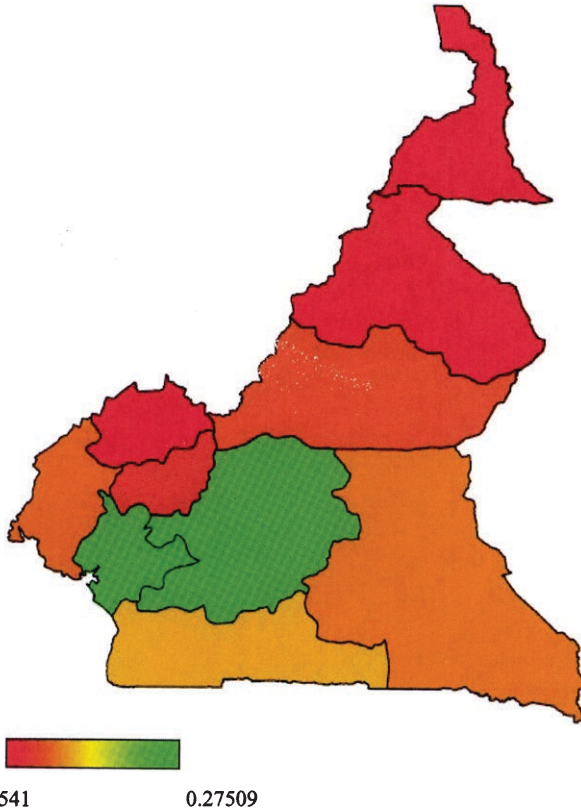
Source: Own computation from the ECAM II household survey data.

The provincial poverty profile can be partially explained by the difference in employment structure, which exists within the 10 provinces and the value added by sector in each province. Like many other African countries, Cameroon failed woefully in its industrialization process, which started immediately after independence in 1960. During the period following independence, focus was placed on industrialization which was considered at the time to be the motor of development. Two decades later, most of the industries crumbled under the weight of gross mismanagement. The concentration of the few existing industries in the Littoral and neighbouring provinces is because of proximity to

the Douala seaport and international airport as well as good infrastructural and communication network. The absence of industries in many other provinces deprives them of employment opportunities and makes them vulnerable to poverty due to the absence of a steady source of income. This is one of the reasons why poverty is highest in those provinces which have little or no industries (Extreme-North, North and North-West).

The absence of job opportunities created by the government and the closure of some of the para-public enterprises forced the majority of the labour force into the informal sector. Within this sector, most of the activities are concentrated around agriculture and petty trade referred to locally as "buyam sellam". Cameroon's economy is agriculturally base and due to the absence of employment opportunities in the northern and western provinces, farming has become the major economic activity in these provinces. Despite the high percentage of the population operating in the agricultural sector, most are unable to adequately feed themselves and raise the family income by selling the surplus. Low yield per unit land area, harvest loss due to inability to handle climate hazards, poor access to markets and fluctuation of local food prices practically explain this situation. The drop in world market prices of Cameroon's export crops like cocoa, coffee, banana, rubber, sugar and cotton which are grown mostly in the northern and western parts of the country also explains the high rate of poverty in these parts of the country. Evidence from table 1.5 also shows that poverty is lower in provinces which have non-agricultural employment opportunities (Littoral and Centre) than in provinces which have a majority of their labour force employed in the agricultural sector.

The lack of industries in the highly agric-provinces, does not make possible the addition of value to the farm products. Until recently, most of the farm products where either sold directly in the local markets, transferred to towns in the Littoral or Centre province where they were converted into semi-finished products or made ready for exportation. The absence of a well established secondary and tertiary sector, capable of generating value added activities, made employment opportunities rare, thus limiting the income source of those within these provinces.

The observations high-lighted above, provide policy makers with a new look at the structure of poverty in Cameroon. It is an x-ray of poverty along provincial lines thus shedding more light on where to find Cameroon's poor besides the rural-urban divide. In section 1.2 of this study just like in many others, (Fambon and Baye, 2002; Baye, 2004; Azam, 2004) it still stands that the poor are mostly found in rural areas. The provincial poverty profile indicates that it would be more effective to intensify the campaign against poverty by targeting the poor in

the rural areas of the most hit provinces (Extreme-North, North and North-West). Targeting the poor in the South province with a contribution of 4.9 percent to national poverty though desirable might not be as efficient in the reduction of national poverty, as if the targeting had been carried out in the Extreme-North or North-West province with the highest contributions to national poverty (20.9 and 10.9 percent respectively). The high disparity in provincial contribution to national poverty is also due to the difference in demographic structure within the different provinces.

1.2.6 Poverty Profile by Sector of Employment

In a country were jobs are rare to come by like in Cameroon, having a job is not tantamount to escaping the burden of poverty. Employment in the informal sector that is marred by low and irregular wages does not really spare one from the burden of poverty. The figures below indicate that 33.3 percent of those employed in the informal sector are poor. That is, despite their engagement in an economic activity, it is not sufficient to raise enough money to enable them skip over the poverty line of 232 547 FCFA per adult equivalent per year. Even the formal sector, often perceived as a privileged sector, is home to thousands of poor people with 16 percent of those employed within this sector considered as poor.

The formal sector being unable to employ many has compelled the informal sector to act like an urban sponge, which soaks up the thousands of qualified and unqualified job seekers who have lost hope in the formal sector. Despite easy entry into the informal sector, stiff competition leaves very little chances of survival for the majority of the unskilled as well as uneducated active population.

Agriculture which employs the majority of the active population is definitely not by choice for the majority but as a last resort to generate the bare minimum required for survival. 68.2 percent of those employed within the agricultural-sector have their households living below the poverty line. The poverty gap and severity of poverty is progressively higher in the agricultural and informal sector than in the formal sector as seen in the table below. An empirical analysis of these two sectors will be the focus of two future papers. Poverty alleviation measures should be put in place with special consideration being given to the agricultural and informal sector that nests millions of poor people.

Table 1.6   Poverty distribution by sector of employment of household heads

Sector	Pop. Share (%)	P_0	P_1	P_2	P_0 contribution to national poverty (%)	P_1 contribution to national poverty (%)	P_2 contribution to national poverty (%)
Formal	29.26	0.16036 (0.0028)	0.04132 (0.0009)	0.01569 (0.0005)	11.5	8.6	7.1
Informal	22.05	0.33352 (0.0042)	0.10248 (0.0016)	0.04326 (0.0009)	18.1	16.1	14.7
Agra	35.84	0.68216 (0.0033)	0.25778 (0.0017)	0.12475 (0.0011)	59.9	65.8	69.22
Other	12.85	0.33525 (0.0055)	0.10398 (0.0022)	0.04476 (0.0012)	10.5	9.5	8.9
Cameroon	100.0	0.40801 (0.0020)	0.14043 (0.0008)	0.06459 (0.0005)	100.0	100.0	100.0

Poverty line = 232 547 FCFA per adult equivalent expenditure per annum

Note: Figures in parentheses represent standard error

Source: Own computation from the ECAM 2001 household survey data

1.3 Estimating Inequality

An investigation of the differences in household poverty between certain population subgroups has made possible the development of a poverty profile for Cameroon. It has posited that particular social, demographic and regional characteristics could be part of the reason for the difference in poverty intensity in the different provinces, as well as in the structure of household spending. These figures, of course, do not tell us anything about how incomes are distributed within these population subgroups or better still how expenditure varies within and between the various sub groups. Redistribution of income as a tool to combat poverty makes it inevitable for policymakers to know how income is currently distributed in the country. Thus, the question of importance has to deal with the level of inequality within the country. Furthermore, from a policy perspective, it is primordial to know the extent to which overall inequality is attributable to inequality between and within population subgroups.

Inequality can simply be measured by one (or more) of the relevant indices. Although this permits the comparison of inequality among different population subgroups, it does not directly say much about the extent to which this inequality contributes to the overall inequality. In order to investigate these issues, we need to be able to decompose inequality into intra-group and inter-group components. Although a large class of inequality indices is decomposable by population subgroup, not all of them are suitable for this purpose (Bourguignon, 1979; Cowell, 1980; Shorrocks, 1980). The use of a particular

inequality measure to quantify the degree of inequality in a given population carries implicit assumptions. The same results might not be necessarily derived using alternative inequality indices since inequality measures differ in the weights they attach to income changes taking place at different segments of the income distribution. It is with this in mind that the following measures of inequality are chosen to develop an inequality profile for Cameroon. The Gini coefficient is known for its sensitivity to income changes around the mode while the Squared Coefficient of Variation is sensitive to transfers that take place at either end of the income distribution (Sen, 1997). The Atkinson index, on the other hand, is rather sensitive to income transfers at the lower end of the income distribution especially for higher values of its inequality aversion parameter (Cowell, 1995). Profiling inequality also requires the partitioning of the data into subgroups similar to the ones used under the poverty profile. That is, total inequality (A_T) can be decomposed multiplicatively into within (A_W) and between (A_B) components such that:

$$A_T = (1 - A_W)(1 - A_B),$$

or equivalently $A_T = A_W + A_B - A_W . A_B$

In order to measure inequality within each group only, use is made of the Gini (G) index and the Atkinson indices $A_{(\varepsilon=0.5)}$ and $A_{(\varepsilon=2)}$. $A_{(\varepsilon=2)}$ is relatively more sensitive to differences at the bottom of the distribution than $A_{(\varepsilon=0.5)}$, while G is more sensitive to differences at the middle of the distribution. Inequality decomposition analysis is done using the Theil's Entropy index (T), the Mean logarithmic Deviation (L) and following Jenkins (1995), the Half the Squared Coefficient of Variation ($C^2/2$). These are also the inequality measures with the most desirable properties for the decomposition analysis and have widely been used in relevant studies (Bourguignon, 1979 and Jenkins, 1995). These three indices are part of the family of Generalised Entropy measures $E_{(0)}$: L is the $E_{(0)}$, T is the $E_{(1)}$, and $C^2/2$ is the $E_{(2)}$. Among these indices, L is more sensitive to differences at the bottom of the distribution, whereas $C^2/2$ is more sensitive to differences at the top.

1.3.1 Inequality Profile by Region

In table 1.7, different measures of inequality are summarized for Cameroon for comparative reasons. Whatever the measure of inequality used, inequality is highest in urban areas (0.412), followed by semi-urban (0.338) and rural areas (0.305).These results fall in line with those of other studies on inequality in Cameroon (Fambon and Baye, 2002; Amin and Dubois, 1999). Cameroon with a Gini coefficient of 0.428 seems to have a relatively low level of inequality as compared to some other African countries like Namibia (0.74) in 2003, Madagascar (0.47) in 2001, South Africa (0.57) in 2000 and Zimbabwe (0.50) in

1995 (see Nation masters factsheet online). Explanations for the differences in inequality between regions in Cameroon and between Cameroon and other African countries can only be made after a careful study on the determinants of inequality in Cameroon. Nevertheless, colonisation, geography, education, gender bias and politics could be advanced as some of the reasons for the inequitable distribution of income in Cameroon.

The indices used in the decomposition of inequality between and within groups show that inequality between groups' accounts for only a small part of overall inequality. None of the indices shows that more than 30 percent of the overall inequality is attributable to the between group inequality. In earlier parts of this chapter, it is shown that about 69 percent of rural areas are poor as against 18 percent for urban areas. The high rate of poverty in rural areas explains the equitable distribution of income among these "have not's" meanwhile the inequality in urban areas continues to be pushed upwards by the constant migration of the poor from the rural area to the urban areas. Those who migrate are those with the means to at least start up a new life in the urban areas, thereby leaving behind the poorest of the poor in the rural areas with little or no disparity in their income status. It is also worth noting that spatial mobility does not lead to social mobility. Thus the problem of inequality is not actually reduced in rural areas but is only shifted to urban areas and becomes more visible due to the excess migration which has occurred over the years.

Table 1.7   Decomposition of inequality by regional location of households

Region	Pop Share %	Mean Expend	G	A $(\varepsilon-0.5)$	A $(\varepsilon-2)$	T $(\theta=1)$	L $(\theta-0)$	$C^2/2$ $(\theta=2)$
Urban	45.1	547398	0.412	0.147	0.389	0.369	0.286	0.899
Semi-Urban	21.3	317175	0.338	0.093	0.309	0.199	0.190	0.264
Rural	33.6	206482	0.305	0.076	0.264	0.161	0.155	0.206
Total	100	383819	0.428	0.156	0.425	0.385	0.310	0.964
Within Group Inequality						0.302 (78.4%)	0.221 (71.3%)	0.884 (91.7%)
Between Group Inequality						0.083 (21.6%)	0.089 (28.7%)	0.080 (8.3%)

Note: In parenthesis are within and between group contributions to inequality.
Source: Own computation from the ECAM 2001 household survey data.

1.3.2 Inequality Profile by Province

The heterogeneous nature of activities in the two major towns in Cameroon (Douala and Yaoundé) partially explains the high level of inequality as seen in table 1.8. Douala and Yaoundé have inequality indices of 0.429 and 0.432 respectively which lie above the country average of 0.428. These two towns absorb migrants from all over the country who see them as oases which could offer them an escape from poverty. High inequality is not the only outcome of

this uncontrollable movement, as it also brings along other urban hazards such as crime, over population, pollution and generates slums. This makes the gap in income distribution visible to the human eye. Besides this migration phenomenon, the high inequality in these towns could be explained by the fact that Yaoundé being the political capital and Douala the economic capital, both exhibit the situation whereby we have the most well-to-do households living alongside the poorest households.

The results shown in table 1.8 below seem to suggest the existence of a link between the extent of poverty and the level of inequality in Cameroon. That is, the lower the degree of poverty, the higher the level of inequality. Figure 1.3 below highlights this inverse relationship between poverty and inequality especially when considering only Douala and Yaoundé which are the two major cities in Cameroon. The assertion of an inverse relationship between poverty and inequality is difficult to make because of the unclear nature of the relationship between poverty and inequality at the provincial level (See figure 1.3). The fact that these results are obtained from a static analysis, provide a more plausible explanation for the apparent trade-off between poverty and inequality. There is an inherent indication that some regions (rural and relatively poor provinces) have a homogenous activity pattern (subsistence agriculture) with relatively little income, thus low intra-group inequality but very high poverty. Meanwhile in other regions (urban and richer provinces), activities are more heterogeneous with income diversification consequently leading to lower poverty but higher inequality. Though the apparent inverse relationship in this case does not make the case for a possible trade-off between poverty and inequality, the question of its existence cannot be ignored.

However, in order to come to a precise conclusion, this finding should be further investigated by using panel data. The North-West province is a special case as it does not follow this trend. With 7.2 percent of the population share, and being one of the poorest provinces of the country, it still exhibits the highest inequality in the distribution of income among the 10 provinces in Cameroon. The Extreme-North and North provinces identified in earlier sections of this paper as being among the poorest provinces show inequality indices close to the rural average of 0.305, the North-West (one of the poorest provinces) has an inequality index of 0.4. $A_{(\varepsilon=2)}$ which captures inequality among the poor shows that the North-West province is not only one of the poorest provinces but income appears to be very inequitably distributed within the province especially among the poor (0.413).

The contribution to national inequality of within group inequality is several-fold higher than that of between group inequalities. This indicates that between group income transfers to iron out the inequality problem might not yield the desirable

effects if not accompanied by policies which follow up redistribution within groups.

Table 1.8   Decomposition of inequality by provincial location of households

Province	Pop Share %	Mean Expend	G	A $(\varepsilon-0.5)$	A $(\varepsilon-2)$	T $(\theta=1)$	L $(\theta=0)$	$C^2/2$ $(\theta=2)$
Douala	09.4	760007	0.429	0.164	0.398	0.427	0.311	1.123
Yaoundé	09.6	755604	0.432	0.159	0.403	0.391	0.309	0.787
Adamawa	07.3	310613	0.334	0.089	0.286	0.192	0.179	0.248
Centre	08.7	337872	0.343	0.095	0.316	0.208	0.195	0.286
East	06.8	338119	0.318	0.081	0.283	0.171	0.168	0.213
Extreme-North	13.5	238112	0.362	0.104	0.333	0.226	0.215	0.297
Littoral	05.8	294484	0.353	0.101	0.331	0.221	0.208	0.315
North	08.2	259064	0.385	0.119	0.339	0.269	0.237	0.401
North-West	07.2	245096	0.400	0.129	0.413	0.283	0.273	0.405
West	10.2	290936	0.314	0.081	0.263	0.178	0.162	0.246
South	07.2	369724	0.297	0.073	0.234	0.159	0.144	0.215
South-West	06.0	329272	0.359	0.104	0.329	0.226	0.213	0.304
Total			0.428	0.156	0.425	0.385	0.310	0.964
Within Group inequality						0.284 (74.0%)	0.220 (71.0%)	0.847 (88.0%)
Between Group Inequality						0.100 (26.0%)	0.089 (29.0%)	0.117 (12.0%)

Note: In parenthesis are within and between group contributions to inequality.
Source: Own computation from the ECAM 2001 household survey data.

Figure 1.3   Poverty and inequality by provinces
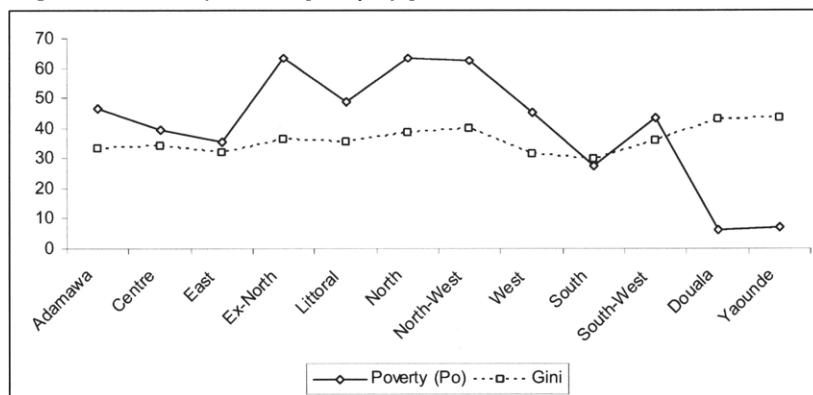
Source: Own computation from the ECAM 2001 household survey data.

1.3.3 Inequality Profile by Sector of Employment of the Household Head

The sector of employment of the head of the household, often considered as the bread winner is primordial in determining the revenue of the household and hence its expenditure. Inequality is higher in the formal sector than in the informal sector as expected. With a Gini index of 0.428, the formal sector exhibits an inequality rate as high as the national average (0.428). Decomposing inequality by sector of employment also reveals like in the other cases that within group inequality contributes more to national inequality than between group inequality. This implies that redistribution of income in Cameroon to reduce poverty cannot be limited to transfer of income from the formal sector to the informal sector which harbours the majority of the poor but transfers within the various sectors itself will be very necessary.

Table 1.9   Decomposition of inequality by sector of employment of household head

Sector	Pop Share %	Mean Expend	G	A (ε−0.5)	A (ε−2)	T (0=1)	L (0−0)	$C^2/2$ (0−2)
Formal	29.26	602758	0.428	0.160	0.412	0.405	0.309	1.013
Informal	22.05	369638	0.351	0.101	0.325	0.223	0.206	0.329
Agra	35.84	208252	0.296	0.071	0.255	0.148	0.146	0.178
Other	12.85	399253	0.383	0.121	0.372	0.273	0.247	0.442
Cameroon	100.0		0.428	0.156	0.425	0.385	0.310	0.964
Within Group Inequality						0.299 (77.7%)	0.220 (70.9%)	0.878 (91%)
Between Group Inequality						0.086 (22.3%)	0.090 (29.1%)	0.085 (9.0%)

Note: In parenthesis are within and between group contributions to inequality.
Source: Own computation from the ECAM 2001 household survey data.

1.4 Determinants of inequality

The Gini decomposition of income (expenditure) often used to identify the sources of inequality addresses two particular issues: first, how much does a particular source of income or expenditure (e.g. food expenditure) contribute to overall expenditure inequality and second, which sources of expenditure help to raise or lower total inequality. This approach is of a more limited use in identifying the causes of expenditure on particular goods and services which will be used in the following section to determine their contribution to total

inequality by the decomposition of the Gini index. This analysis is important because the Gini decomposition by expenditure source cannot describe how important household-level variables such as education, age, household size and land tenure systems cause or determine expenditure inequality.

Therefore in this section, I precede the standard Gini decomposition with an approach to inequality decomposition that is based on a simple regression analysis. This approach provides a flexible and efficient way of quantifying the roles of different determinants of expenditure, such as land possession, sex, age and level of education of household heads and other variables on the level of expenditure inequality. This approach shows how total inequality could be influenced by using a given determinant of expenditure to affect expenditure on a particular source that contributes highly to expenditure inequality, given a certain level of inequality. The results will be very important for policy makers who have as objective the reduction of inequality through taxes or subsidies on those inequality increasing or decreasing sources of expenditure. For a more effective use of these transfer mechanisms to reduce inequality, knowledge of the determinants of total expenditure and its components combined with knowledge on the contribution of each expenditure source to total inequality obtained by a decomposition of the Gini index is important. To properly address the question of inequality in Cameroon therefore, it is not enough to tax or subsidise expenditure on the following items - food, housing and transport and communication known to contribute highest to total inequality (see chapter two). However, knowledge of the determinants of expenditure on sources such as level of education, land possession, region of residence and income as well as policies which can influence them would contribute in achieving poverty and inequality reduction.

This type of decomposition requires the estimation of an expenditure generating equation. In this analysis, the approach is based on modelling the natural logarithm of per capita expenditure of survey households. The question in place is how much expenditure inequality is accounted for by each explanatory factor and how much is unexplained, as gauged by the residual? The model is of the form:

$$\ln y_i = \alpha + \beta_1 x_{1i} + \beta_2 x_{2i} + ... + \beta_k x_{ki} + \varepsilon_i$$

Where y_i denotes expenditure (log per capita expenditure) and $x_{1...} x_k$ are exogenous individuals, households and community characteristics which determine expenditures. The included right hand side variables are broad and intended to capture the household's expenditure capacity. The regressors included are demographic variables, education and dummies for sector of employment as well as region of settlement. Thus the decomposition of the

inequality in the logarithm of expenditures will have an unexplained residual component arising from the residual term.

The econometric results yield estimates of the expenditure flows attributed to various household variables. This allows inequality decomposition by factor expenditure, which is, apportioning inequality to the various components of expenditure, where the sum of these components equals total source expenditure, $Y=\sum_{k=1}^{K} y_i$. Here the analogues are the $y_i = \alpha + \beta_1 x_{1i}...$, the expenditure determined by age, education, household size and so forth, as given by the regression results. The management and taste variables are held fixed since the relevant variables identified in the data set reflect a series of endogenous rather than exogenous choices made by household. I use the approach to estimate the determinants of the five major sources of household expenditure – education, health, transport and communication, housing and food[4]. Determinants of expenditure on particular sources could be very different from determinants on total expenditure meaning that specific policies could be required to obtain particular results. For example while the sex of the household head is insignificant in determining total expenditure, important differences are registered when it comes to expenditure on education and health. Female headed households do spend more on education and health than male headed households. Another advantage of using these five major sources of expenditure is that the majority of households do spend on these sources thus avoiding the bias and inconsistent result problems which exist when so many zero values are present. Table 1.10 reports means and standard deviations for the variables. The model was estimated on all 10992 households in the sample. The majority of household heads are between 31 and 65 years of age (67%) and only 8.7% are older than 65 years. Educationally, most household heads (46%) have less than 7 years of education meaning that they never completed primary education. This is certainly reflected in their earnings and consequently their spending potentials. Average household size in Cameroon is 5 children per household and reflects the African average household size. Possession of land and housing are used as proxies for wealth since income would correlate directly with expenditure. Majority of the household heads are employed or self employed in the informal and agricultural sector which is characterized by very low wages. Only 26% of household heads are employed in the formal sector where better wages are paid and there is a job guarantee. These conditions certainly favour higher per capita expenditure on the various expenditure sources. Irrespective of the location of households (rural or urban), food and transport and communication expenditure constitutes the highest share of budget expenditure. It would be interesting to see how the independent variables determine expenditure on these two sources.

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[4]   These five major sources of expenditure constitute 85% of household total expenditure.

Table 1.10 Descriptive Statistics of the Variables in the Expenditure
Generating Equation

Factor	Mean	Std. Dev.
Marital Status		
Single	0.1752	0.380
Monogamy	0.5120	0.499
Polygamy	0.1572	0.364
Widow	0.1555	0.362
Sex (male=1, female=0)	0.7561	0.429
Age (13-30)	0.2422	0.428
Age (31-65)	0.6702	0.470
Age (66 -)	0.0876	0.280
Edu (<7yrs)	0.7522	0.431
Edu (7-14y)	0.1902	0.392
Edu (15y--)	0.0576	0.232
HHsize	5.1789	3.549
Posses land	0.4801	0.499
Own House	0.1457	0.352
Region (Urban=1, Rural=0)	0.4526	0.452
Agrar (Agric sector=1, Otherwise=0)	0.3507	0.350
Formal (Formal sector=1, Otherwise =0)	0.2670	0.442
Informal (Informal sector=1, Otherwise =0)	0.2482	0.431
Food exp/head (cfa) *	180 199	155 355
Transcom exp/head (cfa) *	63 899	250 317
Housing exp/head (cfa) *	113 401	205 434
Health exp/head (cfa) *	49 228	174 981
Education exp/head (cfa) *	23 383	62 344
Sample size	10992	

* Expenditure per year
Source: Own computation from the ECAM 2001 household survey data.

1.4.1 Results

The results of the regression estimation are shown in table 1.11 below and most of the regression coefficients are statistically significant at 99 percent level of confidence; and more importantly, most have expected signs. Despite the large sample size, the coefficients of determination (R^2) are large. The results provide some insight into the determinant of expenditure given a certain level of inequality which could be influenced by putting policies in place to affect the determinants.

Owning a house enables households to increase their total expenditure by 19 percent. Per capita expenditure on the major components of total expenditure increases except for food which reduces by 6 percent and is highly significant. Land possession does not contribute to increased per capita expenditure except in the case of food. This small increase in food expenditure due to land possession is an indication of the link between land possession and agriculture well established in agricultural economics and development literature (IFAD, 2009; Sulser et al., 2005 and von Ravensburg and Jacobsen, 1999).

Evidently, households located in urban areas have a higher per capita expenditure than those located in rural areas. One of the most important observations here is the gap existing on per capita expenditure on particular sources in urban and rural areas. While urban households spend 34 percent more on education than rural households, rural households spend 10 percent more on food than urban households. This discrepancy in expenditure on education between urban and rural households can be explained by the low school enrolment rates in rural areas as compared to urban areas. Secondly, the majority of educational institutions in rural areas are public and cheaper as compared to the more expensive private institutions preferred by the majority in urban areas. Thirdly, the more costly institutions of higher education are mostly based in urban areas, thus causing expenditure on education in urban areas to rise compared to rural areas which provide only primary and secondary school education. While the above factors partially explain the discrepancy in household expenditure between urban and rural areas, the household structure will have to be included into the analysis to arrive at a better conclusion.

With household heads less than 31 years of age left out as the comparison group, the regression results indicate that households with heads older than 30 years of age spend on average more before it starts dropping (Col. VII). Here again, serious consideration will have to be given to the structure of the households to better understand the determinants on particular sources of expenditure. For example, why do households with older heads spend less on food than their younger counterparts (Col. II)?

The variable household size captures the demographic burden in terms of increases. Caution should be exercised when interpreting the coefficients because the estimate of equivalence scales as suggested by Deaton (1997) is not taken into account. Households may reduce their expenditure on particular commodities as demand for alternative commodities increases due to an increase in household size. One can expect a negative or positive effect of household size on household expenditure depending on priorities and alternatives of the household. Results show how expenditure on the different sources is affected differently by household size.

Under marital status, singles are used as the comparison group. Being married to one or more wives increases your per capita expenditure on food, housing and health. It is surprising to see that married people have a lower per capita expenditure on education and transport and communication than singles.

The sex of the household head is insignificant in determining the total per capita expenditure of households (Col. VII) but the regression on particular sources of

expenditure indicate that female headed households spend more on housing health and education while male headed households spend more on food and transport and communication and these are all highly significant. This means that there is a gender related difference at the level of priorities when it concerns decisions on household well being. Expenditure sources considered by female headed households as priorities indicate a much higher percentage difference than those considered as priorities by male headed households. Female household heads spend 30 and 20 percent more on health and education respectively meanwhile male headed households spend only 4 and 11 percent more than their female headed households on food and transport and communication.

The results also align with the expectation that higher education for heads of households should have a positive effect on total expenditure. Education does not only lead to an increase in expenditures as it affords not only more jobs but higher earning jobs which enhance an individual's earning potential. It also increases the awareness of the benefits of certain sources of expenditure to social well being (education, health and better housing) and accordingly, households whose heads have higher education levels spend more on these sources. With household heads having less than seven years of education as the comparison group, the results indicate that per capita expenditure on all the sources is higher for those with higher education levels. The coefficients are reasonably high and statistically significant at 99 percent level of confidence.

The informal and agricultural sectors have a negative impact on per capita expenditure. That is, household heads working in the informal and agricultural sector have a lower per capita expenditure on all sources except food than those in the formal sector (comparison group). This is certainly due to lower earnings in these sectors.

As expected, household income (log total expenditure) has a positive effect on household expenditure. As household's income increases, households tend to spend more on the various components of total expenditure. It is income which has the highest impact on determining expenditure.

Table 1.11   Regression analysis of determinants of household expenditure per capita

Variables	Food	Trans/Com	Housing	Health	Education	Total Exp.
Col. I	Col. II	Col. III	Col. IV	Col. V	Col. VI	Col. VII
Land						
Own House	-0.068***	0.104***	0.059***	0.058**	0.169***	0.197***
Possess Land	0.018*	0.013	-0.080***	-0.071***	-0.086**	-0.099***
Region (urb=1,ru=0)	-0.105***	0.130***	0.174***	0.119***	0.344***	0.322***
Labour						
Age (13-30)	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Age (31-65)	-0.033***	0.023	0.061***	0.015	0.461***	-0.007
Age (65-)	-0.050***	-0.239***	0.121***	-0.014	0.371***	-0.133***
HHsize	-0.004***	0.011***	-0.023***	0.021***	-0.039***	-0.053***
Mar. Status						
Single	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Monogamy	0.031**	-0.088***	0.060***	0.190***	-0.451***	-0.108***
Polygamy	0.044***	-0.120***	0.075***	0.119***	-0.613***	0.019
Widow	0.029*	-0.117***	0.066***	-0.021	-0.302***	-0.079***
Sex (1=male)	0.044***	0.114***	-0.052***	-0.306***	-0.203***	0.005
Capital						
Edu(<7yrs)	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Edu(7-14yrs)	0.117***	0.180***	0.058***	0.124***	0.376***	0.329***
Edu (15y--)	0.273***	0.335***	0.157***	0.014***	0.453***	0.774***
Formal	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Informal	0.066***	-0.031	-0.041***	-0.058***	-0.290***	-0.141***
Agriculture	0.097***	-0.160***	-0.098***	-0.231***	-0.446***	-0.370***
Log total exp.	0.887***	1.328***	0.734***	1.071***	0.905***	-
Constant	0.523***	-7.172***	1.893***	-3.658***	-2.304***	13.06***
R-squared	0.69	0.60	0.75	0.49	0.45	0.42

(***significant at 1% **significant at 5%, *significant at 10%)
Source: Own computation from the ECAM 2001 household survey data.

1.5 Conclusion

Poverty and income inequality are two challenging issues which require special attention if Cameroon is to meet the Millennium Development Goals. The poverty and inequality profile developed here sets a base for economic analysis and policy decision making aimed at achieving these goals. Because the determinants of poverty are not only income based but consist of a wider range of factors, the poverty map constructed in this paper and the inequality analysis contribute to understanding why poverty persists in certain areas.

Prior to drawing conclusions from this study, it is important to note that the solid growth of 4% per annum experienced by Cameroon between 1996 and 2001 was accompanied by substantial poverty reduction from 50.2 percent as estimated by the NIS to 40.8 percent. This significant reduction in national poverty masked

the vast provincial disparities which exist within the country and it is only through a better understanding of the spatial distribution of poverty that more effective and better targeted poverty reduction policies can be implemented in Cameroon.

Following results obtained from the profile of poverty and inequality, special attention should be paid to the northern parts of the country that appear to bear the brunt of poverty in Cameroon. With more than 40 percent of the population residing in the three provinces of the Extreme-North, North and North-West, poverty in Cameroon will certainly present a different profile if measures to combat poverty and inequality are not only accentuated but effectively applied there.

Results from the study also indicate that Cameroon's poverty is mainly a rural phenomenon with incidence of poverty being extremely high in the northern provinces of the country (Extreme-north, North and North-west Province). Although the incidence of poverty is higher in rural areas, it still remains a major problem in urban zones. The provinces with income generating opportunities besides agriculture have a lower poverty rate as compared to those provinces which rely solely on agriculture for income. The conclusion drawn from this is the urgent need to implement measures that will lead to the infrastructural linking of rural areas to the rest of the country and making them accessible to investment. This will provide new opportunities for income generation to households residing in these areas and thus contribute to poverty reduction.

The inequality profile developed for Cameroon, places Cameroon as a country with low income inequality as compared to other African countries. Nevertheless, expenditure inequality is still too high in Cameroon. A meaningful policy on redistribution will have to be implemented to bridge the existing gap between the poor and non poor. Evidence from the profile showed that inequality was higher in urban areas in Cameroon than in rural areas. Inequality does not only exist between groups, but it was also identified that within group inequality contributed more to national inequality than between group inequality. Considering both profiles for Cameroon (poverty and inequality), it is evident that inequality is higher in areas which exhibit a lower degree of poverty and vice versa. The North-West province seems to be a special case as it does not follow this trend. With 7.2 percent of the population share, and being one of the poorest provinces of the country, it still exhibits the highest inequality in the distribution of income among the ten provinces in Cameroon.

In order to suggest particular policies which could contribute to the reduction of poverty and inequality, an inequality decomposition approach based on a simple

regression analysis provides information which could be used in combination with Gini decomposition of expenditure inequality by source (Chapter two). Following the results obtained from the regression, it is clear that higher total expenditure lead to higher per capita expenditure on the different commodities. The returns on education are extremely high: higher education levels correlate positively with higher per capita expenditure signifying higher standards of living. Free primary education as well as policies to encourage people to stay in school until the completion of high school should be implemented and encouraged. An educated Cameroonian populace will not only benefit from increase earning potentials but will also experience an improvement on the quality of their lives.

Understanding Expenditure Inequality in Cameroon

Abstract: Using Cameroon household consumption survey data of 2001 (ECAMII) and the Lerman and Yitzhaki covariance method for decomposing the Gini coefficient by component, in the first part of this study, it is observed that overall inequality in Cameroon is characterized in particular by the inequality in the expenditure to four major components: food, transport and communication, housing and health. The overall Gini based on household total expenditure for Cameroon is 0.46. The relative marginal effects obtained from the decomposition identified some components as inequality decreasing when expenditure on them increased. Further, parameters of a Linear Expenditure System are estimated and their impact on the consumption pattern of households is assessed by simulating changes in taxes and subsidies. The findings reveal that rural households generally allocate the largest share of supernumerary income on food meanwhile urban households allocate the largest share of their supernumerary income on transport and communication. Committed expenditure is higher for all commodity groups in urban areas as compared to rural areas and roughly follows the same pattern set by the average budget shares. The difference in impact and consequence of certain policies (food price reduction) in rural and urban households shows that, certain areas or sectors will require separate consideration of policy interventions.

2.1 Introduction

Knowledge on overall inequality as well as within and between group inequalities in Cameroon is important to policy makers but this may be insufficient to properly target public policies – reduction of poverty and inequality. Policies implemented to reduce poverty and inequality based on within and between group inequality information may have very differentiated impacts on different expenditure or income sources and knowledge of these impacts is primordial in order to achieve government objectives. This therefore makes the case for the splitting of overall inequality among different expenditure or income sources.

Decomposing inequality by income sources is necessary to know how much of total inequality is explained by income from a particular source[1]. Since Shorrocks (1982) and Lerman and Yitzhaki (1984), there has been a preponderance of literature on the decomposition of inequality using income (e.g. Rahman and Huda, 1992; Adams, 2002; Morduch and Sicular, 2002; Akita, 2003). But unlike in most developed countries, the bulk of empirical literature on poverty and inequality in Cameroon is based on analyses with expenditure rather than income data. This is due to the complexity of obtaining income figures and the unreliability of income figures when available. In the absence of income data which is considered the best proxy to the level of household's economic welfare, expenditure is taken as the second best solution. Thus existing knowledge on the level of inequality in Cameroon is based on expenditure figures (see Amin and Dubois, 1999; Baye, 2004; INS, 2004; Fambon and Baye, 2002).

Though the decomposition of inequality by source is often performed using income data - at least in developed countries given the reliability of the data, this paper will be based on a decomposition of inequality by expenditure source. Using expenditure data for source decomposition of inequality will not only provide for consistency with the other numerous studies which have been done on Cameroon but also permits the identification of the contribution of each source of expenditure to total inequality. Furthermore, such decomposition highlights those expenditure sources that dominate the distribution of expenditure within the low and high income groups as well as in rural and urban areas, and as such offer a bridge on description of inequality and the key economic processes generating inequality in a country.

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[1]   Shorrocks (1982) disaggregated the income of individuals or households into different factor components such as earnings, investment income, and transfer payments and considers how to assess the contributions of these sources to total income inequality.

With such information at hand, the government of Cameroon is in a position to adjust its monetary and fiscal policy so that it influences the various sources of expenditure to achieve the necessary goals of reducing poverty and inequality. Knowing what impact a change in expenditure on a particular source has on the overall expenditure inequality provides an avenue for policy makers to reduce inequality through taxes or subsidies. Garner (1993), used the Lerman Yitzhaki covariance method for decomposing the Gini coefficient by factors and found out that the relatively high Gini expenditure elasticities for household operations, apparel and services as well as for entertainment in the U.S. implied that taxing such goods and services will increase the progressivity or reduce the regressivity of the tax system. Lazaridis (2000) also used the same method to examine the impact of sixteen food items on the inequality of total household food expenditures in Greece with results indicating that, taxing expenditure on food consumed away from home and on alcoholic drinks will improve the distribution of food expenditure equality and will increase the progressivity of the tax system. Subsidising the other food items would have the same but more modest effect.

2.1.1 Objective

The objective of this paper is twofold. Firstly, I analyse inequality in the distribution of household consumption expenditures and examine relationships between various expenditure budget components and total expenditures using micro data from Cameroon. The analysis is based on the Lerman and Yitzhaki (1984, 1985) covariance method for decomposing the Gini coefficient by factors. Secondly, I estimate Linear Expenditure System (LES) parameters required for computing elasticities and then probe the effects of some policy measures by viewing its impact on the consumption pattern of households through their budget shares. Reduction of inequality can be achieved by using transfer policies based on sound analysis of existing income distribution and knowledge of expenditure patterns. Therefore it could prove to be very beneficial if policy makers know the consumption pattern of the population and what the consequences of changing consumption patterns could have on the entire economy.

2.1.2 Relevance of the study to Cameroon

As a follow up to the arguments given above which highlight the relevance of this study, the government of Cameroon has in recent years implemented a series of measures to reduce poverty and inequality. With the windfall of attaining the completion point of the HIPC-Initiative, the government of Cameroon signed an ordinance deflating taxes for frozen fish, rice and other food staples in order to increase the household food consumption through lower prices. The government also passed the education law of 14 April 1998 with objectives to offer basic education to all without discrimination on grounds of

sex or origin. Furthermore, the objective of the abolition of compulsory fees for public primary education announced by the Head of State in February 2000 is an effort to close the gap between the educated and uneducated. Decomposing inequality by expenditure source will assist the justification or not of such measures undertaken by the government of Cameroon to influence expenditure patterns of households through redistribution of income.

Identifying the impact of marginal changes in expenditures for specific commodities on the inequality of total expenditures can therefore provide useful information concerning the effect that certain policies, such as the introduction of percentage commodity taxes and subsidies, may have on the spending patterns of consumers.

2.2 The decomposition of the Gini coefficient

Following Stuart (1954), Lerman and Yitzhaki (1985) showed that the standard Gini coefficient used to produce an estimate of the inequality in the distribution of total household consumption expenditures over the population can be computed using the formula:

$$G = \frac{2\,\text{cov}(y, F(y))}{\bar{y}} \tag{1}$$

Where y is the variable we want to examine with respect to the inequality of its distribution, $F(y)$ its cumulative distribution and $\bar{y}$ its arithmetic mean.

Considering the fact that total expenditure is made up of streams of expenditure originating in different ways, it is of interest to know not only the contributions of the various components to mean expenditure, but how much of total inequality in total expenditure arises from inequality across individuals expenditure in these various sources. Lerman and Yitzhaki (1985) showed that if $y = \sum_{i}^{k} yi$, where yi is the ith component of y, then the Gini coefficient can be decomposed as:

$$G = \sum_{i=1}^{k} R_i S_i G_i \tag{2}$$

Where $R_i = \dfrac{\text{cov}(yi, F(y))}{\text{cov}(yi, F(yi))}$ and is defined as the Gini correlation between the expenditure component yi and the rank of total consumption expenditure, y. $S_i = \dfrac{yi}{y}$ is the component yi's share of total expenditure and $G_i = \dfrac{2\,\text{cov}(yi, F(yi))}{yi}$ is the Gini coefficient for component yi.

This decomposition by expenditure source is quite different from a decomposition of inequality in total expenditure across social groups. Source decomposition is useful in examining how marginal changes in expenditures for particular components can affect overall inequality. Suppose there is a change in household expenditure pattern caused by a change in tax or shocks on the world economy, its impact on the overall inequality can be given by:

$$\frac{\partial G}{\partial t_i} = S_i R_i G_i - S_i G, \tag{3}$$

where t_i represents a percentage change in expenditures for component yi.

The components marginal effect relative to the overall Gini coefficient can be expressed as:

$$\frac{\frac{\partial G}{\partial t_i}}{G} = \frac{S_i R_i G_i}{G} - S_i \tag{4}$$

Equation (4) indicates that the percentage change in the inequality of total expenditure caused by a small change in the expenditure on a particular component y_i, due to a tax or a world market shock is equal to its contribution to total expenditure inequality minus its contribution to total expenditure. If this marginal effect is positive, then a decrease in the expenditure on source yi will decrease overall inequality. If this is due to a tax increase, we can consider this tax to be a progressive tax since it affects more rich people than it does with the poor. The opposite is true in the case of a negative marginal effect.

2.2.1 Data presentation and results

For the purpose of this study, the data used is the same as in paper one (ECAM II). Total expenditure for each household has been divided into ten sources: Food, clothing, housing, education, health, transport and communication and other which includes expenditure on alcohol, leisure, tobacco and transfers. Though this division appears to be arbitrary, it covers to a large extent the sources on which households spend their income in Cameroon. In table 2.1 below, the sources of expenditure are presented by expenditure quintile group. The poor (lowest quintile group), spend on average 48.4 percent of their total expenditure on food. Expenditure on food alone by the poor is higher than total expenditure on important aspects like housing, clothing, education, health, transportation and communication. The rich (highest quintile group) spend 20 percent less on food and almost four times more on transportation and communication than the poor. While minimal differences are identified on expenditure sources between the poor and the rich, ranging from 0.4 percent in

expenditure on clothing to 3.7 percent in expenditure on health, food and transport and communication stand out as the sources with major differences. Whether and how this expenditure pattern contributes to inequality will be shown later.

Table 2.1   Sources of expenditure by quintile

Total per capita expenditure Quintile	Average total per capita expenditure (FCFA)	Percent of total per capita expenditure source						
		Food	Clothing	Housing	Education	Health	Trans/com	Other
Lowest	125278	48.4	6.7	25.6	3.5	7.3	4.7	3.8
Second	209357	47.2	6.5	23.1	4.4	8.3	6.0	4.5
Third	305420	44.4	6.7	22.2	5.3	8.9	7.6	4.9
Fourth	448962	40.5	6.9	21.8	6.4	10.0	9.1	5.3
Highest	1072288	28.4	7.1	22.0	6.4	11.0	18.3	6.8
Total	432107	36.4	6.9	22.3	5.7	9.9	12.8	6.0

Note: Other is the sum of expenditure on alcohol, leisure, tobacco and transfers.
Source: Authors' calculations

Table 2.2 presents the expenditure pattern based on regional location of the household. Households are identified as being located in urban, semi-urban and rural areas. About 50 percent of total mean expenditure of households located in rural areas goes on food and this is 19 percent higher than the figure for households in urban areas. Just like in the previous distribution by total per capita expenditure quintile, expenditure on food plays a leading role in determining how individuals spend their income. Whatever the case, a 50 percent mean expenditure on food is very high.[2]

Table 2.2   Source of expenditure based on location of household

Region	Number of hhold per region	Average total per capita expend (FCFA)	Percent of total per capita expenditure source						
			Food	Clothing	Housing	Educa	Health	Trans/co	Other
Urban	4975	2285416	31.0	6.7	23.4	6.7	10.7	15.4	6.1
Sem-Ur	2137	1692396	40.7	7.6	21.1	5.5	9.1	10.3	5.7
Rural	3880	887309	49.7	6.9	19.7	3.3	8.3	6.7	5.4
Total	10992	1676615	36.4	6.9	22.3	5.7	9.9	12.8	6.0

Source: Authors' calculations

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[2]   According to the European System of Social Indicators (EUSI), expenditure on food and non alcoholic beverages as a percentage of total expenditure in 2002 was 12.1, 11.2 and 14.5 percent for Germany, Holland and France respectively. Figures of about 32.4 and 25.5 percent were calculated for Lithuania and Latvia respectively in 2000.

There are a few individuals and households with extremely high expenditures which necessitated a control for outliers. This exercise proved to be unproblematic because these individuals insignificantly influenced the group average expenditure.

2.2.2 Inequality decomposition by expenditure source

Decomposing the Gini coefficient provides two ways of measuring the contribution of any expenditure source to overall expenditure inequality. First, it is possible to identify how much of overall expenditure inequality is due to a particular source of expenditure. Second, it can be asked whether inequality in an expenditure source serves to increase or decrease overall expenditure inequality.

Table 2.3   Expenditure inequalities decomposed by source for Cameroon

Expenditure component	Contribution to total inequality	Expenditure share	Gini of component	Correlation with rank of total expenditure	Share expenditure inequality	Relative marginal effect
	C_i	S_i	G_i	R_i	I_i	$I_i - S_i$
Food	0.1285	0.3639	0.4029	0.8770	0.2793	-0.0846
Transfer	0.0035	0.0149	0.8410	0.2819	0.0077	-0.0072
Housing	0.0973	0.2228	0.4820	0.9063	0.2114	-0.0114
Clothing	0.0328	0.0691	0.6092	0.7801	0.0714	0.0022
Alcohol	0.0080	0.0132	0.8700	0.7013	0.0175	0.0043
Transcom	0.0854	0.1280	0.7470	0.8937	0.1857	0.0576
Leisure	0.0177	0.0296	0.7775	0.7717	0.0386	0.0090
Tabacco	0.0005	0.0027	0.9411	0.2357	0.0013	-0.0014
Health	0.0512	0.0992	0.6290	0.8218	0.1114	0.0122
Education	0.0348	0.0566	0.7759	0.7942	0.0758	0.0192
Total	0.4603	1.0000	0.4603		1.0000	

Source: Authors' calculations

The results of the inequality decomposition by source for all households are presented in table 2.3 above. Column one is the list of the various expenditure components. Column two (C_i), presents the contribution of each component to total inequality. This is the product of three terms: the Gini correlation between the budget component and the rank of total expenditures (R_i), the component's Gini (G_i) and its share of total expenditure (S_i). The higher a components C_i value, the greater is its contribution to total inequality. Expenditure on food contributes highest to inequality among all households. The proportion of inequality of total expenditures attributable to each component is given in column six as I_i and is defined as C_i divided by G. Relative marginal effects are presented in column 7. The overall Gini based on total consumption expenditure is 0.4603.

Food expenditure which consumes the highest portion of household budgets (S_i=36%) also has the highest percentage share in total inequality (I_i=27%). Expenditure for housing, health and transport and communication account for 50 percent of total inequality though they constitute only 45 percent of expenditure share. Adding food expenditure to this, these four expenditure components generate more than 80 percent of total inequality.

Why does food expenditure make a proportionately smaller contribution to total inequality than transportation and communication relative to their share in total expenditure? Firstly, the source inequality (G_i) for food expenditure is lower than that for transportation and communication (0.4029 and 0.7470 respectively), implying that expenditure on food is more equitably distributed than expenditure on transportation and communication and secondly, the correlation of source expenditure with total expenditure ranking (R_i) for food expenditure is also lower than that for transportation and communication (0.8770 and 0.8937 respectively). Due to the lower source inequality and lower degree of correlation with total expenditure, food expenditure makes a proportionately smaller contribution to overall inequality than transportation and communication.

2.2.3 Inequality increasing and inequality decreasing sources of expenditure.

It is also important to know which expenditure sources increase or decrease inequality. Changes in expenditures which would lead to reductions in inequality are associated with expenditure sources for which the expenditure shares are greater than are the shares of expenditure inequality. The direction of the relative marginal relationship indicates the effect at the margin of an increase in expenditure for a source on overall inequality (I_i-S_i). The results in this column reveal that increases in expenditures for food, transfers, housing and tobacco would decrease overall inequality in total expenditure, holding all other factors constant.

Policy measures to increase or decrease expenditure in order to reduce inequality by redistributing income would be analysed in the second part of this study. The choice of any particular measure to reduce inequality (tax and subsidies), should be done with the consideration that variations observed in expenditure across income groups could also be group specific preferences. Culture, taste and habits determines the expenditure patterns of certain groups and failing to consider this in measures to reduce inequality could widen the gap between the different groups or at best leave it unchanged.

2.3 Inequality variation among different income groups

The decomposition of the Gini coefficient above has provided two ways of measuring the contribution of any expenditure source to overall expenditure inequality. It is now possible to identify how much of overall expenditure inequality is due to a particular source of expenditure and through the relative marginal effect, how an increase or a decrease of a particular expenditure component affects the total inequality. Segmenting the population into two groups, poor and rich permits a within and between group expenditure source inequality decomposition comparison. The goal here is to identify the driving forces behind inequality within groups based on the assumption that homogenous groups have a similar spending pattern and also to enable a between group (heterogeneous in nature) comparison.

Table 2.4 indicates that in the poor group (lowest quintile), component share in total expenditure (S_i) on food and housing takes up to 48 percent and 25 percent respectively of total expenditure and also contribute the highest to expenditure inequality (I_i), 50 and 19 percent respectively. For the rich income group (highest quintile), the story is different (see table 2.5). Though expenditure on food and housing have the highest percentage share of total expenditure (28 and 21 percent respectively), it is transportation and communication which contributes highest to expenditure inequality (I_i =24 percent), closely followed by expenditure on housing and food. Health with less than 5 percent in expenditure share in the rich group, contributes up to 11 percent to total inequality.

From a within group perspective, the driving force behind inequality in the poor group is expenditure on food and housing meanwhile for the rich group, it is expenditure on transport and communication as well as housing which contributes the most to inequality. Comparisons between the poor and the rich group highlight the urgent need to reduce the gap between both groups by reducing the impact food expenditure has on their inequality outcome. 50 percent of inequality within the poor group is caused by expenditure on food meanwhile expenditure on food accounts only for 20 percent of inequality in the rich group. Expenditure on transfers, leisure, and education play a minute role in influencing inequality in the poor group. Though their contributions to inequality in the rich group are higher, these expenditure sources do not have a very significant impact on overall expenditure inequality in the rich income group like the sources mentioned earlier (transport and communication, housing, health and food).

The direction of the relative marginal effect ($I_i - S_i$), which indicates the effect at the margin of an increase in expenditure for a source on overall inequality shows

that for the poor group, an increase in expenditure on transfer, housing and tobacco will be inequality decreasing and for the other sources, an increase in expenditure will be inequality increasing. For the rich group, the inequality decreasing sources of expenditure are food, transfers and tobacco.

Table 2.4   Expenditure inequality decomposed by source for the poor (lowest quintile)

Expenditure Source	Contribution to total inequality	Expenditure share	Gini of component	Correlation with rank of total expenditure	Share expenditure inequality	Relative marginal effect
	C_i	S_i	G_i	R_i	I_i	$I_i - S_i$
Food	0.1464	0.4828	0.3450	0.8795	0.5069	0.0241
Transfer	0.0017	0.0126	0.8577	0.1605	0.0060	-0.0066
Housing	0.0570	0.2575	0.2815	0.7867	0.1973	-0.0601
Clothing	0.0217	0.0675	0.5458	0.5898	0.0752	0.0077
Alcohol	0.0025	0.0072	0.9100	0.3896	0.0088	0.0016
Transcom	0.0163	0.0467	0.6285	0.5575	0.0566	0.0099
Leisure	0.0054	0.0156	0.6894	0.5071	0.0189	0.0033
Tabac	0.0007	0.0034	0.9442	0.2235	0.0025	-0.0009
Health	0.0229	0.0727	0.5420	0.5815	0.0793	0.0066
Education	0.0140	0.0340	0.7241	0.5696	0.0485	0.0145
Total	0.2890	1.0000	0.2890		1.0000	

Source: Authors' calculations

Table 2.5   Expenditure inequality decomposed by source for the rich (highest quintile)

Expenditure Source	Contribution to total inequality	Expenditure share	Gini of component	Correlation with rank of total expenditure	Share expenditure inequality	Relative marginal effect
	C_i	S_i	G_i	R_i	I_i	$I_i - S_i$
Food	0.0917	0.2882	0.3946	0.8064	0.2070	-0.0813
Transfer	0.0015	0.0127	0.8360	0.1437	0.0035	-0.0093
Housing	0.0987	0.2194	0.5065	0.8889	0.2229	0.0035
Clothing	0.0288	0.0710	0.5711	0.7111	0.0651	-0.0059
Alcohol	0.0096	0.0172	0.8206	0.6805	0.0217	0.0045
Transcom	0.1091	0.1808	0.6900	0.8753	0.2464	0.0656
Leisure	0.0193	0.0386	0.7418	0.6768	0.0438	0.0051
Tabac	0.0001	0.0022	0.9316	0.0927	0.0004	-0.0018
Health	0.0499	0.1084	0.6008	0.7666	0.1126	0.0042
Education	0.0340	0.0614	0.7332	0.7554	0.0767	0.0153
Total	0.4432	1.0000	0.4432		1.0000	

Source: Authors' calculations

Another segmentation of the population based on a rural-urban divide provides similar but a new set of results[3]. Just like in the previous cases, food, housing, transport and communication and health dominate on the total share of expenditure but have varying contributions to overall inequality. In urban areas, food with a 30 percent share in total expenditure contributes 22 percent to overall inequality meanwhile housing and transport and communication with a far lesser share than food in total expenditure contribute approximately the same proportion to total inequality (I_i=22 and I_i=21 percent respectively). Health expenditure also contributes greatly to total inequality despite a relatively smaller share in total expenditure. For rural areas, food expenditure share of total expenditure is excessively high (45 percent) and also contributes highest to inequality (40 percent). This is closely followed by expenditure on housing, transport and communication and health (17, 12, and 9 percent respectively) with expenditure shares in total expenditure of 20, 8 and 8 percent respectively. Results also indicate that an increase in expenditure on the following components will have an inequality decreasing effect on overall inequality regardless of the region; food, transfer, housing and tobacco.

Table 2.6:   Expenditure inequality decomposed by source for urban area

Expenditure Source	Contribution to total inequality	Expenditure share	Gini of component	Correlation with rank of total expenditure	Share expenditure inequality	Relative marginal effect
	C_i	S_i	G_i	R_i	I_i	$I_i - S_i$
Food	0.1045	0.3095	0.3923	0.8612	0.2291	-0.0804
Transfer	0.0029	0.0116	0.8422	0.3019	0.0065	-0.0052
Housing	0.1009	0.2341	0.4751	0.9078	0.2212	-0.0128
Clothing	0.0314	0.0672	0.6015	0.7791	0.0690	0.0018
Alcohol	0.0087	0.0144	0.8380	0.7254	0.0192	0.0048
Transcom	0.0987	0.1543	0.7126	0.8977	0.2163	0.0620
Leisure	0.0190	0.0336	0.7638	0.7433	0.0418	0.0082
Tabac	0.0004	0.0024	0.9376	0.2125	0.0010	-0.0013
Health	0.0531	0.1073	0.6037	0.8198	0.1164	0.0091
Education	0.0361	0.0655	0.7192	0.7684	0.0794	0.0138
Total	0.4563	1.0000	0.4563		1.0000	

Source: Authors' calculations

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[3]   Due to the similarity in characteristics of semi urban areas and rural areas, they have been merged together and are now considered as rural area

Table 2.7   Expenditure inequality decomposed by source for rural area

Expenditure Source	Contribution to total inequality	Expenditure share	Gini of component	Correlation with rank of total expenditure	Share expenditure inequality	Relative marginal effect
	C_i	S_i	G_i	R_i	I_i	$I_i - S_i$
Food	0.1621	0.4506	0.4003	0.8991	0.4032	-0.0474
Transfer	0.0046	0.0200	0.8395	0.2757	0.0115	-0.0085
Housing	0.0700	0.2049	0.3994	0.8563	0.1742	-0.0307
Clothing	0.0315	0.0721	0.5898	0.7408	0.0783	0.0062
Alcohol	0.0059	0.0112	0.8923	0.5981	0.0149	0.0037
Transcom	0.0508	0.0861	0.7145	0.8267	0.1264	0.0403
Leisure	0.0125	0.0232	0.7479	0.7225	0.0311	0.0079
Tabac	0.0006	0.0031	0.9424	0.2078	0.0015	-0.0016
Health	0.0388	0.0864	0.6003	0.7483	0.0965	0.0101
Education	0.0250	0.0424	0.7963	0.7431	0.0624	0.0200
Total	0.4022	1.0000	0.4022		1.0000	

Source: Authors' calculations

Expenditure inequality decomposition by source permits the identification of each sources contribution to total inequality. The source contribution to total inequality is identified as being the product of three terms: the correlation between source component and the rank of total expenditures, the source components Gini coefficient and finally its share of total expenditures. Food, housing, transport and communication as well as health are identified as the most important sources of expenditure with more than 50 percent share in total expenditure in all cases.

High source correlation means that as total income increases, the more one is tempted to spend on this particular source. On a national level, it is observed that source correlations with total expenditure is extremely high for housing, transport and communication, food, leisure and clothing, thus meaning that, expenditure will certainly increase on these sources first if individual or household budgets increases. Taking a closer look at the group decomposition, the rank correlations for those in the rural areas varies from that of those living in urban areas and the situation is the same for those in the poor group and those in the rich group. In case of an increase in the household budget of those from the poor group, they will prefer to increase expenditure on food and housing first meanwhile those from the rich group will favour an increase in expenditure on transport and communication and housing first all else being constant. The situation is similar to those residing in rural and urban areas, with those from the rural areas showing a bigger affinity to increasing expenditure on food and housing first in case of an increase in budget and those from the urban area showing an affinity to increase their spending on transportation and communication and housing first.

High G_i's indicate that there are differences in expenditure patterns. These results imply that there are relatively large differences in spending on leisure, transport and communication, transfers, health and education. The direction of the relative marginal effect indicates the effect at the margin of an increase in expenditure for a source on overall inequality ($I_i - S_i$). Considering the direction presented in most of the cases (national and group results), they reveal that increases in expenditures for food, transfer and housing would decrease overall inequality in total expenditures, holding all else constant.

One of the most important outcome of this study is that, it does not only help in designing proposals for inequality reduction but the presence of the relative marginal effects of the various sources of expenditure and their elasticities to be estimated below, offer a good opportunity to determine which instruments are most suitable to obtain the desired outcome of inequality reduction. Taxing or subsidising certain sources of expenditure depending on their elasticity could prove to be very effective in achieving this goal. The choice of instruments will be determined by the results presented in the following section of this study. Levying a tax on some or all inequality increasing expenditure sources with relatively high elasticities could contribute to reducing inequality. Such a tax will be considered to be progressive since individuals or households with higher total expenditures spend relatively more on these sources than do other individuals or households.

2.4 Measuring Income and Tax Effects Using the Linear Expenditure System

Results of the Gini decomposition by expenditure source have shown to what extent varying budget shares contribute to inequality. To test the effects of some of the policies which could be implemented by considering the direction of the relative marginal effect (a tax or subsidy to influence the budget share and thus inequality), an understanding of the structure of consumer demand is particularly important to avoid the adverse consequences of changes in income. The existence of severe budget constraints faced by the households leaves policy makers with very little margins for errors. Therefore programs designed to reduce inequality via influencing expenditure shares of households on particular commodities require that the target groups be well identified. The different budget shares (Table 2.8) observed across the different regional groups with their relative contributions to inequality implies that policies designed to reduce inequality have to be based on a proper analysis of the reactions of the budget shares of households to income or price changes through the introduction of a tax, an import tariff or a subsidy. To make these analyses, empirical estimates help to predict the ultimate effect on the income distribution of an initial

redistribution of income. In addition, it is worth noting that policy interventions are not neutral with respect to distributional issues. There are winners and losers. Policy interventions that have as objective the reduction of inequality may change the composition of demand in Cameroonian households. This change in the allocation of expenditures, in turn, may cause indirect effects which offset or re-enforce the initial effects of the income redistribution[4]. Thus, knowledge of how individuals respond, in terms of their demand for goods and services, to changes in income and prices are an important component of policy analysis and design (Deaton 1989, Alderman 1986).

While many factors determine the level of real income distribution in a society, nominal income and prices have the strongest effect. The interplay between changes in income and prices and consumer preferences has long been established, research now explores the differences in consumer responses by income class, area of residence or household characteristics. Since the pioneering work of Engel, much research has been conducted on how income elasticities differ as the level of income changes. Recent research focuses on whether rich and poor households respond differently to changes in relative prices of important commodities, especially food (see Ackah and Appleton, 2003).

The focus on differences between rural and urban areas is motivated by several factors. First, the poverty rate of Cameroons' rural areas (69 percent) more than triples that of urban areas (18 percent) characterised by poor health facilities, lack of access to educational and employment opportunities, poor means of transportation and communication. Second, earlier results have shown that the sources of inequality are different and higher in terms of contribution to total inequality for rural areas than urban areas. An indirect intervention by the state through the price mechanism will generate different reactions in expenditure among those living in urban and rural areas. This is often evident in food expenditure patterns where rich and poor households respond differently to changes in prices and income. Finally, budget constraints faced by the

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[4]   An effort to redistribute income may cause lower income households to allocate the additional income to commodities which are produced with low-skilled, low income labour intensive methods. Upper income households may reduce their consumption of products which are produced with capital intensive or land intensive methods. In this case, the initial redistribution will increase the income of low-skilled labour relative to the income of the capital and land owners, which reinforces the initial effects of the redistribution. Thus with information on the composition of demand and the factor intensities of the various products produced, the ultimate effect on the equity of income distribution of a government program can more accurately be predicted.

Cameroonian government necessitates a more stringent targeting of beneficiaries of public programs geared towards reducing inequality in Cameroon.

The goal here is to estimate Linear Expenditure System (LES) parameters required in examining the distributional effects of a tax or subsidy which could be policy recommendations based on the results of the decomposition of the Gini coefficient by observing the shifts in budget shares of households. The price changes resulting from a tax or a subsidy is expected to have different impacts on rural and urban households; thus influencing the level of inequality.

The maintenance of the ten broad categories in the estimation of the LES parameters is to keep the number of commodity groups small since the LES is derived from an additive utility function, and when an additive function is used, it is implicitly assumed that the commodities are independent. Table 2.8 presents the descriptive statistics for commodities expenditures and price level indices for each category of household. The data set contains 4975 observations for urban households and 6017 observations for rural households. In general, expenditure and price levels are higher for urban households than their rural counterparts. As expected, the average expenditure amounts to 2280252 FCFA for urban households compared to only 1047708 FCFA for rural households. The average budget shares follow the predictions made by Engel. The largest share of total expenditure is allocated to food and the average budget share for food declines as the mean total expenditure of the group increases. In order to estimate LES parameters, the data on prices are also needed. The 2007 Price Level Index (PLI) series by commodities and country provided by the African Development Bank (ADB) in its "Comparative Consumption and Price Levels in African Countries" are used as price variables (2005 was the base year). These prices where deflated by the regional deflators in 2001 to obtain prices for urban and rural areas.

Table 2.8 Descriptive statistics for expenditure sources and PLI by household type

	All Households		2005 -07	Urban		2005 -07	Rural		2005 -07
Variable	Obs.	Mean	PLI	Obs.	Mean	PLI	Obs.	Mean	PLI
Food	10992	619 263	0.966	4975	715 750	1.02	6017	539 486	0.916
Tobacco	10992	4 560	0.840	4975	5 527	0.892	6017	3 760	0.798
Alcohol	10992	22 438	0.840	4975	33 360	0.892	6017	13 407	0.798
Clothing	10992	117 625	0.867	4975	155 454	0.920	6017	86 346	0.823
Housing	10992	379 226	0.912	4975	541 246	0.968	6017	245 265	0.865
Health	10992	168 879	0.590	4975	248 049	0.626	6017	103 420	0.560
Transcom	10992	217 871	1.16	4975	356 745	1.23	6017	103 047	1.10
Education	10992	96 400	0.679	4975	151 563	0.721	6017	50 789	0.645
Leisure	10992	50 348	1.12	4975	77 717	1.19	6017	27 719	1.06
Transfer	10992	25 308	0.867	4975	26 911	0.920	6017	23 983	0.823
Tot.exp.	10992	1605559		4975	2280252		6017	1047708	

Source: Authors' calculations

2.5 Estimating LES Parameters and Elasticities

The Linear Expenditure System is the most frequently used system in empirical analyses of demand. Stone (1954) was the first to estimate the LES using time series data from 1920 to 1938. It is also possible to obtain LES using cross sectional budget data. A crucial ingredient of the approach is an assumption regarding the variation in the elasticity of the marginal utility of income (Frisch parameter) with income. LES yields for each income group the proportion of supernumerary income devoted to supernumerary expenditure of each of a variety of commodity groups, along with the amount of committed expenditure on each commodity group[8]. Unlike most of the usual demand systems, it is advantageous in that, it is able to replicate the complex variation in the expenditure weights of various commodity groups as income (total expenditure) varies. The use of a single set of expenditure weights for a variety of income groups has no degrees of freedom because different parameters are obtained for each income group. Hence standard sampling statistics cannot be obtained.

The LES has utility functions of the form:

$$U = \sum_i \beta_i \log(x_i - y_i) \qquad (1)$$

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[8] In generalized ordinary demand models, consumer expenditure is decomposed into two parts, committed expenditures and supernumerary expenditures. Committed expenditures are the fixed   proportions of a consumer's budget devoted to specific goods in the demand system whereas supernumerary expenditures represent the remaining unallocated budget.

Where x_i denotes the consumption of the ith good and y_i is the committed consumption (quantities below which consumption cannot fall), with $x_i > y_i, 0 \leq \beta_i \leq 1$ and the normalisation $\sum_i \beta_i = 1$. The demand functions derived from maximisation of this utility function under a budget constraint ($y = \sum_i p_i x_i$) constitutes the LES:

$$p_i x_i = y_i p_i + \beta_i \left(y - \sum_j p_j y_j \right) \tag{2}$$

Where $y - \sum_j p_j y_j$ is supernumerary income and $x_i - y_i$ is supernumerary consumption of good i. β_i's are the marginal budget shares, $\partial px / \partial y$, which tell how expenditure on each commodity changes as income changes. Since $\beta_i > 0$, this system does not allow for inferior goods. From (2), the own-price elasticity of demand is:

$$e_{ii} = -\frac{\beta_i}{p_i x_i} \left(y - \sum_{j \neq i} p_j y_j \right)$$
$$= \frac{y_i (1 - \beta_i)}{x_i} - 1 \tag{3}$$

The income (total expenditure) elasticity is:

$$e_i = \frac{\beta_i y}{p_i x_i}$$
$$= \beta_i / w_i \tag{4}$$

Where $w_i = p_i x_i / y$ is the expenditure share of the ith good.

The Frisch parameter (Frisch 1959), the elasticity of the marginal utility of income (flexibility of money) is given by:

$$\zeta = -\frac{y}{y - \sum_j p_j y_j} \tag{5}$$

This is equal to the ratio of income to supernumerary income, and the maximum value of ζ is -1.

Due to the fact that the sum of expenditures should equal the total income (i.e., the sum of the dependent variables is equal to one of the explanatory variables for all observations), the sum of error terms for each equation of the system is equal to 0, leading to the singularity of the covariance matrix. Estimation

procedure breaks down. To overcome the problem of singularity here, it is common practice to omit one of the equations of the demand estimation system (Judge et al., 1988). The iterative estimation sequence used here requires choosing starting values. There is no clear rule on these values. As quoted by Nganou (2004), Judge et al. suggest the minimum value of the quantity demanded as a reasonable starting value for the associated y_i and proposed the average budget shares to be good starting values for the β_i. Table 2.9 below shows the starting values used in this paper. $\beta_i^0 = w_i$

Table 2.9   Starting values for the iterative process of estimation of LES parameters

Variable	All Households		Urban		Rural	
	y_i^0	$\beta_i^0 = w_i$	y_i^0	$\beta_i^0 = w_i$	y_i^0	$\beta_i^0 = w_i$
Food	7 884	0.375	7 884	0.322	7 884	0.470
Tobacco	0	0.002	0	0.002	0	0.002
Alcohol	0	0.012	0	0.013	0	0.010
Clothing	0	0.064	0	0.063	0	0.068
Housing	20 196	0.222	24 480	0.232	20 196	0.203
Health	0	0.064	0	0.068	0	0.055
Transcom	0	0.165	0	0.196	0	0.109
Education	0	0.042	0	0.048	0	0.031
Leisure	0	0.036	0	0.041	0	0.028
Transfer	0	0.013	0	0.010	0	0.019
Total		1		1		1

Source: Authors' calculations

Zellners' (1962) notion of seemingly unrelated regressions (SUR) is used in the estimation of equation (2) with restrictions of non-negativity of coefficients imposed (i.e. $y_i \geq 0, and 0 < \beta_i < 1$)[9]. Having estimated the $\beta_i s$, the corresponding values of e_i can be obtained using equation (4).The committed expenditure ($p_i y_i$) for each commodity group and household group can be obtained if values of own-price elasticity of demand are available for each good at each household group.

$$p_i y_i = \frac{y w_i (1 + e_{ii})}{1 - \beta_i} \qquad (6)$$

The required set of own-price elasticities obtained here; use the Frisch results for additive utility functions. Frisch (1959) showed that:

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[9]   Although it is theoretically possible for some of the $y_i s$ to be negative, it is unlikely in the present context. If y_i is negative, the demand for the ith good is elastic with respect to its own price and this seems improbable for any of the broad categories of goods used here.

$$e_{ii} = e_i \left\{ \frac{1}{\zeta} - w_i \left(1 + \frac{e_i}{\zeta} \right) \right\}$$ (7)

Equation (7) is used in view of the additivity of the linear expenditure system. Here it is required to have values of ζ for each household group. Unfortunately, estimates for ζ are not available in the data set. For the purpose of this study, the ζ value used -2.5 for urban households and -4 for rural households similar to those estimated by Sodoulet and de Janvry (1995) for urban and rural Morocco.

2.5.1 Limitations of LES

In the LES, many restrictions are imposed on the system due to the simplicity of the Stone-Geary function. No inferior goods are allowed and this implies that all goods are gross compliments (e_{ij}<0). This limitation is not too serious when the expenditure system is estimated for aggregated commodity groups, for one would not expect an entire group to be inferior.

The most severe restriction of the linear expenditure system in this cross section study is that the income–consumption functions must be linear. This is an assumption that can at best be true only over a short range of variation of y. This limits us only to making short term predictions using our equations.

Finally, demand is permitted to be price elastic only when the committed quantity is negative. Since the commodity categories are broad aggregates, the different groups must be fairly distant substitutes, and the own price elasticities may reasonably be expected to be less than one. Since this is a cross section empirical study, the inflexibility of the LES with respect to price elasticities would not appear to be important (see Deaton and Muellbauer 1980a for a more precise discussion).

2.5.2 Results

The estimated LES parameters are presented in table 2.10 below. Findings suggest that the committed expenditure (y_i) is higher for all commodity groups in urban areas as compared to rural areas and roughly follow the same pattern set by the average budget shares (see Table 2.8). The committed expenditure by households in urban areas on most of the commodities doubles that of rural households. The committed expenditure for transfers in rural households is relatively high and close to that of urban households.

The findings also reveal that rural households generally allocate a larger share of supernumerary income (β_i) on food, transport and communication and housing (35, 23 and 16 percent respectively). Meanwhile, urban households spend 39 percent of their supernumerary income on transport and communication, 20

percent on housing and 14 percent on food. This indicates that a very small percentage of supernumerary income is left for allocation among the seven remaining commodities. Because only a few households spend a relatively small portion of their budget on tobacco consumption, it was difficult to obtain reliable estimates for it. This explains its insignificance as shown in table 2.10.

Table 2.10 Estimation results of the LES parameters

	All Households		Urban		Rural	
Variable	y_i	β_i	y_i	β_i	y_i	β_i
Food	557 378	0.165***	602 850	0.145***	399 758	0.357***
Tobacco	2 986	0.001	3 811	0.001	1 912	0.001
Alcohol	10 332	0.036***	6 175	0.040***	5 932	0.018***
Clothing	88 541	0.053***	97 334	0.051***	53 757	0.067***
Housing	300 320	0.206***	344 028	0.205***	169 279	0.167***
Health	85 300	0.064***	97 573	0.064***	43 993	0.053***
Transcom	164 837	0.370***	91 734	0.391***	53 522	0.234***
Education	56 100	0.042***	73 424	0.040***	20 516	0.047***
Leisure	43 640	0.053***	44 570	0.054***	18 208	0.043***
Transfer	19 360	0.006***	17 824	0.006***	17 372	0.010***
Total		1		1		1

(***significant at 1% **significant at 5%, *significant at 10%)
Source: Authors' Calculations

The estimated LES parameters are used to compute expenditure and own-price elasticity. The results of the LES elasticities are presented in table 2.11 below. With the LES, by definition all goods are gross complements and all expenditure elasticities are positive. This implies that all the commodity groups included in the demand system are normal goods, either necessities or luxury goods. This means that an increase in income will lead to an increase in the quantity consumed. Expenditure elasticities of alcohol, leisure and transport and communication in urban and rural areas are greater than one, indicating luxury goods. It is worth mentioning that in rural areas expenditure elasticity on education is also greater than one. This gives education a luxurious status in rural areas. In most cases, expenditure elasticities decline as income increases and this is confirmed by the results which present lower elasticities for urban areas (higher average income) than rural areas (lower average income). This implies that urban households are less responsive to a one unit change in total household expenditures than are rural households. There are however four expenditure categories where the reverse is true (tobacco, alcohol, housing and transfer). All computed own-price elasticities are estimated to be negative and inelastic ($e_{ii} < 1$) except for alcohol demand in urban households.

Table 2.11 Expenditure elasticities and own-price elasticities of the LES demand

	All Households		Urban		Rural	
Variable	e_i	e_{ii}	e_i	e_{ii}	e_i	e_{ii}
Food	0.603	-0.388	0.449	-0.298	0.758	-0.478
Tobacco	0.404	-0.126	0.458	-0.165	0.351	-0.088
Alcohol	2.36	-0.822	2.99	-1.20	1.74	-0.444
Clothing	0.896	-0.326	0.807	-0.357	0.985	-0.296
Housing	0.850	-0.410	0.879	-0.483	0.821	-0.337
Health	0.939	-0.344	0.929	-0.411	0.949	-0.277
Transcom	2.06	-0.758	1.99	-0.875	2.13	-0.641
Education	1.15	-0.377	0.826	-0.356	1.48	-0.398
Leisure	1.41	-0.477	1.31	-0.549	1.52	-0.406
Transfer	0.530	-0.179	0.548	-0.223	0.512	-0.136
Frisch value			-2.5		-4	

Source: Authors' Calculations

2.6 Policy simulation

In this section, I simulate the introduction of different taxes and subsidies and assess their impact on the consumption structure of the households. Under the decomposition of inequality by expenditure category, it is identified that urban and rural households have different consumption patterns with varying contributions to total inequality. Using the estimated LES parameters and the consequent elasticities, urban and rural households are expected to show different reactions to unit increases or decreases in household income. Since it is what tax payers consume rather than what they earn that effectively determines their economic well-being, increasing or decreasing the cost of goods and services through taxes and subsidies could affect those in rural areas more than those in urban areas because of their lower spending capacity. Despite the arguments that support the imposition of measures like a consumption tax, the danger that it could increase inequality and lower the living standards of the poor cannot be over-looked. Generally consumption taxes are, however said to be regressive, since they have a greater effect on low income individuals (rural households). Although general consumption taxes are usually favoured over specific consumption taxes, I am going to simulate both and see how they influence the consumption patterns of the different household groups. These simulations do not reflect the tax systems currently applied in Cameroon. Fact is, consumption taxes account for the lion's share of Cameroons tax revenue due to the majority of households not having a taxable income. Whatever the case, the most useful lesson of these simulations is its importance in measuring the way in which price changes affect the consumption pattern.

Using the demand parameters estimated in the previous section, I simulate a 10 percent tax on tobacco, alcohol and clothing to capture its effect on the consumption patterns of households in urban and rural Cameroon. This tax will certainly reduce the purchasing power of households and lead to some adjustments in their consumption structures. In a second simulation, I assume a proportional income tax, such that the tax revenue generated for the government is the same as the one generated under the specific tax on tobacco, alcohol and clothing. This permits a comparison of the impact on household consumption patterns of the two tax systems. That is, what impact has the different tax systems got on the different household groups?

2.6.1 Tax on tobacco, alcohol, clothing and a proportional income tax

New budget shares are calculated for rural and urban as well as all households incorporating the 10 percent tax on tobacco, alcohol and clothing. The increase in prices orchestrated by the tax will lead to a reduction in demand of these goods. This will lead to some substitution effects thus enabling changes in the budget shares as seen in table 2.12a below. Except for tobacco, the taxed goods experience a drop in share of expenditure on those goods. The extra income originating from spending less on the tax goods is spent differently by the different household groups. Rural households increase their budget share on food expenditure meanwhile urban households increase their expenditure share on transport and communication, health, housing and food.

Table 2.12b below shows the impact of a proportional income tax on the budget shares. Since expenditure elasticities for all household groups are positive, the decrease in income due to the proportional income tax leads to a decrease in expenditure for all categories of goods. The new budget shares are obtained by modifying the original budget shares by the marginal change in budget share resulting from the decrease in income. The new budget allocations of all households presented in table 2.12b below show no significant changes after the introduction of a proportional income tax. There are only minor differences between the original budget shares and the new budget shares for each category good. Expenditure on food, housing and transport and communication still consume a huge portion of households' budget. The narrow range of the elasticities, coupled with the small budget shares for most category goods disperses the impact of the decrease in income over a number of category goods.

Because food expenditure dominates rural households' total expenditure, the loss in income due to the proportional income tax indicates a higher food expenditure share for rural households. For urban households, the same loss of income is absorbed by adjustments in the budget shares of food, housing and transport and communication which make up 75 percent of total expenditure. The relative magnitude of the expenditure decrease is greater for luxury goods

than for necessities. Thus, while in absolute terms the expenditures on all commodities decrease, in relative terms the budget shares after the decrease in income stay roughly the same for each household group.

Table 2.12a   10 Percent tax on tobacco, alcohol and clothing

	Original Budget Share			New Budget Share			Change in Budget Share (percent)		
	All HH	Urban	Rural	All HH	Urban	Rural	All HH	Urban	Rural
Food	0.375	0.322	0.470	0.376	0.323	0.471	0.002	0.003	0.002
Tobacco	0.002	0.002	0.002	0.002	0.002	0.002	0000	0000	0000
Alcohol	0.012	0.013	0.010	0.011	0.011	0.009	-0.083	-0.153	-0.100
Clothing	0.064	0.063	0.068	0.062	0.061	0.066	-0.031	-0.031	-0.029
Housing	0.222	0.232	0.203	0.223	0.233	0.203	0.004	0.004	0000
Health	0.064	0.068	0.055	0.064	0.069	0.055	0000	0.014	0000
Transcom	0.165	0.196	0.109	0.165	0.197	0.109	0000	0.005	0000
Education	0.042	0.048	0.031	0.042	0.048	0.031	0000	0000	0000
Leisure	0.036	0.041	0.028	0.036	0.041	0.028	0000	0000	0000
Transfer	0.013	0.010	0.019	0.013	0.010	0.019	0000	0000	0000

Source: Authors' calculations

Table 2.12b   Proportional income tax

	Original Budget Share			New Budget Share			Change in Budget Share (percent)		
	All HH	Urban	Rural	All HH (.31 %)	Urban (.38 %)	Rural (.24 %)	All HH	Urban	Rural
Food	0.375	0.322	0.470	0.376	0.323	0.471	0.002	0.003	0.002
Tobacco	0.002	0.002	0.002	0.002	0.002	0.002	0000	0000	0000
Alcohol	0.012	0.013	0.010	0.012	0.013	0.010	0000	0000	0000
Clothing	0.064	0.063	0.068	0.064	0.063	0.068	0000	0000	0000
Housing	0.222	0.232	0.203	0.222	0.233	0.203	0000	0.004	0000
Health	0.064	0.068	0.055	0.064	0.068	0.055	0000	0000	0000
Transcom	0.165	0.196	0.109	0.164	0.195	0.109	-0.006	-0.005	0000
Education	0.042	0.048	0.031	0.042	0.048	0.031	0000	0000	-0001
Leisure	0.036	0.041	0.028	0.036	0.041	0.028	0000	0000	0000
Transfer	0.013	0.010	0.019	0.013	0.010	0.019	0000	0000	0000

Source: Authors' calculation

2.6.2 10 Percent subsidy on health, education and a proportional income subsidy

The introduction of a 10 percent subsidy on health and education increases the quantity demanded of these services due to price reductions orchestrated by a fall in production cost. Table 2.13a indicates that the increase in expenditure on these services increases their expenditure share in total household expenditure to the detriment of other goods (housing, food and clothing for both household groups). Urban households also shift expenditure from leisure and transport and communication to increase their consumption of education and health services. The magnitude of the percentage change in education share for rural households

is higher than that for urban households due to the 'luxurious' status of education in rural areas (e_i=1.48). Because expenditure share is not dominated by a single good in urban households as it is in rural households, the impact of the subsidy on health and education influences the expenditure share of more goods in urban households than in rural households where food consumes 47 percent of the household budget.

In table 2.13b below, it is shown that a proportional subsidy on income has a very small impact on the expenditure shares of the demanded goods and services. The additional income coming from the subsidy seems to be consumed by those goods with the highest marginal effect (β_i = 0.357 for food in rural households and 0.391 for transport and communication for urban households). It is important to note that the subsidy in income leads to rural households increasing their share of expenditure on food meanwhile urban households experience a fall in expenditure share on food.

Table 2.13a   10 Percent subsidy on health and education

	Original Budget Share			New Budget Share			Change in Budget Share (percent)		
	All HH	Urban	Rural	All HH	Urban	Rural	All HH	Urban	Rural
Food	0.375	0.322	0.470	0.374	0.321	0.469	-0.002	-0.003	-0.002
Tobacco	0.002	0.002	0.002	0.002	0.002	0.002	0000	0000	0000
Alcohol	0.012	0.013	0.010	0.012	0.013	0.010	0000	0000	0000
Clothing	0.064	0.063	0.068	0.064	0.062	0.067	0000	-0.015	-0.014
Housing	0.222	0.232	0.203	0.221	0.231	0.202	-0.004	-0.004	-0.004
Health	0.064	0.068	0.055	0.066	0.071	0.057	0.031	0.044	0.036
Transcom	0.165	0.196	0.109	0.164	0.195	0.109	-0.006	-0.005	0000
Education	0.042	0.048	0.031	0.043	0.049	0.032	0.023	0.020	0.032
Leisure	0.036	0.041	0.028	0.036	0.040	0.028	0000	-0.024	0000
Transfer	0.013	0.010	0.019	0.013	0.010	0.019	0000	0000	0000

Source: Authors' calculation

Table 2.13b   Subsidy on income

	Original Budget Share			New Budget Share			Change in Budget Share (percent)		
	All HH	Urban	Rural	All HH (.38 %)	Urban (.45 %)	Rural (.28 %)	All HH	Urban	Rural
Food	0.375	0.322	0.470	0.374	0.321	0.471	-0.002	-0.003	0.002
Tobacco	0.002	0.002	0.002	0.002	0.002	0.002	0000	0000	0000
Alcohol	0.012	0.013	0.010	0.012	0.013	0.010	0000	0000	0000
Clothing	0.064	0.063	0.068	0.064	0.063	0.068	0000	0000	0000
Housing	0.222	0.232	0.203	0.222	0.232	0.203	0000	0000	0000
Health	0.064	0.068	0.055	0.064	0.068	0.055	0000	0000	0000
Transcom	0.165	0.196	0.109	0.166	0.197	0.109	0.006	0.005	0000
Education	0.042	0.048	0.031	0.042	0.048	0.031	0000	0000	0000
Leisure	0.036	0.041	0.028	0.036	0.041	0.028	0000	0000	0000
Transfer	0.013	0.010	0.019	0.013	0.010	0.019	0000	0000	0000

Source: Authors' calculation

2.6.3 Taxes, subsidies and purchasing power

Above, it has been indicated that different tax and subsidy systems influence differently the consumption patterns of households. When comparing tax and subsidy systems in order to choose the right instrument to achieve specific outcomes (inequality reduction), we need to consider changes they cause in purchasing power resulting to differences in standard of living as well as government tax revenue objectives. If the value of the FCFA changes between two areas, stating that 1 franc in tax from an urban area is equal to 1 franc in tax in the rural area is incorrect if the first franc can buy more goods. If people in rural areas pay the same amount of tax but their standard of living decreases, this implies that the tax imposed has a punitive effect on those of the rural areas. In this comparison of the effect of a tax or subsidy, I assume a consistent standard of living and evaluate total expenditure based on changes in purchasing power. Under these simulations, the purchasing powers of households are affected differently as indicated in table 2.14 below.

Table 2.14   Percentage loss and gains in purchasing power

Tax and subsidy system	All Households (%)	Urban (%)	Rural (%)
10% tax on alcohol tobacco and clothing	-0.28	-0.34	-0.23
Proportional tax on income	-0.31	-0.38	-0.24
10% subsidy on health and education	0.32	0.42	0.24
Proportional subsidy on income	0.38	0.45	0.28

Source: Authors' calculation

Figures from table 2.14 indicate that the percentage loss in income due to a proportional income tax or percentage gain due to a proportional subsidy on income is equal to the tax or subsidy rate on income. For example, the 0.38 percent tax on income required to recover the same amount gotten from a 10 percent tax on alcohol, tobacco and clothing in urban households, leads to a 0.38 percent loss in purchasing power in urban households. This also applies to the proportional subsidy on income required to raise the budget of households in urban areas by spending the same amount like the 10 percent subsidy on health and education. This 0.45 percent subsidy on income also leads to a 0.45 percent gain in purchasing power. That is a proportional tax or subsidy on income increases or decreases the purchasing power of households by a percentage equivalent to the tax or subsidy rate.

The proportional tax on income causes a larger loss in purchasing power than the 10 percent tax on alcohol, tobacco and clothing. This is because the taxed goods (alcohol, tobacco and clothing constitute a very small portion of total expenditure. This also explains the greater gain in purchasing power resulting from a subsidy on income than the subsidy on health and education. Apart from the budget shares, the taxed and subsidized goods are also characterised by very low price elasticities which vary among households and their region of residence. While the proportional tax or subsidy on income has the same relative impact on all households, taxes or subsidies on specific commodities have different impacts on households relative to the elasticity of the taxed or subsidised commodities facing the households. This makes taxing or subsidising specific commodities an appropriate mechanism to impact a particular group.

Taxing or subsidizing particular goods or services could be a noble objective to pursue when the goal is to protect or stimulate the economy or redistribute income. This comes at the expense of distortions in household consumption patterns by raising or reducing the price of some or all goods as shown above. Figures of table 2.12b and 2.13b show that a proportional tax or subsidy on income cause no or minute distortions in household consumption patterns by collecting or spending the same amount on each household, or if households are heterogeneous, a proportional tax or subsidy will be collecting or spending the same amount from or on all households of each region. Considering the figure for all households, in table 2.14, a proportional tax on income is more progressive because urban households (higher average income) pay more in absolute terms than their rural counterparts.

2.7 Conclusion

Part of the goal of this chapter was to estimate LES parameters required for estimating the impact of certain policy measures on the consumption pattern of

households. The estimated LES parameters suggest that the committed expenditure is higher for all commodity groups in urban areas as compared to rural areas and roughly follow the same pattern set by the average budget shares. The findings also reveal that rural households generally allocate the largest share of supernumerary income on food meanwhile urban households allocate the largest share of their supernumerary income on transport and communication.

The LES expenditure elasticities indicate that all the goods in the demand system are normal goods, i.e., either necessities or luxury goods. The extremely high expenditure elasticity for education in rural areas gives it the status of a luxurious good. All computed own-price elasticities are estimated to be negative and inelastic except for alcohol demand in urban households.

The impact of indirect taxation shows that, the household budget shares will vary with the household income level and policy makers must have the information concerning the differences in consumption behaviour of rural and urban households in order to make the right decisions. The marginal budget shares estimated in this study have provided information concerning the expected changes in household consumption patterns and how different original policy interventions (redistribution of income) could be reinforced or offset through secondary effects. Introducing a tax with the goal of redistributing income or raising revenue for the government does not only increases the price of the taxed good for consumers (households) but could also have an impact on producers (households) by changing supplies of the taxed good. The final impact on households will depend on whether households are net producers or consumers. For example, if the objective of the Cameroonian government is to redistribute income towards the poor in rural areas where the majority of rural households are farmers and spend a huge portion of their income on food as observed above, the introduction of an income subsidy to achieve this goal maybe offset by the decreasing demand for local food products produced by the farmers in rural areas in favour of high quality imported food. That is, the local farmers now experience a fall in demand of their products thus causing them to lose important revenue. Thus the gain in income from the subsidy can be offset by the loss in revenue from the sale of their agricultural products. To better capture this effect, it would be required to have information permitting a study on the production structure of households. Yu and Abler (2008) and Musgrove (1978) have shown that there is a shift in demand toward high quality food in rural China when income increases and when income is redistributed toward the lowest income groups in Columbia. Due to lack of supply and production figures, this effect though important to capture the complete effect of price changes through taxes is not considered in this study.

The simulation of different taxes and subsidies showed that, certain areas will require separate consideration of policy interventions to achieve a desired objective. The budget shares can be combined with additional information concerning the production sector in order to evaluate the complete impact of any income redistribution programs via a tax or a subsidy. The use of taxes or subsidies as instruments to stimulate the economy or re-distribute income could be off-set or reinforced by secondary effects as mentioned above. The total effects of such taxes or subsidies are limited in this study because responses from producers are not looked into. The calculations here have considered only the demand side, thus separating producer and consumer prices. Though this presents only one part of the story, it is a part which is very important to inform policy makers as the effects described here will be the same as those from realistic policies plus additional effects from the supply side not considered in this study.

The Informal and Formal Sector in Cameroon

Abstract: using three distinct definitions of informality to measure the size of the informal sector, results indicated variations in size thus reinforcing the view that in any study dealing with informality, the definition matters and should assume a central role with regards to the subsequent analysis. A multivariate analyses with demographic as well as household characteristics indicated that the likelihood of informality varies across the three definitions used and using these results, certain generalities often used to describe the informal sector are refuted or confirmed. The youthfulness, insecurity and poor working condition often used as characteristics to define the informal sector are confirmed whereas the consideration of informality as an urban phenomenon is not refuted per se but is a consequence of the non consideration of the agricultural sector as being part of the informal sector.

In part two, results obtained indicate that formal sector earnings are in many ways related to informal sector earnings, occupational status and sector of employment of other household members. The magnitudes of the links via earnings are relatively low (less than one) but those of intra-household linkages showed a higher magnitude as compared to the inter-household magnitudes. Using selected informal business units in place of households, the magnitude of the results corroborated perfectly with the argument made that the informal business units are strongly linked to the formal sector in their quest for raw materials (backward linkage) but weakly linked to the formal sector as a market for their finished products (forward linkage). The quality of the link (symbiotic or parasitic) is determined by the sector of the informal business unit's main client and main supplier.

Defining and measuring the informal sector in Cameroon

3. 1 Introduction

A distinguishing feature of Cameroon's economy over the past decade has been the steady increase in size of its informal sector (INS, 2005). This growth in informal sector size pre-occupies the government and all other development actors concerned with the realisation of the Millennium Development Goals (MDGs). The expansion of the informal sector is considered as one of the consequences of the economic crisis (1985-1995) which interfered in Cameroons economic progress, thus resulting to a halt in employment of qualified graduates in the public service and private enterprises. The proliferation of informal sector activities and the related consequences observed during the crisis years and thereafter brought back the sector into the lime light when it came to analysing issues of employment, poverty and development in Cameroon. In Yaoundé in 1992, it was estimated that 80 percent of all new jobs created were in the informal sector (Xaba et al., 2002). The informal sector advanced from a rejected but tolerated sector of the economy to be the main employer of school leavers in place of the formal sector by providing a medium of survival for those affected most from the crisis as well as those who saw in this sector an opportunity to escape the complex tax system of the formal sector. This situation therefore contradicts the opinion often held by some commentators that the informal sector is mainly marginal, a transient phenomenon, a modern day nuisance and consist of people uninterested in being law-abiding citizens because this has been proven not always to be the case as not all who work in micro-enterprises are poor and miserable, not all will rather be somewhere else and not all are barely educated.

The existence and growth in size of informal sector activities is explained in development literature as a natural response to burdensome regulatory and tax environments (Pratap and Quintin, 2006). In addition to this view, Henley et al. (2006), argue that individuals could alternatively be attracted to the informal sector thus increasing its size by the prospective job satisfaction or income stream associated with a successful transition into entrepreneurship, or may perceive the relative benefits of illegal or unregistered activity to outweigh the risk of detection.

The dichotomy between the formal and informal sector has often been interpreted as evidence that the labour markets are segmented in developing countries. That is, barriers to entry are often conjectured which prevent certain groups of workers from competing for higher paying formal jobs. Despite the prevalence of this view in the development literature, direct empirical tests of

the premise that informal workers would expect higher wages in the formal sector yield mixed results. As quoted by Amaral and Quintin (2006), Magnac (1991), Maloney (1998), and Pratap and Quintin (2004), found no compelling evidence of segmentation between the formal and the informal sector with data from Colombia, Mexico, and Argentina, respectively. Günther and Launov (2006), in their study of informal labour market competitiveness and segmentation in urban Côte d'Ivoire found out that informal labour markets in developing countries are composed of two segments (upper-tier and lower-tier) with a distinct wage equation in each of them. They also found out that the lower-tier informal sector is the result of market segmentation whereas comparative advantage considerations seem to be the cause for the existence of the upper-tier informal sector.

The debate over the segmentation of the labour market is far from being the only bone of contention on issues concerning formal and informal sector in development economics. Despite extensive research on informal activities, there is still no agreement on a unique definition of the informal sector though there is a consensus on the characteristics of the sector. It is agreed that workers employed in the informal sector tend to be younger, have less education, and earn less than their counterparts in the formal sector (Maloney, 1999).

The growing size of the informal sector which is of particular interest to economic policy makers concerned with promoting development are also disturbed because of the absence of the informal sectors perceived contributions to dynamic economic efficiency. A large informal sector limits the governments' ability to raise revenue through taxes and compels it to use inefficient means thus delaying necessary investment in infrastructure, education and health. Besides the size factor, governments and development activist also bother about the informal sector because a majority of informal sector workers in developing countries have little or no social security provision as will be seen in the later sections of this paper on Cameroon. This means that they have little on which to fall back in the event of illness, unemployment or old age, beyond personal wealth and extended family support. Though of less importance, another issue is inefficiency in the use of resources when production is carried out in an environment where formal mechanisms of contract enforcement and dispute resolution are not available.

The divergent views about matters of informality raises a number of questions among which are: what is the most suitable definition of the informal sector and does definition affect the size? The problem with defining the informal sector could be explained by the paucity of data on this sector thus making it problematic even to measure. According to Henley et al. (2006), researchers have tended to fall back on the pragmatic and judicial use of data on

employment status and sectoral affiliation with little discussion of the sensitivity of any conclusions drawn to issues of measurement and definition. The use of different definitions most often leads to differences in measurement and size. This raises important questions about the comparability of informal sectors when they are defined and measured differently. So the main purpose of this paper is to show using the same method as Henley et al. (2006) that the precise definition of informality matters and this intends affect the size of the informal sector. Furthermore, a descriptive investigation of the different definitions as well as a multivariate analysis is carried out to reveal which characteristics are more strongly associated with which definition and measure of informality. This is to formulate a definition which permits a proper estimation of Cameroon's informal sector size.

The remainder of the paper is structured as follows. Section 3.1 provides a more detailed discussion of the existing literature concerning the way in which informality has been defined and measured. In section 3.2, the Cameroonian data source used "enquete sur l'emploi et le secteur informel au Cameroun en 2005" (EESI) and the measure of informality will be analysed. Section 3.3 will provide some descriptive analysis and discussion of the measures. In Section 3.4, multivariate analysis to investigate commonalities and differences in the way in which the different definitions/indicators of informality are associated with demographic, employment and household characteristics will be carried out. Concluding remarks will be made in section 3.5.

3.1.1 Defining the Informal Sector

Different definitions have often been used by researchers depending on the objectives of their study as well as the quality of their data. An outcome of the World Employment Program, carried out under the auspices of the International Labour Organisation was the Kenya Mission of 1972 which has as its most important legacy the establishment of the informal sector. The Kenya Mission provided one of the earliest and most detailed definitions of the informal sector. It defined the informal sector as any family owned small scale economic activity in very competitive markets, being very labour intensive, using skills acquired outside the formal school system and relying on indigenous resources. The sector is also characterised by ease of entry and falls under no governmental regulations, such as minimum wage or tax laws (cited in Grimm and Günther, 2008). Others found it easier to define the formal sector and considered all what did not fall under formal to be informal. It is in this manner that Weeks (1975) defined formal firms as firms that are "[…] recognized, nurtured and regulated by the State" and any firm not covered by this definition was considered to be informal. Hart (1973) considered the formal sector to be wage earners as opposed to self-employed workers and Mazumdar (1975) took a similar approach but based his distinction between informal and formal workers on

whether or not they receive protection from the government and/or trade union (see Pratap and Quintin, 2006). Some other economist avoided specificity by working with very broad definitions. Harris (1990), defined the informal sector as the sum total of income generating activities outside modern contractual relationships of production meanwhile Hemmer and Mannel (1989) defined it as that sector which covers all economic activities which cannot be classified under the organisational standards of the industrial countries. These definitions are often criticised for being ambiguous and simplistic.

In January 1993, the Fifteenth International Conference of Labour Statisticians (ICLS) adopted an international statistical definition of the informal sector. In order to obtain an internationally agreed definition of the informal sector, which was acceptable to labour statisticians as well as national accountants, the informal sector had to be defined in terms of characteristics of the production units (enterprises) in which the activities take place (enterprise approach), rather than in terms of the characteristics of the persons involved or of their jobs (labour approach). Following this concept, the informal sector enterprises were defined by the 15th ICLS on the basis of the following criteria: They are private unincorporated enterprises (excluding quasi-corporations), i.e. enterprises owned by individuals or households that are not constituted as separate legal entities independently of their owners, and for which no complete accounts are available that would permit a financial separation of the production activities of the enterprise from the other activities of its owner(s). A major criticism of this enterprise-based definition of the informal sector is its inability to capture all aspects of the increasing so-called 'informalisation' of employment, which has led to a rise in various forms of informal (or non-standard, atypical, alternative, irregular, precarious, etc) employment, in parallel to the growth of the informal sector that can be observed in many countries (Hussmanns, 2004).

Some other authors have simply assumed that the informal sector corresponds to sole-traders (own account workers) and those in small or micro enterprises. 'Small' or 'Micro' has often been arbitrarily defined. Henley et al. (2006) cite some recent studies which make use of this form of definition. For example, Prahan and van Soest (1995, 1997) and Maloney (1999) use a definition of less than six employees for Bolivia and Mexico respectively; Funkhouser (1996) use fewer than five employees for an analysis of five Central American economies; Cohen and House (1996) use fewer than 20 for Sudan; Livingstone (1991) uses fewer than 10 for Kenya.

Due to the multiplicity of definitions, studies on the informal sector often choose a definition of their choice or rely on a "hybrid" definition of informality in which employees are classified according to social security status. Own account workers are classified as entirely informal and employers classified according to

either or both the size of their business (number of employees) or the activity of the business. It is with this freedom of choice in definition that Cogneau et al. (1996) defined the informal sector in Cameroon as all non registered productive activities and the INS (2005) as all existing productive units without a formal accounting system and/or without a registration number (exclusion of agricultural activities).

3.1.2 Measuring the Informal Sector

Measuring the size of the informal sector, given the variation in definition, quality of data and nature of informal sector activities has been a difficult and complex task to the point that it was even believed that the measurement of the informal sector as well as the collection of data was impossible.   That notwithstanding, there are multiple methods of measuring the size of the informal sector as there are definitions. Rough estimates on employment figures and value added in the informal sector are obtained through application of indirect methods for macroeconomic estimates or comparative analyses of data from various sources. Being based on approximations and various assumptions, these indirect methods are always subject to criticisms. Some of the approaches are reviewed below[1].

3.1.2.1 Indirect Method[2]

Macro-economic variables
The first macro-economic evaluations of the informal sector were carried out by national accountants who were attempting to determine its importance to the economy by estimating its relative weight within the GDP, which might explain the origins of part of the country's wealth. From national accounting, the income and expenditure measures of GDP should be equal; therefore the gap between these two concepts can be used to calculate the size of the informal sector. If all the components of the expenditure side were measured without error, then this approach would indeed yield a good estimate of the size of the informal sector. That is, an estimate of undeclared activities is the gap between GDP measured using the income approach and GDP measured using the expenditure approach. Another problem with this method is that, the final balances are often the results of estimates based on "expert opinion", with the expert in question being those of the country's national accounting system. This means that the final figures are internally consistent,

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[1]   The summary of methods presented here is from Schneider and Enste (2000) referred to by Pratap and Quintin (2006).

[2]   Methods elaborated below are summaries from "what is the size of the pie? Measuring the informal economy in Latin America and the Caribbean" by Vuletin (2006).

as they have come from the national accounts, but they are not scientifically valid as they are not based on statistical work.

Currency-demand

Assuming that informal transactions take the form of cash payments, in order not to leave observable trace for the authorities, an increase in the size of the informal sector will consequently lead to an increase in the demand for currency. To isolate this resulting "excess" of demand for currency, a time series approach is used in which the currency demand is a function of conventional factors, such as the evolution of income, payment practices and interest rates, and factors causing people to work in the informal sector like direct and indirect tax burden, government regulation and the complexity of the tax system. The size and evolution of the informal sector can be calculated by the following two steps. Firstly, the difference between the evolution of currency when government regulations and the direct and indirect tax burden are held at their lowest value and the development of currency with the current (higher) burden of taxation and government regulations is calculated. Secondly, assuming the same income velocity for currency used in the informal sector as for legal money in the official economy, the size of the informal sector can then be computed and compared to the official GDP. However, there are several problems associated with this method and its assumptions: (i) this procedure may underestimate the informal sector, because not all transactions take place using cash as means of exchange; (ii) it seems extremely arbitrary to assume equal velocity of money in both types of economies and; (iii) the assumption of no informal sector in a base year is open to criticism.

Electricity consumption

This method is also referred to as the physical input method. The method of electricity consumption as an approach to measuring the size of the informal sector was endorsed by Kaufmann and Kaliberda (1996). Using some findings that the electricity-overall GDP elasticity is close to one, these authors suggest using the difference between growth of electricity consumption and growth of official GDP as a proxy for the growth of the informal sector. This method is simple and appealing, however, it has many drawbacks including: (i) not all informal sector activities require considerable amount of electricity or use other energy sources (like coal, gas), hence only part of the informal sector growth is captured and; (ii) the electricity overall GDP elasticity might significantly vary across countries and over time.

3.1.2.2 Direct Method

Mixed households and enterprise survey
In recent years there has been a specific trend for survey of informal sector
units using the mixed household and enterprise survey, since it has proved to
be the most appropriate survey to give extensive data on the informal sector.
Besides, in such surveys it is possible to cover easily all persons (excluding
the homeless) employed in the informal sector irrespective of the business
size; the kind of activities performed and type of workplaces used. Such
surveys can provide a good estimate of the fraction of workers who fail to
receive the benefits which labour law mandates in a given nation. Some
surveys directly question households about their activities, both declared and
undeclared. Fiscal audits can also be used to estimate the discrepancy
between declared income and expenditure made by households. In all these
cases, the quality of the estimates depends crucially on the reliability of
responses.

3.2 Presentation of Data

For this section, I use the 2005 employment and informal sector data (EESI)
which is richer in information than the "enquête 1-2-3" of 1993 that was carried
out mostly in the capital (Yaoundé). Phase I of the survey which was an
evaluation of the employment situation made possible the identification of 6060
production units[3] scattered over the 12 regions (ten provinces, Douala and
Yaoundé). EESI 2005 is a survey covering 8540 households distributed around
the ten provinces and the two major cities (Douala and Yaoundé). On a general
note, the survey reveals that 45 percent of rural households and 52 percent of
urban households earn all or a reasonable percentage of their revenue from
informal production units. In rural areas, these production units are engaged in
the transformation of agricultural products meanwhile in urban areas, they are
commerce oriented. That is involved in retail activities. The EESI survey allows
separate identification of registered and unregistered production units, social
protection across an individual's main and supplementary job as well as
obtaining information on the type of employment and size and activity of the
business. On labour market questions, responses are considered from those of
ten years of age and above on employment, wages, agricultural and non
agricultural activity, education and housing as well as some assets possessed.

As a follow up to the first phase of data collection in EESI 2005 which captured
information on market and demographic indicators, the second phase was more

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[3]   Refers to all units of production controlled by an employer (boss) or self
        employed in the informal sector.

concerned with capturing information on the functionality of the informal sector, evaluate its performance in order to have improved national figures from this sector and assess their contribution to the economy.

Despite the huge size of the data, many of the respondents failed to answer some of the questions considered very important for this analysis. A lot of observation is lost as will be noticed later when I make analysis using earnings of the active and employed population[4]. To circumvent issues of child labour in this section, entrance into the labour market is considered to be 15 years and those above the age of 65 (retirement age in Cameroon) are also excluded.[5] The inactive population are all those not belonging to the active population (employed and unemployed).

The EESI data set also identifies five institutional sectors of employment: Public sector (public administration and para-public sector), private formal sector, non agricultural informal sector and the agricultural sector. The informal sector is defined as all production units with no tax registration number and without a proper accounting system. For the purpose of the following chapter (chapter four), since I wouldn't be making use of the agricultural sector, I consider all those in the non agricultural private sector as informal workers and all those in the public and private formal sector as formal workers. All household and associative enterprise workers are considered as informal sector workers. Because many respondents do not provide information on other sources of income, I use mostly earnings. Using income in most cases creates a bias sample by discarding many observations.

3.2.1 Measuring informality in Cameroon

Measurement is obviously difficult when the object is poorly defined. Three different definitions distinguishing formality from informality are adopted in order to estimate the size of the informal sector in Cameroon. Besides the goal of showing that definition influences size estimation of the informal sector, a further aim of using the following concept is twofold. Firstly, that definition does not only influence size, it also influences the scope and intensity of

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[4]   Active and employed population refers to all those having worked for at least an hour in the week preceding the survey regardless of whether the job was paid, self employed, family help in an enterprise or family exploitation. Also considers all those with a regular job but who are temporarily out of work for health, holidays work conflict or further training.

[5]   It is worth mentioning that there are many children below the age of 15 as well as old above the age of 65 who are active in the Cameroonian labour market as captured by the data. The choice of this range is to reduce the variance in the age factor since the majority of workers (10-99 years) fall within this range. That is 81% are between 15-68 years of age.

problems inherent within the sector. Secondly, if the intensity of problems inherent within the sector is determined by definition, then it also influences policy recommendations in confronting these problems. It is with this in mind that I prefer to use definitions at the individual level to analyse more closely the working conditions of employees, i.e. the quality of employment. This is to make clear distinctions that facilitate the choice of instruments needed to resolve the problems caused by informality. For example, Policy recommendations designed to address the issue of tax evasion common in the informal sector might not achieve the desired results in an informal sector defined using the working conditions of the sector rather than issues related to tax payment. Reason being that the definition based on working conditions might leave out a sizeable part of the taxable informal sector. The variance in size and analyses which follow using the different definitions requires specific solutions to resolve the problems identified in the informal sector. In some cases, a policy mix will be required to achieve the desirable objectives. The government therefore has the difficult task of guaranteeing a minimum standard working condition for those in the informal sector by making them nearer the standards of their formal sector counterparts and at the same time putting mechanisms in place to enable an effective system of revenue collection as well as acceptable taxes. Obscure taxation policies force many to favour operation under illegality after weighing the cost of formality against the risk of being caught.

To measure the informal sector therefore, a social definition is coined out which pays particular attention to employed individuals with regards to their condition of employment, status and character.

- **Social definition:** One of the biggest problems of the informal sector is the deplorable condition under which those employed in this sector are exposed to. Governments and development activist bother because a majority of informal sector workers in developing countries have little or no social security provision. Meaning that they have little on which to fall back in the event of illness, unemployment or old age, beyond personal wealth and extended family support. The majority of them cannot even boast of a working contract protecting them from the whims and caprices of exploitative employers. In the EESI survey, individuals were asked if they made contributions to the "Caisse Nationale de Prevoyance Sociale" (CNPS)[9]. Under the social definition, workers will be defined as informal if

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The National Social Insurance Fund known by its French acronym (CNPS) is a legal and autonomous public institution placed under the auspices of the Ministry of Labour and Social Security and run by employees and employers representatives as well as government authority building up an administrative council- CNPS is responsible for the assurance of the government's social policies and protection of workers and their rights. To achieve these goals, it is

they make no contributions to a social security institution (CNPS) and have no signed contract. For those with more than one job, it suffices to fulfil the conditions of formality in one of them to be considered as a formal worker.

- **Fiscal definition:** The fact that most informal sector participants are there because of tax evasion among other reasons, they in one way or the other deprive government of their contributions to dynamic economic efficiency. A large informal sector limits the governments' ability to raise revenue through taxes and compels it to use inefficient means thus delaying necessary investment in infrastructure, education and health. To resolve the problem of tax evasion, a definition which compounds all enterprises or units of production and if they pay their taxes is needed rather than one which observes the working conditions of individuals. The EESI survey captures units of production and also defines questions which deal with whether a production unit is registered or not and whether it pays taxes. From the data, only a few individuals were employed in enterprises which were registered but evaded taxes meanwhile it is surprising to note that many unregistered enterprises paid taxes. For this reason, the condition of registration is dropped in coining out a fiscal definition since the most important issue here is not for the government to know how many enterprises do exist but to get them pay their taxes. Under the fiscal definition, workers will be defined as informal if their production units do not pay taxes.

- **Enterprise size definition:** For purpose of comparison with other studies and countries which use the size of enterprises to determine informality, the informal sector will be estimated considering enterprises with five or less than five workers as informal. Advocates of this option have based their views on the premise that the majority of firms in this size category will not likely comply with government regulations. According to Levenson and Maloney (1998) and Morrisson (1995), the level of adherence to government regulations is positively related to the size of the firm.

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sub-divided into different branches. – Family assistance: taking care of maternity leave and medical fees related to pregnancy. – Old age, disability and death assistance: pension is issued at old age or assistance is given to the family in case of death of the bread winner. – Accidents on service: medical fee is taken care of in case of an accident which occurs while you are on service. To meet the following objectives, the CNPS depends on contributions from salaried workers and assistance from the government. Only salaried workers whose enterprises have fulfilled all the necessary conditions can benefit from the services of the CNPS.

Table 3.1 below presents the estimated size of Cameroonian informal sector using the different definitions. Using the social definition which refers to individuals with a signed contract and paying contributions to the social insurance institution (CNPS) as formal, only 6 percent of Cameroon's workers are in the formal sector meanwhile 94 percent are in the informal sector. That is, 94 percent of those working in Cameroon have neither a signed working contract nor do they have the possibility of benefiting from the insurance fund since their employers make no contributions to it. Per the fiscal definition, 22 percent of Cameroon's employed are in the formal sector meanwhile 78 percent operate informally or do not make any contribution to the state coffers in the form of taxes. Using the enterprise size definition, 19 percent of Cameroonians employed are in the formal sector while 81 percent are in the informal sector.

Table 3.1   Cameroon's informal sector size

	Formal	Informal	Total
Social definition	6 %	94%	100%
Fiscal definition	22%	78%	100%
Enterprise size (≤ 5)	19%	81%	100%

Source: Authors' computation

Table 3.1 above shows that Cameroon has a huge informal sector and its size varies as the definition changes. A variation in size of 16% and 13% between the social and fiscal definition and between the social and enterprise size definition respectively. The variation in size between the fiscal and enterprise definition is only 3% and this could be explained by the fact that enterprises with more than 6 people are easier to identify and the risk is very high to engage in task evasion manoeuvres which could end up being very expensive if caught. The informal sector size of 94% is relatively close to that estimated by the Cameroon national institute of statistics (90.4%)[10]. That the possibilities of an eventual overlap between the different definitions or that the different definitions may capture totally different groups of workers, is tested for by a correlation test. Pair wise correlation coefficients indicate that the three definitions are far from being highly correlated with one another.

Table 3.2   Correlation coefficients of informality measures

	Fiscal definition	Ent. Size definition	Social definition
Fiscal definition	1		
Ent. Size definition	0.1655	1	
Social definition	0.2404	0.5314	1

Source: Authors' computation

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[10]   Informality was defined as all units of production with no registration numbers and did not operate a formal system of accounting.

3.3 Descriptive analyses of the informal sector

3.3.1 Distribution of informality across employment sectors

Informality is distinctively distributed across the different employment sectors in Cameroon. Informality is higher in the private than in the public sector. When measuring the informal sector, the assumption that all those employed in the public as well as para-public enterprises belong to the formal sector meanwhile all those working in households belong to the informal sector is made. The reason for this being that individuals under any of this category would certainly not fall under any of the three definitions used to measure the size of the informal sector (social, fiscal and enterprise size). Public sector workers experience income tax deductions but public sector institutions do not pay taxes unlike private sector institutions and this is what is captured in the EESI survey. Individuals' working as house helps pay no taxes and hardly do they have a signed contract. Besides, public administration jobs fulfil all the characteristics of formal employment meanwhile household jobs fulfil all the characteristics of informal employment, thus attributing them 100% formality and informality respectively. Table 3.3 below presents the distribution of informality within the different employment sectors in Cameroon.

The Public Sector
The public sector is sub-divided into public administration and para-public enterprises[11]. The public administration is purely formal as it operates under the control of government and fulfils all the criteria of formality (signed working contracts and pay slip, educated staff and labour law protections guaranteed by the CNPS). That the para-public enterprises are open to private investment, some level of informality can be observed within this sector. This sector comprises of semi-state owned enterprises and services. Following the assumptions made at the beginning concerning the public sector, under the fiscal definition, there is no informality but an informal sector size of 13.5 percent per the social definition is high considering that public sector enterprises are expected to fulfil and respect proper employment conditions. It is common practice in Cameroon that public and para-puiblic enterprises hire part time workers who do not benefit from the same treatment like the permanent staff. These part time workers have no social insurance numbers, no work contracts and are paid a net amount. Therefore though employed in the formal sector, they fulfil all the conditions of informal employment.

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[11]   Para-public enterprises are government corporations open to private investments but with the government in most cases being the majority shareholder.

Agricultural sector
According to table 3.3, informality is at its peak in the agricultural exploitation sector especially when the social definition is used as the unit of measurement. This drops by about 10 percent when we use the enterprise size definition and can be explained by the fact that many farmers no longer only cultivate food staples for home consumption but are also workers (part time basis) for agricultural companies or are employed by medium size enterprises which coordinate the farming activities and purchase their products for export (example of some of these enterprises are Cameroon Development Corporation, Del Monte, Olamcam and Pamol which are involved in the cultivation and marketing of cash crops like cocoa, coffee, banana, rubber, palm oil). This sector is also flooded by the uneducated and school drop outs as well as women who have the responsibility of assuring the families food sufficiency in low income families.

Associative enterprises
The associative enterprises which are composed of non-governmental organisations, cooperatives and syndicates also indicate a high rate of informality under the fiscal definition and social definition. Such institutions are by nature supposed to be formal since they cannot go operational without the consent of government. Those in these sectors are mostly drop outs from the formal sector and educated individuals who have been unable to cross the invisible barrier separating these two sectors and are struggling to set up businesses. Due to the high cost of setting up businesses in Cameroon, they proceed by tax evasion in the early stages and avoid additional expenditures like CNPS contributions or signing contracts which could eventually generate high judicial cost in case of legal conflicts with business partners or business failure. Many prefer this informal situation in setting up their business so as to profit from the cheap labour cost and exploit the ignorance as well as the desperate situation of the workers. The intention is to formalise issues when the business would have passed the difficult test of competition and gaining a sizable market share.

Private non-agricultural enterprises
Figures about the size of the informal sector lead to the following conclusions. Due to the inability of the public sector to continue recruiting, many now sort refuge in the informal sector. The private non-agricultural enterprise is the sector which absorbs the majority of those not being able to make it into the highly formalised sectors. Table 3.4 below provides figures on workers distribution within the various sectors. Within the private non agricultural sector, we have the educated as well as uneducated, drop outs from the formal sector, those who have learned a trade (spend a learning period of at least three years under the tutorship of a master) as well as those with no qualification or practise in any

field (mostly made of new migrants from rural areas with no skills in any profession). They are composed of road side vendors engaged in any business (preferably commerce in urban areas and transformation of agricultural products in rural areas), transporters (known in Cameroon as Klando/Bendskin) as well as local producers and service men. It is also worth noticing that their services and products are not only consumed within the informal sector but also receive wide recognition from the formal sector where they obtain some of their contracts and sell some of their products. This sector is the nucleus of the following chapter on formal and informal sector linkages for the following reasons: it employs the highest amount of workers as compared to all the other sectors, has links through the product and labour market to the formal sector and also comprised of many mini-enterprises which could be a source of revenue to the government from a fiscal perspective. Under the social definition, 90.57 percent of workers are identified as informal and this drops to 65.23 percent using the fiscal definition because most of those operating along the road-side or in small huts do pay some form of taxes such as market place taxes, licences and taxes on equipments etc.

Table 3.3   Distribution of informality across employment sectors

Sector of employment	Fiscal definition (%)		Social definition (%)		Ent. Size definition (%)	
	Formal	Informal	Formal	Informal	Formal	Informal
Public Administration	100	-	100	-	100	-
Para-public Ent.	100	-	86.5	13.5	98.16	1.84
Private Non-agric Ent.	34.77	65.23	9.43	90.57	21.62	78.38
Agric. Exploitation	3.06	96.94	0.84	99.16	10.38	89.62
Int. Organisation	30	70	60	40	100	-
Associative Ent. (NGO)	18.64	81.36	22.6	77.4	77.4	22.6
Households	-	100	-	100	-	100

Source: Authors' computation

Table 3.4 above indicates that it is the private non agricultural sector which employs the highest number of workers (56.6 percent), closely followed by the agricultural sector (32 percent) and then comes the government with the public administration sector (7.2 percent) per the EESI survey. Self employed or sole traders form the bulk of those in the private non agricultural sector with about 50 percent. Family help and Apprentice are mostly in the private non agricultural and agricultural sector.

Table 3.4   Workers status within the various sectors

	Pub. admin	Pub/Par pub.	Pri.non-agric	Agric. Exploit	Int.Org.	Ass. Ent.	Hhold	Total
Managers	651 (58.9)	66 (5.9)	340 (30.7)	3 (0.3)	5 (0.5)	39 (3.5)	1 (0.1)	1105 (100)
Employed qual/semi qual	356 (17.5)	58 (2.9)	1428 (70.3)	44 (2.2)	4 (0.2)	86 (4.2)	56 (2.7)	2032 (100)
Unskilled	38 (3.1)	39 (3.1)	788 (63.3)	174 (14)	1 (0.1)	18 (1.5)	186 (14.9)	1244 (100)
Employer	-	-	378 (77)	110 (22.4)	-	3 (0.6)	-	491 (100)
Self employed sole trader	-	-	4249 (58.5)	3008 (41.4)	-	7 (0.1)	-	7264 (100)
Family assistant	-	-	595 (31)	1306 (68)	-	4 (0.2)	16 (0.8)	1921 (100)
Apprentice	3 (0.5)	1 (0.1)	484 (95)	2 (0.4)	-	20 (4)	-	510 (100)
Total	1048 (7.2)	164 (1.1)	8262 (56.6)	4647 (32)	10 (0.1)	177 (1.2)	259 (1.8)	14567 (100)

Figures in parenthesis represent percentage share of workers status within the various sectors
Source: Authors' computation

3.3.2 Gender and informality in Cameroon

The position of men and women across the three different definitions shows signs of a gender issue in Cameroon. Across all three definitions, women are the majority in the informal sector and this falls in line with results obtained from other studies. The question whether women have it more difficult to access the formal sector is therefore a legitimate one. It is under the social definition that informality is at its highest for both sexes but the gap between the percentage of women and men in the informal sector 16 and 15 percent using the fiscal and enterprise size definition respectively exposes the gender question better. (See table 3.5).

Table 3.5   Distribution of informality across sex

Gender	Fiscal definition (%)		Social definition (%)		Ent. Size definition (%)	
	Formal	Informal	Formal	Informal	Formal	Informal
Male (7755)	29.18	70.82	10.16	89.84	25.61	74.39
Female (6816)	13.79	86.21	3.18	96.82	10.59	89.41

Source: Authors' computation

3.3.3 Educational attainment and informality in Cameroon

Table 3.6 reveals that informality is strongly associated with educational attainment in Cameroon. Rates of above 80 percent are observed for those with no educational certificates (never attended/completed primary education). Informality is also seen to drop for all three definitions as level of educational attainment increases though informality of 42.11 percent for those with a

doctoral degree according to the fiscal and social definition seem to be very high. For this same group, informality is just 15.79 percent under the enterprise size definition. Further analyses would be required to explain this variation in size.

Table 3.6   Distribution of informality by educational attainment

Educational attainment	Fiscal definition (%)		Social definition (%)		Ent. Size definition (%)	
	Formal	Informal	Formal	Informal	Formal	Informal
No certificate	16.38	83.62	2.35	97.65	12.20	87.80
Primary education (FSLC)	26.43	73.57	5.43	94.57	18.58	81.42
Secondary education (GCE-O/L &BEPC)	33.59	66.41	15.56	84.44	31.36	68.42
Intermediary (Probatoire)	44.14	55.86	15.74	84.26	35.19	64.81
High school education (GCE-A/L & BAC)	46.23	53.77	34.52	65.48	49.16	50.84
High school +2yrs (BTS)	55.86	44.14	56.76	43.24	69.37	30.63
University (BSc & Licence)	47.13	52.87	48.41	51.59	61.78	38.22
University (Masters & Maîtrise)	63.39	36.61	59.82	40.18	75.89	24.11
University (PHD & Doctorat)	57.89	42.11	57.89	42.11	84.21	15.79

Source: Authors' computation

3.3.4 Age and informality in Cameroon

One of the striking features of the informal sector in developing countries is the youthfulness of the operators. This assertion is confirmed for Cameroon as is revealed in table 3.7. Another important aspect is the high percentage of old people in the informal sector. Informality is at its highest at both extremes of the age groups as can be seen on table 3.7 giving it a U-shaped age pattern. This is on the one hand an indication of the lack of professional institutions necessary for the training of young school drop outs who flood into the informal sector to earn a living and on the other hand, it is also an indication of the social network often seen in most African families whereby even the young participate in the financial well being of the family. The rise in number of the old in the informal sector can also be explained by the absence of a functioning social network required to care for the old who are compelled to continue to be economically active in order to meet up with their daily needs when they go on retirement or after losing their jobs.   Like in all the other variables used to estimate informality under the three different definitions, informality is at its highest under the social definition.

Table 3.7   The distribution of informality by age

Age group (years)	Fiscal definition (%)		Social definition (%)		Ent. Size definition (%)	
	Formal	Informal	Formal	Informal	Formal	Informal
15-20	17.57	82.43	0.76	99.24	18.29	81.71
21-30	28.13	71.87	6.40	93.60	19.66	80.34
31-50	25.82	74.18	11.91	88.09	21.48	78.52
51-65	13.53	86.47	6.29	93.71	13.60	86.40

Source: Authors' computation

3.4 Multivariate analysis of factors associated with informality

Using three distinct definitions of informality, the size of the informal sector in Cameroon and how it varies per definition has been estimated. It has also been possible to identify differences and similarities between key demographic variables among the three different definitions and sectors of employment. In this section, I try to make some conditional association with demographic variables and the three different definitions of informality. This permits an investigation of the generally mentioned characteristics of the informal sector and their applicability to Cameroon[12]. The main hypothesis here is that just like size, the major characteristics of informality will also change as the definitions change thus influencing further analysis and limiting comparability of studies within and across countries.

A probit regression is used to estimate the variability per definition and the marginal effects present the different potential influences on the likelihood of informality per definition. The specification of the regressions and the consequent marginal effects is given as follows:

$$p_i \equiv \Pr[IF_i = 1 \mid X] \tag{1}$$

$$\text{Marginal effects} = \frac{\partial \Pr(IF_i = 1 \mid X_i)}{\partial x_{ij}} \tag{2}$$

This gives the marginal effect of individual i being in the informal sector assuming a change in variable X (sex, age, region, education sector of employment etc.). The regressors consist of individual demographic information, region of residence, sector of employment and information of the individual's household. Sex, age education and migration status are captured under demography.

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[12]   The informal sector is often described as an urban phenomenon, characterised by low levels of education, the youthfulness of its participants, poor and un-regulated working conditions and largely dominated by females.

Youthfulness of the labour market participants and low levels of schooling often cited as characteristics of the informal sector will be tested. Previous research has also identified the informal sector as a sector dominated by females suffering employment bias into the formal sector.

Urban, semi-urban or rural situates the region of residence of the individual. Given that informality is often referred to as an urban phenomenon, it will be tested using this variable. It has also been argued that the recent growth in size of the informal sector is partly due to the high rates of rural urban migration. Due to the ease of entry, these new comers enter the informal sector in order to earn a living thus purporting that the majority of those in the informal sector are migrants. Another aspect often associated with informality is the insecurity and poor conditions of work. Possessions of a contract or a payslip are two binary indicators used here to test the applicability of this statement to the Cameroonian informal sector. A secured job under good working conditions will require the employer to possess both a work contract and a payslip.

Apart from level of educational attainment, being capable to read and write one of the official languages of the country (French or English) is used to measure its impact on informality. Being considered as a formal or informal sector worker and finally moving out of the situation of informality is often determined by your sector of employment.
The presence of dependents within the family may also influence individual employment decisions. So the log of the household size is included.

3.4.1 Results
Table 3.8 reports the estimated marginal effects for each definition of informality. All the regressors included in the equation attract statistical significance at least in one definition. Magnitudes of the variables vary in direction and size across the three different definitions.

The coefficient of sex is inconsistent across the three definitions of informality. The assertion therefore that the majority of those occupied in the informal sector are women is confirmed under the enterprise size definition but not under the social definition of informality. Men are 10 percent more likely to be informal under the social definition and 3 percent less likely to be informal under the enterprise size definition. Under the fiscal definition, sex is insignificant in determining informality. Using those of age between 15 and 25 years as the comparison group, the U-shaped relationship between age and informality identified in the descriptive part of this paper is confirmed as informality reduces among the middle age groups and rises among the old.

Urban residents are 4.5 percent, 8.7 percent and 11.6 percent under fiscal, social and enterprise size definition respectively less likely to be in the informal sector than those in the rural areas. The reported marginal effects for migrants show a positive and significant relationship between migration and informality across all three definitions.

The marginal effects from the ability to read and write French or English do not suggest any clear relationship with informality. A possible explanation for this could be labour market segmentations (upper-tier and lower-tier) in the informal sector identified in developing countries (see Günther and Launov, 2006). This segmentation can be the source of a positive correlation between ability to read and write French and English and employment in the upper-tier informal sector or the source of a negative correlation or insignificant relationship between being able to read and write French or English and employment into the lower-tier informal sector. Further empirical analysis will be required to fully confirm the suggested relationships. It is also worth mentioning that the main language of communication in the informal sector in Cameroon is 'pidgin' English.[13]

Increasing level of educational attainment is negatively and significantly correlated with informality at least under the fiscal and social definitions. This is insignificant under the enterprise size definition except for tertiary education. The conclusion from this is that those with higher levels of education have better chances of getting employment in the formal sector while the majority in the informal sector have no education or are lesser educated than those in the formal sector.

The private non agricultural sector identified in the descriptive section as the sector with the highest informality is used as the comparison group to determine informality by sector of employment. Reports of the marginal effect for public and para-public employees indicates very strong, negative and significant relationship to informality as compared to those in the private non agricultural sector meanwhile agricultural sector employees indicate very strong, positive and significant relationship with informality as compared to those in the non private agricultural sector. This result confirms the assumption made earlier in this paper and concurs with other studies which consider the public sector as formal and agricultural sector as informal.

The coefficients of possession of a contract and payslip used as a proxy for working condition and job security indicates a strong, negative and significant relationship to informality. Therefore the assertion that informal sector employment is unsecured, unsafe and without any proper regulation is

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[13]   Pidgin English as spoken in Cameroon is a language made up of elements of the Queen's English, French and local dialects.

confirmed. Household size does not provide any clear relationship with informality.

Table 3.8   Estimates of informal sector components variability by definition

	Fiscal	Social	Ent. size
Sex_male	0.015	0.103***	-0.037**
Age (15-25)	Ref.	Ref.	Ref.
Age (26-35)	-0.001***	-0.005***	-0.001***
Age (36-45)	-0.001***	-0.005***	-0.003***
Age (46-55)	-0.001*	-0.004***	-0.002***
Age (56-65)	0.001	-0.003***	-0.001*
HH region			
Rural	Ref.	Ref.	Ref.
Urban	-0.045*	-0.087***	-0.116***
Semi-urban	-0.044	-0.017	-0.046**
Migrant	0.017*	0.056***	0.030**
French	0.038*	-0.009	-0.065***
English	0 .044**	0.026	0.007
Education Level			
No education	Ref.	Ref.	Ref.
Primary	-0.110***	-0.104**	0.006
Secondary	-0.108***	-0.080*	0.009
Tertiary	-0.146***	-0.206***	-0.088**
Sector of employment			
Private non-agric	Ref.	Ref.	Ref.
Public & para-public	-0.483***	-0.690***	-0.457***
Agriculture	0.480***	0.245***	0.076***
Ass. Ent. & NGOs	0.317***	0.122***	-0.195***
Contract	-0.144***	-	-0.144***
Payslip	-0.048**	-0.489***	-0.325***
Log HH size	0.018*	0.008	-0.041***
Log likelihood	-3222	-1894	-3087
# of observations	6801	6801	6801
Pseudo R-squared	0.315	0.563	0.342

Note: reported coefficients are marginal effects
*significant at 10% **significant at 5%, ***significant at 1%.
Source: Authors' computation using EESI 2005

3.5 Conclusion

Using three distinct definitions of informality, the size of the informal sector in Cameroon has been estimated and it is observed that due to the lack of a unique definition for informality and the differences in definitions often used, variations in sizes of the formal and informal sector are inevitable.

The impact of this lack of agreement on a unique definition goes far beyond influencing the size as it also indirectly influences the determinants and characteristics of those employed in the informal sector. I therefore conclude this first part of the paper by postulating that in any study dealing with informality, the definition matters and should assume a central role with regards to the subsequent analysis.

Apart from the difference in size due to definition variance, major differences and similarities are also identified between key demographic variables across the three different definitions. Marginal effects of discrete changes in the regressors vary in magnitude and direction across the different definitions. This leads to the conclusion that the likelihood of informality varies across the three different definitions. Under the enterprise definition, level of educational attainment is insignificant in determining informality compared to the fiscal definition; it is negatively and significantly correlated to informality as compared to the no education group.

These results provide enough arguments to confirm and refute certain generalities about the informal sector. The youthfulness, insecurity and poor working condition often used as characteristics to define the informal sector are confirmed. That the informal sector is often composed of migrants from the rural sector unable to find employment in the formal sector thus explaining the recent growth in informality in Cameroon is also confirmed across the three different definitions. Here it is important to know that, rural-urban migration is extremely high in Cameroon with urbanization rates of 51 percent (Cameroon Statistical yearbook, 2004).

That informality is predominantly an urban phenomenon and a female dominated sector is not confirmed in this paper across the three definitions. Across the three different definitions, sex is inconsistent in determining informality. Educational level did not also confirm the assertion that it is a sector characterised by illiteracy or low level of education as it varied across the definitions. It is worth noticing that even under the fiscal definition which indicates significantly that the likelihood of informality reduces with increasing level of education exhibits very low marginal effects contrary to my

expectations. Cameroons informal sector could be filled with very educated individuals thus keeping the marginal effects very low.

The most important conclusion which emerges from this study is that, it still remains extremely difficult to formulate a single definition for informality in Cameroon. The approach suggested will be to define informality depending on the issues to be analysed, that is use a single definition or a combination of two which best capture the variable to be analysed. For example analysing issues about education and informality in Cameroon, the best definition will be the fiscal definition or a combination of the fiscal and social definition due to significance of the educational variable in determining informality. Secondly seeing the differences which arise due to the use of different definitions, it would be unwise to compare informal sectors across and within countries which have been obtained using different definitions.

Informal and formal sector linkages: symbiotic or parasitic

A case study of Urban Cameroon

4.1 Introduction

Contrary to expectations that the informal sector will disappear as growth and development improves, the informal sector is not only persisting in Cameroon but has actually grown over the years in which Cameroon has experienced growth by dominating the economy in terms of employment (see fig. 4.1). Merceron et al 2007, identify an increase in informality of the economy of Yaounde (capital of Cameroon), despite rising growth rates. More than 50 percent of the employed are located in the informal sector. The importance of this sector in Cameroon and other developing countries has also been fostered by its increasing contribution to economic growth and the fact that it provides an avenue for survival for the poor and underprivileged. In 1995-1996, Cameroon's informal sector contribution to GDP as a percentage of non-agricultural GDP was estimated at 42 percent (Becker, 2004). Despite its increasing importance, working and employment conditions within the sector remain poor and insecure to the detriment of its participants as shown in chapter four and governments continue to complain of a shrinking tax base resulting from an expansion of this sector. Whether we appreciate or dislike the existence of the informal sector, its growing importance in developing countries is a clear indication of the fact that this sector will not disappear soon and its integration into the rest of the economy is unavoidable in order to resolve most of the problems related to informality as well as harness some of the benefits of the informal sector. Effective co-existence of the informal sector alongside the formal sector can only be achieved if the right answers are found to the following questions:
- What is exactly the informal sector and how do we define it (addressed in chapter three of this study)?
- How is it related or linked to the formal sector- symbiotic or exploitative?
- How does it function and what do we do with it- formalise or maintain it the way it is?

The heterogeneity of the informal sector between and within countries makes it difficult to find universal responses to these questions.

Fig. 4.1   Job distribution by institutional sector
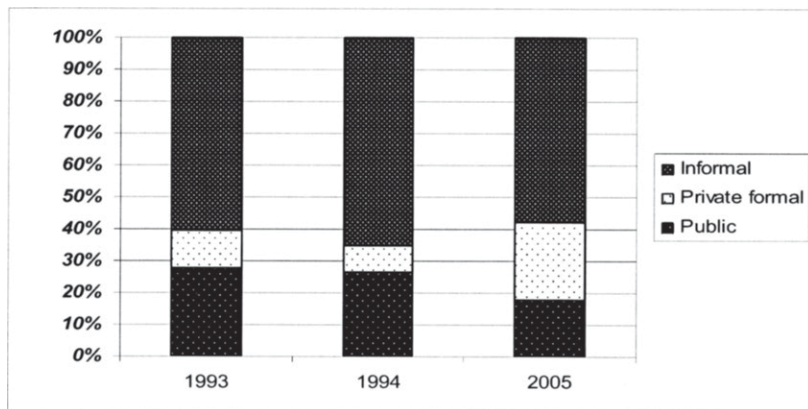
In this chapter, I address the issue of linkages by attempting to find answers as to how the informal and formal sectors are linked to one another in Cameroon. Identification of linkages between both sectors and their magnitude is important because it determines the nature and scope for intervention either to influence the informal sector or to attain other objectives like poverty reduction or increase in tax revenue.

Until recently, literature on formal and informal sector linkages was largely theoretical. Early works by the ILO saw the informal sector as an autonomous segment providing work and income to the poor and an extension of the dual economy described by Lewis, 1954. This dualistic view was also supported by Fields 1974 and Mazumdar 1976, who considered the informal sector to be composed of those unable to access employment in the formal sector. Moser 1978 and Portes 1983, considered the informal sector to be a set of subordinate economic units that serve the purpose of cost reduction for formal enterprises and with little link to the formal sector.

There is little empirical literature on linkages between the formal and informal sector since the work of Tokman 1978 who suggested that: "The informal sector should be seen neither as completely integrated nor as an autonomous sector but rather as one with significant links with the rest of the economy, while simultaneously it also presents a considerable degree of self containment (cited by Harris, 1990). Recently, using households as observation units as opposed to most studies that use enterprises and individuals as observation units, Grimm and Günther 2008, showed that in urban Burkina Faso, inter-household linkages between the formal and informal economy are rather weak and that it is the

performance of the whole economy which matters most for the informal sector. At the same time, they showed that intra-household linkages between informal and formal labour supply and earnings seem more important. Considering recent arguments made in favour of taking into account the heterogeneity of the informal sector when assessing formal and informal sector linkages, Günther and Launov, 2006 found empirical evidence that informal labour markets in developing countries are composed of two segments with a distinct wage equation in each of them. They further show that one segment of the informal sector (the "upper"- tier informal sector) is superior to the other (the "lower" - tier informal sector) in terms of significantly higher earnings as well as higher returns to education and experience. Finally, they also identified that the "lower"- tier informal sector is the result of market segmentation whereas comparative advantage considerations seem to be the cause for the existence of the "upper"-tier informal sector.

4.2 Nature of informal and formal sector linkages in urban Cameroon

There is plenty of literature and cross country studies with Cameroon analysing the informal sector but there is no work which has established the link between both sectors in terms of magnitude to the best of my knowledge. Using the same approach as in Grimm and Günther 2008, I try to fill this void in the literature on Cameroons informal sector analysis.

The United Nations report (1996) on "Informal sector development in Africa" outlined five main categories of linkages:

1. Forward linkages - The formal sector employs good and services produced by informal workers and businesses as an input in their own production.
2. Backward linkages - Enterprises in the formal sector can also provide goods and services to the informal businesses, particularly raw inputs, but also more recently information and communication technology.
3. Technological linkages - The transfer of technology and skills can also link the two sectors as mentioned in the case of backward linkages.
4. Consumer linkages – Consumers (individuals, households, farmers and the public sector) purchase final goods and services from the informal sector.
5. Credit linkages – The formal sector invests or provides credit to informal enterprises.

In this chapter, I limit myself to analysing only forward and backward linkages as presented above. I argue that the informal and formal sector in urban Cameroon are linked to one another and that these linkages are in certain cases "symbiotic"- mutual benefit between both sectors and in some cases "parasitic"- one sector exploiting the other. The links between the informal sector and the

formal sector can be established at the level of the product market (demand for informal sector goods) as well as at the factor market (supply of formal sector goods). In figure 4.2 below, I show how the informal sector is linked to the formal sector in Cameroon. That is, the informal sector has forward linkages to markets outside the informal sector and backward linkages to inputs outside the informal sector.

Fig. 4.2   Urban informal and formal sector linkages in Cameroon.
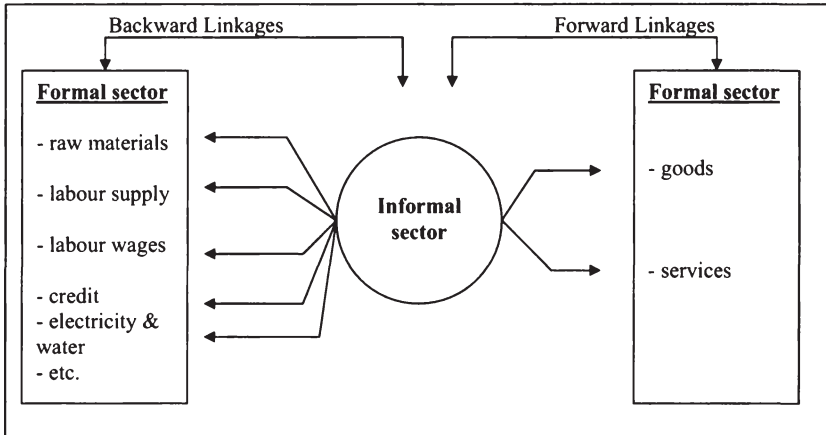
Source: Authors' construction using EESI 2005

4.2.1 Objectives

The main objective of this chapter is to estimate the magnitude and quality of the linkage between the informal and formal sector in urban Cameroon. In a first case, following Grimm and Günther (2008), I use households as observation units to estimate the magnitude of the linkages between the informal and formal sector via inter and intra-household linkages. In a second case, using sector of purchase and sales figures of 2150 informal business units, I estimate the magnitude and quality (symbiotic or parasitic) of their linkage with the formal sector.

4.3 Estimating the informal and formal sector linkages

4.3.1 Inter-household linkages between informal and formal earnings

If the informal and formal sector is linked to one another, by using earnings, one can estimate the influence of formal sector earnings on informal sector earnings. Grimm and Günther (2008) used this approach to prove that informal earnings are linked to formal sector earnings by testing the hypothesis presented below

which I also do for urban Cameroon[14]. In the absence of panel data, they used data for three different years (1994, 1998 and 2003) to examine some temporal variations in income sources and how the growth of formal earnings influence informal earnings. For the case of Cameroon, not only is a panel data unavailable, the EESI 2005 used here is the first of its sort conducted for Cameroon and proved inherently difficult to combine with the other previous data sets for Cameroon which were designed to capture other issues.

Hypotheses
1. Formal and informal earnings are correlated through the existence of forward and backward linkages as shown in figure 4.2 and via intra-household linkages, with the formal sector household members investing in the informal sector and increasing through its actions the marginal productivity of informal sector businesses.
2. Formal and informal earnings are indirectly correlated through the local socio-economic population structure. Assuming free mobility of labour, individuals with similar characteristics will cluster in the same area, thereby causing clusters of people with high earnings (talented) and low earnings (less talented) in an economy.
3. Formal and informal earnings are correlated because both depend first of all on geographic endowments or supply of local public goods and infrastructure determining the productivity of both sectors and therefore their earnings. This means that both sectors could be correlated but there is no direct link between them. That is, an increase in earnings of those employed in the public service will not have the same impact on those informal sector workers in Maroua (Extreme North Province) as it will have on those informal sector workers in Douala (economic capital situated in the Littoral province).

Empirically, the estimates for the informal and formal sector linkages are obtained by simply regressing household specific informal earnings ($\prod_{IF,h}$), on observed individual and household characteristics (X_h). The number of workers involved in the informal activity (L_h) is also included as well as the provincial averages of formal earnings ($\prod_{F,P}$). The specification of the regression to be estimated is given as follows:

$$\log \prod_{IF,h.} = \alpha \log L_h + \beta X_h + \gamma \log \prod_{F,P} + u_h \tag{1}$$

In the absence of panel data, the problems of estimate bias for formal earnings (γ) which could occur due to (i) unobserved heterogeneity in individual and

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[14]   For a detailed presentation of the methodology, see Grimm and Günther, 2008.

provincial specific household characteristics correlated with formal earnings and (ii) unobserved provincial endowments correlated with formal earnings, are dealt with following Grimm and Günther by controlling for province specific characteristics and comparing the coefficient γ with the coefficient obtained by putting in the equation provincial average level of non labour income or total income less informal earnings instead of the provincial averages of formal earnings.

The sample of informal household could be unrepresentative due to selection bias. The presence of such a bias is a threat to the internal validity in that the independent variables are correlated with the disturbance term and this can lead to inaccurate estimates of the relationships between variables, i.e. regression coefficients. The selection bias also threatens the external validity because the final, biased sample might not be generalizable to the whole population (Cuddeback et al. 2004). This potential selection bias is controlled for by using Heckman's proposed sample selection model (1979). As explanatory variables in the selection function, I use the ability to read and write English and French, education level, and age. As dependent variable I use the log of household informal earning per capita. Below is a table of description of all variables included in the estimation equation.

Table 4.1 Descriptive statistics of variables for occupation status and
employment of the urban working population

Variable	Figures in Percentages
Occupied	60.39
Sector of employment	
Public	6.18
Private	15.76
Informal (non agri)	48.06
Sector of activity	
Industrial	26.84
Commercial	27.73
Service	45.44
Migrants	69.11
Education level of HH Head	
No education	5.66
Primary	20.19
Secondary	19.64
Tertiary	8.33
Sex of HH head	
Male	42.95
Female	57.05
Average age of HH head	36.5 years
Average formal earnings	101913 CFAF
Average informal earnings	60782 CFAF

Source: Authors' computation from EESI 2005

Results

The results of the estimation are presented in table 4.2 below. All control variables have the expected signs and are highly significant in most of the cases. An increase by 100 percent of the number of workers employed in the business increases the per capita earnings by 51 percent. Per capita earning increase with increasing level of education and is strongly significant. Age is positively correlated to earnings and is also significant. Experience does not seem to influence earnings in the informal sector as age squared is negatively and significantly correlated to it. Male headed households earn on average more than female headed households. Estimate from ability to speak and write French or English are inconsistent and not always significant especially for English. The coefficient of the dummy variable which captures the presence of a formal sector worker in the household is negative and significant-indicating that households with a share of their income coming from the formal sector are less involved in the informal sector, thus having lower per capita informal earnings.

Table 4.2   Estimation of Urban informal earnings

Log of household informal earnings per capita	(1)	(2)	(3)	(4)	(5)	(6)
Log # of workers	0.515***	0.509***	0.507***	0.510***	0.513***	0.514***
Head no edu.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Head primary edu.	0.205***	0.119*	0.155**	0.118*	0.129*	0.129**
Head secondary edu.	0.472***	0.358***	0.388***	0.357***	0.381***	0.369***
Tertiary edu.	0.861***	0.712***	0.724***	0.711***	0.756***	0.723***
Age Head	0.054***	0.051***	0.050***	0.051***	0.053***	0.052***
Squared Age Head	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***
Head male	0.518***	0.530***	0.531***	0.531***	0.529***	0.530***
Log hh-size	-1.060***	-1.048***	-1.046***	-1.048***	-1.053***	-1.052***
Head sp/wr eng	-0.072*	-0.060	-0.027	-0.061	-0.086**	-0.053
Head sp/wr fre	0.109**	0.097*	0.050	0.098*	0.139**	0.073
F.sec worker in HH	-3.195***	0.123***	0.123***	0.465	-2.644**	0.776
Pro. Av log F.earn	0.281***			-0.028	0.233**	-0.054
Pro.Av log non lab inc.		0.250***		0.255***		
Pro. Av log non If earn.			0.418***			
Pro. Share of F. worker					0.783***	
Pro. Share of IF worker						-1.183***
Intercept	8.544***	6.203***	3.783***	6.151***	8.344***	9.413***
rho	-0.687***	-0.628***	-0.630***	-0.629***	-0.662	-0.629***
# of Obs.	3410	3410	3410	3410	3410	3410
# of non-censored Obs.	2395	2395	2395	2395	2395	2395
Log-likelihood	4606	4585	4575	4585	4597	4586

*significant at 10%, **significant at 5%, ***significant at 1%. rho is the correlation coefficient between the residuals of the earnings regression and the selection function. As explanatory variables in the selection function, I use age, sex, education and ability to read and write French or English.
Source: Authors' computation

The log of the provincial average of formal earnings has a positive and significant effect on informal earnings. The linkage coefficient is smaller than one and when I use the average of non labour income (2) or total household income less informal earnings (3) in the equation, I still obtain a positive and significant impact on informal earnings though slightly lower for (2) and higher for (3). Explicitly, a 1 percent increase in formal earnings increases informal earnings by 0.28 percent meanwhile the increase in informal earnings of a 1 percent increase in non labour income is slightly lower (0.25 percent) and much higher 0.41 percent for a 1 percent increase in total household income less informal earnings. In (4), the coefficient of non labour income remains roughly the same and significant but the coefficient of the average of formal earnings becomes negative and insignificant. This is certainly due to correlation between both income sources. Controlling for the provincial share of formal and informal workers, the coefficients indicate that the provincial share of formal workers is positively and significantly correlated to informal earnings whereas the provincial share of informal workers is negatively and significantly correlated to informal earnings. More precisely, as the size of the formal sector increases, informal earnings increase whereas an increase in the size of the informal sector

leads to drop in informal earnings. The drop in earnings due to an increase in size of the informal sector could be interpreted as a consequence of additional competition meanwhile the increase in informal earnings resulting from an increase in size of the formal sector can be interpreted as externalities benefits. For example, formal sector workers purchasing more goods and services from the informal sector or investing part of their wages from the formal sector in the informal sector. In (6), the average of formal earnings is insignificant when entered together with share of informal workers in the equation.

Though the consistency of these results cannot be tested because of the use of only a single set of data, it can be observed that the coefficients for formal earnings are not only inconsistent when combined with other variables, they are also relatively low. This seems to be an indication that even if the existing inter-household linkages between informal and formal sector earnings are present, they are low and what matters most are the average provincial income and the share of both sectors. Because of the inability to control for specific household characteristics and provincial endowments as well as the lack of panel or time series data for Cameroon, I recommend caution in drawing major conclusions from these results.

4.3.2 Intra-household linkages between informal and formal earnings

In this section different scenarios are used to analyse if intra-household linkages between formal and informal sectors exist and their magnitude. Here again, I use the same method applied by Grimm and Günther (2008).

Assuming that households are at the centre of labour supplies and earnings decisions, the general argument can be made that the household position as well as other household's member's position activity and earnings have a high impact on individual's labour participation and earnings in the informal sector. For the sake of simplicity, only two household positions are distinguished. The first household position also considered here as the household head is determined by taking the individual with the highest earnings in the household. The second household position is given to all other household members 15 years of age and above.

Hypothesis

Under the first scenario, I examine to what extent labour supply and sector choice are determined by the individual's position within the household as well as by the household's head sector of occupation and earnings. To this effect, the following hypothesis is formulated:

1. Informal income in many households constitutes a secondary household income and hence the percentage of informal labour participation is much lower if one only considers individuals with a first household position and

much higher if one only considers members with a secondary household position.

In the second scenario, I analyse the impact of household position, the household head's sector of employment and the household head's earnings on other household member's earnings.

2. Informal earnings differ if undertaken as a main activity or for the purpose of supplementing the household income and if intra-household investments take place, secondary member's informal earnings should be higher if the household head is occupied in the formal sector.

To analyse the first scenario, the following multinomial logit is estimated:

$$\Pr ob(L_i = j) = [\exp(\lambda_{jX} X_{ihj} + \lambda_{js} S_{iHeadj} + \lambda_{jW} \log W_{iHeadj})] /$$
$$[\sum_{j=1} \exp(\lambda_{jX} X_{ihj} + \lambda_{js} S_{iHeadj} + \lambda_{jW} \log W_{iHeadj})]$$
$$(2)$$

This estimates the probability that individual i takes the occupational choice $L_i = j$, where X_{ih} is a vector of individual and household characteristics, as age, education and sex. S_{head} is a vector of dummy variables indicating the sector of employment of the household head and log W_{Head} is the log of the monthly earnings of the household head. A simple probit regression with a binary variable taking the value one if the individual is in the informal sector and zero if the individual is in the formal sector is used to test the robustness of the functional form above. The option 'being not-occupied' is included by estimating this function simultaneously with a selection equation, where the selection variable indicates the value one if the individual is occupied and zero otherwise. The selection model can then be used to analyse the determinants of labour market participation.

For the second scenario, the equation below is estimated:

$$\log W_{ih} = \beta X_{ih} + \psi C_{ih} + \alpha S_{ihead} + \gamma \log W_{iHead} + u_{ih} \qquad (3)$$

where $\log W_{ih}$ is the log of individual earnings of person i belonging to household h, X_{ih} are individual and household characteristics as before but also indicator variables for the branch of activity (commercial, industrial and service) and the sector of employment. C_{ih} is a dummy variable taking the value one if individual i is not the earner of the main income in household h. The Heckman selection model is used when estimating the equation to control for selection into the group of occupied persons.

Results
The results of the different estimates for intra-household linkages between the formal and informal sector are reported in tables 4.3-4.5 below. Most of the coefficients have the expected signs and are highly significant. Males have better chances of being employed in the formal sector. Just like expected, age has positive correlation with informality and employment as a whole. This means that the older one becomes, the higher his chances of finding a job and even being occupied in the informal sector. Higher levels of education contribute positively to higher labour marker participation and higher chances of finding a job in the formal sector. The returns to education also increase with increasing levels of educational attainment. Dependency ratio calculated here as household size divided by number of occupied individuals in household is positively and significantly correlated to informality but negatively and significantly correlated to employment. That is, the higher the dependency ratio, the lower is ones chances of finding a job and the higher is his chance of finding one in the informal sector.

Tables 4.3 and 4.4 report the results of determinants of informal and formal sector occupation. In table 4.3, I use the multinomial logit model and in table 4.4, I use the Heckman selection model and both lead to the same results. Because those with the highest income are placed in the first position, table 4.4 reports that those in second order labour positions are more likely to be found in the informal sector and have lesser chances of having a job.

The sector choice of secondary household members is positively and significantly correlated to the sector of employment of the household head. If the household head is a formal sector earner, table 4.4 reports a low labour market participation rate for the secondary household members of his household but with a higher probability of a formal sector employment. This is confirmed by both the multinomial logit regression and the Heckman selection model. It is also worth highlighting the negative correlation of education to informal sector employment. This indicates that while there is an educational barrier guarding entrance into the formal sector, there is no educational hurdle to overcome for informal market participation.

Table 4.3   Occupational choice of urban non household heads labour
force. (Multinomial logit model)

Dependent variable Occupational choice	Informal sector	Formal sector
	Coef.	Coef.
Male	-0.360***	0.864***
Age	0.127***	0.218***
Squared age	-0.001***	-0.002***
Dependecy ratio	-0.046***	-0.077***
Educational attainment		
No schooling	Ref.	Ref.
Primary edu.	-0.523***	0.405***
Secondary edu.	-1.224***	1.112***
High-school edu.	-1.676***	1.338***
Tertiary edu.	-1.400***	1.446***
HH head sector		
Informal sector worker	Ref.	Ref.
Formal sector worker	-0.888***	0.799***
Log monthly earnings. (HH. head)	0.101***	0.062***
# of observations	6429	6429
Pseudo R Square	0.116	0.217

*significant at 10%, **significant at 5%, ***significant at 1%. Only non household heads are included in the model, i.e individuals between the ages of 15-65 not accounting for the highest earning of a household. The model also includes dummies for the ten provinces of Cameroon.
Source: Authors' computation

Table 4.4   Occupational choice of total urban labour force and second
            order labour force. Selection model (Full MLE)

Dependent variable Occupational choice Informal=1, Formal =0	Total labour force	Second order labour force
	Coef.	Coef.
Male	-0.705***	-.0515***
Age	-0.148***	-0.096***
Squared age	0.001***	0.001***
Dependecy ratio	0.056***	0 .036***
Educational attainment		
No schooling	Ref.	Ref.
Primary edu.	-0.220***	-0.217***
Secondary edu.	-0.637***	-0.622***
High-school edu.	-0.906***	-0.803***
Tertiary edu.	-0.860***	-0.789***
HH head sector		
Informal earnings		Ref.
Formal earnings		-0.464***
Log monthly inc. (HH. head)		-0.018**
Second order labour income	0.651***	
Selection Model: Probability of being occupied		
Male	.510***	.206***
Age	.245***	.208***
Squared age	-.002***	-.002***
Dependecy ratio	-.071***	
Educational attainment		
No schooling	Ref.	Ref.
Primary edu.	-.190***	-.278***
Secondary edu.	-.460***	-.677***
High-school edu.	-.694***	-.993***
Tertiary edu.	-.270***	-.418***
HH head sector		
Informal earnings		Ref.
Formal earnings		-0.451***
Log monthly earnings (HH. head)		-0.011***
Second order labour force (Dummy)	-0.972***	
rho	-0.206	-0.121
# of observations	11287	6429
# of non-censored Obs.	6021	5584
-Log-likelihood	7916	3471

*significant at 10%, **significant at 5%, ***significant at 1%.
The dependent variable in the selection model distinguishes between occupied =1
or unoccupied =0. The model also includes dummies for the ten provinces of Cameroon.
Source: Authors' computation

Table 4.5 presents the results of the estimation of the impact of sector of
employment on earnings. It is again evident that secondary household position
has a negative impact on monthly earnings due to the setting of those with the

highest income in first position. Here it can be observed that despite the irrelevance of the level of educational attainment in seeking informal sector participation, educational attainment reports positive returns in the informal sector. Sector of employment is also very important in determining monthly earnings. The service sector is the one which offers the highest earning chances in Cameroon even in the informal sector. It is also worth mentioning that this sector has grown tremendously during the past decades and has the highest share in Cameroon's GDP (AEO, 2003).

Table 4.5   Estimation of urban monthly earning for total labour force and informal sector. Selection model (Full MLE)

Dependent variable Log monthly earnings	Total labour force	Informal labour force
	Coef.	Coef.
Male	0.283***	0.382***
Age	0.065***	0.043***
Squared age	-0.001***	-0.001***
Dependecy ratio	-0.047***	-0.046***
Educational attainment		
No schooling	Ref.	Ref.
Primary edu.	0.006	0.070**
Secondary edu.	0.158***	0.222***
High-school edu.	0.264***	0.306***
Tertiary edu.	0.183***	-0.005
Sector		
Commercial	Ref.	Ref.
Industrial	0.110***	0.017
Service	0.218***	0.146***
Informal sector	Ref.	
Formal sector	0.681***	
Second order labour force (dummy)	-0.576***	-0.544***
rho	-0.032***	-0.416***
# of observations	11287	5123
# of non-censored Obs.	6336	4536
-Log-likelihood	13280	6346

*significant at 10% **significant at 5%, ***significant at 1%.
Source: Authors' computation

4.3.3 Lessons from inter-intra household linkage analyses

The major lessons from the analyses performed above can be summarised as follow:

1. At the level of inter household linkages. The estimated link between formal and informal household earnings is very low and what seems to matter most is the size of both sectors. An increase in the size of the formal sector leads to an increase in informal sector earnings whereas an increase in the size of the informal sector will lead to a drop in informal sector earnings.

2. At the level of intra household linkages. The sector of employment of the household head determines to a large extend whether the other members of the household get involved in the labour market at all and in which sector. If the household head is a formal sector earner, a low labour market participation rate for the other members of his household is observed and the probability of participation in the formal sector is higher in case of involvement in the labour market.

3. Generally, despite the irrelevance of the level of educational attainment in seeking informal sector participation due to no educational entry barriers, educational attainment reports positive returns in the informal sector. This implies that those with higher levels of education in the informal sector have higher earnings.

4.4 Informal and formal sector linkages via business units in urban Cameroon

In this section, I use 2150 identified informal business units[15] and estimate the magnitude of their linkages through their activities in the market. Unlike in the inter- and intra-household analyses of linkages, where I considered the household as the major supplier of labour force to both sectors and also used earnings to estimate the magnitude of the links between both sectors, in this case, I use purchase and sales as the main transactions existing between and within informal and formal sector business units. I argue that informal business units are linked (backwardly) to the formal sector through the purchase of raw materials required for further production or retail activities and also linked (forwardly) to the formal sector as a market for their finished products. I also consider intra-sector trade. That is, informal business units dealing only within

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[15]   Informal business units are all self employed individuals and employers who
        were identified as not paying any form of taxes.

the informal sector. I also argue that the magnitude and quality of the relationship between the formal and the informal sector will depend in which sector its main supplier and main clients are found. Consequently, I make the following hypotheses:

Hypotheses
Informal business units are strongly linked to the formal sector in their quest for raw materials (main supplier) but weakly linked to the formal sector as a market for their finished products. That is informal business units purchase the majority of what they need for their businesses from the formal sector but sell largely in the informal sector.

To address the issue of quality of linkages (symbiotic or parasitic), I make a number of assumptions. The main assumption here is that all informal business units prefer to market their products to formal sector participants in order to benefit from higher prices and better profit margins for their commodities. I also assume that the link between an informal business unit and the formal sector will be symbiotic if the informal business unit can benefit from an increase in sales in the formal sector as a consequence of its inter sector transaction whereas, the link will be considered parasitic if one sector is exploitative of the other. For example, the formal sector uses the informal business unit as an additional market for its product but with the informal business unit having very little chances of increasing its sales in the formal sector. That is, the informal business units serve in this case the purpose of cost reduction for formal enterprises and with little consideration of issues like job protection and quality of working environment. It is important to note here that because of the excess dependence of the informal sector on the formal sector for raw materials, I examine the quality of linkages by looking only at the forward linkages, i.e. market for finished products.

To estimate the magnitude and quality of these linkages, I regress the log of expenditure on raw materials and also the log of revenue from sales against some demographic as well as important factors determining purchase and sales. Because the focus here is not to estimate the contribution of each of these factors to the revenue from sales or expenditure on raw materials, I concentrate more on the binary variables 'main client' and 'main supplier'. Sex and age of the business head is included, sector of activity of the informal business unit, log of the enterprise size, log of capital and also provincial averages of formal and informal purchases and sales as well as provincial share formal and informal suppliers and clients. Of course I am aware of the fact that sales and the decision to purchase raw materials for a business unit depend on so many other factors which influence the transaction between both sectors and cannot be controlled for here. For example, revenue from sale of informal business units will be

positively influenced by the occupation of a fixed structure, presences of qualified sales personnel and regular operation of activities. This is not always possible due to harassment from tax officials. So many prefer to be mobile, hide their products and present only a sample or operate from their houses. The absence of this information does not permit a differentiation between the different informal sector market participants, that is, street vendors walking the streets who purchase from the formal sector and established store keepers or local producers operating at a fixed location. The fact that the majority of those operating in the informal sector have no fixed location and constantly change positions partly due to harassment from taxation officers, limits their customer base by requiring them to find new customers on a daily base, limits their ability to build relationship with formal market participants thus giving the impression that most informal business units have little or no customers in the formal sector. In addition, faking of trade transactions with informal businesses as if they were formal to provide the required documents of transaction for administrative purposes on the one hand and on the other hand to enable the informal business to evade taxes blurs the level of transaction and could bias the results.

Results

Table 4.6 presents the results of the estimation of the link between informal business units and their transaction with the formal and informal sector. If the main client of an informal business unit is in the formal sector, it experiences a significant increase in purchases of raw materials from the formal sector meanwhile its informal sector purchase of raw materials though insignificant decreases. On the other hand, if the main supplier of the informal business unit is from the formal sector, its sales in the formal sector decreases and are insignificant but its sales increases in the informal sector and are significant. This corroborates perfectly with the hypothesis made that informal business units are strongly linked to the formal sector in their quest for raw materials but weakly linked to the formal sector as a market for their finished products.

The magnitude of the linkages of the informal business units with the formal sector via their main suppliers and clients is relatively low (less than one) but relatively higher when one looks at the provincial share of formal clients. The benefit to informal business units from an increase in provincial share of formal clients is experienced only indirectly through increase sales in the informal sector as sales in the formal sector instead decrease contrary to my expectation.

Table 4.6   Estimation of informal sector monthly sales and purchase

	Log formal purchase	Log informal purchase	Log formal sales	Log informal sales
Male	-0.301***	-0.661***	0.318	0.686***
Age	0.019*	0.078*	-0.102*	0.043**
Squared age	-0.001	-0.001*	0.001*	-0.001**
Commerce	Ref.	Ref.	Ref.	Ref.
Industry	2.268***	1.048***	1.322***	0.815***
Service	2.372***	1.239***	0.593*	0.292***
Log size of ent.	0.193***	0.737***	0.054	0.694***
Log of capital	0.662***	0.329***	0.362***	0.225***
Pro. Share F. suppliers	0.602*	-1.286		
Pro Av. IF. purchase	0.001***			
Pro. Av. F. purchase		0.001		
Main client (dummy) Formal=1, Informal=0	0.249**	-0.219		
Pro. Share F clients			-0.462	3.976**
Main supplier (dummy) Formal=1, Informal=0			-0.101	0.049**
Intercept	1.117*	3.553***	8.149***	6.413***
# of Observations	1537	153	115	1032
R squared	0.543	0.351	0.253	0.189

*significant at 10% **significant at 5%, ***significant at 1%. The ten provinces of Cameroon are also included in the equation.
Source: Authors' computation

On the quality of the linkages, results indicate that if the main supplier is in the formal sector, then the link is symbiotic if an only if the informal business unit has its main client in the informal sector. That is, the effect of the informal business unit having its main client in the informal sector enables it to expect positive and significant returns from its investment by experiencing an increase in sales in the informal sector whereas selling in the formal sector is insignificant for its revenue. Therefore it is parasitic to those who have their main clients in the formal sector. This is certainly because the informal business unit has to suffer competition from other formal sector market participants engaged in the same product. Just like in the earlier analyses of intra-household formal and informal sector linkages, the engagement of informal business units in the formal sector can be interpreted as a way to procure extra revenue. The graphic below highlights the quality of the relationship.

Though the number of formal sector clients for informal business units in this study is small and corroborates with the belief that informal businesses hardly have formal sector clients, this figure is further biased by the illegal formalisation of certain informal market products through falsification by changing place of purchase and issue of falsified receipts. Therefore informal business units actually have more formal sector clients than is often captured.

Fig. 4.3 Quality of linkages between formal and informal business units
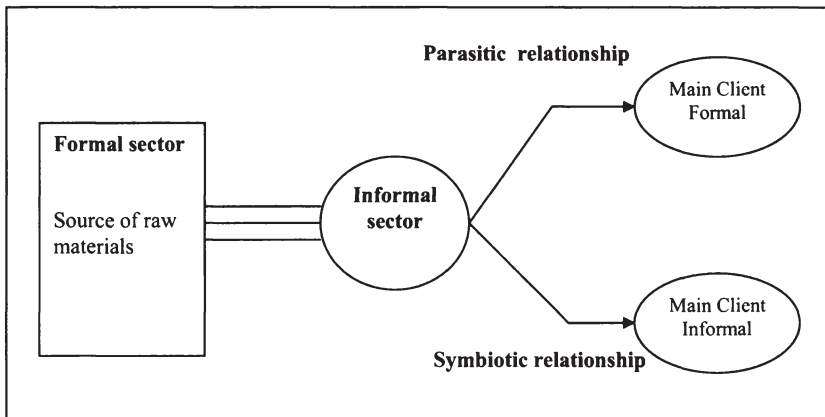
Note: Three lines indicate the extreme dependence of the informal sector on the formal sector for raw materials.
Source: Authors' construction using EESI 2005

4.5 Conclusion

In this chapter, I have tried to fill the void existing in the empirical estimation of formal and informal sector linkages in Cameroon by estimating the magnitude of the linkages and going a step further in qualifying the relationship between both sectors. Using earnings of labour market participants in both sectors, I estimated the inter-household as well as intra-household formal and informal sector linkages in urban Cameroon. Results obtained indicate that formal sector earnings are in many ways related to informal sector earnings, occupational status and sector of employment of other household members. The magnitudes of the links via earnings were relatively low (less than one) but those of intra-household linkages showed a higher magnitude as compared to the inter-household magnitudes.

Using identified informal business units, results of linkage estimates showed that the magnitude of the linkage is dependent from which sector the informal business unit has its main supplier and main client. The magnitude of the results corroborated perfectly with the argument made that the informal business units are strongly linked to the formal sector in their quest for raw materials but weakly linked to the formal sector as a market for their finished products. The strength and significance of the coefficient obtained from the regression of sales revenue against main supplier made possible the identification of the quality of the relationship with the final product market (forward linkage). For those

informal business units that have their main suppliers in the formal sector but their main clients in the informal sector, this relationship could be considered as symbiotic because the formal sector expands its market share   by using the informal sector and the informal sector expects higher sales revenue from sales in the informal sector. The relationship turns parasitic when with main supplier still in the formal sector; the main clients of the informal business unit are in the formal sector. The revenue from sales is negative and insignificant.

Overall, the informal sector is linked to the formal sector in many ways though the magnitudes of these linkages appear relatively small. Across all scenarios estimated, it is always the provincial averages and share of formal sector that has the highest impact on informal earnings and business transactions between both sectors. So what seems to be important is the growth of the size of the formal sector which in many ways can influence activities in the informal sector. Exploitation of the linkages derived via earnings or sales between both sectors might take too long to reach any policy objectives.

Opportunities and constraints in agriculture:

A gendered analysis of cocoa production in Southern Cameroon[*]

Abstract: In this paper we examine gender differences in cocoa production in Cameroon using a survey of about 1000 cocoa producers in Southern Cameroon. We find that women farmers have access to land (of similar size to men), but through different mechanisms than men. They are strongly disadvantaged when it comes to access to extension services and marketing and control of proceeds. Despite these disadvantages, the productivity in terms of output per unit of land is similar to that of their male colleagues. Productivity analyses suggest that a slight disadvantage in productivity on female plots turns into a slight advantage when controlling for all the factors affecting productivity. The policy message from this is quite clear: Independent women farmers are a reality in Cameroon that need equal access to inputs and technologies, and support. If given equal opportunities, their productivity is at least as high as that of men.

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[*] Based on joint work with Herve Bisseleua and Stephan Klasen

5.1 Introduction

It is now common knowledge that men and women both play substantial – though different – economic roles in African economies; and that gender inequality in education and employment directly and indirectly limits economic growth in Africa (Klasen, 2002, Klasen and Lamanna, 2008, World Bank, 2001, Blackden et al, 2007).

The question arises if the removal of these gender-based barriers in agriculture (taking the Cocoa sector as a case study) will make a substantial contribution to realizing Cameroon's agricultural growth potential. To answer this question, the paper starts with the hypothesis that gender inequality in education and in access to important resources and inputs for agricultural production would lead to inefficient allocation of resources and may reduce productivity. This is based on analyses of Blackden and Canagarajah (2003) and Blackden et al. (2007), and Udry (1997) which show that reducing gender-inequality in access to and control of key productive resources necessary for growth, is a concrete means of accelerating and diversifying, making growth more sustainable, and ensuring that the poor both contribute to, and benefit from, that growth. Several studies have reported that in many countries, it is more difficult for females to have access to capital, land and financial or other assets that permit them to be entrepreneurs or improve their productivity (Blackden and Bhanu, 1999, ILO, 1995).[1] Given the importance of agricultural for growth and poverty reduction in many Sub Saharan African countries, including Cameroon, it is particularly worthwhile to investigate to what extent inequalities in access to resources and inputs limit efforts to improve agricultural productivity in Cameroon. Given the importance of the cocoa sector for Cameroon's agriculture, our empirical analysis will focus on that sector.

5.1.1 Objectives
Using gender as an analytical approach, that is, viewing resources and benefits as being distributed within society and its institutions, including the family, market and the government on the basis of gender (roles, relations), the purpose of this paper is to:
a) identify the influence of gender in different aspects of cocoa production,
b) assess the impact that gender disparities have on productivity,
c) study gender differential in cocoa marketing and control over proceeds

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[1]   There is also some literature that claims that households with boys tend to use purchased fertilizers and insecticides more intensively compared with households with girls and that households with boys also tend to have larger land holdings, and use animal and human labor to a greater extent than households with girls, there is no positive correlation drawn between these bias in favor of boys to total productivity (Bhagowalia et al., 2007).

in order to arrive at recommendations for promoting a more gender-equitable "pro-poor growth" in the agricultural sector.

In this paper, we draw on results from a 2007 survey of male and female cocoa producers in Southern Cameroon[2] to investigate to what extent there are gender differences in access to land, inputs, extension services, productivity, and control of proceeds. The results of the study clearly indicate that women farmers, contrary to our expectations and the subordinating role suggested in some studies (Sikod, 2007 and Bryson, 1981, 1979) are experiencing improved opportunities for independent cocoa production. At the same time, a male bias in participation in cocoa cultivation, ease in land acquisition, more regular contacts with extension officers and amount of money spent on land preparation remains. The regression results confirm that land productivity on female farms is slightly lower than that of males and that plot size, variety of cocoa cultivated as well as amount of money invested in land preparation are very important factors determining productivity. There are important differences, however, between single, widowed and married female producers in these gender-based inequalities. When controlling for these inequalities, however, land productivity on female farms is equal to that of male farms, suggesting that these inequalities are responsible for reducing their output. Our results also suggest that women are particularly disadvantaged when it comes to the marketing of cocoa and control over the proceeds.

5.1.2 The importance of agriculture in Cameroon

The choice of the agricultural sector and cocoa in particular to measure the impact of gender inequality on economic growth is due to its importance in the Cameroonian economy. Besides that, women play a pivotal role in African agriculture; they act as producers, processors and marketers (Staudt, 1982). The agricultural sector takes the front stage when one examines the economic and poverty situation in Cameroon. The main cash crops, which provide about 40 percent of Cameroon's exports, are cocoa (Cameroon is the world's fifth-largest producer), coffee and cotton. Before Cameroon began exporting oil in 1977, cocoa and coffee was the mainstay of the economy, contributing about 80% of the country's GDP. But after two decades (1980-2000) of neglect and a poorly handled economic liberalization policy, the share of agriculture in GDP has fallen drastically (see figure 5.1) and the two sectors represent only 1.5% of GDP (Amin, 2001). The production and exportation of cocoa and coffee had declined precipitously after 1989 in response to the government cut of producer prices and subsidies (Courade and Alary, 1994, Janin, 1996, Mama, 1996, Bamou and Masters, 2006). This decline in cash crop production could be explained by the shift in small-scale production from export crops to food crops

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[2]   Southern Cameroon for the purpose of this paper refers to the following Provinces: Centre, Littoral and South West.

due to an increase in demand of food crops, increased input cost caused by a government phase-out in the subsidies for fertilizers, pesticides and herbicides programs (Ndoye and Kaimowitz 2000, Sunderlin et al. 2000). Figure 5.2 below shows the trends of Cameroon's cash and food crop production and figure 5.3 shows the trend of cocoa exports as well as assistance given to cultivators of the various crops. As shown, cocoa exports have fallen and direct assistance has turned negative. As the cocoa sector shrank, Cameroon's economy developed a heavy dependence on oil in the early 80's. Petroleum output share which accounted for 20% of GDP in 1980 dropped to 5.6% by 1998/99. Though the big rise in oil prices in 2000 doubled the share of oil in GDP, this was dampened by a 4.7% drop in the volume of production (AEO, 2003). This increase in oil share of GDP in the early 80's led to a reduction of agricultural share in GDP from 42.3% in 1962 to 33.4 % in 1991, 30 percent in 1998 (Amin, 2001) and 26% in 2002 (AEO, 2003).

Though services and manufacturing (figure 5.1) and to some extent oil continues to assume an important role in Cameroon's economy, agriculture still remains the main economic activity for the majority of the population, and particularly for the poor. Over two-third of the working population are employed in agriculture, and the sector contributes about a quarter of value added and brings in a third of export earnings (AEO, 2003; Amin, 2001). In this regard, cocoa was selected to examine the impact of gender inequality on productivity and to develop recommendations as to how improving gender equality could contribute to pro-poor growth.

Fig. 5.1   GDP by sector in 2001/2002

Other private services 12%
Government 8%
Food crops, livestock, fishing 19%
Commerce, restaurant, hotels, etc 24%
Export crops 5%
Forestry 2%
Oil 5%
Construction, electricity gaz and water 3%
Manufactures 22%
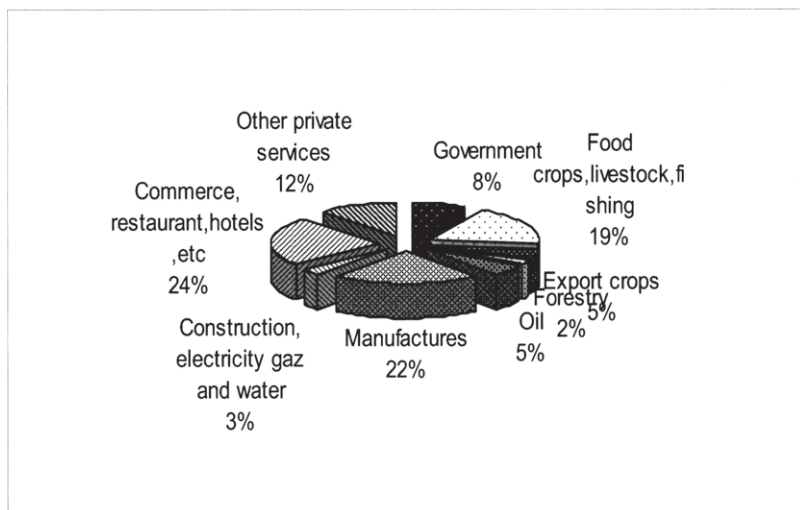
Source: African Economic Outlook, 2003

Fig. 5.2   FAO estimates of average yields for major food and cash crops, 1961-2005 (mt/ha)
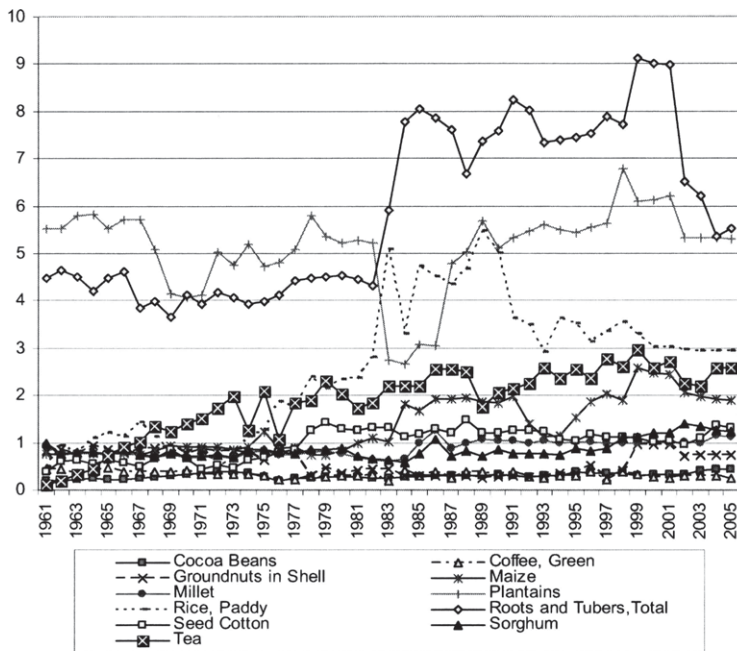
Source: Bamou and Masters, Oct. 2006

Fig. 5.3a Direct Rate of Assistance by commodity
Cameroon (2000-2004)
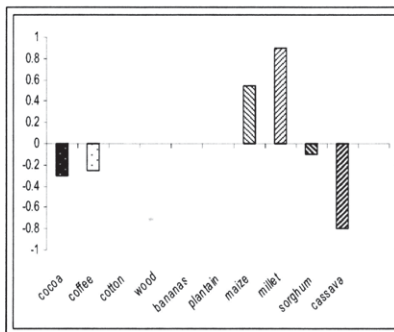
Fig. 5.3b Cocoa exportation trend
Cameroon (1961-2000)

Source: Bamou and Masters
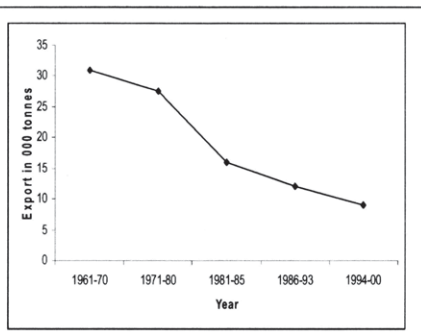
Source: Constructed from data by Lade Dada

5.1.3 Study site and data presentation

Twelve communities were selected from six main cocoa growing sub-divisions: Ngomedzap, Obala, Mbangassina and Bokito in the Centre province, Boumyebel in the Littoral province and Kumba in the South West province. A number of villages where chosen for the survey from these communities based on their population density (Appendix 1). Regions in the Centre are located between 3°35'N and 11°48' and 11°15' E with a mean annual rainfall that varies between 1400 and 1900 mm, while Kumba is positioned between 4 ° 30'N and 9 °25 E with a mean annual rainfall ranging between 2500 and 4000 mm. Rainfall seasonality and altitudinal range characterize the local ecosystem as that of a tropical wet forest life zone and suitable for cocoa cultivation (Kotto-Same et al., 1997).

The communities were small, representative of rural villages in Cameroon (500 - 5000 inhabitants), yet differing in many respects. Villages in Kumba and Mbangassina are mainly composed of migrants, who are more market-oriented and less concerned with land accumulation than their indigenous counterparts. Women in these communities are more engaged in commercial activities that require them to leave their households for distant market places. Communities in Bokito, Boumyebel, Ngomedzap and Obala are mainly composed of indigenous people that are less market oriented. Women in these communities are also involved in small income generating activities, but unlike their counterparts in Kumba and Mbangassina, they generally carry out their trade within their homes and generate considerably fewer earnings. The farming system in all the communities is based on long fallow and slash-and-burn techniques in a forest environment using the short handled hoes as described by Duguma et al. (2001).

Agriculture in all communities consisted of smallholdings where men, particularly senior men, occupy central positions. In these villages, descent is traced patrilineally and control over productive resources is corporate. Age and sex are important characteristics in social, political, and economic contexts, with elders dominating juniors and men typically holding more power than women and marriages being frequently polygamous.

5.2 Gender differences in cocoa cultivation

The study based on a survey of 1030 cocoa farmers shows that customary land tenure institutions are gradually evolving towards individualized systems. Though difficult to quantify, many more females can purchase and own land and this provides incentives to invest more in cocoa cultivation. The individualization of land tenure is strengthening women's land rights, thus breaking one of the strongest barriers to cocoa cultivation by women, which is

access to land. Many husbands are also circumventing traditional practice by enabling their wives to inherit land through "indirect means", which are often explained as rewards to wives for helping their husbands plant and cultivate cocoa since cocoa production is very labour intensive. Women are usually in charge of the corresponding weeding and pruning which are very important to ensure the proper growth of cocoa.

Table 5.1   Land acquisition methods

Land acquisition	Percent	
	Male	Female
Forest clearing	12.1	1.8
Heritage	77.2	57.8
Gift	2.5	3.7
Purchase	8.2	20.6
Marriage		16.1

Source: Authors' calculation from survey data

Table 5.1 indicates that there is a major difference in land acquisition methods between men and women. The majority of men acquire land by heritage and forest clearing, whereas women in possession of land claimed to have obtained their land by heritage, purchase and marriage, in that order. More women acquire land through purchase than men. In addition, by circumventing traditional practices (women not being allowed to inherit or own land), men also permit women to obtain land by marriage. Looking only at females (table 5.2); it is surprising to see that the majority of married women acquired land through purchase, while the majority of single women and widows actually acquired their land through heritage. Widows and singles have more control over land than married women with regard to passing on or renting land to others.

Table 5.2   Land acquisition by marital status (Women)

	Married	Single	Widow
Cleared Forest	1.3	4.2	1.8
Heritage	35.4	75	68.2
Gift	8.9	4.2	0
Marriage	12.7	0	22.7
Purchase	41.7	16.6	7.3

Source: Authors' calculation from survey data

If men are traditionally land owners in Southern Cameroon, it is also worth noticing that land titling which would have strengthened their land rights at women's expense is not an issue since most people have no land title for the land they own. Only 15.5% of the cocoa farmers were in possession of a land title.

Table 5.3   Level of education by sex and marital status

	Male				Female		
	Married	Single	Widower		Married	Single	Widow
None	28.1	22.8	67.9		54.8	41.6	70
Primary	65.2	68.4	25		42.7	50	30
Secondary	4.5	3.5	0		1.2	0	0
Tertiary	2.1	5.3	7.1		1.2	8.4	0

Source: Authors' calculation from survey data

Table 5.3 indicates that though education does not seem to be an issue in these village communities, there is a large disparity regarding the education attainment level between male and female cocoa farmers in Southern Cameroon. This gender bias in educational outcomes is a constraint women face which holds them back from adopting new methods of cultivation, thus limiting their chances of benefiting from economies of scale or fully participating in marketing channels higher up stream. Klasen (2002) and Knowles et al. (2002) remarked that in an economy where there is inequality in girls' education, the average level of human capital is likely to be low, resulting in lower returns on investment and economic growth.

The total area cultivated with cocoa exhibits no major differences between males and females in size, with the average area cultivated being estimated at 5.5 hectares). The major problem here is the secondary role women occupy in these activities and their limited opportunities to productive assets. Women spend almost 50% less income than men on land preparation; have fewer contacts with extension officers as shown below (table 5.4) and are also pre-occupied by food crop cultivation since they have to cater for the food self sufficiency of the family. Distinguishing contacts with extension officers by sex and marital status, it is observed that there is no major disparity between married men and women; whereas single women and widows on average have fewer or no contacts with extension officers (see fig. 5.4).

Table 5.4   Contact with extension officers

Frequency	Male	Female
Never	53.3	72.4
Less Frequent	16.3	12.2
Frequent	25.3	10.7
Very Frequent	5.1	4.7

Source: Authors' calculation from survey data

Fig. 5.4   Contact with extension officers by sex and marital status
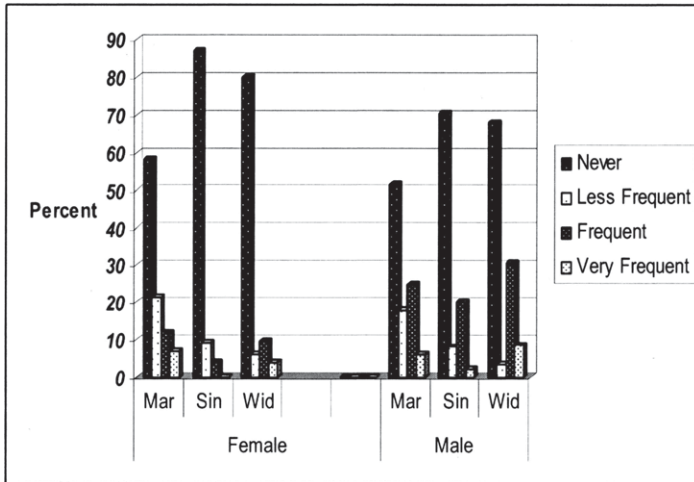
Source: Authors' calculation from survey data

Another very important factor is the number of hours and days cocoa cultivators spend on the cocoa farm. Males spend twice the number of days on farm as females, but both sexes spend the same number of hours on average per day on farm (5hrs/day).

Cocoa cultivators combine their activities with other food crop production. Particularly women do so in order to satisfy the food sufficiency of their households. Due to the barriers they face in accessing cocoa cultivation and controlling the marketing and revenue from cocoa, it is also seen that women prefer to engage in the less profitable food crops which they can control[3]. Below is a list of some of the crops combined with cocoa. It is seen that women prefer to associate cassava, maize, cocoyam and groundnuts in that order to cocoa production whereas men prefer maize, plantain, cassava and groundnuts in that order[4]. Table 5.5 below indicates that women sell more of their crops associated

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3   Women normally market and control the revenue from their food crop production whereas women involved in cocoa cultivation seek assistance from male relatives to market their cocoa for them in the absence of a spouse. Thus losing control over the marketing and the revenue generated.

4   Women principally prefer to associate those crops with cocoa which require further processing thus increasing their market value. Cassava is transformed into several other staples consumed by households known locally like garri, fufu, bobolo etc. Men's choice of crops associated with cocoa could be explained by the fact that these are crops which are less demanding in time and

with cocoa than males. Since they have little access to revenue from cocoa cultivation in which they actively participate, they sell most of the food crops associated to cocoa cultivation in order to generate income for themselves.

Table 5.5   Share of crop associated with cocoa sold

	Male	Female
Cassava	65%	72%
Cocoyam	0	60%
Maize	57%	77%
Plantain	80%	0
Groundnut	58%	42%

Source: Authors' calculation from survey data

The difficulties faced by women does not reduce the productivity of their land as there is no clear indication that men harvest more per hectare than women. This holds true at least for the married and widowed. For the married couples, this could be explained by the difficulty in separating their yields between themselves, but we start recording slight surpluses in yield from men when we consider only widows and singles. The difference is particularly large among singles. Further analysis will be required to have a clearer picture on output by sex to see if the difficulties women have in accessing land, education, and extension services are counteracted by some other advantages or greater inputs in other areas (see below).

Table 5.6   Total harvest by sex and marital status

	Average harvest in bags per hectare	
	Male	Female
Married	4.2	4.3
Widows	4	3.8
Single	3.5	2.4

Source: Authors' calculation from survey (A bag = 85Kg)

Marketing the products is used as an indicator of control over revenue. For the cocoa producing areas of Southern Cameroon, figures from the tables below indicate a gap between male and female cocoa cultivators when it comes to marketing the products. The disadvantaged situation of women is even made clearer when one disintegrates marketing and revenue control by marital status. 95.7 % of male cocoa cultivators do the marketing by themselves against 61% of female cultivators. The lack of control over the marketing and, consequently the lack of revenue are clearer when looking at married cocoa cultivators. Only

control, like maize and plantains. When asked why they associated plantains to cocoa most farmers declared that this paid as much as cocoa or even better. The only problem with plantains was the high risk because it easily dies off, thus giving an advantage to cocoa cultivation which even when poorly taken care of does not die off but only suffers from a reduction in yield.

1.8% of wives market cocoa for their husbands, whereas 26.5 % of men have control over the marketing for women with cocoa plantations (see table 5.7a). Generally, men have more control on the revenue generated from marketing. Even the majority of women claiming to market their products, also indicated they gave the revenue generated to their partners for management. Table 5.7b goes further to show the extent to which women are marginalized in the control over revenue generated from agriculture. Looking only at females, it is clear that widows have more control over the marketing and thus revenue than married women. While 97% of married males control marketing, only 54 % of married females do.

Table 5.7a   Control over marketing of cocoa products by sex

Marketing				Male				Female
Self				95.7				61
Spouse				1.87				26.5
Son/daughter				1.49				7.43
Other rel.				0.94				5.07

Source: Authors' calculation from survey

Table 5.7b   Marketing Cocoa by sex and marital status

	Male				Female		
	myself	wife	other		myself	husband	other
Married	97	1	2		54	43	3
Single	95	-	5		100	-	-
widower	85	-	4		77	-	23

Source: Authors' calculation from survey

The descriptive analysis so far suggests that women have access to land, though they get this access differently than men. They are particularly disadvantaged when it comes to education, access to extension services, and control over marketing and proceeds. On the other hand, the output on their land does not appear to be noticeably lower than that of men, an issue that deserves closer attention and will now be investigated.

5.3 The model and measure of productivity

Contrary to the traditional household models which assume that farm households function like a single unit for productivity and consumption and that there is a consensus among household members on allocation of resources and benefits and that all- household member's interest and problems are identified (Cloud, 1987), the concept of gender goes further to provide evidence for the fact that, production in farm households is determined mainly by intra-household differences. That is, differences in the roles, incentives and

constraints of men and women in the household affect production decisions. Household members are likely to have conflicting preferences in regard to the intra-household distribution of effort and reward. Men and women allocate their resources to activities that best enable them to fulfil their obligations rather than to activities that are most productive from an aggregate household perspective. A very clear example of this is the case of cash crops combined with cocoa cultivation. Although women and men collaborate on some tasks on all plots, there are clearly defined plots that are managed by women and plots that are managed by men; each decide largely on their own on all aspects of production on their respective plots (although men then end up having more control over the marketing also of output from 'female' plots). Rather than viewing the household as a single unit, only the head of farm units were surveyed to capture their practices[5]. That is farm heads use the resources at their disposal to maximize output. Pareto efficiency in production would imply that marginal products should be the same on all plots planted to the same crop within a given year. Gender inequalities will be observed by comparing the differences in productivity on plots controlled by women and men.

What measure of productivity to use is certainly an open question. Most studies have used either a production function approach or used land productivity (aggregate output divided by farm size). This measure is subject to criticism as giving too much importance to one input, land. In the Cameroonian context where land for agriculture and the difficulty faced by women to obtain land are important for poverty reduction, a focus on land is appropriate. Though land productivity is also often criticized for not being an accurate measure of efficiency, the issue of technical efficiency will not be examined. This is defensible in the context of Cameroon as the cocoa sector in Cameroon makes very little use of modern technology.

The hypothesis is that gender inequalities reduce the productivity of females. The impact of gender inequalities on productivity is tested by regressing land productivity (farm revenue from cocoa divided by farm size) on farm characteristics, farm management factors, and intensity of inputs. It is worth noticing that we cannot control for important aspects like climate and soil fertility, which also influence productivity. The specification used is as follows:

$$\log Y_i = \mu + \alpha X_i + \beta D_i + \varepsilon_i$$

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[5]   If a farmer is married, the spouse was not interviewed but information on his/her participation in the farming activities was obtained from the farmer.

where i refers to the ith individual. The dependent variable Y_i, represents yearly land productivity. On the right hand side, μ is a constant, X_i is a matrix that contains continuous explanatory variables-i.e., plot size, household size, age, hours spent on farm and amount spent on land preparation. D_i represents a vector of qualitative dummy variables, i.e. sex, marital status and contact with extension. The regression equation can be explicitly written as:

$$\log Y_i = \mu + \alpha_1 sex_i + \phi age_i + \kappa hsize_i + \nu plotsize_i + \vartheta xlapre_i + \gamma_1 mar_i + \gamma_2 wid_i + \psi_1 Hrfarm_i + \delta cox_i + \varepsilon_i$$

in which $sex = 1$ if the individual is female, 0 if male. mar = married, wid = widow and sin = single. sin is left out like the comparison group. $cox = 1$ if the individual had contacts with extension services and 0 if not. $Hrfarm$ is the number of hours spent on farm per year. $xlapre$ is the total expenditure on land preparation and pesticides.

Table 5.8 below presents the descriptive statistics for the dependent and independent variables used in the regression analysis. Note that women tend to have slightly smaller plot sizes, have much lower contact with extension officers, are slightly older, spend fewer hours on the farm, but spend more money on land preparation.

Table 5.8   Descriptive Statistics on Cocoa Cultivation by Sex

Variable	Male	Female
Land Productivity (bags/Ha.)	4.1	3.9
Age	49.3	51
Household size	7.2	6.2
Sex (Female=1 and male=0)	78%	22%
Plot size (Ha./household)	5.9	5.5
Hours spent on farm/year	1150	1052
Contact extension office(cox)	47.8%	29.7%
Marital status:		
1. Married	88.8%	37.6%
2. Widow	3.8%	51.4%
3. Single	7.4%	11.0%
Exp land preparation/Ha. (CFA)	84 488	91360

Source: Authors' calculation from survey

5.4 Results and Discussion

We begin with a simple regression of land productivity on sex which indicates a slightly lower productivity for women although the coefficient is rather small (suggesting 4.4% lower land productivity per hectare for women) and not

significant (table 5.9). In the next model, all the other variables are included (age, household size, marital status, plot size, expenditure on land preparation and pesticides, contact with extension services and hours spent on farm). There is an inverse relationship between plot size and land productivity which is highly significant; smaller plots have a higher land productivity, which is in line with evidence from elsewhere (e.g. Binswanger, Deininger, and Feder, 1995). Expenditure on land preparation is estimated to significantly increase land productivity. So, the more a farm spends on land preparation, the higher land productivity that farm will enjoy. Labour input is captured in our model by the log of hours spent on farm. There is a positive and significant correlation between hours spent on farm and productivity. Contact with extension services significantly increases land productivity. Contrary to our expectation, education which we expected to increase land productivity, since knowledge should improve farming ability was highly insignificant and this could be explained by the generally low level of education among the cocoa farmers in the study site. For this reason, education was left out of the regression. Even the inclusion of household size and age considered as important factors representing labour support and experience and capable of influencing productivity were also insignificant. Married couples enjoy higher and significant productivity than singles (comparison group). Widows indicate a higher productivity than singles but the difference is insignificant. The number of hours spent on the farm is significant and positively influences the productivity of the farmers.

After controlling for all these factors which we consider could be playing a major role in influencing the productivity of the farmers, it is shown that sex is not significant in determining productivity though there is a small edge in favour of women of 0.4%. That is to say, controlling for other factors, plots managed by women are at least as productive as those by men, when controlling for all factors affecting productivity, particularly also those where women are disadvantaged.

Table 5.10 below shows the complete results of the regression after including all the independent variables. The coefficient of sex is influenced by the introduction of other variables though it remains insignificant.

Table 5.9   Survey regression of land productivity of cocoa plots

	Coefficient	Robust Std. Err.
Sex	-0.044	0.066
Intercept	11.68***	0.086
R-Squared = 0.00 # of Observation = 812		

(*significant at 10% **significant at 5%, ***significant at 1%)
Source: Authors' calculation from survey data

Table 5.10 Survey regression of land productivity of cocoa plots

	Coefficient	Robust Std. Err.
Sex	0.004	0.084
Log of plotsize	-0.351***	0.039
Log xlaprc	0.065***	0.018
Mar	0.237*	0.129
Wid	0.108	0.147
Cox	0.173***	0.059
Hsize	-0.006	0.006
Log Hrfarm	0.082**	0.041
Age	0.003	0.002
Intercept	10.44***	0.379
R-Squared = 0.13 # of Observation = 812		

(*significant at 10%, **significant at 5%, ***significant at 1%)
Source: Authors' calculation from survey data

5.5 Conclusion

Despite the complexity encountered in separating 'difficulties' faced by farmers and 'preferences' made by these farmers, several interesting conclusions come out of this study. Generally, agriculture and in particular cocoa production was and still remains an underexploited opportunity to generate income and contribute to pro-poor growth in Cameroon. The low participation of women in cocoa cultivation though they are equally as productive as men and the non-use of modern technology are some of the factors limiting the exploitation of the opportunities in cocoa cultivation. According to the farmers, this is due to the absence of adequate government support to cocoa farmers as well as the poor liberalization of the sector cited by Amin (2001).

Limited contacts to extension services hinder the access of farmers to modern methods of cocoa cultivation. It is identified that, though most of the constraints experienced by cocoa cultivators are common to men and women, access to extension services for women is much lower, thereby negatively influencing their agricultural output and limiting their chances of getting out of poverty through agriculture. Women encounter more difficulties than men in acquiring land necessary for agriculture. They are generally less educated than men and this limits their ability to apply simple economic principles or to fully participate in marketing channels. Women's double 'work day', identified in other studies causes them to spend fewer number of days on the farm than men though they spend the same number of hours per day on the farm. It is also seen from the data that work is equally shared between men and women in cocoa cultivation, but there is a gross imbalance at the level of control of marketing and the revenue that ensues.

The most important aspect of this study was to identify the impact of gender on productivity. First, sex's overall impact on productivity is small. Once controlling for the most important factors affecting productivity, including those where women are disadvantaged, women's slight disadvantage turns into a small advantage. This slight disadvantage in productivity which turns into a slight advantage for women after controlling for certain factors can be explained by the greater attention and care women give to their farms. Table 5.8 indicates that women spend on average more on land preparation then men. Expenditure on land preparation consisted of expenditure on pesticides, herbicides and labour recruitment for clearing and preparation of the farm. Since some other important factors have not been controlled for (in particular, land quality), it may even be the case that women are actually more productive when given equal opportunities. This conclusion would be warranted if women are operating in general on land of lower quality.

A consistent result of this study is that expenditure on land preparation and pesticides significantly and positively influences productivity. The coefficient of contact with extension officers makes the case for better access to extension services and training programs in new and modern methods of cultivation. In the absence of modern technology, the negative and significant correlation that exists between plot size and productivity is understandable.

It is no stretch to say that the argument for promoting gender equality in access to land, inputs, and technologies is bolstered by this study. The insignificance of sex in determining productivity is a clear case being made in favour of the eradication of the notion that there are male crops (cocoa) and female crops and that with equal opportunities, women could even be more productive. Particularly worrying is that women have little control over the marketing and proceeds of cocoa. The impact this has on household decisions and family welfare has not been investigated here, but is an urgent further research priority.[6]

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[6]   In line with literature summarized in World Bank (2001), it seems likely that their lower control over the proceeds has negative impacts on household welfare.

Appendix 1: Distribution of study sites in Southern Cameroon

Districts	Communities	Villages surveyed
Ngomedzap	NNomNNam	Akok, Ayene, NNomNNam, Bilon, Tiga
	Abod-Mveng	Abod-Mveng, Nkolbewa, Meva'a Mebot, Nkolmbong, Bikonong, Adzap
Boumyebel	Libel-ligoï	Libel-ligoï North and Libel-ligoï South
	Simanyai	Simanyai I, Simanyai II, Pan-Makak, Pan-Kombe, Pan-So-Makonde
Obala	Etong-Bidjoe	Etong-Bidjoe, Ekabita-Essele, Zima, Kouradeng, Legom, Efok, Nkometou
	Nkol-Obang	Nkol-Obang, Etoud'Ayos, Elig-Nkouma, Lékié-Assi, Oyama, Nkomassi, Nkoa-Akom
Mbangassina	Talba	Talba, Iyambouni, Mpi, Etam-Nyat, Kwassara, Okola
	Biakoa	Biakoa (centre and village), Goura (centre and village), Mbangassina (centre and village)
Bokito	Kedia	Kedia, Ediolomo, Bokito, Tobagne
	Bakoa	Bakoa, Yorro, Begni, Assala I
Kumba	Kossala	Kossala, Kumba
	Ikiliwindi	Ikiliwindi, Ikiliwindi mile 10

Appendix 2: DATA COLLECTION

The survey was conducted from October through November 2007 in the selected communities. In each community, 100 farmers (men and women), all members of the cocoa farmer organizations (Common Initiative Group), were randomly selected with the initial objective to select 50 women and 50 men per community. However, this objective was not met due to the poor involvement of women in cocoa farming in most communities. The questionnaire was pre-tested in two communities (Obala and Ngomedzap) and revised prior to use in the study areas. The pre-survey was performed with key informants and focus groups. The resulting observations were used to inform the French version of the original English questionnaire. From the total of 1150 questionnaires administered, 1030 cocoa farmers (807 males, 223 females) were finally selected as our sample and the rest discarded for incoherence in response. Farmers answered to the questions during one-on-one meetings with interviewer which took between 30 and 60 min per interviewee. For some villages, the interviewer was accompanied by village officials. All answers by farmers were regarded as correct and efforts were made to prevent farmers from perceiving the survey as an "examination". Twelve interviewers were selected among university students of diverse background and were trained in general issues in cocoa production, livelihood asset analysis and survey research techniques. The interviewers also received information of a socio-cultural nature on the farming communities with whom they were to be working in order to become more familiar with the individuals they will encounter. That is, their farming systems and farming behaviour from a gender perspective.

The survey tool, designed for multiple purposes, consisted of several sections[1]. The first section was to provide a demographic and socio-economic profile of farmers in each community. In the second section, farmers were assessed on their mode of land acquisition, land title and property rights. The third section of the survey focused on cocoa management and production constraints. Here the varieties grown, the type of farm sanitation activities, pest and disease management practices, pesticides and the labour used were documented. The fourth and fifth sections assessed other farming activities and extension support. The last section of the survey covered farmers' yield variation from 2005 to 2007 as well as cocoa marketing and other agricultural and non-agricultural products.

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[1]   The survey also captures enough data which could be used for biological studies: Variety of cocoa planted, pest and diseases encountered, pesticides and insecticides used as well as cultivation methods.

Appendix 3: Questionnaire

Questionnaire
Opportunities and constraints in agriculture:
A gendered analysis of cocoa cultivation in Cameroon

Farmer ID code ☐☐

Locality: _____

Date of survey: _____   Name of Enumerator: _____

1. Personal information

Name of farmer: _____   Age: _____

Sex: 1. ☐ M   2.   ☐   F

Status: 1.☐   Married   2.☐ Single   3☐ Widow   4 ☐Divorced/separated

5. ☐ Living with other spouse

Religion

1. ☐ Catholic   2. ☐ Protestant   3. ☐ Muslim

4. ☐ Pentecost   5. ☐ Animist   6. ☐ No religion

Ethnicity

1.☐   Indigenous   2. ☐ Migrant   3.   ☐ Other, specify:

Size of household

_____

Level of education:

1. ☐ none   2. ☐ Some primary   3. ☐ Completed primary

4.☐   Attended secondary school   5. ☐ Completed secondary school

6. ☐ Attended college or university

Can write: 1. ☐ Yes   2.☐ No

Can read   1. ☐ Yes   2.☐ No

Occupation

1. Main occupation_____
2. Second occupation_____
3. Third occupation_____

Acquisition of land

What is the size of your plot?_____

Since when do you own the plot? Month/Year (if possible)_____

How land is acquired
1. ☐ Cleared primary forest 2. ☐ Heritage   3. ☐ Purchase   4. ☐ Marriage

5. ☐ Gift   6. ☐ As loan from defaulting borrower   7. ☐ Son   8. ☐ Other

If 3 how much did you pay for the land? _____

If not, estimate current value of the plot_____

From whom did you get the plot?
1. ☐ Family members   2. ☐ Other relative   3. ☐ Friend   4. ☐ Neighbour

5. ☐ Other person in the village   6. ☐ Other person outside the village

Do you have an official land title?
1. ☐ Yes   2. ☐ No

What kind of title
1. ☐ Certificate   2. ☐ Contract of sale   3. ☐ Letter from the village headman

4. ☐ Letter from the seller   5. ☐ Letter from other person

5. ☐ Other _____

Do you have the rights to:

Rights to	1. Without approval of oth Family member	2. With approval of other Family member	3. No
Pass On			
Sell			
Rent out			
Mortgage			

Type of soil

1. ⬚ Fertile soil   2. ⬚ Medium-fertile   3. ⬚ Less-fertile

Distance of land from the forest

1. ⬚ At the forest border   2. ⬚ In the forest   3. ⬚ Less than 50 m

4. ⬚ Less than 100 m   5. ⬚ Less than 500 m   6. ⬚ Less than 1 km

7. ⬚ More than 1 km

Are forest trees left?
1. ⬚ Yes   2. ⬚ No

If yes how many _____

Are exotic fruit trees left?
1. ⬚ Yes   2. ⬚ No

If yes how many _____

Output and input for cocoa

Code Plot	Area planted	Age of trees	Variety Code1	Weed Control 1. manual 2. herbicide 3. no	Pruning 1. Yes 2. No	Remove Infected pods 1.Yes 2. Yes + A 3. Yes A+B 4. No	Coppicing 1. Yes 2. No	Harvest Time (Mn/Yr)	Qty	Unit 1. kg 2. piece

Code 1
1. German cocoa
2. Hybrids
3. Local material or breed
4. Mixed material

Expenses for land preparation _____

Planting distance (in meters) _____

Expenses for plant materials _____

Location of the cocoa farm

1. ⬜ Near the village   2. ⬜ Near the forest

3. ⬜ Near other cocoa farms   4. ⬜ In the forest

Type of shading trees

1. ⬜ forest trees species only   2.   fruit trees species only

3. ⬜ forest and fruit tree species   4. ⬜ No shade

5. ⬜ Other (specify)_____

Crop associated with cocoa

1. ⬜ Maize   2. ⬜ Cassava   3. ⬜ Palm oil

4.   Plantain and bananas   5. ⬜ Other (specify) _____

Amount of shading

1. ⬜ Little (≤5%)   2. ⬜ Average (≤ 35%)

3. ⬜ High (≤ 65%)   4. ⬜ Very high (≤ 95%)

Fertilizer, Pesticides and labour costs

Plot Code	Application of fertilizer			
	Type	Quantity	Price/type	Time

Application of Pesticides				
Plot code	Type	Qty	Price	Time

Cost of labour				
Plot code	Number of Person employed	In number of days	Paid in CFA	Paid in Kind

Output and input of oil palm

Code of Plot	Area planted	Age of trees	Variety	Weed Control 1. manually 2. herbicide 3. no	Harvesting Time (Month/Year)	Quantity harvested	Unit 1. kg 2. pieces

Other farming activities

Crops Grown	Area Planted	Intercropped With cocoa 1. Yes 2. No	Time of Planting Month/Year	Time of Harvesting Month/Year

Crops Grown	Quantity Harvested	Unit 1. Kg 2. Bags 3. Pieces	Money spend On land preparation In CFA	Origin of Seeds or planting materials	Cost of purchase Of seeds and Planting materials

Contact with extension

Do you have contact with extension services?
1. ☐ Never   2. ☐ Less frequent
3. ☐ Frequent   4. ☐ Very frequent

In which year did you meet an extension officer for the first time?_____

Have you met an extension officer in the last twelve months? _____

How often have you met an extension officer in the last twelve months?_____

Most important topics discussed and concerning which crops?

	Crops	Topic
1		
2		
3		
4		

Do you know about new integrated control methods: 1. □ Yes   2. □ No

Yield variation

Give an estimate of the yields of the following crops

Crop	Harvested in 2007 1. Yes 2. No	If Yes Yield Kg/ha	Harvested in 2006 1. Yes 2. No	If Yes Yield Kg/ha	Harvested in 2005 1. Yes 2. No	If Yes Yield Kg/ha
Cocoa						
Oil palm						
Plantain/Banana						
Maize						

Collection of products from forest

Forest Product	How often do You collect It? 1. weekly 2. twice a week 3. daily	Who collects I.D. member	Do you sell These products 1. Yes 2. No	Percentage (%) Or Qty sold	Value received In 2007 CFA	Value received In 2006 CFA

Collection of exotic fruits from farm

Exotic Fruits	How often do you harvest It? 1. weekly 2. twice a week 3. daily	Who collects I.D. member	Do you sell These products 1. Yes 2. No	Percentage (%) Or Qty sold Kg/bag	Value received In 2007 CFA	Value received In 2006 CFA

Self-employment

Did you gain any income from any other activities?

	Activity	Income	Type of contract	Total number Of days worked	Satisfaction 1. Yes 2. No	Remarks
1						
2						
3						
4						
5						
6						

Other source of income and assistance

Are you benefiting from some kind of public/NGO transfer program or remittance from family   member/ friends in the last three years?

Type of program	Who is Providing The program	What kind of Assistance or training	Person who Sent money	Estimated Amount	Relationship	Sort of remittance 1. Food 2. clothes
1						
2						
3						
4						
5						
6						

Marketing

Crops	Quantity (Kg, Pieces Bags)	Who markets the product	Where does the transaction take place	Buyer type	Amount received CFA	System of payment	Transportation costs from home to market
1							
2							
3							
4							
5							
6							

Credit obtained

Do you have access to credit?   1. ☐ Yes   2. ☐ No

If yes what is the maximum amount of money you can borrow if you really need money

	Credit source	Amount in CFA
1		
2		
3		
4		
5		

Food and clothing related indicators

How much you spend on the following?

	items	Amount in CFA per month	Remarks
1	Food		
2	Housing		
3	Trans/comm		
4	Health		
5	Clothing		
6	Leisure		

Livestock Possession

Do you possess any livestock?

Livestock	Quantity	Who markets the product	Amount received CFA	Quantity consumed
1				
2				
3				
4				
5				

Other assets

Do you still own the following assets

Assets	Number owned	Estimated Sales Value (cfa)	Do you still own It? 1. Yes 2. No	If no: Number owned now?	Member who uses it?	Estimated current sales value Using method	
House/ building						Current value	Cost to replace it (Cfa)
Motorbike							
Bicycle							
Vehicle							
Radio							
TV							
Mobile phone							
VCD/tape player							
Gas cooker							
Kerosene cooker							
Fans							
Sprayer							
Water pump							
Other							

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