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WHICH INEQUALITIES MATTER FOR AFRICA'S SUSTAINED GROWTH AND POVERTY REDUCTION?

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This Occasional Paper establishes that African countries need to pursue economic diversification and structural transformation vigorously using appropriate policies and institutions that address inclusive growth priorities. In addition, good governance and a committed national leadership with a developmental vision are crucial ingredients. Any capacity building interventions have to be crafted taking these priorities into account as well as the contextual factors that determine a particular country's economic direction.

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WHICH INEQUALITIES MATTER FOR
AFRICA'S SUSTAINED GROWTH AND
POVERTY REDUCTION? A Macro-
Micro Comparative Analysis with
Case Studies on Cameroon and
South Africa

PREFACE

Africa has been the second-fastest growing region in the world over the past decade. Some countries like Rwanda have done well; Ethiopia has been showing promise. Angola, Tanzania, and Mozambique are growing fast. Ensuring access to and equity of opportunities created by economic growth, including equal access to basic social services (such as education and health services) is of utmost importance. But it is paradoxical that most poor people live in Africa. It seems the high growth performance is not translating into shared opportunities in social, human, and physical development or well-being. Poverty is still a scourge in many African countries and unemployment is increasing even as these countries achieve higher growth rates and increased investments and trade volume. Why is higher economic growth not translating into better living standards and lower poverty rates? Partially, the response has to do with some segments of the population disproportionately capturing growth's outcomes. There is a general consensus that reducing inequality will make economic growth pro-poor. As this study shows, Africa's inequality problems largely have spatial, economic, and gender dimensions.

While inequalities are understood, the actions implemented thus far have had little effect. Capacity for effective strategy implementation and robust monitoring and evaluation of programs is needed. The continental Agenda 2063 recognizes the importance of paying attention to issues related to inequality. Among other challenges, the First 10 Year Implementation Plan describes the inadequate capacity for diversity management, the real or perceived inequality and discrimination against minorities, the marginalization along ethnic and religious lines, and the alienation and consequent disillusionment of youth as potential causes of crisis and insecurity.

It is against this background that the African Capacity Building Foundation (ACBF) has produced this occasional paper under its Strategic Studies Group. The aim is to provoke discussion, encourage further investigation, and lay bare for action the critical capacity challenges at the center of Africa's observed inequality.

This paper examines the growth, poverty, and inequality dynamics in a macro-micro comparative approach using disaggregated measures of inequality. The findings suggest that policy efforts should target class inequality, especially gender and age related. Among other recommendations, this paper suggests that countries like South Africa should shift focus from interracial inequality to inter-class inequality broadly, which is affecting its economic performance.

The ACBF believes that, in addition to its support in establishing think tanks and policy institutes and strengthening individual and institutional capacities throughout the continent, generating knowledge such as this will help enhance evidence-based policymaking processes.

Building the capacity for policy analysis and economic management remains a Foundation priority. Our hope is that the stakeholders and development partners will join us to continue the journey of strengthening human and institutional capacity for sustainable African development.

Professor Emmanuel Nnadozie
Executive Secretary
The African Capacity Building Foundation

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The paper was produced as part of the African Capacity Building Foundation (ACBF) Strategic Studies Project, which aims to provoke discussions and raise awareness about strategic issues of importance to Africa and its development agenda. Strategic studies topics were selected through a consultative process by members of the Policy Institutes Committee and the Strategic Studies Group (SSG). Special thanks to members of both networks. In addition, we thank the SSG for its critical review of the manuscript.

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About the African Capacity Building Foundation

The African Capacity Building Foundation (ACBF) is Africa's premier institution in capacity building. Established in February 1991, ACBF builds human and institutional capacity for good governance and economic development in Africa. The Foundation has empowered governments, parliaments, civil society, private sector, and higher education institutions in more than 45 countries and six regional economic communities. It supports capacity development by way of grants, technical assistance, and knowledge generation across the continent. ACBF's vision is that of an Africa capable of achieving its own development.

About the Strategic Studies Group

The Strategic Studies Group (SSG) is an ACBF network of global development experts and practitioners made up of the ACBF Policy Institutes Committee, selected development partners, international development specialists, and the ACBF-supported training programs and university partners. The SSG assists the Foundation in identifying key policy and emerging issues requiring the attention of the Foundation and its stakeholders.

The SSG works with the ACBF to identify research themes and advises the Foundation on strategic and pertinent issues that need special attention. It also serves as a "review panel" that shapes, examines, and evaluates the high-level studies undertaken by the Foundation.

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ABBREVIATIONS

ACBF	The African Capacity Building Foundation
AfDB	African Development Bank
FGT	Foster-Greer-Thorbecke
GDP	Gross domestic product
MIC	Middle-income country
MLE	Maximum Likelihood Estimator
OLS	Ordinary least squares model
PPP	Purchasing Power Parity
VTE	Vocational and technical education
WDI	World Development Indicators
2SLS	Two-stage least square
3SLS	Three-stage least square

All dollar amounts are U.S. dollars unless otherwise indicated.

EXECUTIVE SUMMARY

Although African economies have registered robust economic growth since 2010, distributing the fruits of this growth to all areas of society is a key challenge. A general consensus holds that reducing inequality makes growth pro-poor, and that persistently high inequality is the underlying reason for poverty reduction's slow pace. But the literature delivers mixed messages about inequality's effect on poverty reduction. One reason is that using average inequality measures masks data on inequality's interaction with growth and poverty. This study examined these interactions' underlying dynamics in a macro-micro comparative approach using a mixture of methods using disaggregated measures of inequality. The Macro dimension uses a panel of 18 countries spanning 128 observations. The micro aspects focus on South Africa, as an emerging economy and Cameroon as a developing economy. The choice of these two countries were motivated by adequate household survey availability and the position, representing different development levels and cultural orientations. The following paragraphs describe six major findings.

First, the study shows that growth in the agriculture and services subsectors is associated with less inequality. These sectors employ the most people at the lower end of the income distribution spectrum, as shown by their positive correlation with income shares accruing to the population's bottom 20 percent. On the other hand, manufacturing growth relates negatively to extreme poverty. The falling share of agriculture in gross domestic product (GDP) for most countries is thus a concern for Africa's pro-poor growth prospects. The observed negative correlation of manufacturing and industry growth with poverty suggests there is room to help make these subsectors more pro-poor.

Second, average inequality does not show any significant effect on growth. But growth leads significantly to higher average inequality, confirming observations that strong growth recovery in Africa tends to appear in the midst of persistent and rising inequality. While capital investment appears to be a stronger and more significant growth driver, human capital is a more significant driver of average inequality. This may suggest that the most skilled people take advantage of opportunities to appropriate economic growth's fruits, resulting in wider inequality. Average inequality not only drives poverty upward significantly, it more than counteracts economic growth's poverty-reducing effects. This reinforcing nature of the relationship between inequality and growth is a key concern for African economies.

Third, at the continental level, inequalities between classes in the middle and high end of the income distribution spectrum are good for growth. Micro evidence shows that in South Africa, inequalities within racial groups relate negatively with income at household level, but the relationship is positive in Cameroon. In South Africa, government public investment policies may be driving these dynamics. Pro-black policies such as Broad-based Black Economic Empowerment (BBBEE), which has helped to raise a number of black middle and top class business elites and empower young blacks to integrate the mainstream production, may be at the root of rising income leading to less inequalities between racial groups.

All inequalities between the rich and any class have poverty-enhancing effects at both continental and household levels. But inequality between the middle class and the poor has significant anti-poverty effects at both levels. This suggests that because the middle class drives small and medium enterprises as well as effective reforms and new patterns of demand, it is likely the biggest employer of the poor. Poverty reduction thus depends on this inequality.

Fourth, only inequality among the rich shows consistent positive effects on income and growth across all models. These findings are in line with Voitchovsky (2005) and suggest that high-end inequality promotes growth in Africa and elsewhere. But this inequality has a large and significant poverty-increasing effect. It drives a cycle of high growth and high top-end inequality that keeps the poor in poverty. Africa's poverty reduction gains may be reversed if this trend persists.

Inequality within the poor tends to reduce growth (though not significantly) but is still a concern, as most conflicts erupting in South Africa have generally occurred in townships and low-income neighborhoods.

The behavior of investment and human capital in the macro models suggests that mobility to high income depends more on human capital and less on investment, while upward mobility at the lower end of the income distribution depends more on investment and less on human capital. This implies that education without finance may not help the poor move up the income ladder.

So policy efforts should target between-class inequality, especially between the rich and other classes, with less effort spent on the middle class and the poor. It may be time for South Africa to shift its focus from interracial inequality to broad inter-class inequality, not only addressing racial issues but also correcting the emerging within-race inequality beginning to stress the South African economy.

Fifth, gender inequality reduces growth and growth weakly reduces gender inequality. Increases in incomes may allow more girls to be educated by limiting the constraints they generally face in developing countries, including early pregnancy, child labor, home care burden, and so on. The effect of gender inequality on poverty implies that more educationally disadvantaged girls today translates to entrenched poverty in the next generation.

At the household level, within-gender inequalities do not pose concerns. In South Africa, intra-gender inequality has a negative relationship with household income and vice-versa, while in Cameroon, the relationship is positive. In both countries, reduction in male-female gender inequality is associated with lower poverty. Perhaps more income in the hands of women could more easily reach other poor people than in the hands of men. The results however suggest that economic growth is increasingly leaving women behind. The continental-level assessment has indicated that combined measures to ease access to financial, physical, and human capital can be a possible re-balancing remedy of all types of inequality including gender.

Sixth, in Cameroon, inequalities between age groups tend to be associated with lower poverty. Unemployed poor youths are likely to live in extended families with adults, so that an increase in the gap in favor of adults would mean that youths share in the same resources. The picture is somewhat different for South Africa. Inequality across age groups tends to lead to lower income, and higher poverty. The type of social capital that one would expect in a more homogenous and socially cohesive Society like Cameroon is rather absent in South Africa where social capital has been deteriorating.

Given these findings, what kind of policies can make high-end inequality more pro-poor without jeopardizing growth? How do countries consolidate the poverty-reduction potential of the income gap between the middle class and the poor without polarizing the middle class? Some further observations may help in formulating an answer:

- Evidence suggests that within-group inequalities (whether within gender, income class, or age group) are less destructive than others.
- The emergence of a middle class is good for the poor. The relationship between the middle class and the poor should be considered key to sustained poverty reduction.
- Access to capital is more important for upward mobility than education at the lower end of distribution.
- Skill development within the poor and middle class can assist in curbing the capture of growth rents by high-end income earners—that is, make skill development broader among the middle class and use capital for small business start-ups to reduce poverty and develop the middle class.

Two complementary approaches emerge. Policies aiming to move those at the lower end of the income distribution upward will require removing constraints on credit access for investment while ensuring that human capital does not deteriorate. But where policies target top-end inequality, human capital development will be the main weapon.

Because human capital development takes longer to mature, short-term policy should target credit constraints while aiming at long-term extreme inequality reduction with development of equitably distributed human capital. Social capital can dampen inequality's adverse effects, giving time to address inequality's underlying structural elements. Policies for gender inequality reduction also require a two-pronged approach of enhancing human capital and relaxing credit constraints.

The capacity building challenges related to dealing with inequality in most African countries relate to governance issues, human capacity gaps, and finance resource deficits. The capacity to fight corruption—meaning good governance of the relationship between the state and businesses—is paramount. The related issue of state capacity for resource mobilization is also significant, as inequality leads to tax evasion and capital flight. This also hinges on the relationship between the state and large businesses.

There is significant country diversity and specificity in the way different inequalities interact with growth and poverty. We use South Africa and Cameroon to show the extent of this diversity. Developing research (specifically monitoring) evaluation and reporting capacity of policy stakeholders and academics in different countries, with respect to implementation of inequality-reducing policies and in view of preempting possible inequality- impacts of other policies.

CHAPTER 1. INTRODUCTION

African economies have registered robust economic growth since the 2000 to present), averaging 5 percent a year (Martins 2013), significantly higher than the 2.9 percent average population growth rate. About a third of African economies have been growing at least 6 percent a year (World Bank 2013). Currently, 21 Sub-Saharan countries are middle-income countries (MICs), with 10 more projected to be MICs by 2025 (Devarajan and Fengler 2012). The potential for further African growth still remains enormous, with vast productive natural resources including abundant land in a period of high and increasing food prices, eminent demographic dividends, agglomeration economies from increasing urbanization, and more revenue streams expected from mineral exploitation (Christiaensen, Chuhan-Pole, and Sanoh 2013).

The limited degree to which African economic growth reaches all parts of society is a key challenge. There is strong concern that high economic growth has not been beneficial to most Africans (McKay 2013). Growth has not translated to a commensurate poverty reduction rate, despite marked improvements in Sub-Saharan Africa's human development indicators. The World Bank (2013) identifies persistently high inequality as the underlying reason for the slow pace of poverty reduction amid robust African economic growth.

An analysis by Adedeji, Du, and Opoku-Afari (2013) of economic growth inclusiveness in selected African countries concludes that achieving overall growth is necessary but not sufficient for attaining inclusivity. It calls for conscious pro-poor policies that target resources toward sectors with maximum poverty impact, ensuring the poor's participation in growth. There is consensus that reducing inequality will make growth pro-poor (Ravallion, 2009). Voices increasingly call for action to reduce inequality, including those of the World Bank, African Development Bank, Oxfam, and so on. knowing inequality's growth and poverty effects is crucial to inform anti-inequality campaigns and redistribution policies.

The empirical literature offers mixed messages about inequality's effects on poverty reduction. Not considering the effect of inequality on growth, Dollar and Kraay (2002) show that growth benefits all income groups, with the growth elasticity of poverty not affected by income distribution. Adams (2004) finds that in developing countries, growth reduces poverty only when measured in mean income or consumption, not when GDP per capita is used. But Ravallion (2001) highlights inequality's dampening effect on growth's poverty-reducing effects. Specifically for Africa, Ali and Thorbecke (2000) find that poverty increases where inequality is high, with income distribution effects outweighing that of growth on poverty. Fosu (2009) notes that growth elasticity of poverty decreases with initial inequality in Africa. Other recent studies have confirmed that Africa's poverty has declined, but that the poverty reduction rate is low compared with developing countries showing similar growth (Sala-i-Martin and Pinkovskiy 2010; Young 2012).

Although theoretical conjectures of an inverse relationship between inequality and economic growth have found numerous empirical verifications (Bourguignon 2004), the debate on inequality's effect on growth and poverty is far from over. In an analysis by Barro (2000), for instance, inequality appears to enhance growth in rich countries while slowing it in poor countries. Two key theories link high inequality to slow growth. One is the theory of credit constraint effects (Aghion and Bolton 1997); the other is a theory of political economy

considerations, where high inequality may prompt distortionary policy responses that block efficiency-enhancing reforms (Alesina and Rodrik 1994; Bardhan, Bowles, and Ginitis 2000). Ngepah (2011a) provides a survey of these theoretical channels.

Three key limitations afflict most studies that have looked at Africa's growth-poverty-inequality nexus. They have mainly considered direct effects on poverty, looking at growth and inequality separately; often, average inequality is used and cross-sectional or panel data are used with GDP per capita to capture economic growth.

But in a spectrum of inequality types, the specific inequality type to reduce needs to be identified. Most studies that have informed the different calls for measures to curb inequality have generally used average measures of inequality. Voitchovsky (2005) for instance argues that inequality at different income distribution segments may affect growth differently, and the use of a single aggregate measure might miss these diverse effects. Using data from some developed countries, she shows that inequality among low incomes is bad for growth, while inequality among high incomes may promote growth. Similar effects may be inferred for poverty. This type of analysis would not have been possible some years back, but as data becomes increasingly available such analysis can be undertaken for Africa.

Ngepah (2011a) also finds that in South Africa, between-group and within-group inequalities have different impacts on economic growth. Another line of thought has argued that the size of a country's middle class matters for economic growth (Doepke and Zilibotti 2005).

There is a need to understand the impact of disaggregated inequality measures on growth and poverty, and to understand the channels through which such effects may be propagated for targeted policy interventions. For instance, will inequality within and between the poorest 20 percent and the richest 20 percent affect growth and poverty in the same way as that within and between the middle 20 percent and the top 20 percent? Is income inequality among different age groups equal to gender inequality in their effects on growth and poverty? Should focus be on inequality of inputs or inequality of outputs? These are the main questions in this study. A proper micro-level analysis of these issues requires reliable and nationally representative household survey data rich in income and consumption information.

This study aims to assess each inequality type's underlying linkages with growth and poverty, and to develop a set of policy and capacity building recommendations for targeted redistribution policies that can optimally effect growth and poverty reduction. The study takes a macro-micro comparative approach in a battery of models, evaluating the growth-inequality-poverty relationship in the context of African countries' robust growth captured from household survey data. South Africa and Cameroon are considered for micro case studies. The two case study countries are selected based on availability of household survey data rich in income and consumption variables. Such household survey data allow for comparative assessments at the household level in relating with continental-level analyses. The two countries are also culturally and historically very diverse to complement one another in the micro analysis.

The inequality types considered are mainly inequality within and between different income classes, inequality within and between gender, and inequality within and between age profiles. An example of input inequality (human capital) is considered when analyzing inequality at the continental level. Finally, links to changes in incomes and poverty in an endogenous econometric model are employed to establish these issues.

The remainder of the report is organized as follows. Section 2 provides background on Africa's growth in sectoral composition and natural resources content. It also looks at how growth by sector correlates with continental-level inequality and poverty. Section 3 puts forward the theoretical underpinnings, looking particularly at growth and inequality's two-way relationship. The section also examines the pro-poor growth framework, by which poverty's effects may be deduced from the interaction between growth and inequality. Section 4 proposes a methodological approach, with appropriate growth and inequality frameworks and the mechanism for poverty effects computations. The section ends by presenting appropriate functional frameworks, the underlying data, and the estimation techniques. Section 5 interprets and reports the analyses' results by inequality among wealth, gender, and age groups. Section 6 concludes with policy recommendations and capacity building implications.

CHAPTER 2. BACKGROUND TO AFRICA'S GROWTH, INEQUALITY, AND POVERTY

African nations' economies have exhibited one of the longest and sustained growth episodes recorded in African economic history. At a time when developed countries barely achieve positive economic growth rates, African nations' growth performance has remained strong. Even the financial crisis that affected all the world's economies left Africa on its feet. Although resource-rich countries performed stronger than non-resource-rich nations, all countries remained resilient.

This section explores Africa's GDP composition and the main sectors' contributions to GDP growth including key resource rents (table 2.1). It is followed with simple correlations of growth in different sectors and inequality with income shares accruing to different segments of the income distribution spectrum and poverty indicators (table 2.2). The consideration of Africa has just considered Sub-Saharan Africa; it has included North African countries.

Sectoral growth contributions

Since the 1970s, Africa's GDP structure has not experienced much variation. The period from 1971 to 2000 is divided into three decades and 2001 to 2012 into two six-year periods—2001–2006 and 2007–2012. The services sector has remained the highest GDP contributor, starting with about 47.7 percent from 1971 to 1980. From 2001 to 2012, it has accounted for just over half of Africa's GDP, increasing to 53.2 percent in the last seven years (table 2.1). Agriculture's contribution has declined from 19.5 percent in 1971–1980 to 15.9 percent in 2007–2012. The industry sector has also marginally declined from 33.1 percent to 30.1 percent between 1971–1980 and 2007–2012. Of industry's contribution, the manufacturing sector's share was 16.8 percent of GDP in 1971–1980. By 2007–2012, manufacturing's share had fallen to 11.2 percent. This deindustrialization trend has been steady for the periods in the table.

These sectors' contributions to GDP growth show similar trends. Services sector growth is the highest, starting with 4.1 percent during the first decade in Table 2.1. Though it fell somewhat in the next two decades, it rebounded strongly to 5.3 percent in the last decade. In the periods 2001–2006 and 2007–2012, African GDP growth has been highest and most sustained. Agriculture has been the highest, but fell from 6.2 percent to 4.9 percent. Services remained stable in the two periods while industry fell from 5.1 percent to 3.3 percent. Manufacturing also fell marginally from 3.8 percent to 3.2 percent.

Table 2.1 GDP sectoral composition and contributions to GDP growth

	1971–1980	1981–1990	1991–2000	2001–2006	2007–2012
GDP composition					
Services	47.66	45.22	48.03	49.85	53.17
Industry	33.13	34.12	32.09	31.60	30.09
Agriculture	19.47	20.83	19.90	18.24	15.92
Manufacturing	16.83	15.73	13.85	12.79	11.16
Average annual growth rates					
Services	4.11	2.32	2.56	5.34	5.26
Agriculture		2.56	2.66	6.24	4.93
Industry		1.63	1.08	5.07	3.25
Manufacturing	4.01	1.78	1.09	3.83	3.21
GDP	3.65	1.50	2.05	5.65	4.55
GDP per capita	0.87	-1.33	-0.66	2.91	1.80
Natural resource rents (% of GDP)					
Total	12.41	12.66	11.13	16.82	20.33
Oil	7.80	7.05	6.35	11.61	13.11
Forest	2.21	2.76	3.70	2.86	2.83
Mineral	1.91	1.82	0.65	0.85	2.37
Coal	0.46	0.90	0.21	0.62	1.25
Natural gas	0.03	0.12	0.22	0.87	0.77

Source: The Table is from author's calculations using World Bank (2015) data. The data are for all African countries except fragile states like Somalia, for which reliable information is rarely.

Total mineral resource rents have been rising steadily, from 12.4 percent in 1971–1980 to 20.3 percent in 2007–2012. The resource with the highest rents in African economies is oil. Oil rents have been stable around 7 percent until about 2001, when they significantly increased to 11.6 percent in 2001–2006, then to 13.1 percent in 2007–2012. The other resource with significant rent is forest, whose GDP share increased and peaked at 3.7 percent in 1991–2000. The rents for minerals, coal, and natural gas have increased marginally, but remained below 3 percent.

In the two last periods (2001–2006 and 2007–2012), the structural picture kept overall GDP growth at 5.7 percent and 4.6 percent, respectively, and GDP per capita growth at 2.9 percent and 1.8 percent, respectively. Perhaps worthy of concern is the decline in the shares of agriculture and manufacturing in GDP and the low manufacturing growth. When one considers agriculture's role in poverty alleviation and manufacturing's role in high-value job creation and sustained growth, the concern can be even more valid.

Growth, poverty, and inequality correlates by sector

Agriculture and services growth rates have the strongest negative relationship with inequality as measured by the Gini coefficient (table 2.2). This is perhaps because these sectors are associated with employment of most at the lower end of the welfare rank. This picture is also corroborated by the high correlation of growth in these sectors with the income shares accruing to the lowest 10 percent and 20 percent of the population. So growth in agriculture and services relate negatively to extreme poverty as measured by poverty head count and poverty gap at \$1.25 a person a day. The negative relationship between growth in per capita

income and poverty and the positive correlation between inequality and poverty confirm what would be expected theoretically in growth, inequality, and poverty relationships.

Table 2.2 Growth and inequality correlates of poverty and quintile income shares

		Growth in					Inequality
		Income per capita	Agriculture	Manufacturing	Industry	Services	Gini
Inequality	<i>Gini</i>	0.0295	-0.1144	-0.0006	-0.018	-0.1245	-
Share of growth accruing to	<i>lowest 10%</i>	0.0497	0.0872	0.0128	0.0255	0.1703	-0.9146
	<i>lowest 20%</i>	0.0334	0.0961	0.0154	0.027	0.1641	-0.9474
	<i>second 20%</i>	-0.0189	0.1089	0.0056	0.018	0.1365	-0.992
	<i>third 20%</i>	-0.0588	0.1153	-0.0052	0.0147	0.1057	-0.9846
	<i>fourth 20%</i>	-0.1158	0.1156	-0.025	0.0086	0.0312	-0.8538
	<i>top 20%</i>	0.0438	-0.1154	0.0027	-0.0177	-0.1142	0.9964
	<i>top 10%</i>	0.063	-0.1191	0.01	-0.0131	-0.0924	0.9804
Poverty head count	<i>at \$1.25 /p/day</i>	-0.1489	-0.0196	0.1473	0.2192	-0.0224	0.1136
	<i>at \$2.0 /p/day</i>	-0.1343	0.0527	0.1603	0.2429	0.0901	0.0477
Poverty gap	<i>at \$1.25 /p/day</i>	-0.1603	-0.0008	0.1106	0.1807	-0.0662	0.1907
	<i>at \$2.0 /p/day</i>	-0.1533	0.0198	0.1375	0.2135	0.001	0.1355

Source: Author's calculations using World Bank (2015) data.¹

Manufacturing and industry have a positive correlation with poverty. This suggests that the growth rates recorded in these sectors are less pro-poor and measures are called for to address these sectors' pro-poorness. The concerns raised in table 2.1's interpretation, particularly the one relating to agriculture's falling share in GDP is important to pro-poorness' prospects of helping growth in Africa given these correlation relationships.

In what follows, these relationships are looked at in more formalized analytical frameworks of growth, inequality, and poverty at the continental level, substantiated with two case studies at the country level.

¹ Data is for all African countries for which indicators were available. See table A.1 in the appendix for the list of countries and years.

CHAPTER 3. THEORETICAL AND EMPIRICAL UNDERPINNING

Economic growth pro-poorness has attracted a great deal of interest among researchers since the late 1990s (Bourguignon 2004; Bruno and others 1998; Dollar and Kraay 2002; Eastwood and Lipton 2001; Ravallion 2001; World Bank 2002). The research has concluded that economic growth benefits the poor and that the poor suffer equally from economic slow-downs. Although the conceptualization of growth pro-poorness still leaves researchers with different viewpoints, all agree the pursuit of growth benefits the poor. A key determinant of economic growth rates and growth pro-poorness is inequality. But growth and inequality are also endogenous to each other. This leads us to first review the theoretical and empirical relationship between growth and inequality before explaining the effects on poverty in a pro-poor conceptual framework.

Growth-inequality relationship

Although the poverty-reducing impact of growth depends on progress in inequality, the processes that generate growth and inequality are mutually dependent. The endogenous economic growth theory's proposition has resulted in renewed interest in the growth-inequality relationship. The recent interest focuses rather on the corresponding endogenous relationship between growth and inequality, different from the unidirectional Kuznets (1955) type process. This review's focus is to establish the bidirectional relationship in order to inform the approach for conceptual framework.

Inequality impact of growth

The work of Kuznets (1955)—which hypothesizes that at the early growth stages in developing countries, inequality increases and then starts to fall—has gained interest among researchers (Oshima 1970; Ahluwalia 1976a; Robinson 1976). Kuznets suggests labor market imperfections, productivity differentials across economic sectors, and the changing importance of the sectors in the economy are the main channels through which growth impacts inequality. Stiglitz (1969) explained the same hypothesis within a neoclassical framework of growth and distribution in which individual accumulation behavior and changing factor rewards (due to diminishing returns to capital) account for the U-shape in the evolution of inequality with development. Growth also tends to modify institutions, social relations, culture, and so forth in various ways.²

Empirical works that lend support to this hypothesis made use of cross-country datasets from the 1950s to 1970s (Adelman and Morris 1973; Ahluwalia 1976b; Ram 1995). Ahluwalia (1976b) estimates inequality as a function of log of per capita income and its square to capture the quadratic effect in a cross-section of data, and confirms the existence of an inverted U-shaped relationship. Anand and Kanbur (1993a and 1993b) propose other functional forms and show that Ahluwalia's (1976) estimates are not robust to functional form variations. This relationship was verified for the 1970s, but as more and better data became available, not for later periods. Bruno and others (1998) replicated the specifications and found no evidence of an inverted U-shape in cross-sections datasets. Bourguignon and Morrisson (1998) use unbalanced panel data for developing countries and found that this hypothesis is not verified. Deininger and Squire

² For example, people then become politically more active, leading to change in the distribution of political power and evolution of institutions (Justman and Gradstein 1999). And transaction costs—which hinder institutional change—can become more affordable with economic growth (North 1990). Bourguignon (2004) observes that the urbanization process that follows economic development occurs naturally with social relations' evolution.

(1998) use an unbalanced panel with about 10-year intervals. A simple pool regression of Gini with respect to per capita income and its inverse give a significant inverted U-shape. But decadal differencing to account only for time changes gives an insignificant curvature. Introducing country-fixed effects causes the U-shape to disappear completely.

As Bourguignon (2004) remarks, all the above does not imply that growth has no significant impact on inequality, but rather much presence of country-specific factors in its inequality impact. This makes a country-specific study more interesting. Bourguignon, Lustig, and Ferreira (2005) suggest that growth does have an effect on inequality, a major contributing factor being the poorest households' difficulty in incorporating themselves into the labor market in the advent of slow growth.

Growth impact of inequality

Three major ways through which inequality can have an effect on growth are physical endowment (credit constraints), human capital endowment, and political economy. In the credit market, if 10 percent and 50 percent are the respective interest rates of rich and poor individuals (due to lack of collateral by the poor), then all projects with return rates of 10 percent and above will be undertaken by the rich while only projects of 50 percent and above return rates will be carried by the poor. But if there is wealth redistribution from richer to poorer individuals, it will reduce their need to borrow while allowing them to undertake projects with returns lower than 50 percent. As such, redistribution will lead to higher investment and higher return to capital (Bourguignon 2004).

More formal models (such as Galor and Zeira 1993; Banerjee and Newman 1993; Aghion and Bolton 1997) put information asymmetry at the center of credit constraints. In these models, evolving inequality and output is influenced by the limited choice of poor people (and possibly middle class) of occupations and investment due to credit rationing. When the poor are so prevented from making productive investment (benefitting them and society), a low and inequitable growth process can result. Besides, in a Keynesian economy where marginal rate of savings increases with income, or with higher propensity to save from capital returns than labor returns, those at the distribution's top end may represent the main savings source (Voitchovsky 2005).

Human capital endowment (education, skills, and healthy life) is also important in inequality's growth effect. When ability is rewarded, there is incentive for more effort, risk taking, and higher productivity, resulting in higher growth but with higher income inequality. In such cases, talented individuals will tend to seize higher return to their skills. The resulting talents and skills concentration in the advanced technology upper-income sector becomes conducive for further innovation and growth (Hassler and Rodriguez-Mora 2000). Such incentive can induce greater effort in all parts of the distribution (Voitchovsky 2005). But frustration in the lower end of the distribution resulting from perceived unfairness may counteract the innovation gains (Akerlof and Yellen 1990).

From a political economy view, high inequality sets the stage for adopting distortionary policies that adversely affect investment and generate political instability leading to stifled growth (Persson and Tabellini 1994). Alesina and Perotti (1993) have equally argued that higher political instability can result from high inequality, the resulting uncertainty then reduces investment levels. Rodrik (1996) has confirmed that divided societies with weak institutions also witnessed the sharpest fall in post-1975 growth. This situation brought about a weakness in their capacity to respond effectively to external shocks.

Empirically, various authors have found a negative impact of initial inequality on growth in developed countries (Persson and Tabellini 1994), developing countries (Clarke 1995), and a combination of both (Deininger and Squire 1998). Schwabish, Smeeding, and Osberg (2003) find that top-end inequality (measured by 90/50 percentile ratio) strongly and negatively impacts social expenditures while the bottom end (captured by 50/10 percentile) show a small positive effect. They suggest that high top-end inequality reduces social solidarity, with the rich trying to pull out of publicly funded programs such as health care and education in preference to private provision.

Pro-poor growth framework and poverty effects

In a review of the poverty-growth-inequality relationship by Bourguignon (2004) and Son (2004), growth's impact on poverty is shown to be a decreasing function of inequality. Kakwani and Pernia (2000) developed an operational pro-poor growth framework that was later updated by Son and Kakwani (2008). Let the degree of poverty P measured by average deprivation (in terms of poverty line (z) and income (x)) be:

$$P = \int_0^z p(z, x) f(x) dx \quad (1)$$

Where $p(z, x)$ is a general family of additive poverty indices such as Foster, Greer, and Thorbecke (1984), and $f(x)$ a probability density function. Let $L(p)$ be the percentage share of the income of the population's bottom p percent. If the mean income of the society $\mu =$

$\int_0^1 x(q) dq$, then

$$L(p) = \frac{1}{\mu} \int_0^p x(q) dq \quad (2)$$

Where $L(p) = 0$ when $p = 0$; $L(p) = 1$ when $p = 1$; $L(p) \leq 0$ for $0 \leq p \leq 1$; and $\frac{dL(p)}{dp} =$

$\frac{x(p)}{\mu} > 0$ and $\frac{d^2L(p)}{dp^2} > 0$: $L(p) = p$ gives perfect equality in income distribution. Based on Atkinson's (1987) relationship between second order dominance and poverty reduction, if $\Delta(\mu L(p)) \geq 0$ for all p , then change in poverty is negative, that is $\Delta P \leq 0$ for all poverty line and the entire family of poverty measures in (1). From the definition of the Lorenz curve with mean income of the bottom p percent of the population as: $\mu_p = \frac{1}{p} \int_0^p x(q) dq$, (2) can be rewritten as:

$$L(p) = \frac{\mu_p p}{\mu} \quad (3)$$

Log-linearizing (3) implies:

$$\ln(\mu_p) = \ln(\mu L(p)) - \ln(p) \quad (4)$$

Taking the first difference of (4) gives:

$$g(p) = \Delta \ln(\mu L(p)) \quad (5)$$

where $g(p) = \Delta \ln(\mu_p)$ is the growth rate of the mean income of the population's bottom p percent when individuals are ranked by their per capita income, also called the poverty growth curve (Son 2004). Son and Kakwani (2008) show that if $g(p) > 0$ (< 0), for all p , then poverty has decreased (increased) unambiguously between two periods. They suggest a pro-poor growth rate (γ^*) in terms of the area under the poverty-growth curve:

$$\gamma^* = \int_0^1 g(p) dp = \int_0^1 \Delta \ln(\mu L(p)) dp \text{ or } \gamma^* = \gamma - \Delta \ln(G^*) \quad (6)$$

where γ is the growth rate of societal mean income and $\Delta \ln(G^*)$ is the inequality rate of change. If inequality decreases (increases) in a given period, then the pro-poor growth rate is greater (less) than the actual growth rate for that period. Equation 6 therefore informs the empirical framework for poverty analysis.

CHAPTER 4. METHODOLOGICAL APPROACH

This study's methodology is divided into two parts. The first is at continental cross-country level, where growth is regressed against inequality and various other conventional growth determinants simultaneously with an inequality model using unbalanced panel data. After this, the poverty effects are deduced from the pro-poor growth model above. The second is a case study for two countries at household level, regressing a three equations simultaneous model of income, (appropriate indicator of) inequality, and poverty.

Continental growth, inequality, and poverty analysis

The growth model

A five-year averages of panel data in a growth model is used following Voitchovsky (2005). Specifically, the five-year growth model is based on the following form:

$$y_{it} - y_{it-1} = \alpha_1 y_{it-1} + \alpha_2 G_{it} + \omega' X_{it} + u_{it} \quad (7)$$

where y is GDP per capita, t and $t - 1$ are time periods corresponding to observations five years apart, X is a vector of control variables, i is a country index, ω' is a vector of coefficients, G is a measure of inequality, α are coefficients, and u_{it} is a composite term including an unobserved country-specific effect, time-specific effect and an error term.

According to Barro (2000), the neoclassical model underlying equation (7) explains a long-term steady state income level. As such, an enduring change in inequality (and other growth determinants) will affect growth rates only in the short run. That is while the economy is still on the convergence path to a new equilibrium. Because the economy generally takes a long time to reach a new steady state following a change in any of the determinants, the short-term inequality effect on growth can last a good while.

The variables in the growth model are five-year averages beginning from the year of inequality data.³ This means that if the inequality observation is at t , then all the other variables are the average from t to $t + 5$. This approach takes care of the endogeneity between growth and inequality as the reverse causation from growth to inequality would have been purged out.

The inequality model

Five-year averages of panel data similar to the one above are used to specify inequality. The functional form follows Lopez (2003). Specifically, the five-year growth model is based on the following form:

$$G_{it} = \beta_0 + \beta_1 G_{it-1} + \beta_2 \Delta y_{it-1} + \varphi' X_{it} + \vartheta_{it} \quad (8)$$

where G is an inequality, t and $t - 1$ are time periods corresponding to observations five years apart, X is a vector of control variables, i is a country index, φ' is a vector of coefficients, Δy is growth in real GDP per capita, β are coefficients, and ϑ_{it} is a composite term including and unobserved country-specific effect, time-specific effect and an error term. Contrary to the growth equation, the inequality measure in the inequality equation is taken at the end of the period

³ In literature, decadal averages are common (Bourguignon 2004). But in the absence of adequate data as in this case limited by few time spans on inequality series, it has been common to use five-year averages in order to save degrees of freedom (Voitchovsky 2005).

while the other variables are five-year averages for the period ending with the inequality observation. The different inequality measures (described below) are introduced.

Poverty specification

Following the pro-poor growth framework, a simple model of poverty jointly estimated with growth and inequality is specified as follows:

$$P_{it} = \delta_0 + \delta_1 G_{it} + \delta_2 \Delta y_{it-1} + \sigma_{it} \quad (9)$$

where P is a Foster-Greer-Thorbecke (FGT) poverty measure, G is an inequality, t and $t - 1$ are time periods corresponding to observations five years apart, i is a country index, Δy is growth in real GDP per capita, δ are coefficients, and σ_{it} is a composite term including and unobserved country-specific effect, time-specific effect and an error term.⁴ The order is maintained as an inequality equation, where an inequality measure is taken at the end of the period together with a poverty measure while the growth variable is a five-year average for the period ending with the inequality observation. The different inequality measures described below are introduced to consider the possible differences in the impacts on poverty.

Variables and data

The measure of growth rate ($y_{it} - y_{it-1}$) is the growth in real per capita GDP taken from the World Bank's World Development Indicators (WDI) database (2015). The lagged variable (y_{it-1}) is the average of real per capita GDP for the five years preceding the five-year period in consideration for the other variables.

Inequality measures: Various inequality indicators that the WDI dataset could allow for are considered. The first measure of inequality is the Gini index, the only synthetic measure of inequality directly provided in the WDI dataset. The dataset also presents distributional data grouped in quintiles (Q1 to Q5) and includes the two extreme deciles (D1 and D10). This information is used to compute the other possible indices. The main attempt here is to try to capture the different disparities in the entire income distribution. Dividing the distribution into the poor (Q1), the middle class (Q3), and the rich (Q4) is therefore considered. The paper looks at inequality within and between these three points in the income distribution spectrum.

Most growth-inequality relationship studies typically use the Gini coefficient as an inequality measure (Ravallion 2009). Voitchovsky (2005), in a study using developed country data, argues that the use of average inequality like the Gini coefficient might miss the true impact. She then uses an indicator of inequality among the top income earners (90/75) and another for the bottom-end distribution (50/10). She concludes that inequality in the distribution's lower end is harmful for growth, while inequality in the distribution's top end is good for growth.

Some literature has highlighted the middle class's importance in economic growth. This contribution is supposed to come from several factors: the fostering of entrepreneurship (Acemoglu and Zilibotti 1997; Doepke and Zilibotti 2005); the changing composition of consumer demand (Murphy, Schleifer, and Vishny 1989); and the feasibility of policy and institutional changes conducive for growth (Birdsall, Graham, and Pettinato 2000). The middle class may not only employ most of the poor in developing countries, but may also be the agents that bring about pro-poor reforms in the same countries.

⁴ FGT is an additively decomposable family of poverty measures. The family has three members: poverty incidence (proportion of people below the poverty line); poverty intensity (average normalized gap from poverty line to the position of the poor in the income ranks among the poor); and poverty severity, the square of the poverty intensity, designed to give more weight to the severely poor.

This paper therefore considers an index of inequality between the middle class and the poor as Q_3/Q_1 and Q_3/D_1 . The measure of inequality among the poor is Q_2/D_1 . It also considers inequality among the middle class as Q_4/Q_3 . Next, it looks at inequality among the rich and considers Q_4/D_{10} . Inequality between the rich and the middle class is captured by D_{10}/Q_3 . Finally, extreme inequality is captured by Q_5/Q_1 . These inequality measures can be crudely grouped into within and between groups: within rich, within middle class, and within poor, and rich-poor, rich-middle class, and poor-middle class. Finally, the paper considers another inequality type, education gender inequality (primary and secondary completion rates, and tertiary enrollment), considered in cases with available data. This proxies for inequality in input to income generation (human capital) and introduces a gender perspective. The inequality along gender lines will be explored in detail in the case studies later.

Poverty measures: There are two possible members of the Foster-Greer-Thorbecke (FGT) family of poverty measures captured in the WDI dataset. These are the poverty head count ratio and the poverty gap ratio. Each is measured at the lower poverty line of \$1.25 a day (2005 international prices) and an upper line of \$2 a day (2005 international prices). This makes four possible poverty indicators considered one after the other in a three-stage least squares (3SLS) regression approach.

Other control variables: Apart from the lagged income variable in the model in (7), the other variables that matter for the model to be effectively estimated are investment and human capital (Fagini 1999; Voitchovsky 2005). Fagini (1999) ran the Ramsey omitted variables test and found no significant evidence of omitted variable bias when these variables are the only other determinants included in growth regression for determining inequality's impact. In an attempt to balance the risk between multicollinearity bias and omitted variable bias, this paper sticks to the basic model including only investment and human capital.

The investment variable is measured by the average share of gross fixed capital formation in GDP. It is the five-year average from the year of inequality measure observed. The data is from the WDI database.

Human capital variables measured by education have two possible candidates. The first is the use of enrollment ratios. But this is an indicator of investment in education rather than an outcome of education. Traditionally, the outcome variable used in similar research is the population's average years of schooling. This is usually from Barro and Lee's computation (2000). This dataset only dates to 1995 and cannot be useful in the growth-inequality relationship's current analysis. The paper therefore opts to use primary and secondary school completion rates. In the absence of a tertiary completion rate, tertiary enrollment at the beginning of the five-year period is employed just assimilar to the way inequality is used.

Table 4.1 presents a summary of the key variables for continental-level analysis.

Table 4.1 Variables, meaning, and source

Variable	Meaning	Source
Between-group inequality		
Rich-poor	Ratio of incomes accruing to 5 th and 1 st quintiles and 10 th decile and 1 st quintile.	WDI
Rich-middle class	Ratio of 10 th decile to 3 rd quintile incomes.	WDI
Middle class-poor	Ratio of 3 rd to 1 st quintiles and 3 rd quintile to 1 st decile incomes.	WDI
Gender	Ratio of male to female primary school completion rate.	WDI
Within-group inequality		
Poor	Ratio of 2 nd quintile to 1 st decile incomes.	WDI
Middle class	Ratio of 4 th quintile to 3 rd quintile incomes.	WDI
Rich	Ratio of 5 th quintile to 10 th decile and 5 th to 4 th quintiles incomes.	WDI
Poverty		
Head count	Share of population below \$1.25, and \$2 a person a day.	WDI
Poverty gap	Average income gap between the poor and \$1.25, and \$2.	WDI
Other variables		
Initial income	Real per capita GDP at the beginning of the period.	WDI
Growth	Per capita GDP growth.	WDI
Human capital	Lower secondary completion rate.	WDI
Investment	Share of gross fixed capital formation in GDP.	WDI

Source: Author.

Estimation technique for cross-country models

Traditionally, the first-difference generalized method of moments technique developed by Arellano and Bond (1991) has been used in panel data estimation to address issues of omitted variables and endogeneity (Forbes 2000; Panizza 2002). Differencing the model removes the time-invariant effect, but leads to significant information loss. It has been shown that most variations in income and income inequality are mainly due to cross-sectional variations (Li, Squire, and Zou 1998; Barro 2000; Dollar and Kraay 2002). Dollar and Kraay (2002) explain that the reliance on limited time series variations in the data such as in this case may lead to imprecise estimation. In estimating a model like equation (7), given the data availability, the most important thing therefore is to preserve degrees of freedom. To do this, the most important approach could be to consider variables at level, after controlling for endogeneity by considering inequality only at the beginning of each five-year period.

Another issue to consider is that most panel data used in inequality-growth regression are unbalanced because the underlying survey data from which inequality indices are generated are usually collected at different times for different countries. The unbalanced nature of the data is even worse for African countries. These countries have been under-researched in the area of inequality and growth at the cross-country level.

Baltagi, Song, and Jung (2002) have shown that where the unbalanced pattern is severe, a maximum likelihood estimator (MLE) does better. Monte Carlo simulations have also revealed that the MLE for unbalanced panels performs well in situations where observations in the data are missing at random. In such cases, the missing observations affect mainly the root mean square errors, with t-tests on the slope parameters performing as well as the balanced panel counterpart thereby making inference reliable (Pfaffermayr 2009).

Following this consideration, the first choice for the data type used is the maximum likelihood random effects estimator. The model is most suited for unbalanced panel estimation of the type employed in this work. The paper compares the MLE with a robust regression version of the pooled ordinary least squares (OLS) model and the 3SLS estimates to be explained further. This method is performed on the growth, inequality, and poverty equations separately and jointly for the 3SLS.

The growth and inequality equations are combined with the poverty specification in a pro-poor growth framework that gives model (10).

$$\begin{cases} \Delta y_{it} = \alpha_1 y_{it-1} + \alpha_2 G_{it} + \omega' X_{it} + u_{it} \\ G_{it} = \beta_0 + \beta_1 G_{it-1} + \beta_2 \Delta y_{it-1} + \varphi' X_{it} + \vartheta_{it} \\ P_{it} = \delta_0 + \delta_1 G_{it} + \delta_2 \Delta y_{it} + \sigma_{it} \end{cases} \quad (10)$$

The average per capita income growth rate at a five-year interval t for country i is $[\Delta y]_{it}$. In order to deduce the poverty effects of growth and inequality under different types of inequality specifications described above, two possible regression techniques can be employed for model (10). These are two-stage least square (2SLS) and 3SLS techniques. The first has been thought of as more efficient than 3SLS in small samples, particularly when cross-equation covariations are small. In cases of large covariation, 3SLS would have an edge even if the sample is small (Ngepah 2011b). Because the sample size in this work is up to 132 observations (see table A.1 in the Appendix for countries and years included), the paper seeks to derive the full benefits of cross-equations systems estimation by employing a 3SLS approach.

Case studies

The case studies are designed to gain further understanding at the household level of the relationship among the elements of growth, inequality, and poverty analyzed at the cross-country and continental level above. For this purpose, the paper uses household surveys from two African countries: South Africa, the largest African economy in per capita GDP, and Cameroon, a lower-middle-income country. Both represent African colonial history's two main traits—English and French. The countries were primarily chosen based on readily available datasets, rich in the type of variables that would be of interest; they lend themselves to this work's type of analysis. More on the two countries will be discussed in the background section.

In what follows, the paper starts by giving a succinct background of the case study countries' economic structure, inequality, and poverty. It then follows up with the micro-conceptual framework, methodology, variables, data, and estimation techniques.

Case study country background

Cameroon

Cameroon is sandwiched between West and Central Africa. It is mainly French speaking with English speaking communities (about 20 percent of its 10 provinces). Fambon and others (2014) estimate that in 2013, its population was about 22.5 million, giving the 475,000440-square-kilometer nation a population density of 39.7 inhabitants per square kilometer. Table 4.2 presents some of Cameroon's socioeconomic indicators.

Cameroon's real GDP per capita was about \$825.7 (at 2005 prices) from 1971 to 1980. In the following decade, the value increased to \$1190.9, and then fell, averaging \$942 in 2007–2013. During the same period, GDP growth fell from 2.9 percent to 2 percent a year. The slowdown in economic indicators during this period can be attributed to deterioration in the country's

trade balance and to food and energy price shocks; it was also partly because of the international financial crises. The main contributors of Cameroon's GDP are services and agriculture. At the start of the analysis period, the services sector contributed to about 50 percent of GDP and the agricultural share was 30.7 percent. The services share fell to 42.8 percent and has fluctuated to 47 percent in the past decade.

Table 4.2 Fundamentals of Cameroon's socioeconomy

Indicators	1971–1980	1981–1990	1991–2000	2001–2006	2007–2013
Share of GDP					
Agriculture	30.71	25.02	24.02	21.35	23.26
Industry	19.24	32.20	30.87	31.85	29.75
Manufacturing	9.65	12.59	19.63	19.58	15.14
Services	50.05	42.77	45.11	46.80	46.98
Real GDP per capita	\$825.74	\$1190.95	\$837.05	\$906.55	\$942.52
Growth rates in					
Agriculture	3.87	2.69	4.85	3.49	4.21
Industry	11.09	7.10	-0.78	0.50	1.42
Manufacturing	7.35	7.38	2.62	2.10	2.38
Services	12.10	2.22	0.16	6.04	4.56
GDP	6.78	3.59	1.47	3.63	3.66
GDP per capita	3.86	0.52	-1.30	0.97	1.05
Natural resource rents					
Total	6.37	14.69	10.29	10.84	11.01
Oil	2.76	12.05	6.29	8.18	7.52
Forest	4.16	2.64	4.01	2.62	3.28
Coal	0.00	0.00	0.00	0.00	0.00
Mineral	0.00	0.00	0.00	0.02	0.16
Natural	0.00	0.00	0.00	0.00	0.05
Income distribution					
Gini			44.57	42.13	40.72
Income share held by highest 10%			36.53	33.77	31.76
Income share held by highest 20%			51.56	48.90	47.69
Income share held by fourth 20%			19.75	20.71	21.43
Income share held by third 20%			13.24	14.27	14.50
Income share held by second 20%			9.25	9.95	10.03
Income share held by lowest 20%			6.20	6.17	6.35
Income share held by lowest 10%			2.75	2.62	2.74
Poverty at \$ a day purchasing power parity (PPP)					
Poverty headcount ratio \$1.25			47.43	24.86	27.61
Poverty headcount ratio \$2			71.50	50.69	53.15
Poverty gap at \$1.25			15.86	6.69	7.24
Poverty gap at \$2			32.78	18.50	19.97
Investment					
Gross fixed K formation (% of GDP)	29.83	20.85	14.39	18.46	18.72

Indicators	1971–1980	1981–1990	1991–2000	2001–2006	2007–2013
Gross K formation (annual % growth)	12.94	0.78	0.30	5.92	6.28
	Human capital				
Lower sec. completion rate, female	4.94	10.38	17.63	18.56	25.37
Lower sec. completion rate, male	11.74	18.97	24.65	21.88	29.36
Lower sec. completion rate, total	8.34	14.68	21.15	20.23	27.38
Primary completion rate, female	42.38	47.39	46.38	49.51	61.25
Primary completion rate, male	58.46	56.62	54.11	58.39	72.02
Primary completion rate, total	50.44	52.01	50.27	53.98	66.67
	Unemployment				
Unemployment, total			6.14	5.17	4.09

Source: Author's calculations using World Bank (2015) data.

The agricultural contribution has fallen steadily to 21.4 percent in 2001–2006 and was at 23.3 percent in 2007–2013. The share of industry has risen from 19.2 percent at the start of the period in table 4.2 to more than 30 percent, with oil mainly contributing to the increase. Manufacturing's share also rose from 9.7 percent to 12 percent in earlier decades and then fluctuated from 19.6 percent to 15.1 percent.

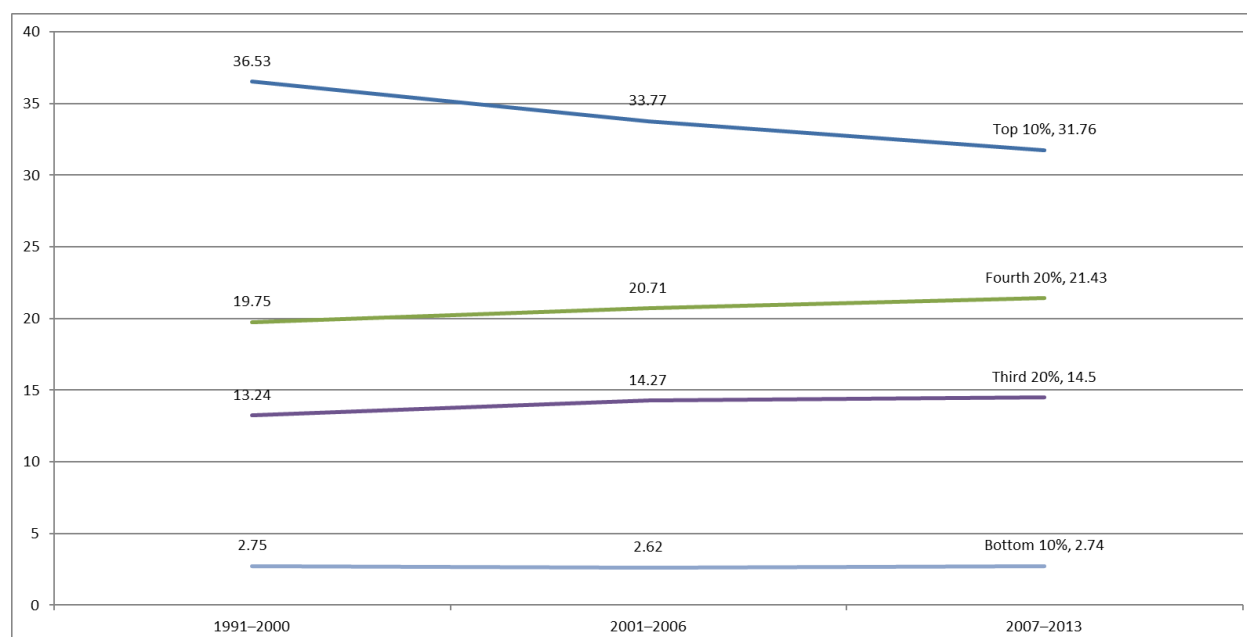
Agriculture growth has been stable over the years, varying between 2.7 percent and 4.8 percent. Although Cameroon's economic growth rates, both overall and across sectors have shown significant recovery in the last decade, they are still weaker compared to the earlier two decades. The main contributors of Cameroon's recent recovery have been services, agriculture, and manufacturing.

Its economy also relies significantly on natural resource rents, with their share of GDP increasing from 6.4 percent in 1971–1980, following the beginning of oil exploitation in 1978, to more than 10 percent in the other periods. It was at about 11 percent in the recent decade. Oil rent is thus the most significant of Cameroon's natural resource rents, increasing from 2.8 percent at the start to an average of about 7.5 percent in the past decade. Another important contributor of natural resource rents is the forest sector, though its importance has marginally decreased from 4.2 percent to about 3.2 percent today.

Investment as proxied by gross fixed capital formation, like most other indicators, deteriorated from 1971–1980 (at 29.8 percent of GDP) to 1991–2000 (at 14.4 percent of GDP). It also followed a similar recovery path, up to 18.7 percent of GDP in 2007–2013. Growth in gross capital formation has been similar, falling from 12.9 percent at the beginning to 0.3 percent in 1991–2000. It has now recovered to only about half its 1971–1980 value.

The structure of income distribution has improved, with the Gini coefficient falling from 44.6 in 1991–2000 to 40.7 in 2007–2013. The shares of income accruing to the poorest 10 percent and the poorest 20 percent have remained stable over the three periods, at about 2.7 percent and 6.2 percent, respectively (figure 4.1). The income share of the top brackets have fallen steadily, with the top 10 percent's falling from 36.5 percent to 31.8 percent, and that of the 20 percent falling from 51.6 percent to 47.7 percent. Those who have captured Cameroon's growth recovery gains are mainly the middle class, with the share of the third 20 percent of the population rising from 13.2 percent to 14.5 percent, and that of the fourth 20 percent rising from 19.7 percent to 21.4 percent.

Figure 4.1 Trends in shares of income accruing to different classes in Cameroon

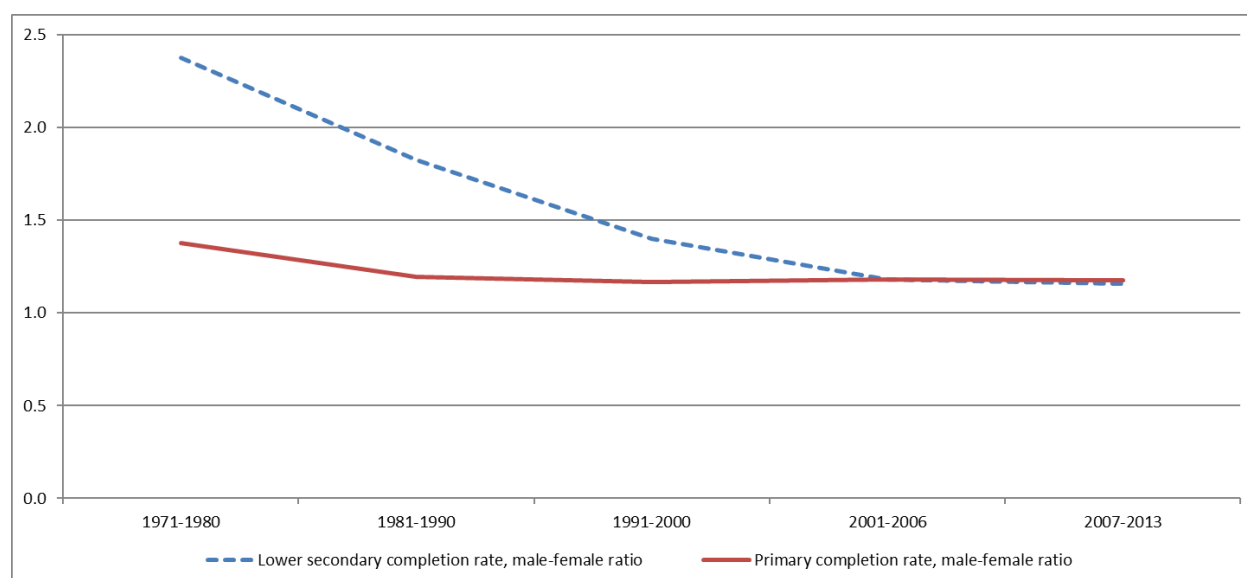


Source: Author's calculations using World Bank (2015) data.

Poverty fell significantly from 1991–2000 to the recent decade for all poverty measures. The poverty gap at \$1.25 has halved since the 1990s. The 2015 MDG report finds that from 1990 to 2010, poverty in Sub-Saharan Africa has reduced by only 8%, clearly not commensurate to its 5% average growth. Growth recovery has therefore been less pro-poor than it should be.

Primary school completion rates have improved from 50.4 percent in 1971–1980 to 66.7 percent in 2007–2013. Secondary school completion rates also rose from 8.3 percent to 27.4 percent during the same period. Figure 4.2 shows the inequality in male-female primary and secondary school completion rates.

Figure 4.2 Cameroon's male-female gap



Source: Author's calculations using World Bank (2015) data.

Although the male-female inequality embedded in these human capital indicators has fallen, that gap still remains above parity to girls' disfavor. In 1971–1980, the gap was as high as 1.38 in primary completion rate and 2.38 in secondary completion rate. By 2007–2013, these had

improved on average to 1.18 and 1.16 respectively. Unemployment rates have also fallen steadily from 6.1 percent in 1991–2000 to 4.1 percent in 2007–2013.

South Africa

A brief overview of the historical context of South Africa's socioeconomics, gleaned from Ngepah and Mhlaba (2013), is important, given that most of the inequalities and social unrest are inherited from the apartheid era.

For the past century and a half, South Africa's economic growth has been fueled by mining. The period between 1948 and 1973 saw the country's average real GDP growth rate rise above 7 percent a year, with an average employment growth rate of 4.3 percent. But from the 1970s to the mid-1990s, there was a steep decline, following the effects of external sanctions on the apartheid regime and the internal unrest that marked the regime's discriminations.

The South African economy's structure in GDP sectoral shares has been relatively stable (table 4.3). Agriculture is the only sector whose contribution declined steadily from 7.2 percent to 2.7 percent over all the periods considered. Industry's share, though falling from about 42 percent to 30.2 percent, remains high. The services sector has gained share, rising from 51.4 percent to 67.1 during the periods. Resource rents, particularly minerals and coal, have been significant, though not as high as in Cameroon. Total rents have risen from 4.2 percent to 7.7 percent from the first period to the last, fluctuating in between.

GDP and GDP per capita growth rates were 3.4 percent and 1.1 percent, respectively, in 1971–1980. The main GDP growth contributors in the first decade of table 4.3 are manufacturing, agriculture, and services, averaging 5.3 percent, 4.8 percent, and 4 percent, respectively. From then, there has been a steady and significant decline in all the economic sectors' growth rates.

The late 1990s, following regime change to democratic rule, saw a high capital-labor ratio as employers tended to substitute capital for labor. Scarce skilled labor led to higher skilled wages. With most of the population under-skilled, this became one reason for the entrenched structural inequality. The economic growth rates recovered significantly in 2001–2006. The services, manufacturing, and industry sectors averaged 4.4 percent, 3.7 percent, and 3.0 percent, respectively.

Table 4.3 Fundamentals of South Africa's socioeconomy

Indicators	1971–1980	1981–1990	1991–2000	2001–2006	2007–2013
Share of GDP					
Agriculture	7.17	5.30	3.99	3.15	2.71
Industry	41.43	42.94	34.23	30.93	30.16
Manufacturing	21.71	23.04	20.64	18.47	14.45
Services	51.41	51.76	61.79	65.92	67.13
Real GDP per capita	\$5,273.50	\$5,295.53	\$4,789.38	\$5,218.52	\$5,967.69
Growth rates in					
Agriculture	4.84	2.59	1.97	0.35	3.38
Industry	2.40	0.76	0.50	3.02	0.92
Manufacturing	5.26	1.37	1.38	3.67	1.21
Services	3.96	1.80	2.17	4.43	3.27
GDP	3.39	1.54	1.84	4.13	2.53

Indicators	1971–1980	1981–1990	1991–2000	2001–2006	2007–2013
GDP per capita	1.12	-0.91	-0.41	2.63	1.04
	Natural resource rents				
Total	4.16	5.64	1.84	3.19	7.69
Oil	0.00	0.00	0.03	0.18	0.06
Forest	0.84	0.87	0.94	0.86	0.63
Coal	0.93	1.45	0.03	0.87	3.34
Mineral	2.40	3.31	0.75	1.11	3.57
Natural	0.00	0.01	0.09	0.16	0.08
	Income distribution				
Gini			57.90	67.40	64.08
Income share held by highest 10%			45.56	57.54	52.74
Income share held by highest 20%			62.94	72.21	69.07
Income share held by fourth 20%			18.45	14.20	15.98
Income share held by third 20%			9.78	7.08	7.93
Income share held by second 20%			5.64	4.06	4.46
Income share held by lowest 20%			3.19	2.45	2.58
Income share held by lowest 10%			1.35	1.07	1.11
	Poverty at \$ a day PPP				
Poverty headcount ratio \$1.25			23.98	16.72	11.55
Poverty headcount ratio \$2			41.30	35.15	28.71
Poverty gap at \$1.25			6.77	3.06	1.73
Poverty gap at \$2			16.72	11.95	8.88
	Investment				
Gross fixed K formation (% of GDP)	26.56	22.40	16.63	16.55	20.36
Gross K formation (growth)	5.17	-3.01	3.70	9.55	3.67
	Human capital				
Lower sec. completion rate, female			68.98	87.33	
Lower sec. completion rate, male			60.25	81.53	
Lower sec. completion rate, total			68.85	84.43	
Primary completion rate, female			86.85	95.59	
Primary completion rate, male			81.57	93.92	
Primary completion rate, total			84.20	94.75	
	Unemployment				
Unemployment, youth total			45.13	50.47	48.65
Unemployment, total			23.16	25.13	24.00

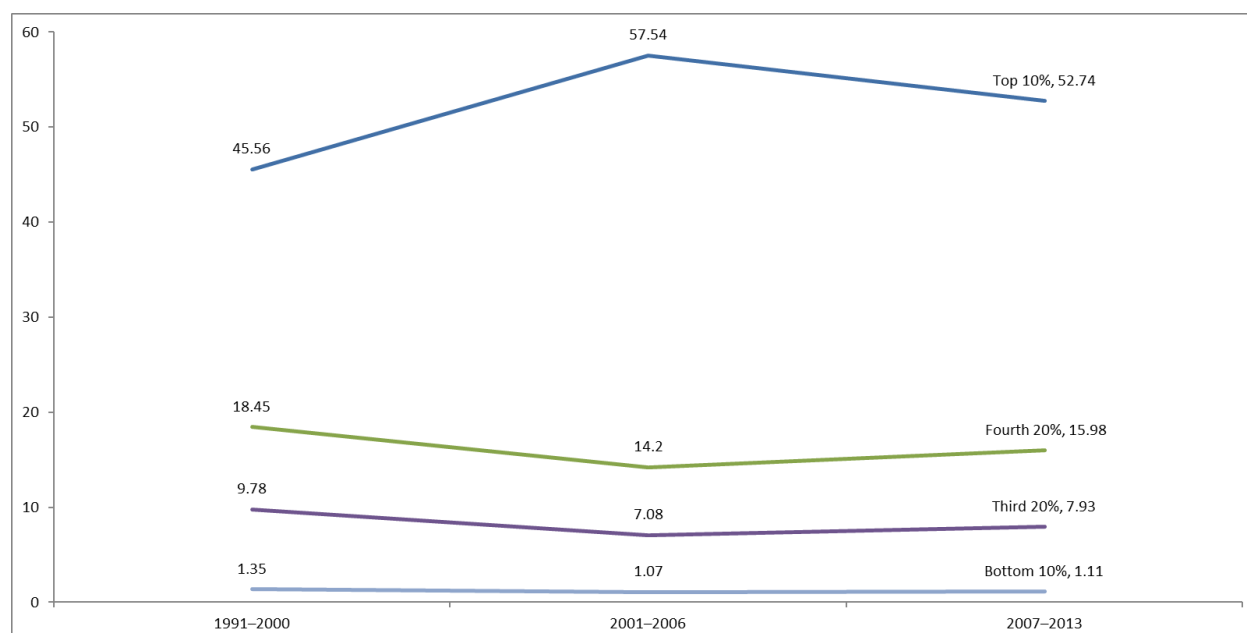
Source: Author's calculations using World Bank (2015) data.

Though significant, it is notable that due to an increasing skills premium because of a rising capital-labor ratio and low skilled labor, the recovery has been marked by increasing unemployment. When growth indicators were at their lowest (1991–2000), unemployment was at 23.2 percent, of which youth unemployment was 45.1 percent. Following the recovery (2001–2006), unemployment rose to 25.1 percent, of which 50.5 percent were youths. In 2007–2013, economic growth rates fell overall and most significantly in industry, manufacturing, and services. These happened at the back of labor unrest, mining strikes, and persisting social gaps. Only agricultural growth managed to increase from 0.4 percent to 3.4 percent between 2001–

2006 and 2007–2013. At the same time, unemployment remained high at 24 percent, with youths at 48.7 percent.

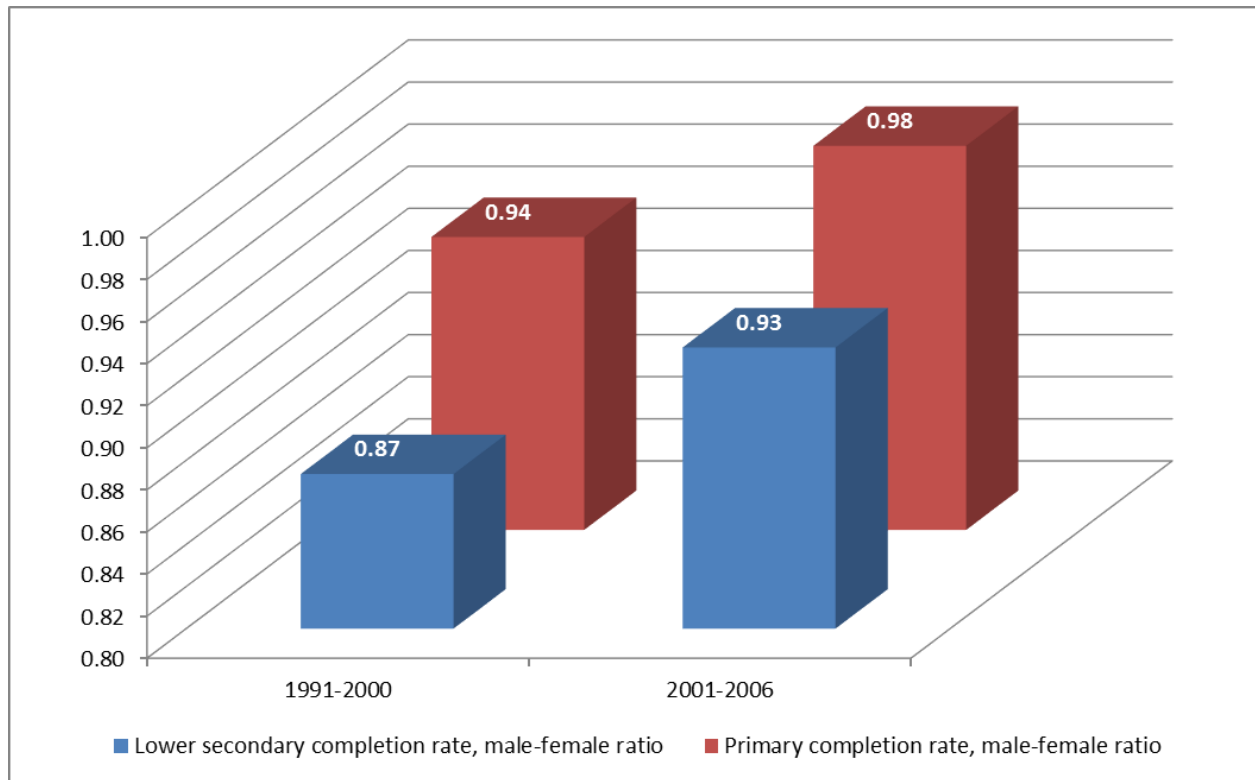
Most apartheid-era policies catered to the white minority, leaving blacks and other races behind. Despite more than 20 years of democratic black rule, the gap in access to social infrastructure and social services is still persistent, largely due to governance inadequacies, especially at local government levels (Chitiga, Ngepah, and Sekyere forthcoming). Income distribution has worsened from a Gini of 57.9 percent in 1991–2000 to above 65 percent in the last decade. The shares of income accruing to the bottom 10 percent and 20 percent have also deteriorated significantly, even with increasing government interventions through social grants (figure 4.3). The respective shares fell from 1.3 percent and 3.2 percent in 1991–2000, to 1.1 percent and 2.6 percent in 2007–2013. Figure 4.3 shows that the loss of income in the bottom class is gained by those at the distribution’s top 10 percent and 20 percent, with their shares increasing from 45.6 percent and 63 percent, respectively, to 52.7 percent and 69.1 percent, respectively. Though poverty has almost halved during the same periods, the income distribution picture suggests a considerable South African economic polarization.

Figure 4.3 Trends in shares of income accruing to different South African classes



Source: Author’s calculations using World Bank (2015) data.

Figure 4.4 Male-female human capital gap



Source: Author's calculations using World Bank (2015) data.

Primary and secondary completion rate levels have been high and increasing. The picture of the male-female human capital gap shows that there are more females completing primary and secondary schools than male—an opposite situation to Cameroon's. Though figure 4.4 shows that the ratio has narrowed, there are still 0.12 and 0.17 gaps in primary and secondary school completion rates in 2001–2006.

These insights into the background of these two countries will be relevant in interpreting the results of the econometric analyses of the case studies that will follow.

Micro-conceptual framework

The conceptual approach to be adopted for the analysis of income, inequality, and poverty is founded on the approaches employed to study welfare's determinants. This paper adopts a conceptual model similar to the type used by Muherjee and Benson (2003), written as follows:

$$\ln y_i = \alpha x_i + \varepsilon_i \quad (11)$$

Where $\ln y_i$ is the natural log of a welfare indicator for household i , x_i is a set of exogenous dependent variables, α is a vector of coefficients, and ε_i is a random error term.

Income equation

In order to specify the income equation, this paper adapts equation (11) by augmenting it with a measure of inequality that can be captured by relative welfares at the household level as follows:

$$\ln y_i = \rho \theta_i + \alpha x_i + \varepsilon_i \quad (12)$$

Where θ_i is a measure of inequality in household i relative to a reference group mean in welfare, and ρ is a coefficient of inequality, while all else is as in (11).

Most poverty studies use a material welfare approach for individuals or households, measured either by incomes or consumption expenditures (Wagle 2007). There is a debate whether to use income or consumption in analyzing welfare. Ravallion (1992) suggests that incomes may do better in empirical applications dealing with developed countries, while consumption would be preferred for developing countries, mainly because incomes tend to be significantly understated in the latter. In this work, consumption is chosen to calculate poverty, and income is a proxy for economic activity at the household level similar to national level GDP. Income is used to capture household-level economic activity rather than welfare.

Inequality equation

The underlying income generation processes are most significantly those that bring about inequality. As such, inequality can be specified as a function of income and other exogenous variables in the same way as the income equation is specified. This framework becomes plausible for inequality estimation at household level:

$$\ln\theta_i = \gamma y_i + \beta x_i + \vartheta_i \quad (13)$$

All variables are defined as in previous equations with \ln as natural logarithm, γ the coefficient of income, β a vector of coefficients for other determinants, and ϑ a random error term.

Poverty framework

This paper develops a framework for poverty estimation similar to equation (9). Contrary to the cross-country poverty framework, it also introduces the other exogenous variables from the income and inequality equations. The basic model for poverty thus follows the pro-poor growth framework and can be written as:

$$\ln P_i = \delta_0 + \delta_1 \theta_i + \delta_2 y_i + \omega x_i + \sigma_i \quad (14)$$

All variables are as defined previously, \ln as natural logarithm, δ as coefficients of income and inequality, ω as a vector of coefficients for other determinants, and σ as a random error term.

Variables and data

Income is captured by monthly individual incomes summed over all sources. While the use of income is designed to capture the dynamics of household production and income generation processes, it is relevant to consider the usual smoothing effects of consumption expenditures when calculating poverty and inequality. The rationale is that one's level of consumption is less dependent on income than wealth given the consumption smoothing behavior of households over a life cycle. Although the income equation uses household income as a dependent variable, the inequality and poverty measures will use consumption (which captures elements of wealth) and welfare to calculate relevant poverty and inequality indices.

Inequality indices

The method adopted for the generation of inequality indicators at the household level builds on the polarization concept. Polarization occurs when observations disperse from the middle of the distribution either to the left or right (Holzner 2012). Though polarization is distinct from inequality (Yitzhaki 2010), its underlying reasoning can help generate household-level proxies for inequality.

This paper adapts this concept to use in developing proxies for various inequality types in household welfare relative to different reference groups. It uses this method to generate income disparity indicators between and within wealth groups and gender and age groups. The

polarization notion is based on an absolute difference in location, say along some welfare distribution (Duclos, Esteban, and Ray 2004). The same notion in a ratio form, which can be log transformed to the difference is used. For consumption C of household i relative to mean consumption \bar{C} of a reference group j , the following is proposed as the basic indicator of welfare disparity in a household i relative to a reference group:

$$\theta_i = C_i^I / \left(\frac{1}{n_j} \sum_{j=1}^J C_j^J \right) \quad (15)$$

Household i belongs to its own subgroup I , which may be a given quintile, age group, gender or ethnic group, or geographic locality; n_j is the population of subgroup J .

When $I = J$, then the measure can be a within-group inequality. An individual's identification within a group depends on the welfare density at the point where the group sits in the welfare distribution spectrum (Duclos, Esteban, and Ray 2004). But the cohesion within the group can also depend on dispersing welfare distribution at that point. Given the other ties that may bond individuals belonging to the same group, but whose characteristics may be similar in many other ways than income (for example ethnicity), there may be significant altruism or within-group social capital that may minimize or even reverse welfare disparity's impact on productivity (Ngepah 2011b).

When $I \neq J$, then the measure can be a between-group inequality. As shown in the continental-level analyses, between-groups inequality may have different impacts on income (production) depending on the groups compared. Inequality between groups located far apart along the welfare distribution spectrum may not have the same impact on income generation as in the equation between groups relatively close in the distribution curve. An example may be the relationship between the middle class and the poor (Ravallion 2009). The different household inequality measures would be as follows:

Middle class-poor inequality

Inequality between the middle class and the poor ($\theta_{(mc-p)i}$) is the ratio of the mean per capita consumption of quintile three (Q3) to the per capita consumption of a quintile one (Q1) household.

$$\theta_{(mc-p)i} = C_{i \in Q1}^{Q1} / \left(\frac{1}{n_{Q3}} \sum_{j=1}^{Q3} C_j^{Q3} \right) \quad (16)$$

Rich-poor inequality

Inequality between the rich and the poor ($\theta_{(r-p)i}$) is the ratio of the mean per capita consumption of quintile five (Q5) to the per capita consumption of a quintile one (Q1) household.

$$\theta_{(r-p)i} = C_{i \in Q1}^{Q1} / \left(\frac{1}{n_{Q5}} \sum_{j=1}^{Q5} C_j^{Q5} \right) \quad (17)$$

Rich-middle class inequality

Inequality between the rich and the middle class ($\theta_{(r-mc)i}$) is the ratio of the mean per capita consumption of quintile five (Q5) to the per capita consumption of a quintile one (Q3) household.

$$\theta_{(r-p)i} = \frac{C_{i \in Q1}^{Q1}}{\left(\frac{1}{n_{Q5}} \sum_{j=1}^{Q5} C_j^{Q5} \right)} \quad (18)$$

Within-group inequalities

The inequality within a group is calculated as the relative position of a given household in the group with respect to the mean welfare of that group:

$$\theta_{(r-p)i} = \frac{C_i^I}{\left(\frac{1}{n_I} \sum_{i=1}^I C_i^I \right)} \quad (19)$$

The within-group inequalities are for the poor (in Q1), the middle class (in Q3), and the rich (in Q5), such that $I = Q1; Q3 \text{ or } Q5$.

This paper uses the same reasoning to define gender and age group welfare inequality. For gender inequality, it looks at the consumption ratio between female relative to male average and male relative to female average. It combines both measures into one to obtain what is termed between-gender inequality. The idea is to look at between-gender inequality as combining welfare gaps from the perspective of females relative to males and then males relative to females. Within group is simply the gap in female consumptions relative to the female group mean, and the same for males.

Inequality among age groups is aimed mainly at understanding youth marginalization's growth and poverty impact. This paper considers two types of youth definitions. One is the extended definition proposed by the African Youth Charter, 15 to 35 years. The other is the traditional United Nations definition for the purpose of labor market: 15–25.

Poverty indicators

This paper generates the normalized shortfall of household per capita consumption from the appropriate poverty line. For poverty line z , the normalized consumption gap g_i for household i , for levels of censored consumption C_i is as follows:

$$g_i = \begin{cases} \frac{z - C_i}{z}, & \text{for } C_i < z \\ 0 & \text{for } C_i \geq z \end{cases} \quad (20)$$

This is the poverty measure that will be used at the household level. The distribution is censored in that given the poverty line, it is defined only for the poor household. The function's value is zero for non-poor households.

The poverty line is defined as the \$1.25 and \$2 a person a day PPP. This paper converted to the respective local currencies of the countries by multiplying the international poverty lines by the respective local currency/\$US PPP exchange rates at the year of the household survey data and correcting for the price index gap between the years.

Exogenous variables

The variable selection to be used as exogenous determinants has been guided by literature (Mansour 2012). Since the main aim is not to investigate welfare determinants but to understand how the relationship between income/production, inequality, and poverty play at the household level, the analysis tries to be as parsimonious as possible. This paper also takes care to include key determinants so as not to run into the risk of omitting key determinants.

The exogenous variables are grouped into three: household demographics, characteristics of household head, household asset ownership, and some community-level characteristics.

- Household demographics: This set of variables captures households' composition and size. It comprises household size and square of household size.
- Characteristics of household head: This comprises age of household head, square of the age of household head, gender of household head, education (years) of household head, employment status of household head, and ethnicity of household head.
- Household asset ownership: This includes key productive assets like land and means of access to information such as radio and television. It also includes means of communication, mainly cell phones.
- Community-level characteristics: The main variable included is infrastructure in the community. This is hardly present in most household surveys. It is also believed that pipe-borne water in households can be a good proxy for infrastructure development in that community. This paper aggregates the number of households with piped water in the house at the primary sampling unit level to get an idea of a community's infrastructure development level.

The paper also includes location, mainly rural versus urban for Cameroon, and race for South Africa.

Table 4.4 Variables in the case study micro models

Variable	Meaning	Source
Between-group inequality		
Rich-poor	Ratio of consumptions of households in the 1 st quintile to the mean of the 5 th quintile and consumptions of households 5 th quintile relative to the mean of the 1 st .	Calculated from 2007 Household Survey for Cameroon and 2010 Income and Expenditure Survey for South Africa.
Rich-middle class	Ratio of consumptions of households in the 3 rd quintile to the mean of the 5 th quintile and consumptions of households 5 th quintile to the mean of the 3 rd .	
Middle class-poor	Ratio of consumptions of households in the 1 st quintile to the mean of the 3 rd quintile and consumptions of households 1 st quintile to the mean of the 3 rd .	
Gender	Ratio of consumptions of female households to the mean of male group and consumptions of male households to the mean of female group.	
Within-group inequality		
Poor	Ratio of consumptions of households in the 1 st quintile to the mean of the 1 st quintile.	As above
Middle class	Ratio of consumptions of households in the 3 rd quintile to the mean of the 3 rd quintile.	
Rich	Ratio of consumptions of households in the 5 th quintile to the mean of the 5 th quintile.	
Poverty		
Poverty gap	The gap between the incomes of the poor at \$1.25 a person a day PPP, and the poverty line, normalized by the poverty line.	As above
Exogenous variables	Household per capita income; household size; square of household size, age; square of age; gender of head; education; employment status; race; ownership of assets (land size, radio, TV, DSTV, cell phone, fixed line, Internet, computer); infrastructure (proportion of households with pipe-borne water in the community); rural/urban location.	As above

Source: Author.

Data

The two countries included in the case study exercise in this work were chosen because of the availability of reliable data that were collected for national welfare analysis. The data for the case study countries are from the respective nationally representative household surveys. This paper presents the background to each country's datasets below.

Cameroon

Cameroon has so far conducted four nationally representative household surveys through its National Institute of Statistics. These are the Household Consumption Budget (HCB) undertaken in 1983/84, and the Cameroon Household Surveys (CHSs) 1, 2, and 3 undertaken in 1996, 2001, and 2007 respectively. The fourth has recently been completed but not yet released to general users. The household surveys are primarily aimed at understanding household living conditions and underlying determinants.

The HCB initially sampled 6,000 households but effectively interviewed only 5,474. Its primary sampling unit was the administrative districts. The CHS 1 studied the structural adjustment policies' impacts on people's living conditions. It sampled and surveyed 1,700 households. The CHS 2 profiled national and provincial poverty. It sampled and surveyed 12,000 households but effectively surveyed 10,992. The desire to update CHS 2 poverty profiles and document poverty reduction progress and the attainment of the millennium development goals led to CHS 3. It also sampled and surveyed 12,000 households but effectively surveyed 11,392. The main difference between the HCB and the CHSs is that the HCB used the first General Population and Housing Census conducted in 1976 as a sampling frame while the CHSs used the second General Population and Housing Census conducted in 1987. Since our objective is not to study the trends in income, poverty, and inequality but to analyze the relationship between income, inequality, and poverty at the household level, the paper uses the 2007, most recent dataset.

South Africa

The South African government has thus far five waves of official household surveys to document household income and expenditure. Most rich household surveys like the General Household Surveys do not have detailed income and expenditure information. The first attempt to collect data on South African household incomes and expenditures was in 1990, with the Survey of Household Expenditures by the then Central Statistics, now Statistics South Africa. But that first attempt only focused on 12 urban South African areas. The dataset's weakness is that it isn't nationally representative. An important variability source in the income, inequality, and poverty relationship may also include the rural versus urban divide. The second aspect is that the coloured and Indian households tended to be underrepresented in the sample (Central Statistics 1997). This paper therefore makes use only of the Income and Expenditure Surveys (IESs) starting from 1995.

The 1995 IES is the first nationally representative survey that captures detailed information on household incomes and expenditures. Its lowest aggregation level is the magisterial district. The 1995 IES sampled and surveyed 30,000 households, using the 1991 population census as the sampling frame. All official statistics between 1970 and 1994 excluded the former Transkei, Bophutatswana, Venda, and the Ciskei "independent states" (Woolard and Leibbrandt 1999). This is another main weakness of the 1990 Survey of Household Expenditures. The 1991 census could not account for these states and the size of their population had to be estimated to include in the sampling frame.

The 2000 IES also maintained a sample of 30,000 households. It used the same frame as the 1995 IES. In 2005, the sample size was reduced to 24,000 households from 3,000 primary sampling units, with few methodological differences. A more rigorous combination of recall and diary approach was introduced, compared to the recall approach in the previous years. It took a full year to complete the survey. The dual methodology of the diary and recall method was also applied to the 2010 IES wave. This round sampled 31,419 households but effectively realized 27,665. There were 3,254 primary sampling units. Both the 2005 and 2010 rounds used the 2001 population census as the sampling frame. This paper uses the 2010 IES wave for the South African case study dataset. The aim is to use the most recent datasets version, but take the precaution that it is not plagued with irregularities, so take the time to review all the datasets before deciding.

Estimation technique

A system of equations similar to (10) above is considered. The combined specification of income, inequality, and poverty yields model (21) below.

$$\begin{cases} \ln y_i = \rho \theta_i + \alpha x_i + \varepsilon_i \\ \ln \theta_i = \gamma y_i + \beta x_i + \vartheta_i \\ \ln P_i = \delta_0 + \delta_1 \theta_i + \delta_2 y_i + \omega x_i + \sigma_i \end{cases} \quad (21)$$

All the variables and notations are as described above. In order to deduce income and inequality's poverty effects under different types of inequality specifications described above, two possible regression techniques can be employed for model (21). These are 2SLS and 3SLS techniques. As mentioned, 2SLS has been thought of as more efficient than 3SLS in small samples, particularly when cross-equation covariations are small. In the current case, the analyses deal with a large sample size and therefore will take advantage of 3SLS in estimating model (21).

CHAPTER 5. RESULTS AND INTERPRETATIONS

In this section, the econometric analyses' results are presented and interpreted. The results and interpretations for the continental-level analyses are first presented in subsection 5.1. The continental findings are then related to household-level case studies for South Africa and Cameroon in subsection 5.2.

Continental growth and inequality regression

This subsection discusses the continental regression outputs. The discussions start with presenting the descriptive statistics of the World Bank's WDI data. They then follow with the results for average inequality, inequality along income classes, and gender inequality.

Descriptive statistics

Table 5.1 displays the descriptive statistics, with 132 observations in an unbalanced panel. Initial per capita income averages 1311.9 real dollars, with considerable variations between 123.8 and 10920.5. The Gini coefficient averages 44 percent and varies between 29.8 and 74.3. Africa's most unequal country is South Africa, which forms one of the household-level case studies in the next section. In the between income class, the highest mean inequality is the income ratio of the rich and poor, 11.2 when the poor is measured at Q1, and 28.8 when the poor is measured at D1. The lowest is the gap between the middle class and the poor.

In the within class, there is a lot more inequality within poor, with mean ratio of 4.4 and consideration variations between 2.9 to 12.9. Within-middle-class inequality is the lowest, averaging 1.5. Inequality among the rich is also low, at 2.6.

Table 5.1 Cross-country descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Initial per capita income	131	1,311.857	1,771.598	123.810	10,920.470
Growth in real per capita income	131	1.424	2.619	-6.184	13.294
Gini	131	44.564	8.937	29.830	74.330
Between group					
Middle class and poor (Q1)	131	2.638	0.731	1.722	6.081
Middle class and poor (D1)	131	6.692	2.817	3.727	24.040
Rich and poor (Q1)	131	11.216	7.824	4.256	52.872
Rich and poor (D1)	131	28.787	23.175	9.731	144.739
Rich and middle class (D10)	131	2.835	1.491	1.521	11.905
Rich and middle class (Q5)	131	3.996	1.743	2.349	14.332
Within group					
Within poor	131	4.385	1.281	2.865	12.940
Within middle class	131	1.515	0.172	1.271	2.194
Within rich (Q5/Q4)	131	2.568	0.756	1.831	6.532
Within rich (D10/Q4)	131	1.811	0.688	1.150	5.426
Invest (%GDP)	128	21.372	9.434	6.926	65.931
Lower secondary completion	131	29.684	23.478	3.053	110.800
Primary completion (female)	127	51.866	27.171	4.156	112.995
Primary completion (male)	127	59.014	22.493	8.713	111.853
Primary completion (total)	127	55.441	24.149	6.426	112.407
Poverty head count at \$1.25	131	42.626	24.925	0.000	93.740
Poverty head count at \$2	131	61.904	25.929	0.000	98.980
Poverty gap at \$1.25	131	18.069	14.210	0.000	65.360
Poverty gap at \$2	131	31.240	18.109	0.000	77.200

Source: Author's calculations using World Bank (2015) data.⁵

The human capital measure finally adopted for this model is lower secondary school completion rate. The reason is there were more observations for this variable than the other options. But it was not possible to get a breakdown for male and female, hence the use of the primary completion rate to generate gender human capital inequality. The primary school completion rate measure is significantly skewed in favor of male pupils on average. The average primary school completion rate is 59 percent for male compared with 52 percent for female.

Inequality along the income distribution spectrum

Average inequality

The outputs for the heteroskedasticity-consistent pooled OLS model, maximum likelihood panel regression, and 3SLS model are reported in table 5.2 for the Gini coefficient. Judging by the model parameters, the model performances are relatively acceptable. The lag per capita GDP depicting initial conditions has the expected negative sign in all the models. This is

⁵ See Appendix A.1 for countries and years.

consistent for all the regressions on the different inequalities. In the models, inequality weakly enhances growth, but not significantly. It turns strong and significant in the 3SLS model.

Table 5.2 Regression outputs for average inequality (Gini)

	Heteroskesdasticity-consistent OLS		MLE (random effect)		3SLS	
Growth equation						
	Coef	SE	Coef	SE	Coef	SE
Lag GDPPC	-0.0003*	0.0002	-0.0003*	0.0002		
Inequality	0.0304	0.0215	0.0186	0.0256	0.4040***	0.0415
Human capital	0.0308**	0.0111	0.0200	0.0136		
Investment	0.0704***	0.0194	0.0805***	0.0225		
Constant	-1.9451*	1.0049	-0.9842	1.2885	-16.5833***	1.8768
Observations	132		132		127	
P-value	0.0000		0.0033		0.000	
ρ			0.354			
chi2					94.93	
Inequality equation						
GDPPC growth	0.0751	0.3235	0.4348*	0.2585	2.4706***	0.2402
Human capital	0.0576*	0.0342	0.0251*	0.0410		
Investment	0.1277*	0.0891	0.0523	0.0761		
Constant	38.7848***	2.0710	43.5004***	2.4060	41.0585***	0.9393
Observations	128		128		127	
P-value	0.0743		0.3862		0.000	
ρ			0.734			
chi2					105.77	
Poverty equation						
GDPPC growth	-0.2438*	0.4819	-0.3923*	0.3690	-7.4775***	1.0935
Inequality	0.3862**	0.1417	0.6855***	0.1351	12.5590***	3.1352
Constant	0.5613	6.4015	-12.0884*	6.4494	32.8527***	5.2831
Observations	131		131		127	
P-value	0.0264		0.0000		0.000	
ρ			0.725			
chi2					54.74	

Source: Author's calculations using World Bank (2015) data.

Note: In the 3SLS models, the endogenous variables are growth, inequality, and poverty. For this model, these variables are taken as five-year averages for the same periods. The exogenous variables investment and human capital are taken at the period's beginning and are therefore truly exogenous to the growth, inequality, and poverty. *, **, and *** denote significance at 15 percent, 10 percent, and 5 percent levels, respectively.

In the inequality model, growth equally tends to enhance inequality. The coefficients of growth in inequality equations are higher than those of inequality in the growth equation in all the estimation models. The inference from the MLE model suggests that growth significantly enhances average inequality. This is consistent with the recent observations that strong growth recovery in Africa has tended to happen in the midst of persistent and rising inequality. While investment appears to be a stronger and more significant growth driver, human capital is a more significant driver of inequality than investment. This seems to suggest that the most

skilled people take advantage of the opportunities for appropriating the fruits of economic growth.

In the poverty equations, growth in per capita GDP has the theoretically expected negative sign. It is established that growth is good for the poor (Dollar and Kraay 2002). Inequality, equally according to theoretical expectation, is bad for the poor. But while the growth coefficient is hardly significant, the inequality coefficients are significant across all the models. The implication is that inequality significantly increases poverty and growth tends to reduce it. This is a key concern for the reinforcing nature of the relationship between inequality and growth in African economies. In the following tables, the attention is on the nature of distribution within and between groups.

Rich-poor inequality

All other variables have the theoretically expected signs in the models for rich-poor inequality as suggested by table 5.3. As with average inequality models, the extreme inequality coefficient (between the rich and the poor) in the growth equation is even weaker and less significant across the models. Investment still remains a stronger growth determinant than human capital.

Table 5.3 Regression outputs for rich-poor inequality

	Heteroskesdasticity- consistent OLS		MLE (random effect)		3SLS	
Growth equation						
	Coef	SE	Coef	SE	Coef	SE
Lag GDPPC	-0.0002*	0.0002	-0.0003*	0.0002		
Inequality	0.0214	0.0262	0.0016	0.0305	0.4640***	0.0061
Human capital	0.0300**	0.0112	0.0199	0.0137		
Investment	0.0697**	0.0198	0.0804***	0.0227		
Constant	-0.8303	0.5324	-0.1818	0.7050	-3.7971***	0.3887
Observations	132		132		127	
P-value	0.0001		0.0041		0.000	
ρ			0.365			
chi2					5,831.63	
Inequality equation						
GDPPC growth	0.0930	0.0824	0.3975	0.2622	2.1552***	0.0282
Human capital	-0.0144**	0.0086	-0.0293*	0.0359		
Investment	-0.0273	0.0225	0.1776**	0.0763		
Constant	8.6508***	0.5271	7.2178**	2.1336	8.1834***	0.8258
Observations	128		128		127	
P-value	0.0201		0.0808		0.000	
ρ			0.546			
chi2					5,842.70	
Poverty equation						
GDPPC growth	-0.2202	0.4811	-0.4300	0.3684	-5.3927***	0.3298
Inequality	0.4287**	0.1610	0.6213***	0.1310	6.8523***	0.4301
Constant	12.8833***	2.2594	11.5746***	2.5199	13.5174***	2.9090
Observations	131		131		127	
P-value	0.0309		0.0000		0.000	
ρ			0.696			
chi2					72.33	

Source: Author's calculations using World Bank (2015) data.

Note: In the 3SLS models, the endogenous variables are growth, inequality, and poverty. For this model, these variables are taken as five-year averages for the same periods. The exogenous variables investment and human capital are taken at the period's beginning and are thus truly exogenous to the growth, inequality, and poverty. *, **, and *** denote significance at 15 percent, 10 percent, and 5 percent levels, respectively.

Per capita GDP growth still has a relatively high coefficient in inequality, but is not significant. But inequality between the rich and the poor shows a stronger and more significant positive effect on poverty, compared to growth's weaker and less significant effect on poverty. The same concern of high inequality jeopardizing gains in poverty reduction is reinforced much more by extreme inequality's effect compared with growth's effect.

Another significant aspect of the result is that improvements in human capital as measured by lower secondary school completion rates tend to significantly reduce extreme inequality. Improvements in investment also tend to significantly reduce inequality, more strongly than human capital. This has important implications for extreme inequality reduction. A combination of measures to relax credit constraints and improve human capital for those at the distribution's lower end will reduce extreme inequality. But in doing so, relaxing credit constraints should take priority, due to the stronger coefficient of investments (relative to human capital) on inequality.

Rich-middle class inequality

Equally, according to table 5.4, inequality between the rich and the middle class is positively associated with growth. Growth also positively associates with rich-middle class inequality. Investment still remains a stronger and more significant growth determinant compared with human capital. But increases in human capital more significantly reduce inequality between the rich and the middle class. This finding is consistent with that of inequality between the rich and the poor.

Though growth remains poverty reducing, howbeit insignificantly, inequality between the rich and the middle class has even higher positive coefficients on poverty. The coefficient is significant in the MLE and the 3SLS models.

Table 5.4 Regression outputs for rich-middle class

	Heteroskesdasticity-consistent OLS		MLE (random effect)		3SLS	
Growth equation						
	Coef	SE	Coef	SE	Coef	SE
Lag GDPPC	-0.0003*	0.0002	-0.0003*	0.0002		
Inequality	0.1874*	0.1100	0.0950	0.1326	1.7251***	0.2111
Human capital	0.0298**	0.0111	0.0195	0.0136		
Investment	0.0701***	0.0192	0.0805***	0.0225		
Constant	-1.3026**	0.6146	-0.5327	0.8153	-5.4943***	0.8944
Observations	132		132		127	
P-value	0.0000		0.0033		0.000	
ρ			0.349			
chi2					66.80	
Inequality equation						
GDPPC growth	0.0328	0.0252	0.0734	0.0527	0.5724***	0.0671
Human capital	-0.0084**	0.0026	-0.0141*	0.0079		
Investment	0.0126*	0.0069	0.0129	0.0156		
Constant	3.2505	0.1613	3.4358***	0.4630	3.1950***	0.1986
Observations	128		128		127	

P-value	0.0036		0.1904		0.000	
ρ			0.652			
chi2					72.82	
Poverty equation						
GDPPC growth	-0.1751	0.4860	-0.4860	0.3816	-4.2448***	0.6110
Inequality	1.0479	0.7302	2.3256***	0.6821	7.7114***	2.4475
Constant	13.5113***	3.2046	9.3182**	3.4786	13.7358***	1.4834
Observations	131		131		127	
P-value	0.3494		0.0014		0.000	
ρ			0.693			
chi2					50.42	

Source: Author's calculations using World Bank (2015) data.

Note: In the 3SLS models, the endogenous variables are growth, inequality, and poverty. For this model, these variables are taken as five-year averages for the same periods. The exogenous variables investment and human capital are taken at the period's beginning and are thus truly exogenous to the growth, inequality, and poverty. *, **, and *** denote significance at 15 percent, 10 percent, and 5 percent levels, respectively.

Middle class-poor inequality

The relationship between middle class versus poor inequality and growth, though not significant, is positive in both directions (table 5.5). The strong and significant negative effect of the gap between the middle class and the poor on poverty tends to corroborate the conjecture that was put up earlier. This is due to three key characteristics of the middle class - they are the main drivers of small and medium enterprises; they create new patterns of demand and reforms and they are also likely the greatest employers of the poor - poverty reduction therefore depends on this relationship. Contrary to the other inequality forms, investment is a greater and more significant determinant of the gap between the poor and the middle class, compared to human capital. It may therefore not so much depend on human capital to move from poor to middle class, but rather access to capital. This implies that relaxing the poor's credit constraints is more important for mobility toward the middle class than human capital.

Table 5.5 Regression outputs for middle class-poor

	Heteroskesdasticity-consistent OLS		MLE (random effect)		3SLS	
Growth equation						
	Coef	SE	Coef	SE	Coef	SE
Lag GDPPC	-0.0002*	0.0002	-0.0003	0.0002		
Inequality	0.2740	0.3120	0.2211	0.3522	1.0096***	0.1468
Human capital	0.0292**	0.0112	0.0192	0.0138		
Investment	0.0784***	0.0201	0.0820***	0.0228		
Constant	-0.0947	0.8464	0.3801	1.0861	-5.3484***	1.0187
Observations	132		132		127	
P-value	0.0001		0.0035		0.000	
ρ			0.368			
chi2					47.31	
Inequality equation						
GDPPC growth	0.0058	0.0134	-0.0190	0.0257	0.9492***	0.1321
Human capital	-0.0041*	0.0024	-0.0035	0.0032		
Investment	-0.0086*	0.0036	-0.0204**	0.0074		
Constant	2.4755***	0.0855	2.3292***	0.1962	5.3547***	0.3319
Observations	128		128		127	
P-value	0.0050		0.0401		0.000	
ρ			0.400			
chi2					51.60	
Poverty equation						
GDPPC growth	-0.3393	0.4686	-0.4731	0.3571	14.3135***	1.8872
Inequality	-6.9115***	1.6778	-7.1919***	1.2510	-15.3848***	1.3884
Constant	-0.2729	4.5936	-0.2367	3.8201	-56.4177***	11.9252
Observations	131		131		127	
P-value	0.0003		0.0000		0.000	
ρ			0.678			
chi2					126.86	

Source: Author's calculations using World Bank (2015) data.

Note: In the 3SLS models, the endogenous variables are growth, inequality, and poverty. For this model, these variables are taken as five-year averages for the same periods. The exogenous variables investment and human capital are taken at the period's beginning and are therefore truly exogenous to the growth, inequality, and poverty. *, **, and *** denote significance at 15 percent, 10 percent, and 5 percent levels, respectively.

Inequality among the rich

The within-rich inequality reported in table 5.6 shows more remarkable effects. It enhances growth significantly across all the models. This is consistent with Voitchovsky (2005) who finds that high-end inequality for rich nations tends to be associated with higher economic growth. This result confirms this finding for African countries. High-end inequality promotes growth at any development level.

Still, investment causes larger and more significant growth than human capital, which causes larger and more significant high-end inequality. This suggests, in line with the results from above, that mobility to high income depends more on human capital and less on investment, while upward mobility at the distribution's lower end depends more on investment and less on human capital.

Table 5.6 Regression outputs for within-rich inequality

	Heteroskesdasticity- consistent OLS		MLE (random effect)		3SLS	
Growth equation						
	Coef	SE	Coef	SE	Coef	SE
Lag GDPPC	-0.0003*	0.0002	-0.0003	0.0002		
Inequality	0.5003**	0.2562	0.265*	0.3082	3.8101***	0.5339
Human capital	0.0302**	0.0110	0.0194	0.0136		
Investment	0.0705***	0.0191	0.0810***	0.0225		
Constant	-1.8430**	0.7720	-0.8433	1.0094	-8.3869***	1.3986
Observations	132		132		127	
P-value	0.0000		0.0030		0.000	
ρ			0.345			
chi2					50.92	
Inequality equation						
GDPPC growth	0.0133	0.0136	0.0257	0.0235	0.2541***	0.0341
Human capital	-0.0044**	0.0014	0.0068**	0.0035		
Investment	0.0116**	0.0037	0.0019	0.0069		
Constant	2.1637***	0.0871	2.3810	0.2046	2.2129***	0.0880
Observations	128		128		127	
P-value	0.0004		0.2276		0.000	
ρ			0.634			
chi2					55.66	
Poverty equation						
GDPPC growth	-0.1641	0.4876	-0.5137	0.3860	-48.0481***	7.2838
Inequality	2.3302**	1.6886	4.5983**	1.5435	5.6998***	2.2423
Constant	11.6448**	4.5090	6.8220	4.5361	133.0719***	17.0559
Observations	131		131		127	
P-value	0.3803		0.0051		0.000	
ρ			0.682			
chi2					47.78	

Source: Author's calculations using World Bank (2015) data.

Note: In the 3SLS models, the endogenous variables are growth, inequality, and poverty. For this model, these variables are taken as five-year averages for the same periods. The exogenous variables investment and human capital are taken at the period's beginning and are thus truly exogenous to the growth, inequality, and poverty. *, **, and *** denote significance at 15 percent, 10 percent, and 5 percent levels, respectively.

While high-end within inequality significantly enhances growth, it also has a large and significant poverty-increasing effect. It therefore tends to drive a cycle of high growth and high top-end and extreme inequality, which tends to keep the poor in poverty. This may be the force

behind the type of high growth and high inequality in Africa. One can caution here that the poverty reduction gains may be reversed if this trend persists. The main question here may be what kinds of policies can make high-end inequality more pro-poor without jeopardizing growth, the fundamental element in sustainable poverty reduction?

Inequality among the middle class

Inequality among the middle class (table 5.7) tends to be associated with positive growth, but not significantly compared with inequality among the rich. The positive feedback of growth-enhancing inequality is also present, but equally not significant.

Table 5.7 Regression outputs for within-middle-class inequality

	Heteroskesdasticity-consistent OLS		MLE (random effect)		3SLS	
Growth equation						
	Coef	SE	Coef	SE	Coef	SE
Lag GDPPC	-0.0002	0.0002	-0.0003	0.0002		
Inequality	0.8238	1.1591	0.3452	1.4171	21.3709***	1.0835
Human capital	0.0300**	0.0112	0.0199	0.0137		
Investment	0.0708***	0.0197	0.0800***	0.0227		
Constant	-1.8612	1.7031	-0.6723	2.1721	-30.9517***	1.6830
Observations	132		132		127	
P-value	0.0001		0.0040		0.000	
ρ			0.362			
chi2					389.02	
Inequality equation						
GDPPC growth	0.0041	0.0034	0.0088*	0.0047	0.0468***	0.0023
Human capital	-0.0002	0.0004	0.0003	0.0007		
Investment	-0.0012	0.0009	0.0032**	0.0014		
Constant	1.4718***	0.0215	1.4480	0.0441	1.4483***	0.0181
Observations	128		128		127	
P-value	0.4796		0.0791		0.000	
ρ			0.722			
chi2					400.34	
Poverty equation						
GDPPC growth	-0.2081	0.4814	-0.4140	0.3623	-7.9493***	1.9360
Inequality	0.7088***	0.1365	0.3908***	0.0465	0.8347***	0.1115
Constant	-9.0888	11.1564	-34.8216***	10.9179	1067.1690***	147.5406
Observations	131		131		127	
P-value	0.0560		0.0000		0.000	
ρ			0.723			
chi2					64.31	

Source: Author's calculations using World Bank (2015) data.

Note: In the 3SLS models, the endogenous variables are growth, inequality, and poverty. For this model, these variables are taken as five-year averages for the same periods. The exogenous variables investment and human capital are taken at the period's beginning and are thus truly exogenous to the growth, inequality, and poverty. *, **, and *** denote significance at 15 percent, 10 percent, and 5 percent levels respectively.

There is a significant positive relationship with poverty, implying that within-middle-class polarization may tend to make small businesses' growth ineffective and inefficient. The high inequality within middle class implies that individuals at the middle class's lower end are too far away from those at the top of the same class, making overall middle class investment less effective and efficient than in low inequality scenarios. This in turn reduces the poverty benefits of the relationship between the middle class and the poor.

Within-poor inequality

Within-poor inequality as reported in table 5.8 tends to reduce growth, though not significantly. Although not significant, it is still something to watch, as most conflicts generally erupting in townships often happen in poor neighborhoods. A glaring example is the xenophobia eruption in South Africa, which has occurred in townships and low-income neighborhoods.

Again, investment remains stronger and more important for growth and is also at the root of increasing within-poor inequality, reinforcing that access to investible capital is the most important constraint at the distribution's lower end. Human capital is hardly significant in the within-poor inequality models. Education without finance may not help the poor move up the income ladder.

Table 5.8 Regression outputs for within-poor inequality

	Heteroskesdasticity-consistent OLS		MLE (random effect)		3SLS	
Growth equation						
	Coef	SE	Coef	SE	Coef	SE
Lag GDPPC	-0.0002	0.0002	-0.0003	0.0002		
Inequality	-0.2389	0.2031	-0.1661	0.2185	2.1513***	0.3720
Human capital	0.0284**	0.0112	0.0189	0.0137		
Investment	0.0787***	0.0199	0.0812***	0.0227		
Constant	0.2350	0.9240	0.5415	1.1336	-8.0271***	1.6496
Observations	132		132		127	
P-value	0.0001		0.0032		0.000	
ρ			0.366			
chi2					33.45	
Inequality equation						
GDPPC growth	0.0003	0.0210	-0.0071	0.0465	0.4191***	0.0686
Human capital	0.0011	0.0022	-0.0089*	0.0052		
Investment	0.0064*	0.0057	0.0392**	0.0135		
Constant	3.9321***	0.1341	3.8204***	0.3338	3.7946***	0.1546
Observations	128		128		127	
P-value	0.7726		0.0181		0.000	
ρ			0.179		1.	
chi2					37.32	
Poverty equation						
GDPPC growth	-0.3443	0.4679	-0.5660	0.3777	29.3066***	3.8623
Inequality	-5.3234***	1.1816	-2.8680***	0.6923	-4.0833***	1.2782
Constant	-5.0196	5.2548	6.2942*	3.5818	-90.9783***	16.3960
Observations	131		131		127	
P-value	0.0001		0.0001		0.000	
ρ			0.644			
chi2					132.51	

Source: Author's calculations using World Bank (2015) data.

Note: In the 3SLS models, the endogenous variables are growth, inequality, and poverty. For this model, these variables are taken as five-year averages for the same periods. The exogenous variables investment and human capital are taken at the period's beginning and are thus truly exogenous to the growth, inequality, and poverty. *, **, and *** denote significance at 15 percent, 10 percent, and 5 percent levels, respectively.

All the models show that within-poor inequality is associated with high and significant poverty reduction. Since poverty was measured in these models by the gap between the poor's income and the poverty line, the poverty-reducing tendency of within-poor inequality may be understood to imply that it is easier with high inequality, given a minor positive shock, to bring those who are located closer to the poverty line up to the line itself or above it. On the contrary, if distributions were more equal within the poor, one would expect the positive shock to be big enough to be able to move the same number of people out of poverty. This conjecture can only be verified by looking at the relationship between inequality and severity of poverty using measures with higher aversion to inequality among the poor. A positive relationship will mean that while inequality may make it easier for the just poor to be lifted out of poverty, it may tend to keep the severely poor worse off. Unfortunately, it is not possible to verify this in the current work given the data constraints and the work it may require.

Inequality along gender lines

Table 5.9 reports the inequality results between male and female human capital as measured by the male-female primary school completion ratio. This variable was taken at the period's beginning, and it is expected that over the five-year period in which the averages are taken, whatever the effects are, they will begin to manifest in the socioeconomic system.

Table 5.9 Regression outputs for gender inequality

	Heteroskesdasticity-consistent OLS		MLE (Random effect)		3SLS	
Growth equation						
	Coef	SE	Coef	SE	Coef	SE
Lag GDPPC	-0.0002	0.0002	-0.0003	0.0002		
Inequality	-0.7244*	0.4425	-0.2508**	0.0579	-5.3519***	0.2976
Human capital	0.0255**	0.0119	0.0178	0.0152		
Investment	0.0624**	0.0205	0.0788	0.0232**		
Constant	0.5439	1.1841	0.2407	1.3897	8.2437***	0.4536
Observations	132		132		124	
P-value	0.0001		0.0039		0.0000	
ρ			0.371			
chi2					323.47	
Inequality equation						
GDPPC growth	-0.0179*	0.0100	-0.0159	0.0106	-0.1867***	0.0106
Human capital	-0.0058***	0.0010	-0.0081***	0.0015		
Investment	-0.0114***	0.0027	-0.0031	0.0032		
Constant	1.7026***	0.0639	1.6362***	0.0891	1.5402***	0.0467
Observations	124		124		127	
P-value	0.0004		0.0000		0.000	
ρ			0.586			
chi2					307.88	
Poverty equation						
GDPPC Growth	-0.1029	0.5370	-0.0800	0.3831	9.0169***	2.5629
Inequality	6.0847*	3.5426	6.1470***	1.1345	14.1709***	2.9630
Constant	8.7773*	5.0585	-2.7945	4.6040	-129.3568***	22.5679
Observations	127		127		127	
P-value	0.2122		0.0000		0.000	
ρ			0.712			
chi2					57.27	

Source: Author's calculations using World Bank (2015) data.

Note: In the 3SLS models, the endogenous variables are growth, inequality, and poverty. For this model, these variables are taken as five-year averages for the same periods. The exogenous variables investment and human capital are taken at the period's beginning and are thus truly exogenous to the growth, inequality, and poverty. *, **, and *** denote significance at 15 percent, 10 percent, and 5 percent levels, respectively.

A significantly high and negative coefficient on growth means that gender inequality reduces growth. The impact is robust across all estimation models. Growth in income per capita also tends to weakly reduce the gap. This is possibly capturing that income increases allow more girls to be educated by limiting the different constraints that they generally face with education in developing countries, including early pregnancy, child labor, home care burden, and so on.

Gender educational inequality's impact on poverty is highly positive and significant. That the descriptive statistics indicate that male pupils are better off than female implies that more disadvantaged girls in education today translates to entrenched significant and high poverty in the next generation.

Unlike inequality along the income distribution spectrum, where credit constraints are more binding and restricting of upward mobility at the lower end, and human capital is more important at the higher end, both human capital and credit for investment are equally important for gender poverty reduction. This means that access to education and access to investible capital must be combined to have effective gender inequality reduction.

The issues examined at the continental level provide insight into the interaction between growth and inequality, and how these interactions translate into poverty impacts. This paper attempts to look more closely at the issues at the micro and household level. Some differences may arise here. First, the macro estimations make use of panel data while the next section will employ cross-household survey data. Second, this paper uses growth in this section but will use log of income levels in the next. GDP, GDP growth, and investment variables also come from the national accounts while inequality and poverty measures are taken from household surveys. It is for these reasons that two case studies are considered to compare these findings with micro-level evidence before concluding.

Household-level case studies

This section undertakes the same assessment at household level to further understand how inequality interacts with income, and how the interaction feeds into poverty impacts. Using income is meant to capture economic activities from the household perspective. The mechanisms by which income interacts with consumption inequality to feed into poverty pass through the economic production system. The aim is to then compare the findings at this level with the previous sections' analyses at the continental level.

The descriptive statistics of the underlying variables in the data is analyzed. Datasets are the 2010 South African IES along with the CHS 3. Following the descriptive statistics are the analyses of the regression results for between and within consumption groups in South Africa and between consumption groups in Cameroon. The Cameroon dataset did not allow for within-group analysis. The problem of singularity of the covariance matrix of errors becomes obvious. This likely occurred because the number of observations within group would have been too small, leaving little room for enough variability that would be useful in the regressions. The problem is avoided in the between-group models because when computing the measure of between-group inequality, it is also done for all the households in both groups. Therefore the number of observations within groups is only about half that of between groups.

Following the analysis along the distribution spectrum, an evaluation of the impacts of inequalities between and within gender for South Africa is undertaken. Again, for the same reason as above, the analysis could only be done for between male-female inequalities for Cameroon. The section is then completed with an assessment of inequality's impact between the age groups, considering only youths and adults.

Descriptive statistics

The descriptive statistics for the variables used in the model are reported in table 5.10. There are 25,328 households in the South Africa dataset and 11,391 in Cameroon's. The mean incomes are in respective local currencies. Poverty indicators are measured as the gap between the per capita household consumption and poverty line at \$1.25 a person a day. The conversion was made by first converting the poverty line to local currency using the 2005 PPP exchange rate and then multiplying the local currency value by the relative prices between the year of the survey (2007 for Cameroon and 2010 for South Africa) and 2005. All data for this conversion was taken from the World Bank's WDI database for the respective countries.

Table 5.10 Descriptive statistics for household survey variables

	South Africa					Cameroon				
Variable	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max
Income	25,328	4,039.16	7,921.64	0.08	166,666.70	11,391	39,758.84	1,379.32	197.41	31,067.65
Poverty at \$1.25 PPP	25,328	0.03	0.30	0.00	0.99	11,391	0.06	0.08	0.00	0.49
Poverty at \$2 PPP	25,328	0.05	0.34	0.00	1.00	11,391	0.26	0.17	0.00	0.68
Rich-poor inequality	25,328	29.34	74.34	0.00	1,404.12	11,391	33.44	59.58	0.00	1172.81
Rich-middle class inequality	25,328	8.65	20.96	0.00	397.78	11,391	7.73	13.36	0.00	264.81
Poor-middle class inequality	25,328	3.62	9.13	0.00	65.27	11,391	4.47	9.53	0.00	29.46
Within poor	25,328	1.00	3.29	0.00	22.67	11,391	1.00	3.22	0.00	13.89
Within middle class	25,328	1.00	2.59	0.00	18.49	11,391	1.00	2.15	0.00	6.65
Within rich	25,328	1.00	2.61	0.00	49.08	11,391	1.00	1.80	0.00	35.36
Male-female inequality	25,328	1.62	2.38	0.00	172.90	11,391	3.22	3.87	0.05	92.26
Within male	25,328	1.00	2.59	0.00	71.93	11,391	1.00	1.41	0.00	32.01
Within female	25,328	1.00	2.48	0.00	59.17	11,391	1.00	2.48	0.00	57.30
Youth-adult, extended definition	25,328	1.05	3.87	0.00	106.05	11,391	1.32	1.76	0.00	49.76
Youth-adult	25,328	2.50	7.86	0.00	184.91	11,391	5.24	6.42	0.00	149.15
Household size	25,328	4.04	2.34	1.00	21.00	11,391	4.49	3.07	1.00	43.00
Age	25,328	17.88	18.94	0.00	95.00	11,391	41.92	15.19	11.00	99.00
No education	25,328	0.10	0.31	0.00	1.00	11,391	0.24	0.42	0.00	1.00
Primary/post-primary	25,328	0.23	0.42	0.00	1.00	11,391	0.33	0.47	0.00	1.00
Lower secondary	25,328	0.13	0.34	0.00	1.00	11,391	0.20	0.40	0.00	1.00
Upper secondary	25,328	0.19	0.39	0.00	1.00	11,391	0.15	0.36	0.00	1.00
Employed	25,328	0.16	0.37	0.00	1.00	11,391	0.30	0.46	0.00	1.00
Own business	25,328	0.02	0.14	0.00	1.00	11,391	0.59	0.49	0.00	1.00
Information assets (radio, TV, and so on)	25,328	0.91	0.28	0.00	1.00	11,391	0.66	0.47	0.00	1.00
Communication assets (phone and so on)	25,328	0.93	0.25	0.00	1.00	11,391	0.56	0.50	0.00	1.00
Computer	25,328	0.23	0.42	0.00	1.00	11,391	0.03	0.17	0.00	1.00
Piped water infrastructure	25,328	0.77	0.36	0.00	1.00	11,391	0.08	0.06	0.00	0.18
Black	25,328	0.73	0.44	0.00	1.00					
Colorued	25,328	0.13	0.34	0.00	1.00					
Indian	25,328	0.02	0.14	0.00	1.00					
Urban						11,391	0.56	0.50	0.00	1.00
Land						2,504	11.52	83.08	0.00	999.00

Source: Author's calculations using the Cameroon household survey 2007 data for Cameroon (2007) and the South African (2010). Income and Expenditure Survey, 2010.

The mean values of our between-inequality measures might give some indication of between-group polarization of consumptions. But given the way the within-group household consumption gaps are calculated, the mean will have to give one. That is the case in the descriptive statistics. The rich-poor consumption ratio is the highest, as would be expected. The ratio is marginally higher on average for Cameroon than for South Africa. All the other polarization measures at household level are marginally higher for Cameroon than South Africa. But that does not mean that the polarization is the same in both countries. For example, in South Africa, female average incomes are higher than male average incomes, whereas it is the contrary for Cameroon. A closer look is taken at the different measures by examining the ratios of the mean of consumptions in each category (table 5.11). Note that the mean of consumption ratios in table 5.10 will necessarily be different from the ratio of the means in table 5.11.

Table 5.11 Consumption by group, and ratios of mean

Levels of income within class	Cameroon (FCFA a day)	South Africa (ZAR a day)	Inter-class ratio	Cameroon	South Africa
q1	3,515.51	892.19	q3/q1	2.23	1.65
q3	7,853.36	1,472.40	q5/q1	8.17	11.68
q5	2,8729.07	1,0421.64	q5/q3	2.23	1.65
male	15,885.94	3,833.41	male/female	1.05	0.90
female	15,135.67	4,244.11			
youth25	19,717.80	4,437.05	adult25/youth25	0.77	0.89
adult25	15,100.30	3,961.08			
youth35	18,591.67	4,625.09	adult35/youth35	0.74	0.83
adult35	13,724.37	3,836.60			

Source: Author's calculations using household survey data for Cameroon (2007) and South Africa (2010).

The average consumption is FCFA 3515.51 in Cameroon in 2007, while it was ZAR 892.19 in 2010.⁶ Usefulness can be derived by comparing the inter-class consumption ratios rather than comparing values in different currencies. The ratios are higher for bottom-end and top-end consumption ratio for Cameroon than South Africa. Bottom end is 2.23 for Cameroon and 1.65 for South Africa while top end is 2.23 for Cameroon and 1.65 for South Africa. The biggest difference comes in the extreme ratio of rich and poor, 11.68 for South Africa and 8.17 for Cameroon. This confirms the information in figure 4.3 for South Africa, where most fruits of economic growth increasingly go to the richest.

Another difference is that males earn more than females in Cameroon, with the reverse in South Africa. This is also consistent with the macro-level background information where male school completion rates were higher than those of females for Cameroon, but higher for females than males in South Africa. This flip in ratio also translates to the income gap.

There are more polarizations along age groups in South Africa than in Cameroon. A bit surprising is that youths earn on average more than adults. This may arise from that youths who do not earn any income will likely be living in a household headed by a non-youth, thereby driving the incomes of the non-youth households downwards. All other variables can be referred to in table 5.10.

⁶ About \$89.2 a person a day and \$5.84 a person a day, respectively.

Inequality across income class

South Africa: Between class

Judging from the Chi2 and p-values, the 3SLS regression models performed well for the cross-sectional data. The iterative regression approach is used to limit the heteroskedasticity effects. All between-group inequalities significantly reduce incomes. Greater income reduction comes by rich-middle class inequality. Increases in income also tend to reduce all inequalities between the classes. This is in contrast to the continental-level results, where growth and between-class inequality tended to mutually reinforce each other. That the continental-level results were less significant may imply country differences in effects. The results below for Cameroon confirm this.

Table 5.12 Inter-class inequality for South Africa

	Rich-poor		Rich-middle class		Middle class-poor	
	Coef	SE	Coef	SE	Coef	SE
Income equation						
Ln(inequality)	-0.8425***	0.0015	-1.4477***	0.0028	-0.4876***	0.0012
Constant	7.5906***	0.0036	7.7519***	0.0039	6.7029***	0.0023
P-value	0.000		0.000		0.000	
Chi2	312,307.33		265,537.12		162,533.69	
Inequality equation						
Ln(income)	-1.1849***	0.0025	-0.6844***	0.0018	-1.8282***	0.0058
Constant	8.9970***	0.0156	5.3154***	0.0112	12.3734***	0.0360
P-value	0.0000		0.0000		0.0000	
Chi2	228,496.47		144,833.92		98,971.00	
Poverty equation						
Ln(inequality)	0.0839***	0.0045	1.0549***	0.0042	-0.0596***	0.0018
Ln(income)	-0.8092***	0.0064	-0.2946***	0.0041	-0.9812***	0.0043
Constant	4.2562***	0.0457	-0.3402***	0.0284	5.3119***	0.0275
P-value	0.0000		0.0000		0.0000	
Chi2	55,482.29		153,916.65		57,650.27	
Endogenous variables	Lnincome Lninequality Lnpoverity					
Exogenous variables	Householdsize, square of household size, age, age2, male dummy, no education dummy, post primary dummy, Lower secondary dummy, upper secondary dummy, employment dummy, own business dummy, black dummy, coloured dummy, indian dummy, information and communication assets dummy (cell phone, landline, internet), computer dummy, piped water in dwellin.g					

Source: Author's calculations using South African household survey data (2010).

Note: *, **, and *** denote significance at 15 percent, 10 percent, and 5 percent levels, respectively.

The strongest inequality-reducing effects of income is for the gap between the middle class and the poor. This corroborates with what was discussed earlier, that the employment relationship between the middle class and the poor leads to more poverty reduction. As incomes increase, the middle class invests more, employing more of the poor. Since small

businesses may be characterized by low margins and low scales, the gap between the middle class and the poor thus employed, narrows. The effect of inequality on the poverty equation confirms this. Inequality between the middle class and the poor is the only inequality type that creates poverty reduction. But pro-black policies such as the BBBEE efforts may also be at the root of rising income and lowered inequality. Table 5.13 shows income and inequality's reinforcing nature within growth.

A 1 percent increase in middle class-poor inequality leads to a 0.05 percent reduction in poverty, but a much more significant increase in poverty comes from an increase in rich-middle class inequality. Combining this with significant income-reducing effect implies that the gap between the rich and the middle class should take policy priority in South Africa. Any inequality between the rich and the other income classes is bad for income and poverty reduction efforts.

South Africa: within class

Table 5.13 Intra-class inequality for South Africa

	Rich-rich		Middle class-middle class		Poor-poor	
	Coef	SE	Coef	SE	Coef	SE
Income equation						
Ln(inequality)	4.7611***	0.1342	1.4396***	0.0028	0.8596***	0.0015
Constant	9.0191***	0.0853	4.7247***	0.0037	4.7225***	0.0036
P-value	0.0000		0.0000		0.0000	
Chi2	1,258.16		268,521.74		327,740.78	
Inequality equation						
Ln(income)	0.1460***	0.0051	0.6886***	0.0018	1.1618***	0.0023
Constant	-1.5039***	0.0310	-3.2449***	0.0112	-5.4843***	0.0148
P-value	0.0000		0.0000		0.0000	
Chi2	835.63		146,903.41		246,198.19	
Poverty equation						
Ln(inequality)	-5.2631***	0.0717	-1.2122***	0.0037	-0.4995***	0.0039
Ln(income)	-0.1559***	0.0172	-0.2297***	0.0036	-0.4089***	0.0052
Constant	-4.5775***	0.1276	1.6448***	0.0200	2.7999***	0.0274
P-value	0.0000		0.0000		0.0000	
Chi2	6,835.02		236,055.71		118,234.73	
Endogenous variables	Lnincome lninequality lnpoverty					
Exogenous variables	hsize hsize2 age age2 sexmale noedu postprim second1 second2 empl ownbusi black colo indian info1w info2w computer pipeinf					

Source: Author's calculations using South African household survey data (2010).

Note: *, **, and *** denote significance at 15 percent, 10 percent, and 5 percent levels, respectively.

The results of the within-class regressions in table 5.13 suggest that there are significant symbiotic relationships within South African income/consumption classes. But as mentioned, this may be driven more by government policies than within-group social capital. All the within-class inequalities lead to high incomes. But income increases tend to increase all within-class inequalities as well. This is consistent with what has been happening in South African

inequality—though it has remained high, policy has shifted it from between race to within-race (Ngepah and Mhlaba 2013).

Increases in income increase within-poor inequality faster than any other class, followed by middle class and lastly the rich. As incomes increase, there will be greater dispersion at income's lower end rather than upper end. For this reason, there would most likely be more mobility from the bottom-up than the top-down.

This implies that policy efforts should target between-class inequality, especially between the rich and the other classes, with less effort on the middle class and the poor. For South Africa, it may be time to shift focus from interracial inequality to inter-class inequality broadly, which will in any case address the racial issues but also correct the emerging within-race inequality beginning to stress South Africa's socioeconomy.

Cameroon: Between class

According to Table 5.14, the relationship in Cameroon with between-class inequalities, incomes, and poverty is different than in South Africa. This underscores that the cross-country analysis, even with disaggregated inequality measures, still masks many country specificities as shown in the descriptive statistics about the country-level structure of inequalities.

Inequalities between all classes in Cameroon enhance income. One may conjecture that Cameroon's social capital stock is higher than South Africa's. The hatred and violence in South Africa have been high, and are rising. This may not be as much a result of inequality and poverty as it is one of the driving forces behind the inequality and growth dynamics. Nonetheless, these issues are all potentially endogenous.

Rising income in Cameroon also enhances all inequality, with the greatest effect on middle class-poor inequality. One might suggest that the middle class are better placed to appropriate the proceeds of their income growth more than in South Africa. This can have some implications on investment attraction, a good one for Cameroon, but an adverse one for South Africa. In South Africa's case, one might be concerned about the possibility of sharing the fruits of one's sweat through some sort of redistribution policies. The pro-black BBBEE is an example of the forces that may make the South African middle class not appropriate riches. But these are only along racial lines, hence not leading to overall inequality reduction. These dynamics in themselves could be behind the bidirectional positive relationship between income and inequality in Cameroon and the bidirectional negative one between income and inequality in South Africa.

Table 5.14 Inter-class inequality for Cameroon

	Rich-poor		Rich-middle class		Middle class-poor	
	Coef	SE	Coef	SE	Coef	SE
Income equation						
Ln(inequality)	0.6381***	0.0010	0.5262***	0.0013	0.2145***	0.0009
Constant	7.3744***	0.0071	8.6802***	0.0065	8.3052***	0.0056
P-value	0.0000		0.0000		0.0000	
Chi2	450,557.33		158,927.78		53,696.75	
Inequality equation						
Ln(income)	1.5672***	0.0023	1.9005***	0.0048	4.6626***	0.0201
Constant	-11.5576***	0.0245	-16.4968***	0.0475	-38.7242***	0.1756
P-value	0.0000		0.0000		0.0000	
Chi2	450,733.86		159,159.69		53,950.63	
Poverty equation						
Ln(inequality)	0.8949***	0.0888	0.4873***	0.0571	0.0002***	0.0010
Ln(income)	-1.5571***	0.1392	-1.1552***	0.1085	-0.0430***	0.0044
Constant	11.6285***	1.0272	10.0720***	0.9424	0.3240***	0.0367
P-value	0.0000		0.0000		0.0000	
Chi2	779.79		1,074.22		15,777.56	
Endogenous variables	Lnincome lninequality lnpoverty					
Exogenous variables	hsize hsize2 age age2 sexmale noedu postprim second1 second2 empl ownbusi urban land info1w info2w computer pipeinf					

Source: Author's calculations using household survey data for Cameroon (2007).

Note: *, **, and *** denote significance at 15 percent, 10 percent, and 5 percent levels, respectively.

The disturbing factor for Cameroon is the significant positive relationship between inequality and poverty, tending to increase poverty more strongly for rich-poor than rich-middle class. These are consistent in South Africa. Middle class-poor inequality is also softer on poverty. The coefficient is significant, but near zero. This implies one can still expect the similar symbiotic relationship between the middle class and the poor, except that because for Cameroon, the middle class might be more able to appropriate the fruits of growth from investment than in South Africa. One might also suggest that the poor might have lower wages in Cameroon than in South Africa, given weak labor laws and less powerful trade unions. This is possibly why the coefficient on poverty, though near zero, is not negative.

Inequality across gender

The outputs according to gender inequalities are reported in table 5.15 for South Africa and table 5.16 for Cameroon. Within-gender inequalities in South Africa are strongly and significantly associated with increased income in South Africa. The coefficients are relatively equal. A 1 percent increase in within-male (within-female) inequality is associated with a 1.6 percent (1.5 percent) increase in income. This is the same with the within inequalities across income class in South Africa. Similarly, an income increase is positively associated with increasing inequalities within male and female. The coefficients' magnitudes are also similar for both groups. Also, within-class gender inequalities translate to lower poverty.

Table 5.15 Between- and within-gender inequality for South Africa

	Male-female		Within male		Within female	
	Coef	SE	Coef	SE	Coef	SE
Income equation						
Ln(inequality)	-0.0816***	0.0014	1.5880***	0.0036	1.4748***	0.0034
Constant	6.1808***	0.0014	7.5631***	0.0037	7.7607***	0.0042
P-value	0.0000		0.0000		0.0000	
Chi2	3,265.56		192,796.25		187,657.86	
Inequality equation						
Ln(income)	-0.1448***	0.0040	0.6197***	0.0015	0.6713***	0.0017
Constant	0.7889***	0.0247	-4.7004***	0.0096	-5.2203***	0.0106
P-value	0.0000		0.0000		0.0000	
Chi2	3,265.56		164,535.33		154,828.27	
Poverty equation						
Ln(inequality)	-0.0333***	0.0013	-0.9976***	0.0054	-0.9901***	0.0059
Ln(income)	-1.3227***	0.0029	-0.2155***	0.0037	-0.1926***	0.0045
Constant	7.2628***	0.0180	-0.4543***	0.0268	-0.7785***	0.0328
P-value	0.0000		0.0000		0.0000	
Chi2	208,965.20		117,336.01		97,777.76	
Endogenous variables	Lnincome Lninequality Lnpoverity					
Exogenous variables	hsize hsize2 age age2 sexmale noedu postprim second1 second2 empl ownbusi black colo indian info1w info2w computer pipeinf					

Source: Author's calculations using South African IES household survey data (2010).

Note: *, **, and *** denote significance at 15 percent, 10 percent, and 5 percent levels, respectively.

Between male-female inequality significantly reduces income, and income tends to significantly attenuate the male-female gap. It should be recalled that the South African gap favors females over males. This might be from polarization indeed, but the poverty-reducing effect would be from the simple fact that resources in women's hands are better used than in men's. More income in women's hands would reach poor people than it would in men's hands.

On the contrary for Cameroon, the ratio is in men's favor (table 5.16). It produces an opposite effect on income than in South Africa. Income increases also increase the gap, contrary to in South Africa. But the impact on poverty is negative. This may be explained by the possibility that high gender inequality with high social capital may not have an income-reducing effect, but will reduce poverty.

Table 5.16 Male-female inequality results for Cameroon

	Male-female	
	Coef	SE
Income equation		
Ln(inequality)	0.9852***	0.0159
Constant	8.4902***	0.0178
P-value	0.0000	
Chi2	3,847.82	
Inequality equation		
Ln(income)	0.9739***	0.0151
Constant	-8.2366***	0.1408
P-value	0.0000	
Chi2	4,148.65	
Poverty equation		
Ln(inequality)	-0.0327***	0.0067
Ln(income)	-0.1318***	0.0062
Constant	1.1227***	0.0535
P-value	0.0000	
Chi2	1,426.55	
Endogenous variables	Lnincome Lninequality Inpoverty	
Exogenous variables	hsize hsize2 age age2 sexmale noedu postprim second1 second2 empl ownbusi urban land info1w info2w computer pipeinf	

Source: Author's calculations using household survey data for Cameroon (2007).

Note: *, **, and *** denote significance at 15 percent, 10 percent, and 5 percent levels, respectively.

That income increases tend to raise inequality means that women are increasingly being left behind in economic growth. This alone should suffice to design gender inequality-reducing measures for Cameroon. The continental-level assessment has indicated that a combination of measures to ease access to financial, physical, and human capital could be a remedy.

Inequality across age groups

Age group inequality was measured following two different youth definitions. One is between 15 and 25 years old; the other is between 15 and 35. In Cameroon, inequality derived from both definitions yields similar effects (table 5.17). The welfare gap between the age groups in Cameroon tends to increase income. Increases in income also lead to increases in the gap between the two age groups. Since the gap is measured as the ratio of adults and youth, it implies that as incomes increase, more of it goes to adults than to youth. This translates to lower poverty in Cameroon. Although the poor may be among the youth, unemployed poor youths are likely to be living with extended families with adults, such that an increase in the gap in adults' favor would mean that the same youth share in the same resources.

Table 5.17 Inequality impact across age groups in South Africa and Cameroon

	Cameroon		South Africa		Cameroon		South Africa	
	age[15, 25]-age[25, 65]				age[15, 35]-age[35, 65]			
	Coef	SE	Coef	SE	Coef	SE	Coef	SE
Income equation								
Ln(inequality)	1.0109***	0.0099	0.2743***	0.0134	0.9922***	0.0324	-1.1509***	0.0101
Constant	7.8862***	0.0172	6.4901***	0.0069	9.1516***	0.0172	6.6956***	0.0030
P-value	0.0000		0.0000		0.0000		0.0000	
Chi2	1,0528.64		420.24		935.28		13,030.20	
Inequality equation								
Ln(income)	0.9872***	0.0094	0.0843***	0.0048	0.7716***	0.0221	-0.4307***	0.0046
Constant	-7.7825***	0.0876	-0.0867***	0.0318	-7.028***	0.2062	2.9171***	0.0304
P-value	0.0000		0.0000		0.0000		0.0000	
Chi2	1111.30		307.83		1216.19		8833.29	
Poverty equation								
Ln(inequality)	-0.0287***	0.0112	0.2643***	0.0154	-0.025***	0.0069	-0.5191***	0.0122
Ln(income)	-0.1323***	0.0106	-1.8410***	0.0078	-0.139***	0.0047	-1.6925***	0.0078
Constant	1.1405***	0.0847	10.9472***	0.0521	1.1684	0.0431	10.1234***	0.0520
P-value	0.0000		0.0000		0.0000		0.0000	
Chi2	1,368.57		55,526.43		1,260.14		46,863.98	
Endogenous variables	Lnincome Lninequality Inpoverty							
Exogenous variables	hsize hsize2 age age2 sexmale noedu postprim second1 second2 empl ownbusi urban land info1w info2w computer pipeinf							

Source: Author's calculations using household survey data for Cameroon (2007) and South Africa (2010).

Note: *, **, and *** denote significance at 15 percent, 10 percent, and 5 percent levels, respectively.

The picture is different for South Africa. The gap between the 15–25 bracket and adults tends to be positively associated with incomes, and income increases increase the gap. The interaction, however, leads to higher poverty, perhaps for the opposite reasons. Social capital in South Africa is low and most unemployed poor youths are likely to be on their own compared with Cameroon. This is also evident in the many youth and child-headed South African households.

The difference however is that the gap using the 15–35 age bracket tends to lead to lower income in South Africa. Conversely, rising income tends to reduce the gap, though this inequality's income-reducing effects are significantly higher than the attenuating impact of incomes on it. It may therefore be older youths that tend to take issue with South Africa's welfare distribution age gap. Possibly, at 25, some youths are still in education, benefiting from different scholarships. Between 25 and 35, most start to face adult life, and the inequality inefficiencies kick in. Social capital can become a cushion at this stage, but in a society where social capital is deteriorating, the effect will be evident on incomes.

CHAPTER 6. SUMMARY OF FINDINGS

This work's purpose has been to undertake a rigorous macro-micro comparative analysis to understand the kinds of inequalities Africa should be concerned about for sustained growth and poverty reduction. It uses mixed methods to establish the findings in hopes of defining the capacity building initiatives needed to sustainably reduce inequality challenges.

The study finds that average inequality does not affect growth but growth significantly enhances average inequality, confirming recent observations that strong growth recovery in Africa has tended to happen in the midst of persistent and rising inequality. Average inequality drives poverty upward significantly and growth tends to reduce it. This is a key concern for the reinforcing relationship between inequality and growth in African economies. Mid-end and high-end inequalities support growth; all inequalities between the rich and other classes are bad for poverty.

In South Africa, the relationship between inequalities within groups and income levels is negative from both directions, while it is positive in Cameroon from both directions. In South Africa, these dynamics may be driven more by government policies than just within-group social capital. Pro-black policies such as the BBBEE efforts may cause rising income leading to less between inequalities.

High-end within inequality has a large and significant poverty-increasing effect. It therefore tends to drive a cycle of high growth and high top-end inequality that tends to keep the poor in poverty. The poverty reduction gains in Africa may be reversed if this trend persists. The poverty effects of high-end inequality and some within inequalities, especially in South Africa at the household level, fit with Schwabish, Smeeding, and Osberg's (2003) findings. They suggest that high top-end inequality reduces social solidarity, with the rich trying to pull out of publicly funded programs such as health care and education in preference to private provision.

The behaviors of investment and human capital in the models suggest that mobility to high income depends more on human capital and less on investment, while mobility upward at the distribution's lower end depends more on investment and less on human capital. Education without finance may therefore not help the poor move up the income ladder.

This implies that policy efforts should target between-class inequality, especially between the rich and the other classes, with less effort on the poor and the middle class. For countries like South Africa, it may be time to shift focus from interracial inequality to inter-class inequality broadly, to address the racial issues as well as correct the emerging within-race inequality beginning to stress the South African economy.

Gender inequality reduces growth and growth weakly reduces gender inequality. This is possibly capturing the fact that increases in income allow more girls to be educated, by limiting the constraints that they face with education in developing countries, including early pregnancy, child labor, home care burden, and so on. Gender inequality's effect on poverty implies that more educationally disadvantaged girls today translates to entrenched and high poverty in the next generation.

At household level, within-gender inequalities do not pose concerns. In South Africa, intra-gender inequality interacts negatively with income from both sides. The interaction is positive

for Cameroon. In both countries the inequality is poverty reducing. Perhaps income in women's hands would more easily reach poor people than income in men's hands.

Women are increasingly being left behind with economic growth in Cameroon. This should suffice to design gender inequality-reducing measures for Cameroon. The continental-level assessment suggests that a combination of measures to ease access to financial, physical, and human capital could be a remedy.

In Cameroon the welfare gap between age groups and incomes is mutually reinforcing, but translates to lower poverty, due to a lower impact of inequality relative to income on poverty. Although the poor may be among the youth, unemployed poor youths are likely to be living with extended families with adults, such that an increase in the gap in adults' favor would mean that the same youths share in the same resources. The picture is different for South Africa. The gap using the 15–35 age bracket tends to lead to lower income, and increasing income tends to reduce the gap. Possibly, at 25, some youths are still in education, benefiting from different scholarships. Between 25 and 35, most of them start to face adult life, and the inequality inefficiencies kick in. Social capital can become a cushion at this stage, but in a society where social capital is deteriorating, the effect will be evident on incomes.

Policy recommendations

Policy recommendations should build on the following emerging issues:

- Evidence suggests that within inequalities, whether gender, income class, or age group, are less destructive.
- The emergence of the middle class is good for the poor. The relationship between the middle class and the poor should be key for sustained poverty reduction.
- Access to capital at the distribution's lower end is more important for upward mobility.
- Skill development in the poor and middle class can help curb the capture of growth rents by high-end income earners. That is, make skill development broader among the middle class, and use capital for small business start-ups as an approach to reduce poverty and develop the middle class.

Policy objectives should thus aim to push those at the distribution's lower end upward. This will require relaxing credit constraints while ensuring that human capital does not deteriorate. If policy targets top-end inequality, human capital development will be the main weapon. But because human capital development takes a longer time to mature, short-term policy should target credit constraint issues among those at the distribution's lower end, while aiming at long-term extreme inequality reduction with development of equitably distributed human capital. Inequality's adverse effects can be dampened by social capital, giving time to address the inequality's underlying structural elements.

Policies for gender inequality reduction require a two-prong approach of enhancing human capital while removing the constraints to credit access for investment.

For South Africa, while social capital development strategies are called for, it may be time to shift focus from interracial inequality to inter-class inequality broadly, which will address the racial issues but also correct the emerging within-race inequality beginning to stress the South African socioeconomy.

Capacity building implications

Addressing inequality can be daunting because of the different trade-offs that may exist between inequality and efficiency of the economy. This work has described the inequality types that can be easily addressed without posing a threat to economic growth. But the main challenge in most African countries is the capacity issues that stem from governance, human capability, and resources.

Most inequality problems are also intricately connected to governance issues, where the ruling elite are either directly involved in skewing wealth creation, or indirectly through collusion with big businesses and the rich. This problem also links to resource mobilization issues, equally necessary to reduce inequality and poverty. Capacity to fight corruption and good governance of the relationship between the state and business is thus paramount. The related issue of state resource mobilization capacity is also significant as inequality leads to tax evasion and capital flight, which also hinges on the relationship between the state and big businesses.

Flowing from the foregoing issues are human technical capacity challenges to undertake country-specific case studies for addressing tailored inequality issues within countries. This is important as this work shows that there is significant country specificity in the relationship among growth, inequality, and poverty. Different inequalities may relate differently to growth and poverty. Thus, developing capacity, both to generate country evidence and to implement emanating policy prescriptions is necessary.

APPENDIX

Table A.1 Countries and years in the macro model

Country	Years
Algeria	1988, 1995
Djibouti	2002
Egypt, Arab Rep.	2000, 2004, 2008
Morocco	1984, 1990, 1998, 2001, 2007
Tunisia	1985, 1990, 1995, 2000, 2005, 2010
Angola	2008
Benin	2003, 2011
Botswana	1985, 1994, 2003
Burkina Faso	1994, 1998, 2003, 2009
Burundi	1992, 1998, 2006
Cabo Verde	2007
Cameroon	1996, 2001, 2007
Central African Republic	2003, 2008
Chad	2002, 2011
Comoros	2004
Congo, Rep.	2005, 2011
Côte d'Ivoire	1985, 1986, 1987, 1988, 1993, 1995, 1998, 2002, 2008
Ethiopia	1995, 1999, 2005
Gambia, The	1998, 2003
Ghana	1987, 1988, 1991, 1998, 2005
Guinea	1991, 1994, 2003, 2007, 2012
Lesotho	1986, 1993, 1994, 2002, 2010
Liberia	2007
Madagascar	1993, 1997, 1999, 2001, 2005, 2010
Malawi	1997, 2004, 2010
Mali	2001, 2006, 2010
Mauritania	1987, 1993, 1995, 2000, 2004, 2008
Mauritius	2006, 2012
Mozambique	1996, 2002, 2009
Namibia	1993
Namibia	2004, 2009
Niger	1992, 1994, 2005, 2007, 2011
Rwanda	1984, 2011
Sao Tome and Principe	2000, 2010
Senegal	1991, 1994, 2001, 2005, 2011
Seychelles	1999
Sierra Leone	2011

South Africa	1995, 2000, 2006
Sudan	2009
Swaziland	1994, 2000, 2009
Tanzania	2000, 2007, 2012
Togo	2006, 2011
Uganda	1999, 2002, 2005, 2009, 2012
Zambia	2006, 2010

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