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An econometric analysis of the  
bifurcation of within-country  
inequality trends in Sub-Saharan Africa,  
1990-2011

G. A. Cornia

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DISEI, Università degli Studi di Firenze  
Via delle Pandette 9, 50127 Firenze, Italia  
[www.disei.unifi.it](http://www.disei.unifi.it)

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## Abstract

The paper documents and explains the income inequality changes that have occurred in Sub-Saharan Africa over 1991-2011. After reviewing the causes of post-Independence income polarization, it shows that during the 2000s 17 countries recorded an inequality decline and 12 a rise. The paper then explores the determinants of this trend bifurcation by reviewing the changes recorded in a long list of inequality determinants and by testing their relevance by means of a multivariate macro-panel regression. The results indicate that the growth rate of GDP/capita is unrelated to inequality while its composition is closely associated with it. Improvements in the distribution of human capital improved inequality while lack of land reforms and high population growth increased it. Changes in global conditions had a mixed effect. While remittances and rising world agricultural prices appear to have been equalizing, rising FDI in extractive industries and a surge of terms of trade in resource-rich economies were regressive. ODA changes were statistically non-significant, but debt cancellation in HIPC-eligible countries reduced the Gini perceptibly. Domestic policy changes had a mixed effect. Where direct taxation and targeted social expenditure rose the impact on inequality was favourable. Among the macro-policies, trade liberalization was un-equalizing as it reduced the value added share of manufacturing, while a stable macroeconomy, fall in inflation and competitive exchange rate reduced income polarization. Exogenous shocks generated contrasting effects: the recent fall in HIV/AIDS incidence reduced inequality modestly, while conflict intensity increased it. Our estimates do not find a clear distributive effect of democratization. The paper concludes stressing the need to strengthen the informational basis to analyse various aspects of inequality, and to improve our understanding of the politics of distributive policies.

## AN ECONOMETRIC ANALYSIS OF THE BIFURCATION OF WITHIN-COUNTRY INEQUALITY TRENDS IN SUB-SAHARAN AFRICA, 1990–2011

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Author: Giovanni Andrea Cornia<sup>1</sup>

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All comments can be directed to mailto: giovanniandrea.cornia@unifi.it

*Views expressed in this paper do not necessarily represent those of UNDP, but those of the authors.*

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## I. Background, motivation and approach of the paper

The last decade has witnessed renewed interest in the issue of inequality. First, in many cases the liberalization of the 1980s and 1990s led to a surge in inequality. Second, a growing body of literature has documented the detrimental effects of asset and income inequality on long-term growth, poverty incidence, intergenerational mobility, health status, crime rate and political stability. In addition, the inclusion of income inequality within the Sustainable Development Goals (SDGs) has de facto opened the door to a closer scrutiny of the inequality-growth-poverty nexus. Indeed, as shown by Bourguignon (2003), the growth elasticity of poverty reduction crucially depends on the initial level of inequality and its change over time. Also, greater availability of survey data has made the analysis of inequality levels, trends and determinants more doable than in the past. In addition, recent analyses have fostered understanding of the interaction between wealth, income, education, health and gender inequality. As a result, growing attention is now being paid to this issue in policy circles, including in Sub-Saharan Africa (henceforth SSA) where this type of debate has only recently emerged, having been bypassed until now. In fact, while inequality is now recognized as a key determinant of most SDGs, its documentation, the analysis of its determinants, and the debate on how to reduce it have been limited so far, due to the emphasis placed on growth by past development strategies, limited data availability, and the heterogeneity of inequality levels, trends and causes in the region.

This paper aims to document and explain the inequality changes observed in the region over 1991–2011. Given inequality's path-dependent nature, Section 2 provides a review of its traditional causes. It turns, Section 3 presents an analysis of the inequality trends over 1991–2011 on the basis of a new Integrated Inequality Database (IID-SSA) developed by Cornia and Martorano (2016) that includes 29 countries for which acceptable time series of consumption inequality data were available. These countries represent 81.8 percent of the African population and a greater share of its GDP. Given the broad coverage of IID-SSA, the conclusions of the regression analysis presented in this paper can be considered as broadly applicable to the region as a whole. The main finding of this section is that SSA experienced a clear bifurcation in national inequality trends, by which 17 countries recorded a decline in inequality over the 2000s while 12 recorded an increase. Next, section 4 discusses, one by one, the possible immediate and underlying causes of the observed inequality changes. Section 5 tests econometrically the working hypotheses regarding inequality determinants formulated in the prior section, while Section 6 provides policy conclusions and suggestions for further work.

Before closing this introduction, it should be noted that the nationwide Gini coefficients included in the IID-SSA refer to 'average household consumption expenditure per capita' derived from Household Income and Consumption Surveys. These data do not allow for capturing all types of inequality, in particular gender and ethnic inequality. This prevents us from including these important variables in the regression analysis presented in Section 5. Despite the provisions of legal systems, gender inequality remains rooted in social and religious norms on women's rights to land, inheritance, marriage, division of labour, access to education, credit, employment and participation in social and political life. The few microeconomic studies focusing on these two aspects of inequality show that their impact tends to be stable over time. However, the formulation of policy recommendations on how to reduce inequality must also rely on ad-hoc studies on these issues.

## II. Initial conditions: post-independence income inequality

Together with Latin America, income inequality in Eastern and Southern Africa and SSA's oil economies has traditionally been one of the highest in the world. With a Gini coefficient of income distribution per capita of 0.74 in 1993, Namibia was (and still is) the country with the highest inequality in the world. Inequality is substantially lower in West Africa and other parts of the continent traditionally dominated by communal land tenure systems. What were the causes of inequality in the 1970s–1980s? A good grasp of them is key to understanding the path-dependent nature of today's inequality.

### 2.1 Economic structure and income distribution from post-Independence to 1990

From a distributional perspective, the economy could be broken down into five sectors, exhibiting different factors intensity, output per capita, income inequality and factor shares. The features of these five sectors are discussed in the next three sub-items:

**(i) A dualistic agriculture.** Traditionally, subsistence agriculture absorbed up to 80 percent of the workforce (as in Burundi and Rwanda). Family labour predominated, production focused on food crops and farming practices were rudimentary. Market integration was low because of inadequate infrastructure. Land yields and output per head were low and declined due to population pressure. This very slow rural modernization was due to the lack of an 'African Green Revolution' and the urban bias of public policy that—in the nine countries analysed by Norton (1987)—assigned to rural areas a share of public expenditure ranging between 17 and 49 percent of their contribution to GDP, while rural savings were drained to the cities and the domestic terms of trade discriminated against agriculture. Land property rights varied across sub-regions. In the then land-abundant West-Central Africa, communal land ownership prevailed, no landed gentry existed (Moyo and Yeros, 2007) and land and income inequality was low (Table 1). In contrast, in the 'white settlers' economies of East and Southern Africa, land concentration was high and rural wages low.

**Table 1. Average Gini coefficients of land concentration by type of land tenure system**

Countries with a dominant communal land tenure systems	Land Gini	Countries with a dominant 'white settlers' dualistic land tenure systems	Land Gini
Burkina Faso (1993)	39.1	Liberia (1971)	68.1
Mali (1960)	45.1	Uganda (1991)	57.4
Niger (1980)	31.2	Tanzania (1960)	70.0
Senegal (1960)	46.7	Zambia (1971)	69.9
Guinea (1989)	45.2	South Africa (1960)	64.3
Sierra Leone (1970)	42.4	Swaziland (1971)	83.5
Cote d'Ivoire (1974)	41.5	Madagascar (1970)	80.4
Ghana (1970)	53.0	Mauritius (1930)	74.2
Togo (1961)	45.2		
Cameroon (1972)	40.7		
Gabon (1974)	40.2		
Congo (Zaire) (1970)	53.2		
Ethiopia (1977)	42.4		
Mozambique (1999)	36.8		
<b>Average</b>	<b>43.0</b>	<b>Average</b>	<b>70.9</b>

Source: Author's compilation of Frankema's (2005) data, which relied mainly on agricultural censuses

However, in the then land-abundant nations of West and Central Africa, rapid population growth altered farming and land tenure systems and increased inequality. Indeed, newly formed families migrated to marginal lands, subject to wind and water erosion and with low yields and unstable output. This well-documented process, affecting on a massive scale Burundi, Ethiopia and the Sahel reflected the inability to manage the transition from a land-abundant shifting agriculture to input-intensive settled farming. For instance, in Niger, in the early 1980s bad harvests happened every ten years, while over 1998-2010 they occurred every 2–3 years. During the bad years, small farmers affected by production shortfalls sold their

land at distress prices. Ever more frequent food crises thus led to the formation of a class of medium-sized farmers and rising levels of landlessness (Cornia and Deotti 2014).

The estate sector operated as a capitalist firm. With the introduction of cash crops, land became vastly more valuable, and significant land markets emerged alongside the beginning of a system of tenancy and sharecropping (Ghai and Radwan 1983). This led to radical changes in land concentration, use, tenure and yields, and to growing income concentration. Already in the 1970s, large farms and estates were estimated to own 20 to 40 percent of the land, while by 1985, 15 and 30 percent of rural households were landless or near-landless (FAO 1988). These estates were capital-, input- and skill-intensive and employed landless labourers at low wages. Inequality was higher than in subsistence agriculture. While national expenditure on roads, input subsidies and extension services was modest, it favoured the estates at the expense of smallholders (FAO 1986).

**(ii) An oil and mining enclave.** This was particularly important in 12 countries (Annex Table 1). Countries endowed with natural resources tend to grow more slowly over the long term and have higher income and asset concentration (Sachs and Warner 1995). In this sector, production requires considerable capital and few unskilled and semi-skilled workers. This type of sector was and is mainly operated by multinationals, which remit their profits abroad and are staffed by expatriates recruited at internationally competitive pay scales. Overall, the wage share in this sector's income is low and unequally distributed, and the capital share high.

**(iii) A dualistic urban sector.** The formal urban sector comprises state employees and workers hired by foreign and domestic firms operating in the manufacturing, transport and utilities sectors, as well as well-capitalized businesses operating in trade and services. Formal sector earnings were much higher than in agriculture, due to the higher human capital of its employees, higher capital per worker and favourable collective bargaining arrangements. Formal sector earnings were two to four times higher than rural earnings. In contrast, the urban informal sector employed workers with low human capital. This sector is comprised of micro-enterprises, artisans, domestic servants, daily workers, informal traders and so on. Given an infinitely elastic supply of labour, and the neoclassical nature of the informal labour market, wages were much lower than in the formal sector. The formal-informal urban earnings gap was therefore as high as the rural-urban one, while the sector's distribution of income was highly polarized.

In view of the above, in most countries the ranking of average income/capita ( $Y_c$ ) of the above sectors was as follows<sup>3</sup>:

$$(1) \quad Y_{c_{res\ encl}} > Y_{c_{urb\ form}} > Y_{c_{comm\ agr}} > Y_{c_{urb\ inf}} > Y_{c_{sub\ agr}}$$

In addition, given the distribution of land, mining assets and human capital as well as supply/demand and institutional conditions in the labour market, in countries with low land-concentration and a little developed commercial agriculture, the Gini coefficients of these sectors were ranked as follows :

$$(2) \quad G_{res\ encl} > G_{urb\ inf} > G_{urb\ form} > G_{comm\ agr} > G_{sub\ agr}$$

while in those countries with high land concentration and strong commercial agriculture, it was ranked as follows:

$$(3) \quad G_{res\ encl} > G_{comm\ agr} > G_{urb\ inf} > G_{urb\ form} > G_{sub\ agr}$$

<sup>3</sup> For instance, Cogneau et al. (2007) found that for Cote d'Ivoire, Ghana, Guinea, Madagascar and Uganda the Gini-income coefficients in agriculture (non-agriculture) were: 0.41 (0.59), 0.45 (0.48), 0.48 (0.53), 0.49 (0.52) and 0.46 (0.50).



## 2.2. A limited rural-urban migration and a low urbanization rate

In view of the large and persistent urban-rural income and services gap<sup>4</sup> and of the growing shortage of farmland, one would have predicted much faster urbanization than what actually happened. In fact, over 1990–2010 urbanization in SSA grew more slowly than in other less developed regions, possibly due to a decline of the formal sector (the share of which declined due to de-industrialization and slow modernization services, as discussed below), or to an increase in enclave incomes (which happened in a few cases). A second hypothesis is that, as shown by Sahn and Younger (2014) for five SSA countries, the distribution of health gains for children mostly favoured the poor living in rural areas. Finally, in some countries (e.g., Ethiopia), land policy restrictions raised the costs of migration, including the risk of land confiscation and loss of local safety nets (Gebeyehu, 2014). Yet, with a continued decline in farmable land and limited opportunities in rural non-agricultural activities, rural-urban and international migration will become unavoidable and entail major un-equalizing effects.

**Table 2. Trend in the share of urban population**

	1960	1970	1980	1990	2000	2010
<b>Less Developed Regions</b>	21.9	25.3	29.4	34.8	39.9	46.1
<i>Difference over prior year</i>		3.4	4.1	5.6	5.1	6.2
<b>SSA</b>	14.8	18.2	22.4	27.1	30.8	35.4
<i>Difference over prior year</i>		3.4	4.2	4.7	3.7	4.2

Source: UN Population Division database

## 2.3 Limited income redistribution

During the 1980s–1990s, redistribution in SSA was limited and seldom improved the lot of the poor, owing to the limited and regressive/neutral nature of taxation and transfers. Around 1990, on average, tax revenue depended on (regressive) VAT, trade taxes and ‘other taxes’ for 10.4 percent of GDP; on social security contributions for 2 percent of GDP; and on progressive corporate income tax for 4 percent of GDP. Non-tax revenue due to royalties accounted for another 5.6 percent of GDP (UNCTAD 2012). In turn, in 1989 social insurance transfers amounted to one percent of GDP and were dominated by regressive transfers to civil servants and formal sector employees, while social assistance was non-existent (ILO 1996). Likewise, subsidies in kind were affected by a strong urban and class bias and had a regressive incidence (Table 3), especially in the case of secondary and tertiary education.

**Table 3. Benefit incidence analysis of public spending on education and health in the 1990s in Sub-Saharan Africa (percent, unweighted averages of total sectoral spending)**

Number of sample countries	All		Primary education		Secondary education		Tertiary education	
	Poorest	Richest	Poorest	Richest	Poorest	Richest	Poorest	Richest
10	12.8	32.7	17.8	18.4	7.4	38.7	5.2	54.4
Number of sample countries	All		Primary health care		Health centres		Hospitals	
	Poorest	Richest	Poorest	Richest	Poorest	Richest	Poorest	Richest
9	12.9	28.6	15.3	22.7	14.5	23.7	12.2	30.9

Source: Excerpted from Tables 2 and 3 of Davoodi et al. (2003)

<sup>4</sup> Alternative theories argue that urban migration is due to falling land/man ratios, household risk-diversification strategies, or the irrelevance of formal education in rural areas.



### III. 1991/3–2011 trends in income/consumption inequality

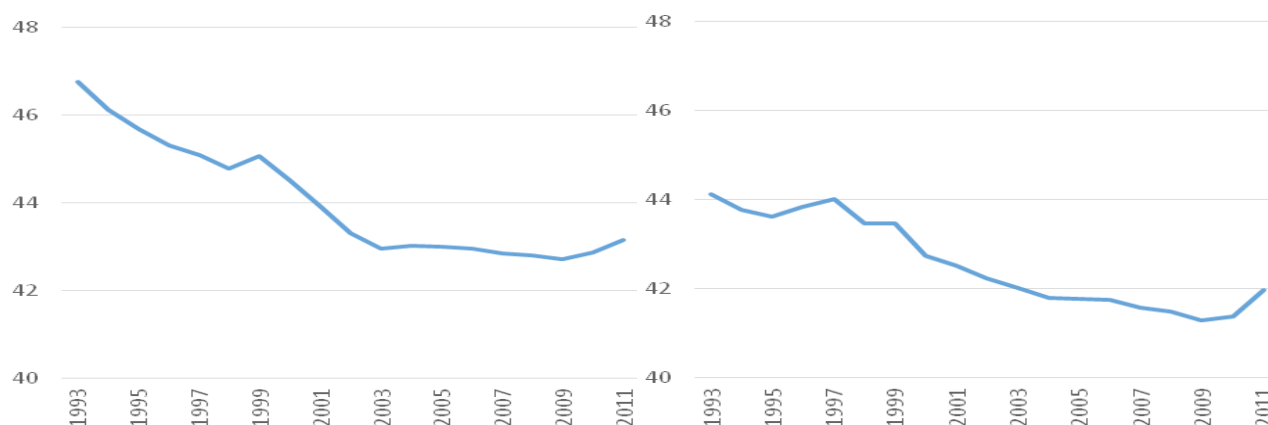
#### 3.1 The scant evidence on inequality trends in the region

There are only a few comprehensive studies about income/consumption inequality in SSA. While there has been an increase in the number of micro-studies, very few have tried to outline its evolution for a sufficiently large number of countries and years. Among these, Pinkovskiy and Sala-i-Martin (2010) argued that since 1995, inequality and poverty fell rapidly, but their results rest on implausible assumptions and data. Instead, Chotikapanich et al. (2014) found that inequality increased over 1997 to 2010 in six countries while a marginal decrease or inverted U-shape was observed in four. Finally, Fosu (2014) found that between the mid-1990s and the late 2000s, the consumption Gini grew in 9 countries, but fell in 13 and remained constant in one.

#### 3.2 Inequality trends 1991/3/2011 derived from the IID-SSA

One of the reasons for this limited and contrasting past evidence on inequality changes in the region was the lack of a consolidated database of inequality measures. To tackle this problem, Cornia and Martorano (2016) developed an Integrated Inequality Database for SSA (IID-SSA), which compiles in a comparative approach and according to a standard protocol the Gini coefficients from all existing data sources for the 29 countries (comprising 81 percent of SSA's population) with adequate information. For each of these countries, the available Gini coefficients were fitted with a trend over 1991–2011. The resulting trend in the average regional Gini coefficient of household consumption per capita is summarized in Figure 1 for both population-weighted and un-weighted Gini coefficients. With all the necessary prudence given the varying quality of the data, Figure 1 seems to suggest that the regional Gini fell between 1993 and 2011 by 3.4 points (or 2 points for the population-weighted Gini), though between 2009 and 2011 it rose by 0.6 points, possibly due to the effects of the financial crises of 2008 and 2010 that also affected SSA.

**Figure 1. Trend in the average Gini coefficient of consumption expenditure per capita for 29 SSA countries 1993–2011: un-weighted data (left panel) and population-weighted data (right panel)**



Source: Author's elaboration on the 'IID-SSA-database' (Cornia and Martorano, 2016)

However, while the average regional unweighted Gini coefficient declined, its standard deviation and coefficient of variation fell at first, but then rose since 2000 (Table 4). This suggests that the heterogeneity of country inequality became more acute during the last decade.

**Table 4. Mean, standard deviation and coefficient of variation of the regional Gini coefficient of household consumption per capita, 29 SSA countries over 1993-2010.**

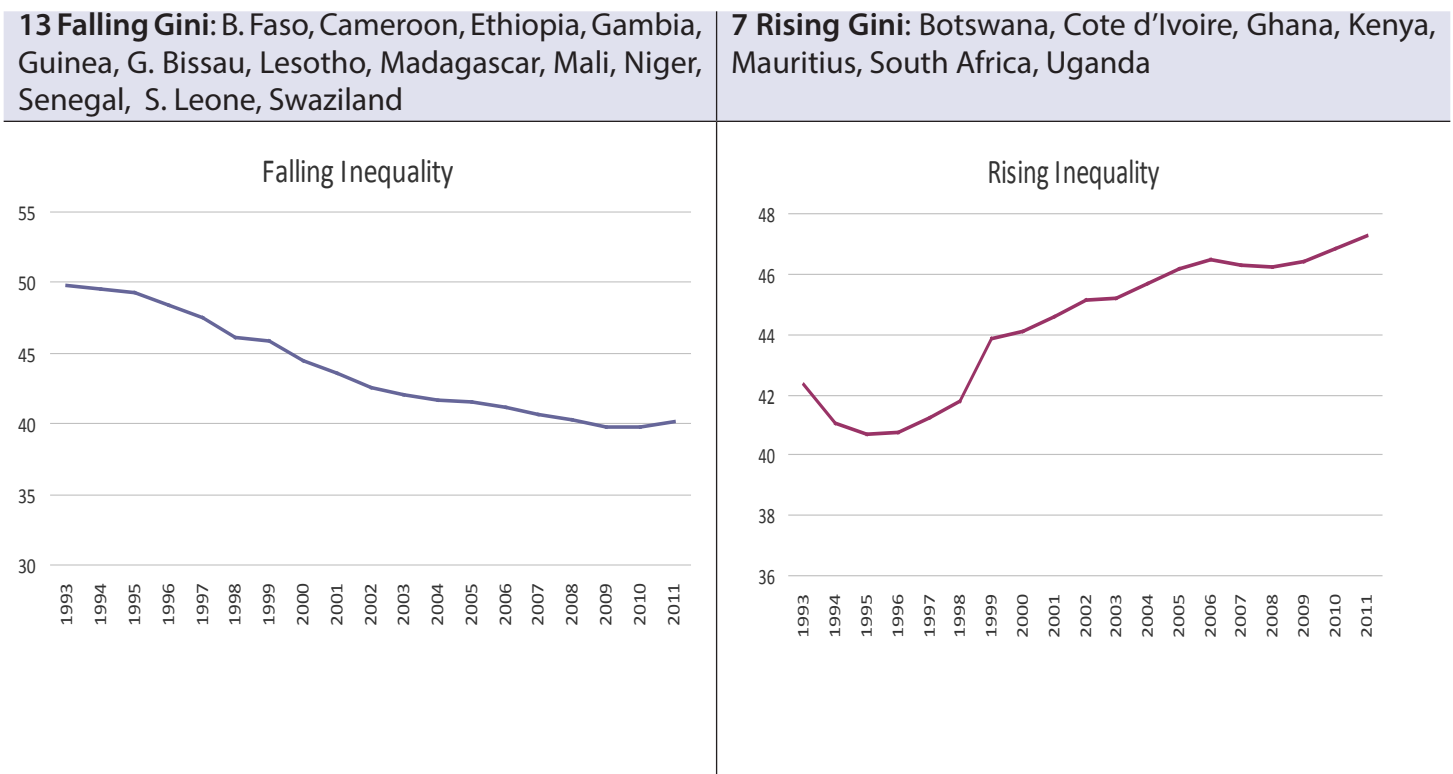
	1993	2000	2005	2010
Gini mean (unweighted)	47.5	45.5	43.8	43.5
Standard deviation	8.8	7.0	7.7	9.4
Coefficient of variation	0.185	0.154	0.176	0.216

Source: Author’s elaboration on IID-SSA. Note: the Gini for 1993 refers to 25 out of 29 countries

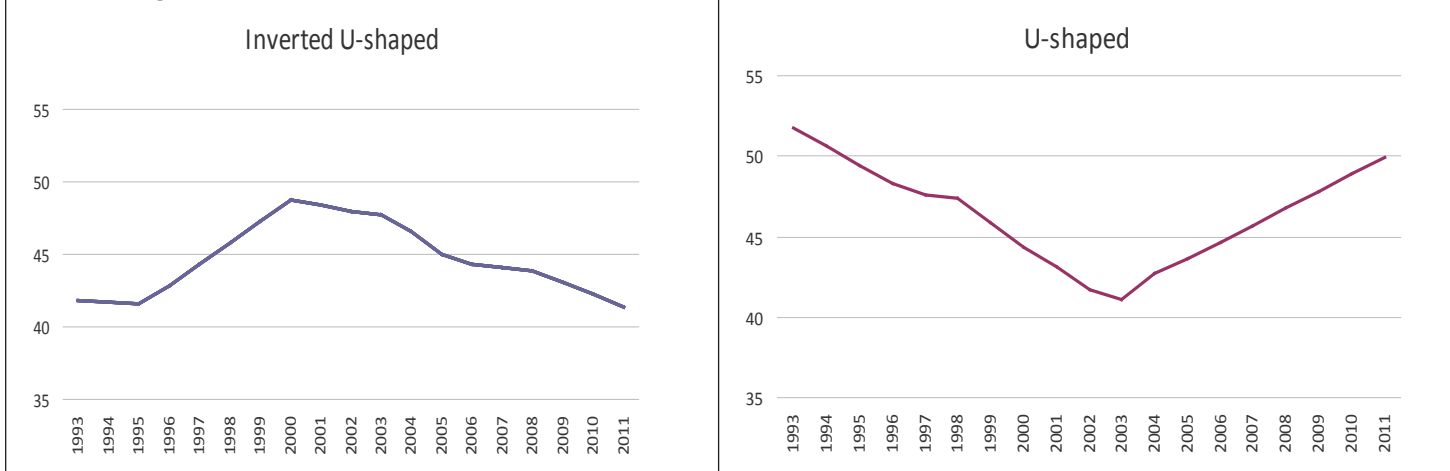
Indeed, a more detailed analysis of each country’s trend shows that Figure 1 conceals more than it reveals, and that the regional trend needs to be broken down into subgroups of countries with similar trends. This is done in Figure 2. Based on the shape of their Gini trends, the 29 sample countries were assigned to the falling, rising, -shaped and U-shaped groups. The result is that inequality:

- **fell steadily in 13 countries** (31 percent of the population of the 29 countries analysed). This group overlaps little with the 17 ‘emerging countries’ identified as ‘leading the way’ in the economic-political literature. Other factors explain their inequality decline;
- **rose steadily in 7 countries** (26 percent of the sample population). These countries are few but have larger populations (as in Kenya, South Africa, Ghana, Uganda and Cote d’Ivoire). Their Gini increase was, on average, less pronounced than the decline observed in the first group; and
- followed an **inverted U-shape** in four countries (8.5 percent of the sample population) and a **U-shape** in five countries including populous Nigeria, whose trend was little pronounced both downward and upward. This group represents 35 percent of the sample population. The downward-upward variations of the U-shaped trends were more pronounced than those of the inverted-U trend.

**Figure 2. Trend of the unweighted Gini coefficient of consumption expenditure per capita for four groups of countries, 1993–2011**



**4 Inverted U-shaped Gini: Angola, Mauritania, Mozambique, Rwanda**      **5 U-shaped Gini: CAR, Malawi, Nigeria, Tanzania, Zambia**

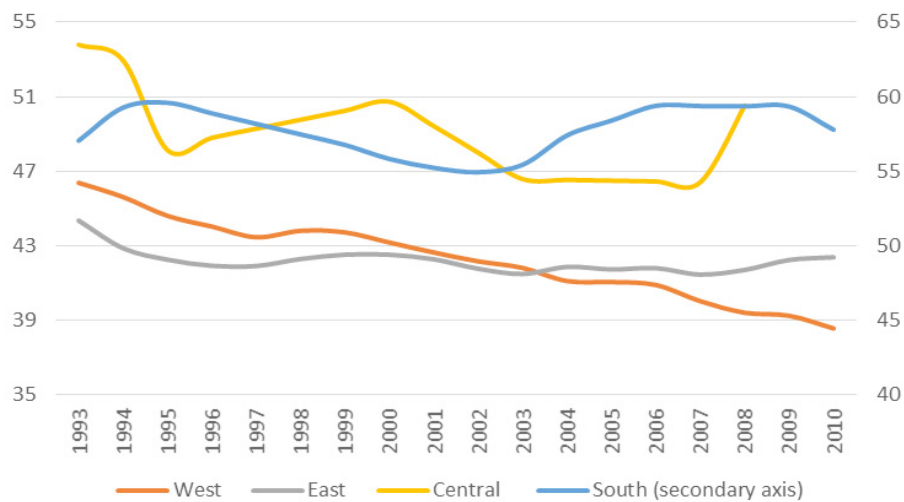


Source: Same as in Figure 1

Weighing the countries' Gini with their population size does not change the four identified trends but alters the extent of their variations. Finally, if the analysis of the un-weighted Gini is restricted to the 2000s, one obtains flatter trends for the U and inverted-U countries in Figure 2. This makes it possible to aggregate the falling with the inverted-U countries and the rising with the U-shaped ones. This means that between 2001 and 2011 there were basically two trends: in 17 countries Gini fell on average by 3.8 Gini points, while in 12 countries it rose by 4.4 points. Repeating the same exercise on population-weighted Gini produces similar results, though the balance favours the 17 falling Gini countries (that recorded a slightly sharper fall) versus the rising ones that recorded a smaller rise. In brief, restricting the analysis to 2001–2011 does not change the identified 'inequality bifurcation results' identified above.

Sub-regional inequality trends differed. Figure 3 shows that in West Africa inequality fell steadily in 9 out of 12 (mostly agrarian) economies, while a modest decline was recorded in a few Eastern African countries. In contrast, Southern and Central Africa show a rise since around 2003. Thus, since the early 2000s, there was a regional divergence in inequality trends, as most low-inequality nations experienced a decline and the high-inequality ones a rise or stagnation at high levels.

**Figure 3. Trends in unweighted average regional Gini, 1993–2010**



Source: Author's elaboration on IID-SSA

## IV. Immediate and underlying determinants of the observed inequality changes

### 4.1 Immediate causes of changes in consumption inequality

The methodology used followed to identify the factors affecting the immediate causes of the changes in consumption inequality follows a two steps approach. It first focuses on ‘between-sector inequality’, i.e., the inequality due to differences in Gini coefficients among sectors (agriculture, estates, resource enclaves, manufacturing, various types of services, etc.) caused by differences in the factor-intensity of production and intra-sectoral heterogeneities. The second step focuses on ‘within-sector inequality’, i.e., the distribution of land, human capital and other production assets within the urban and rural economy. In symbols, a country’s overall Gini can be decomposed into between- and within-sector consumption inequality:

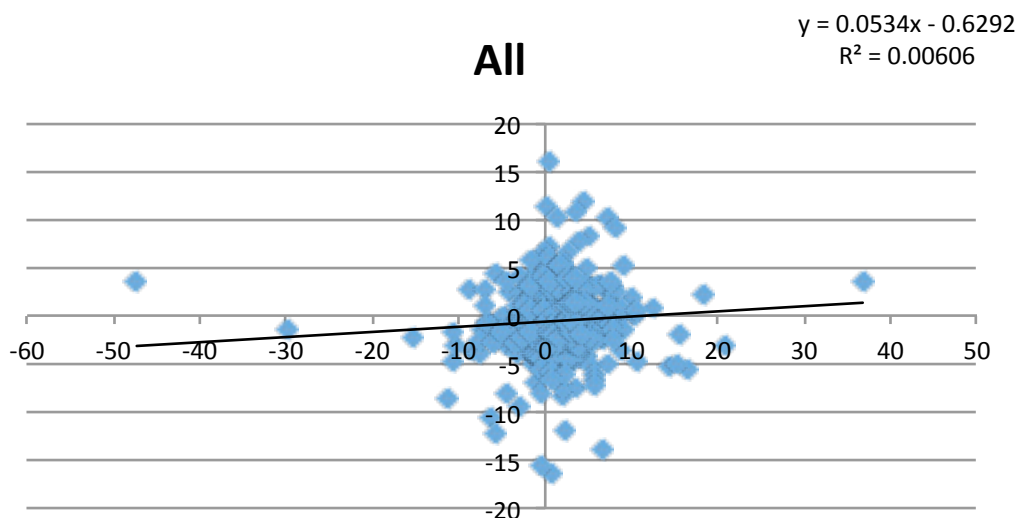
$$(4) \text{ Gini}_t = \text{Gini}_t \text{ between sectors} + \sum w_{it} \text{ Gini}_{it} \text{ within sectors} + \text{Residual}_t$$

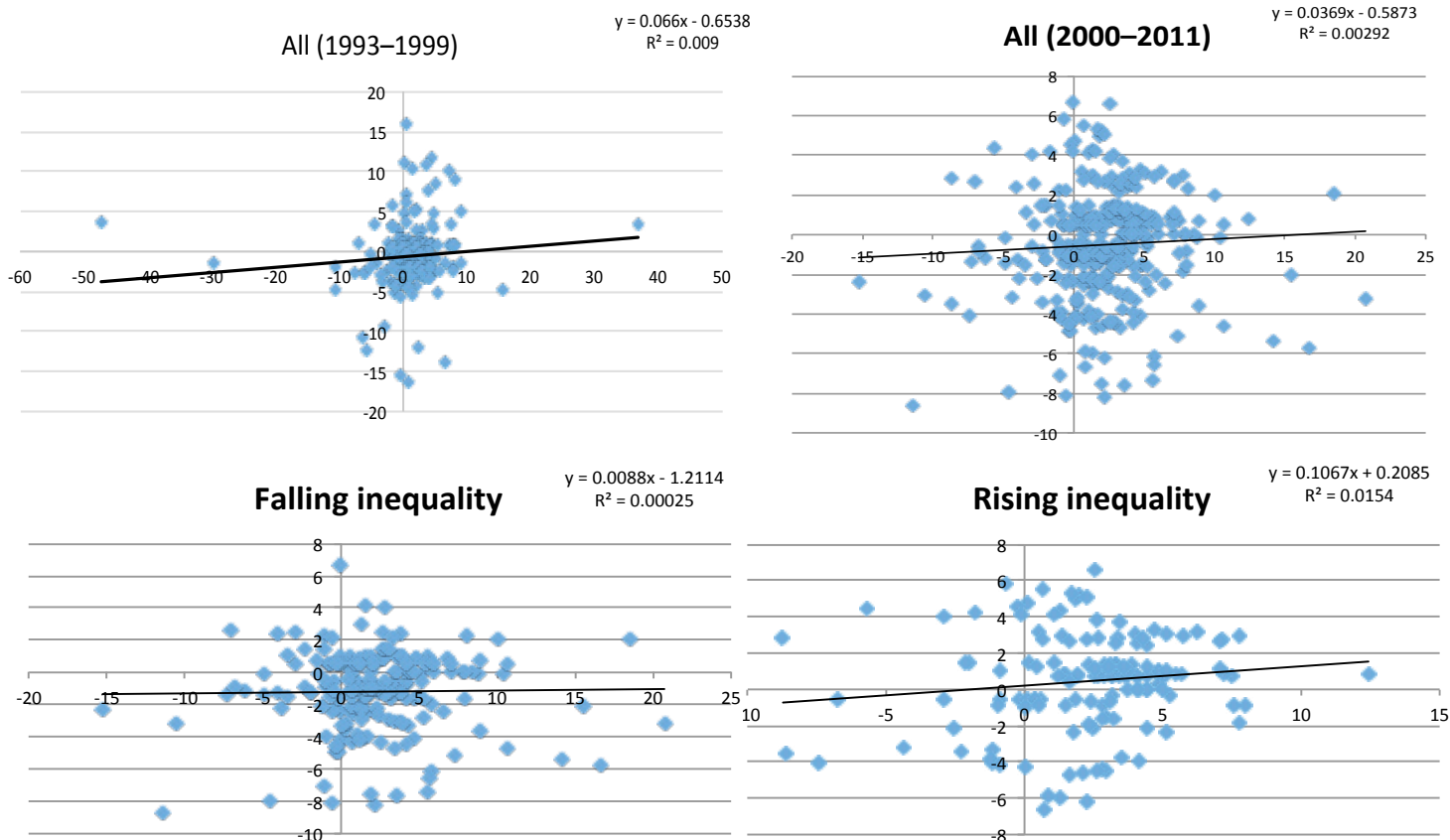
where the weights  $w_{it}$  are the sectoral value added shares of sectors ‘i’ (subsistence agriculture, resource enclave, urban informal and formal services—or other sectoral classifications). By applying decomposition (4) at two points in time, it is possible to derive by difference whether the change in the total Gini between  $t$  and  $t+n$  can be attributed to changes in between-sector inequality—due, for instance, to a shift in economic structure towards high-inequality sectors like mining—or changes in within-sector distributions—due, for instance, to a rise in human capital concentration. In practice the immediate causes of the inequality analysed hereafter include the rate of growth of GDP/c, the ‘pattern of growth’ that affects the ‘between-sector’ inequality and ‘within-sector inequality’, and the impact of population growth.

#### (i) Growth rate of GDP per capita, growth pattern and between-sector inequality.

The growth rate of GDP per capita may be reasonably considered an immediate determinant of the inequality of household consumption per capita since—with no changes in production structure—faster growth may raise labour absorption and reduce underemployment. Growth has accelerated since 1995 and continued its upward trend until 2011. Yet, GDP/c growth was 1.5–2 points higher in oil exporting countries, i.e., those where inequality rose. As a result of this and other factors, the poverty alleviation elasticity of growth in SSA was a meagre 0.27 compared to about 2 in other developing regions (IMF 2011). The lack of association between growth and inequality is confirmed by Figure 4, for the whole sample of 29 countries over 1990–2011 (top panel), for the two decades (1990s and 2000s, central panels), and for the subgroups of falling and rising inequality countries (bottom panel).

**Figure 4. Relationship between the growth rate of GDP/c (horizontal axis) and the growth rate of the Gini coefficient (vertical axis), 1991/3–2011**





Source: Author’s calculation on official data

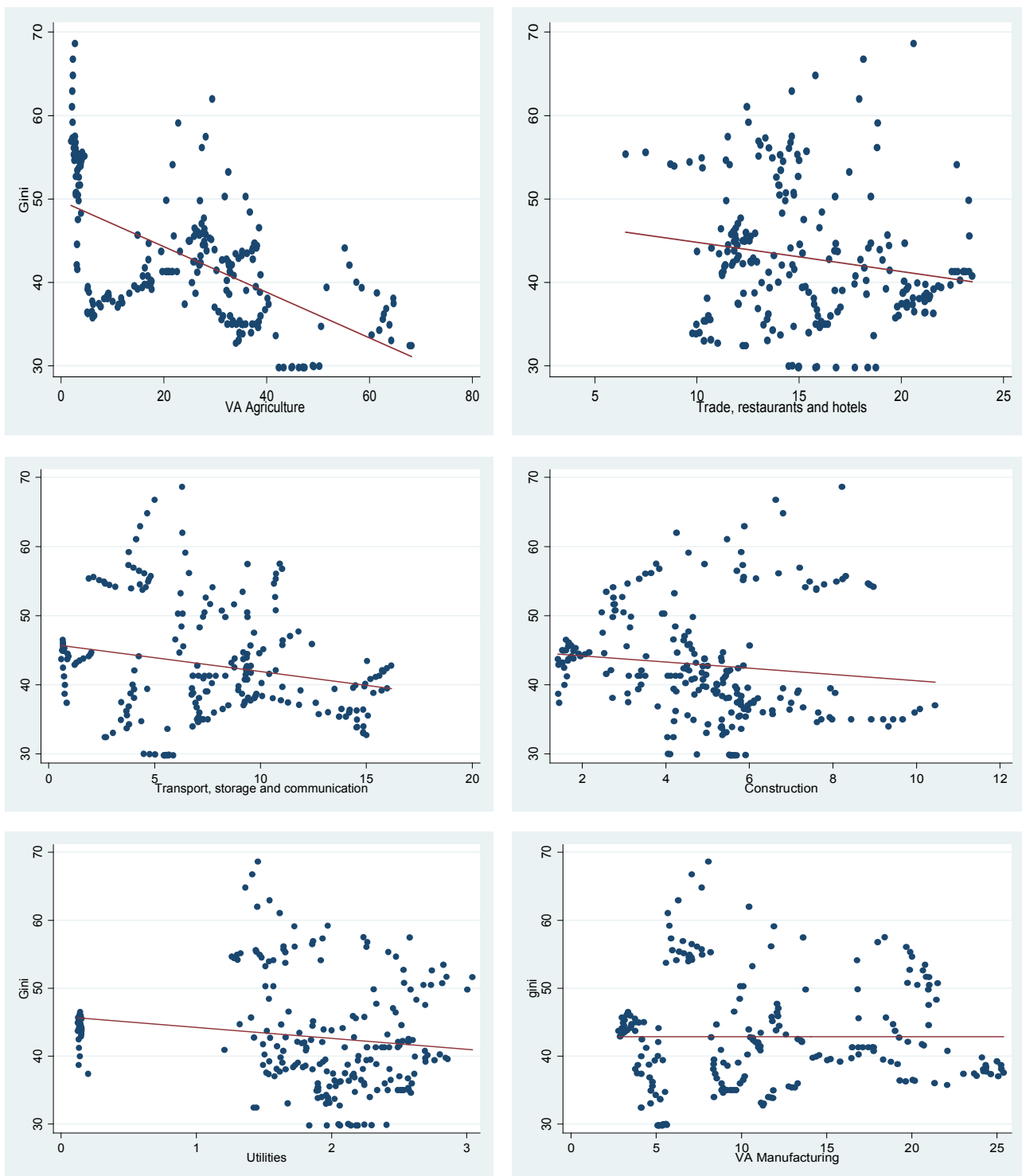
This suggests that, on average, the past growth pattern was far from inclusive. The main reason for this is that during the last 20 years, inequality rose hand in hand with GDP growth in almost half of the countries, while in some where it fell, the initial inequality was high. Thus, the ‘pattern of growth’ (i.e., its composition) matters more than the ‘rate of growth’. When growth occurs in sectors characterized by high asset concentration and high capital- and skilled-labour intensity—such as mining, finance-insurance-real estate (FIRE) and the public sector—overall inequality rises (Figure 5). In contrast, inequality falls or remains stable if growth takes place in labour-intensive manufacturing, construction and agriculture (especially if land concentration is acceptable).

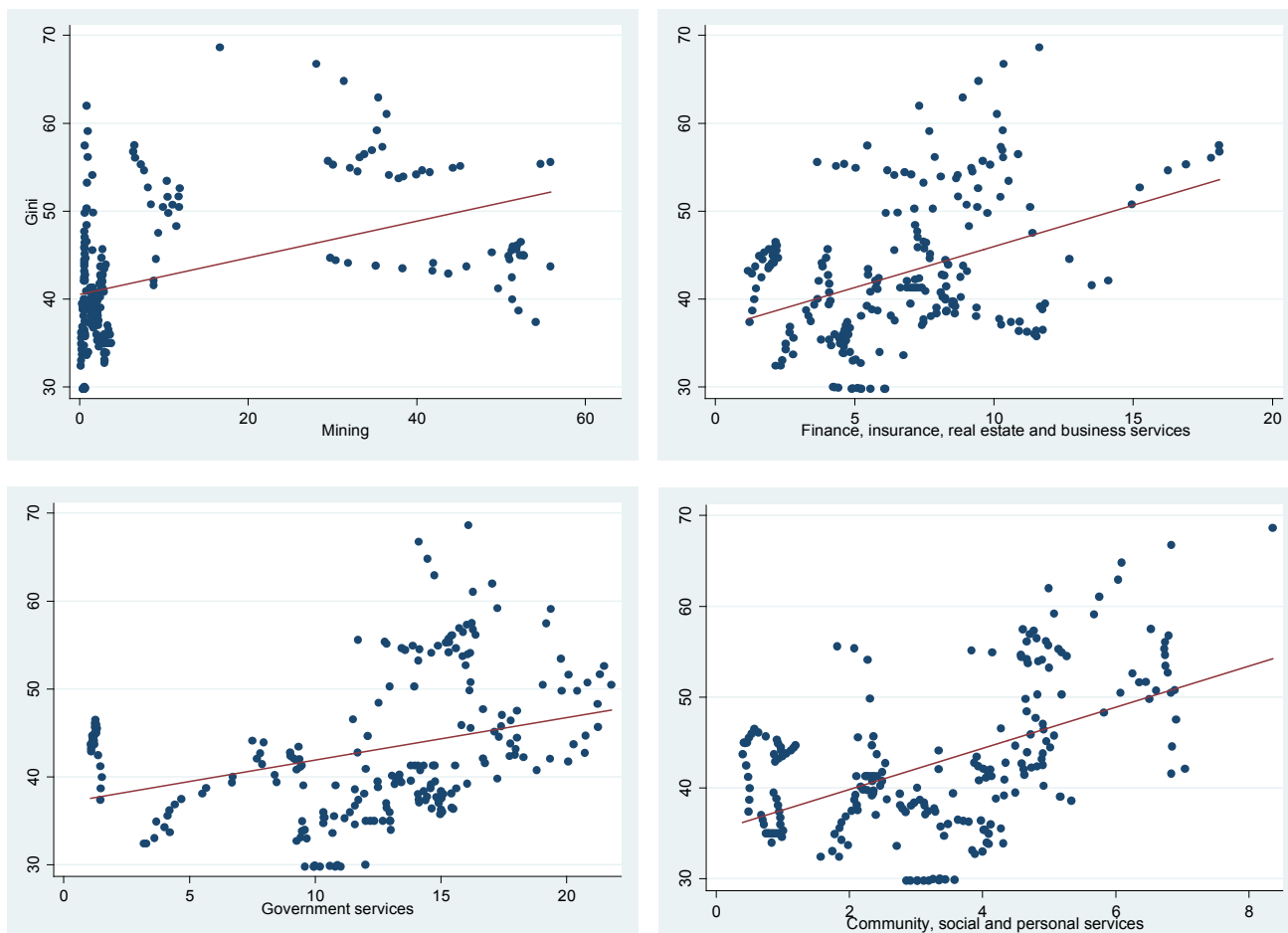
At Independence, most SSA countries tried to increase the share of value added of the modern sector, particularly manufacturing and modern services. Yet, trade liberalization and subsidy cuts introduced by the structural adjustment programmes in the 1980s and 1990s and the subsequent rise in commodity prices led to de-industrialization, ‘re-primarization’ and ‘informal tertiarization’. Gini fell where the value added share of modern agriculture, labour-intensive manufacturing and modern services did not decline or rose. In contrast, it went up in countries with low land yields, a drop in manufacturing, and a rise of the resource enclave, skills-intensive services and urban informal services. The World Bank (2014) underscores that this sub-optimal transition from low- to high-inequality sectors is behind SSA’s low poverty alleviation elasticity of growth. There were however differences. Cameroon and Madagascar followed an equalizing pathway as the share of labour-intensive manufacturing rose, that of mining fell, while the shift to utilities and FIRE was less marked, and food output rose in a context of relatively egalitarian land distribution. These examples confirm that, at the stage of development of most SSA countries, reduced inequality requires raising agricultural productivity under egalitarian land distribution (Kelsall, 2013).

## Chapter IV: Immediate and underlying determinants of the observed inequality changes

Figure 5 offers evidence of the relationship between income inequality and sectoral shares of value added on the basis of data for 1980–2011, covering Botswana, Ethiopia, Ghana, Kenya, Malawi, Mauritius, Nigeria, Senegal, South Africa, Tanzania and Zambia. The first four figures from the top show that—*ceteris paribus*—inequality drops following an increase in the share of agriculture, trade-restaurants and hotels (all of them labour intensive); transport and communications; and, less pronouncedly, construction. In contrast, it changes little in relation to a rise in the value added share of manufacturing (that includes utilities). Finally, inequality clearly rises following a surge in the value added share of capital- and/or skilled-labour-intensive mining, FIRE, government services, and community and personal services (that include domestic services).

**Figure 5. Relationship between the share of value added (x axis) in 10 production sectors and the Gini coefficient (y axis) for 11 SSA countries, yearly values over 1980–2011**





Source: Elaboration on the GGDC 10 Sector Database, <http://www.rug.nl/research/ggdc/data/10-sector-database>.

The key question then is how did the economic structure of SSA countries evolve over 1990–2011? Rostow's (1962) theory of the stages of economic development and subsequent work by Rodrik (2013) and others suggest that after land yields rise above subsistence, surplus rural labour is shifted towards manufacturing, utilities and urban services (banks, insurance, transport and public administration) that facilitate industrialization. Only after the demand for manufactured goods and related services has been saturated will one observe a decline in their value added share and a rise in that of other services, including personal and leisure services—a phenomenon often alluded to as 'tertiarization'. Of course, this development pattern does not apply to all countries, especially those characterized by small size, specific initial factor endowment, opportunities for migration and so on.

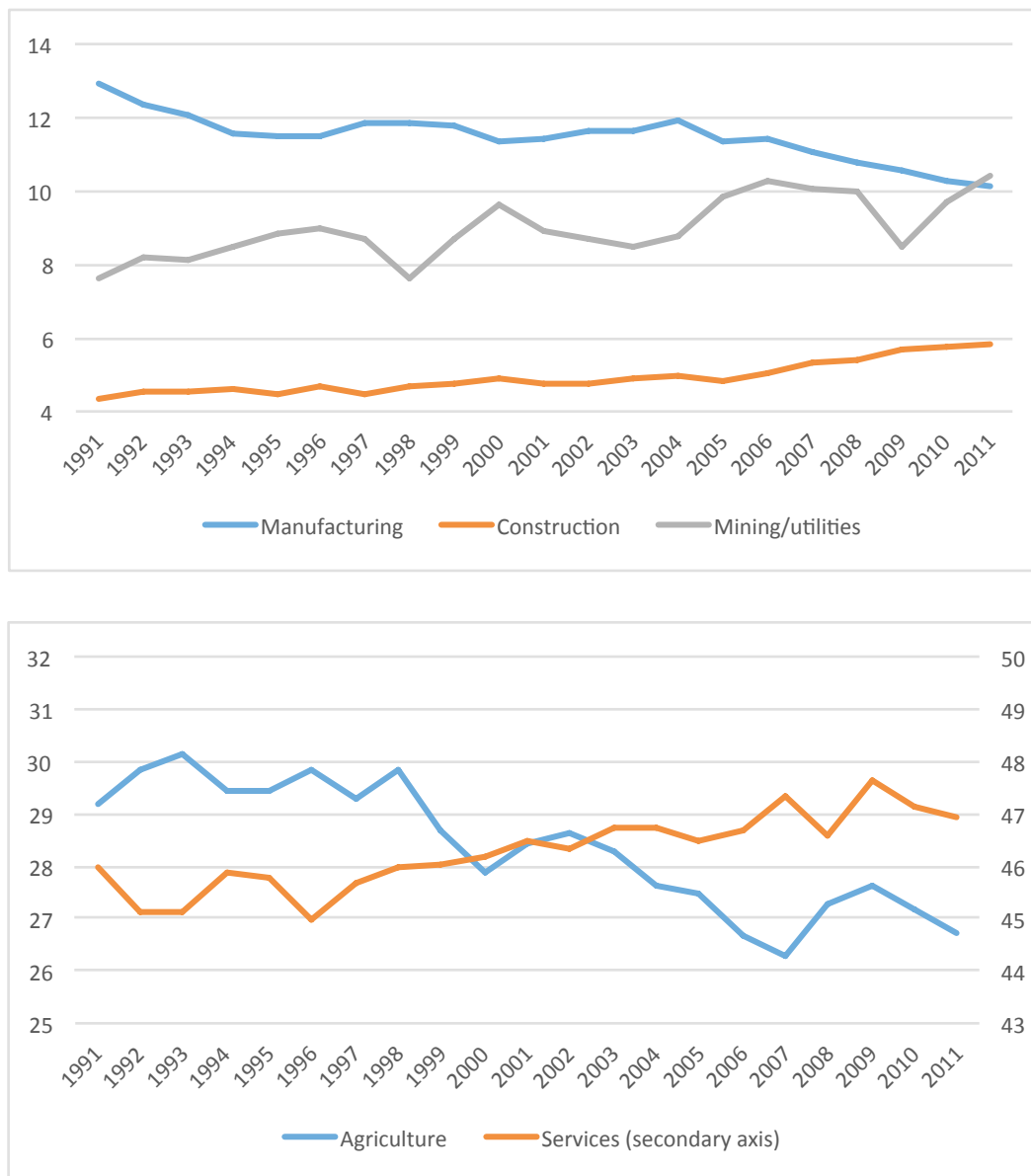
As shown in Annex Table 1, in most of the 29 sample countries (plus 9 countries for which there are no inequality data but information on their value added structure), the evolution of production has not followed the model outlined above. Interestingly, in nine countries already dominated in 1990 by agriculture, there was a further rise in its share, reflecting either an increase in land yields, or rising prices for cash crops or a 'retreat to subsistence'. In another 10 countries there was a rapid surge of the un-equalizing mining sector (in 2011 in Equatorial Guinea oil/mining absorbed 89.4 of value added, up from 4.2 percent in 1990). In another nine there was 'informal tertiarization', with most of the value added and jobs being created in sub-sectors exhibiting high informality, low value added per capita and high inequality. In contrast, the share of manufacturing rose in only three countries, while it increased markedly during the same years in all Asian least developed countries.



## Chapter IV: Immediate and underlying determinants of the observed inequality changes

Thus, despite a regional growth of GDP/c of 4.1 percent, over 1990–2011 several of the 38 SSA countries in Annex Table 1 followed a ‘sub-optimal pattern of growth’ characterized by re-primarization, de-industrialization, and informal tertiarization (Figure 6). Only in a few cases was there a shift towards modern agriculture, construction, manufacturing and services ancillary to industry. This pattern of structural transformation that often increased inequality was due to rising prices for primary commodities, limited capital accumulation, limited modernization of agriculture, and rapid trade liberalization that displaced domestic manufacturing output with imports. Figure 6 illustrates the average trends of the sectoral value added shares over 1991–2011.

**Figure 6. Trends in the average value added shares of the 29 sample countries for manufacturing, mining-utilities and construction (top panel); and (bottom panel) for agriculture (left scale) and services (right scale), 1991–2011**



Source: Author’s elaboration on UNCTADSTAT

To test econometrically the distributive effects of the ‘pattern of growth’, we introduced in regression the value added shares of agriculture, manufacturing and ‘other services’ that we expected on the basis of Figure 5 to

affect inequality negatively, non-significantly, and positively. The dis-equalizing impact of the expansion of the mining-oil sector is captured by interacting a 'mineral rich dummy' with the terms of trade.

## **(ii) Asset distribution and within-sector inequality.**

Within each sector, inequality depends on the household distribution of production factors, mainly land and physical and human capital.

- **Land distribution.** Since the 1990s, land scarcity worsened throughout SSA due to population growth, the weakening of customary institutions, limited land reforms, and the purchase of large tracts of land by foreign investors. All this generated, *ceteris paribus*, a dis-equalizing effect on land distribution and raised the number of landless workers seeking employment in rural non-agricultural activities. Since the mid-1990s, a few governments started registering customary land rights, liberalizing land markets and redistributing land to achieve a more egalitarian distribution. The new tenancy reforms allow land transfers and purchase of land by foreign investors. In Rwanda, 9 million plots were registered, enabling smallholders to invest and increase productivity (<http://blogs.worldbank.org/developmenttalk/land-rights-and-the-world-bank-group-setting-the-record-straight>). Meanwhile, due to the high costs of official titling, local administrators often designed informal systems to register land transactions. Land redistributions were rare. Approaches ranged from market-assisted reforms (as in Southern Africa) to compulsory acquisitions (as in Zimbabwe) and land redistribution (as in Ethiopia). In the latter, the state organizes recurring land redistributions to accommodate population growth (Gebreselassie, 2006) though this risks eroding property rights and incentives to invest in the land. Because of this, during the last decade the government issued property certificates to the owners of 20 million small plots. Such certificates ensure the right of continued use of land for 20-30 years and compensation in case of expropriation.

The last two decades witnessed a rise of state-blessed 'land grabs'. The Land Matrix database lists 375 land transactions in 27 countries. In at least nine of them, the land to be transferred exceeds 20 percent of total arable land. The distributive impact of land grabs are controversial. Deininger and Byerlee (2010) argue that the emphasis on smallholders needs to be reconsidered in light of their limited success in raising productivity. Yet, it is necessary to ensure that foreign farms generate enough rural employment (an uncertain outcome in view of their high degree of mechanization), help small producers to access new technologies and markets, promote broad development and do not infringe on the rights of traditional users. It is however impossible to include this variable in regression due to lack of data. We tried to capture the differences in land distribution by introducing land/man ratios and regional dummies in regression, but the results were unsatisfactory.

- **Rural modernization and food production.** Until the early 1990s, SSA experienced a steady decline of agricultural output per capita (Table 5). Since then, agricultural production per capita has grown at low but positive rates, with a likely equalizing effect in countries with moderate land concentration such as Angola, Cameroon, Ethiopia, Malawi, Rwanda, Senegal, and so on. Except for Liberia and Zambia, countries with high land concentration recorded a slower rise or a decline of agricultural output per capita (*ibid*).

What explains this surge in agricultural output per capita in some countries? As noted in Section 2, during the early days of the Green Revolution, SSA achieved no increases in yields. Yet, maize yields breakthroughs have been recorded since the mid-1990s, mainly in East Africa (Table 5) thanks to investments in National Agricultural Research Systems and Maize Breeding Programmes that produced seed varieties adapted to local conditions, while governments at times stabilized input and output prices, provided extension services, and sometimes subsidized seeds and fertilizers. Indeed, regression analysis shows that that Gini fell where growth was characterized by a surge in the value added share of agriculture driven by increases in land yields and total factors of productivity following the modernization of agriculture (Block 2010). However, SSA as a whole had in 2011 an index of agricultural output per capita well below that of the 1960s and 1970.

Table 5. Index of agricultural output per capita (2004–6 = 100) for 26 of 29 countries with Gini data

	1961–65	1971–75	1981–85	1986–90	1991–95	1996–2000	2001–05	2006–10	2011
*Ethiopia					76.16	87.32	92.97	109.04	123.54
*Kenya	104.42	104.90	103.07	103.93	103.29	91.44	95.51	104.90	103.04
*Madagascar	150.40	157.75	134.52	128.36	115.79	103.09	96.03	104.63	103.95
*Malawi	80.45	94.11	87.92	74.13	70.16	94.16	98.91	127.94	132.51
*Mozambique	138.97	145.78	89.65	84.78	73.38	95.08	97.72	111.54	145.68
*Rwanda	94.40	108.18	118.08	100.75	100.82	92.19	98.11	111.15	134.78
*Uganda	147.59	196.25	118.25	114.36	111.08	107.07	108.01	94.10	91.03
*Tanzania	104.31	101.11	102.07	97.46	85.27	80.02	93.58	101.20	115.42
*Zambia	97.39	112.84	84.30	100.88	82.42	82.38	87.44	109.37	146.86
<b>East Africa</b>	<b>122.83</b>	<b>135.41</b>	<b>112.66</b>	<b>109.36</b>	<b>98.30</b>	<b>101.02</b>	<b>97.84</b>	<b>104.21</b>	<b>114.43</b>
*Angola	142.18	140.91	57.52	52.36	52.86	57.06	88.73	132.18	176.05
*Cameroon	89.04	103.05	87.22	80.85	80.12	85.56	90.02	116.78	134.27
*CAR	133.76	144.77	121.85	108.65	100.65	112.26	103.02	103.21	105.41
<b>Central Africa</b>	<b>134.39</b>	<b>131.23</b>	<b>110.34</b>	<b>105.95</b>	<b>101.26</b>	<b>98.74</b>	<b>98.32</b>	<b>106.06</b>	<b>113.26</b>
*Botswana	181.06	200.36	122.51	123.03	109.13	100.73	105.36	80.27	93.38
*Lesotho	204.22	155.85	116.81	137.84	102.38	134.98	112.01	95.61	100.81
*South Africa	104.99	127.40	114.18	114.64	94.64	104.68	102.83	98.54	98.21
*Swaziland	68.44	116.66	136.86	132.40	103.20	97.98	97.02	95.21	95.19
<b>Southern Africa</b>	<b>133.65</b>	<b>140.30</b>	<b>116.94</b>	<b>118.90</b>	<b>96.32</b>	<b>104.22</b>	<b>101.95</b>	<b>94.14</b>	<b>98.68</b>
*Côte d'Ivoire	56.22	57.27	55.82	67.60	81.20	99.03	104.95	98.95	98.27
*Gambia	53.07	52.97	60.95	76.60	80.34	83.13	97.88	95.85	83.50
*Ghana	93.77	101.26	97.28	98.73	94.99	106.69	100.79	97.68	101.03
*Guinea	271.09	243.95	156.83	122.16	83.71	87.06	97.45	96.59	67.25
*Mali	84.75	88.45	93.51	92.27	92.16	90.13	96.36	100.56	101.42
*Mauritania	127.21	150.85	132.31	130.70	75.93	104.21	104.21	87.42	75.22
*Niger	56.55	58.94	63.22	80.30	90.57	98.43	102.72	106.56	115.08
*Nigeria	163.15	84.78	86.15	120.57	117.58	131.85	102.41	108.11	114.73
*Senegal	113.57	77.21	75.60	75.87	78.61	82.54	100.17	125.11	124.87
*S. Leone	68.78	63.53	47.07	59.02	81.39	88.43	93.25	91.70	86.68
<b>West Africa</b>	<b>118.99</b>	<b>103.40</b>	<b>87.47</b>	<b>92.98</b>	<b>88.62</b>	<b>97.28</b>	<b>99.63</b>	<b>102.15</b>	<b>97.26</b>
<b>SSA</b>	<b>127.47</b>	<b>127.58</b>	<b>106.86</b>	<b>106.80</b>	<b>96.12</b>	<b>100.32</b>	<b>99.43</b>	<b>101.64</b>	<b>105.91</b>

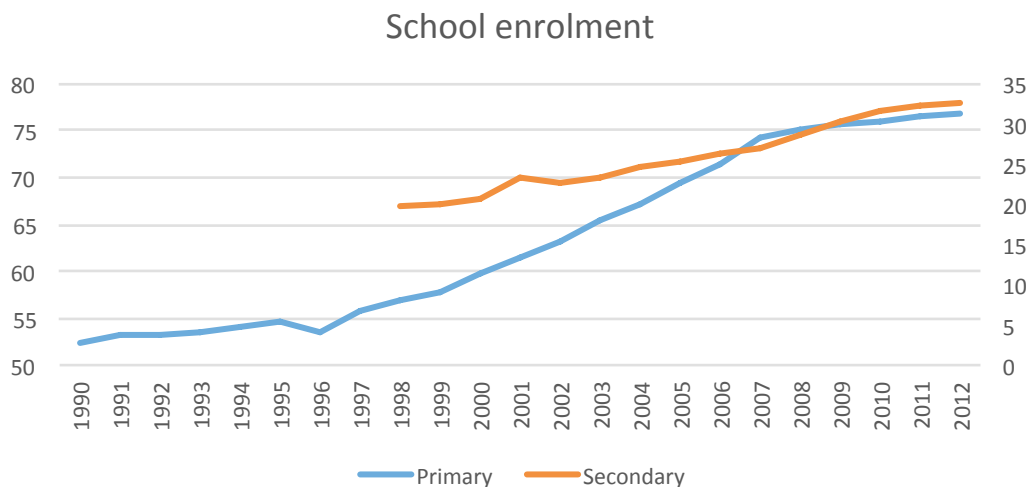
Source: Author's compilation on the basis of FAOSTAT.

Note: countries marked in light blue recorded an output increase since the mid-2000s.

**- Human capital investments and distribution.** In the urban sector the only production factors for which there are data are the Barro-Lee (2011) time series on the years of education of the labour force. In regression, the distribution of human capital and the skill premium can be proxied by the ratio of workers with secondary and tertiary education divided by that of workers with lower or no education. The higher the relative supply of skilled workers, the lower the skill premium and income inequality, especially in the modern sector.

Between 1990 and 2010, average public expenditure on education remained at around 4 percent of (a rising) GDP, while that on health rose from 2 percent to 2.9 percent (WDI 2014). MDG-driven education policies led to visible gains in primary education but less so for the secondary level. Figure 7 shows that while primary enrolment rates rose on average by 18 points between 1998 and 2012, the secondary enrolment rose by half this amount. An acceleration of secondary enrolments is particularly important for the modernization of the urban and agricultural sector, but several countries remain far behind. For instance, in 2009 in Niger and Mali there were respectively 4 and 7 workers with secondary or higher education for every 100 with primary or no education. In Botswana and South Africa these ratios were 28 and 19, respectively. As shown below in Table 12, the interaction of secondary enrolment rates with the share of rural population reduces inequality.

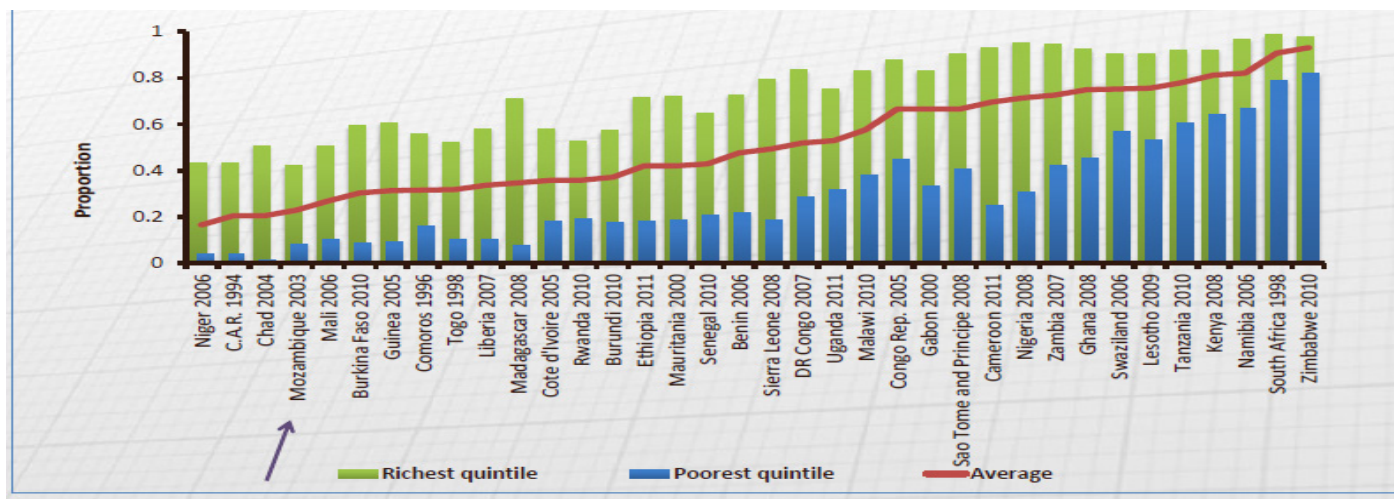
**Figure 7. Enrolment rates in primary (blue, left scale) and secondary (red, right scale) education**



Source: Author's compilation on the basis of FAOSTAT.

A related problem was that, also during the 2000s, school completion rate of children belonging to the bottom 40 percent was 20–40 points less than those of the top 60 percent (World Bank 2014). Enrolment differentials by income groups were even greater at the lower secondary level (Figure 8).

**Figure 8. Enrolment rates of the poorest (blue) and richest quintile (green) of 15–19-year-olds who completed grade 6, late 2000s**



Source: Ferreira (2014)

While the low level of human capital formation and its unequal distribution reflect limited and poorly targeted investment in education, in rural areas low enrolments may also reflect rational decisions of households engaged in subsistence agriculture. Without the modernization of farming techniques (see above), it makes little sense to invest in education since the lack of complementary inputs does not allow for an increase in the productivity of human capital. An expansion of primary and secondary education in rural areas thus requires accompanying efforts to modernize farming.

**(iii) Population growth, dependency rates and inequality.** Unlike in other less developed regions, between 1990–5 and 2010–5 SSA's average population growth did not slow down (Table 6), while in both East and West Africa it accelerated. Even assuming that population growth will slightly decline, by 2050 the population of SSA will reach 2.4 billion.

**Table 6. Trends in population growth rates by main sub-regions of SSA**

	1960–65	1970–75	1980–85	1990–95	2000–05	2010–15
<b>Less developed regions</b>	<b>2.26</b>	<b>2.39</b>	<b>2.15</b>	<b>1.81</b>	<b>1.43</b>	<b>1.33</b>
<b>Sub-Saharan Africa</b>	<b>2.38</b>	<b>2.66</b>	<b>2.81</b>	<b>2.69</b>	<b>2.61</b>	<b>2.65</b>
<b>East Africa</b>	<b>2.62</b>	<b>2.86</b>	<b>2.92</b>	<b>2.54</b>	<b>2.74</b>	<b>2.83</b>
Uganda (highest)	3.32	2.73	3.11	3.36	3.37	3.33
<b>Central Africa</b>	<b>2.29</b>	<b>2.52</b>	<b>2.82</b>	<b>3.33</b>	<b>2.90</b>	<b>2.74</b>
Angola	1.80	2.26	3.42	3.16	3.45	3.09
<b>Southern Africa</b>	<b>2.56</b>	<b>2.67</b>	<b>2.55</b>	<b>2.39</b>	<b>1.41</b>	<b>0.85</b>
Namibia	2.49	2.98	2.53	3.12	1.32	1.87
<b>West Africa</b>	<b>2.14</b>	<b>2.50</b>	<b>2.75</b>	<b>2.68</b>	<b>2.61</b>	<b>2.73</b>
Niger	2.79	2.78	2.78	3.35	3.64	3.85

Source: UN Population Division data, accessed in January 2016.

The factors behind this ongoing rapid population growth are a slow decline in total fertility rate (TFR) and a high proportion of fertile women in the total population. The UN Population Division data show that between 1990–5 and 2010–5 the TFR fell only from 6.4 to 4.9 in East Africa, 6.8 to 5.8 in Central Africa and 6.4 to 5.5 in West Africa. Differences are however starting to emerge. While in Niger the TFR stagnated over 1990–2015 at 7.6–7.7, in Ethiopia it fell from 7.4 to 4.6 as a result of proactive public policies. The region has thus not benefitted from a demographic dividend, while high population growth negatively affected inequality. Leite et al. (2009) found that the increase in urban inequality recorded in Ethiopia between 1995 and 2004 was due inter alia to the fact that young and well educated heads of household lived alone or in couples with no or few children. Likewise, evidence for Uganda shows that high population growth retarded economic development and was partially responsible for slowing poverty reduction and raising inequality (Klasen 2004).

Aggregate data are unable to capture the un-equalizing effect of high population growth in macro-panel regressions, as such variable varied little across countries and over time. However, such effect is evident on microdata that show that dependency rates are lower and/or fall faster in high income households (Table 7), a fact that, ceteris paribus, raises inequality. Thus, we introduced in regression the aggregate dependency rate, expecting it to correlate positively with inequality, while being aware that this effect may not be easily captured in macro panels like ours.

**Table 7. Ethiopia, trends in the share of dependents (<15, >64) by area and consumption quintiles**

		Poorest 20%	II quintile	III quintile	IV quintile	Richest 20%
<b>Rural</b>	2000	....	....	...	....	....
	2005	57.3	56.0	53.6	49.3	45.3
	2011	55.8	53.5	53.0	51.1	46.1
<b>Urban</b>	2000	41.9	42.5	39.7	37.0	26.8
	2005	46.4	42.6	40.7	36.7	30.9
	2011	41.9	42.5	39.7	37.0	26.8
	% change 2000–11	- 15.0	-9.6	-8.6	-3.7	-17.3

Source: author's elaboration on Ethiopian Household Survey data



## 4.2 Underlying causes of inequality

The changes in the immediate causes of inequality depend to a significant degree on its underlying causes that either influence the immediate causes of inequality or affect it directly.

### (i) Changes in the global economic environment.

- **Gains in terms of trade and export volumes.** While between the early 1990s and the mid 2000s the world prices of oil, metals and agricultural products stagnated, the rapid growth of the emerging economies in the 2000s entailed for several African countries a significant increase in export prices (Table 8) and volumes. As a result, the trade/GDP ratio rose (Table 9), while the regional terms of trade jumped from 100.7 over 1997–2001 to 141 in 2011 (IMF 2013). This bonanza had a positive effect on growth for commodity exporters, while energy importing countries were negatively affected. What does economic theory suggest about the impact of these changes on inequality? Oil, metals and some cash crops are produced in enclaves where asset concentration is high and production is capital intensive. Thus, the recent gains in terms of trade likely generated, *ceteris paribus*, a rise in the share of mining and land rents and a worsening of between-countries inequality. Under democracy, such rents may be taxed and redistributed through transfers. However, the evidence suggests a weak relationship between terms of trade and revenue/GDP ratio, due in part to large capital flights. In contrast, the terms of trade gains of agricultural crops had mostly an equalizing effect, as they are labour-intensive and are produced also by smallholders.

**Table 8.** Unit prices of main agricultural commodities exported by SSA

	Unit price	2005	2006	2007	2008	2009	2010	2011	2011/2005
Banana (US)	(\$/mt)	602	677	675	844	847	868	968	1.61
Cocoa	(cents/kg)	153	159	195	257	288	313	298	1.95
Coffee (Arabica)	(cents/kg)	253	252	272	308	317	432	597	2.36
Cotton	(c/kg)	121	126	139	157	138	228	332	2.74
Groundnut oil	(\$/mt)	1060	970	1352	2131	1183	1404	1988	1.87
Logs (Cameroon)	(\$/CM)	...	318	381	527	421	428	484	1.52
Maize	(\$/mt)	98	121	163	223	165	185	291	2.97
Palm oil	(\$/mt)	422	478	780	948	682	900	1125	2.67
Rubber (US)	(cents/kg)	...	231	248	284	214	386	482	2.09
Sugar (US)	(cents/kg)	47	48	45	47	55	79	84	1.79
Tea (Mombasa)	(c/kg)	148	195	166	221	252	256	272	1.84
Tobacco, US import u.v.	(\$/mt)	2789	2969	3315	3588	4241	4304	4485	1.61

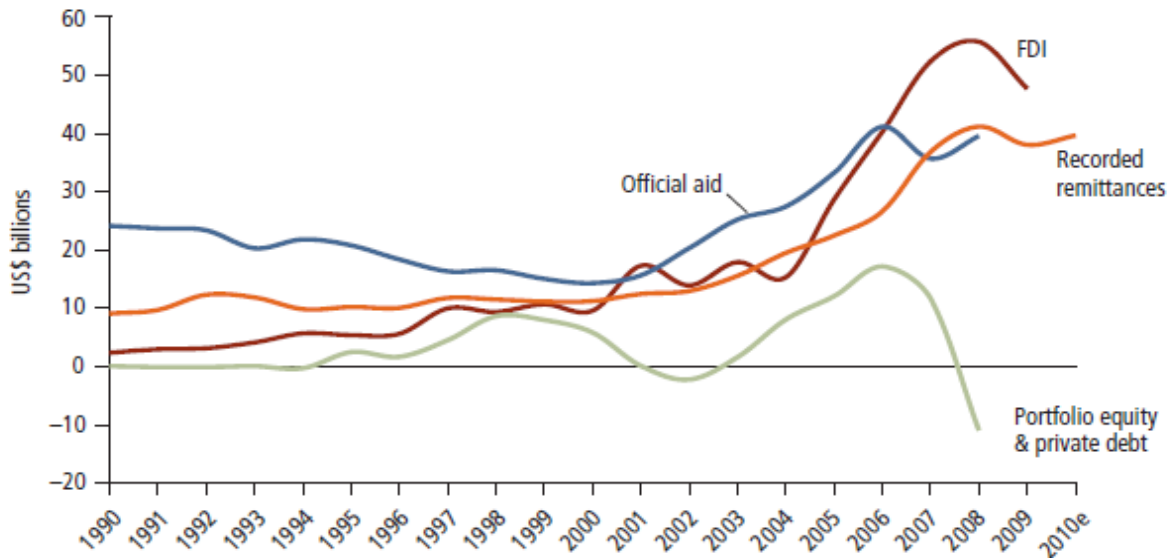
Source: UNCTAD (2012)

- **FDI, portfolio flows, aid and HIPC.** Foreign direct investments (FDI) in SSA have historically been marginal but rose from 3.0 to 5.3 percent of GDP over 2000–2011. Such investments are mainly directed to the capital- and skilled-labour-intensive extractive sector and therefore are unlikely to be equalizing, though the final outcome depends on the extent of the taxation/redistribution of the sector's profits and rents. In this regard, Ndikumana (2014) notes that at least 8 percent of petroleum proceeds earned by oil-rich SSA countries ends up in tax heavens. In contrast, FDIs in labour-intensive manufacturing and infrastructure (as in Ethiopia, Ghana and Mozambique) increased the integration of domestic and world markets and reduced inequality via growing employment in labour-intensive sectors.

Between 1990 and 2011 the region experienced negligible or negative portfolio inflows (Figure 9). However, it recorded a large drop in the foreign debt/GDP ratio thanks to the completion of the Heavily Indebted Poor Countries (HIPC) programme in many countries. We thus introduced in regression the first difference of the external debt/GDP ratio. Finally, foreign aid to SSA declined from 25 to 15 billion over 1990–2001 to rebound to about 40 billion by 2008 (*ibid*). IMF data show that low-income countries received on average 3–4 percent of GDP as aid, fragile countries 5–6 percent and much more for countries experiencing conflicts. Theory and empirical evidence are divided about the impact of aid on inequality. Boone (1996) argues that it mainly

raises unproductive expenditures. Others claim that it may induce self-interested recipients to engage in rent-seeking activities. Others assert that it is effective only if structural reforms have been implemented. In turn, Bourguignon and Sundberg (2007) trace the impact of aid to the nature of conditionality and governance, as countries with more flexible conditionality and good governance recorded better outcomes. Finally, in examining official development assistance (ODA) allocations since 2000, Hailu and Tsukada (2012) find that aid was distributed according to MDG-sensitive criteria while Juselius et al. (2011) show that aid had a positive long-run impact on the macroeconomy and investment in 33 of the 36 countries analysed. Overall, the majority view is that international aid can have a role in stimulating growth, fighting poverty and reducing inequality. The variable 'net ODA received/GDP' was thus introduced in regression with the expectation that it would have a negative sign.

Figure 9. Flows of foreign resources to SSA, 1990–2010



Source: Ratha et al. (2011)

- **Growing remittances.** Official remittances grew fourfold between 1990 and 2010 (Figure 9) and exceeded official aid. If the unrecorded ones are included, remittances likely represent the main source of foreign exchange after exports. According to the 'hump theory of migration' remittances are un-equalizing, as only middle-income households are able to finance the high cost of migration and, as a result, remittances accrue to middle class households (IMF 2005). Micro-evidence from Ethiopia and Ghana (which send droves of doctors, pharmacists and nurses to the UK and USA) confirms this hypothesis. Similar conclusions are reached by Ratha et al. (2011) for Nigeria, Senegal and Uganda. However, in Africa a large part of migration is seasonal, informal, directed to neighbouring countries and low-cost. Also the rural poor migrate and remit moneys to their households. Such variable was thus included in regression, expecting its parameter to be negative.

**(ii) Changes in domestic policies.**

- **Macroeconomic policies.** According to Ndulu et al. (2008), the SSA's macro problems of the 1970 and 1980s started to be solved since the mid-1990s, as many countries adopted more sensible policies, the impact of which was enhanced by the favourable global environment of the 2000s and the HIPC initiative. Table 9 summarizes the main average policy changes and outcomes. Domestic markets were substantially liberalized. For instance, Ethiopia eliminated compulsory food delivery by farmers, relaxed restrictions on private grain trade, devalued the Birr and liberalized the foreign exchange market. Import duties were cut by three quarters, the capital account was partly liberalized and the financial sector was reformed while, outside the CFA zone,



there was a shift towards flexible exchange rates. In turn, fiscal deficits were reduced by raising revenue rather than cutting outlays. The conclusion of the HIPC initiative ended a longdrawn-out debt crisis, reduced the net transfer of resources abroad, reduced the foreign debt to sustainable levels and allowed a rise in social spending.

The evidence for the 29 SSA sample countries for 1985-2011 shows that the real interest rate had modal values around 20-25 percent and was unstable. As 90 percent of economic agents are excluded from formal credit, such variable is unlikely to affect inequality and was therefore dropped. Second, the CPI recorded a general and steady decline. A low CPI is generally assumed to reduce inequality. Yet, if the food price index (FPI) rises faster than the CPI, consumption inequality rises. Lack of data for some of the 29 sample countries did not however allow to use FPI in regression. The CPI was included instead, expecting its coefficient to have a positive sign.

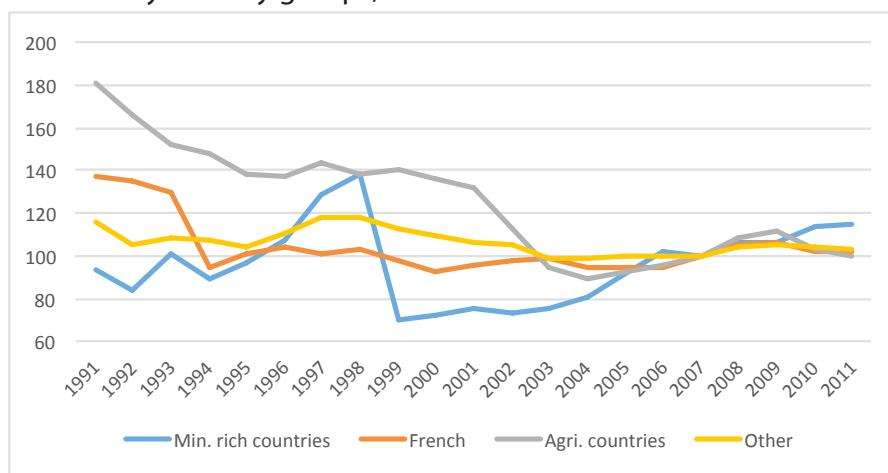
**Table 9.** Summary of average policy changes, macroeconomic shocks and performance, SSA

	1982-90	1991-1997	1998-2002	2003-2010
Policy changes				
Average import tariff	40.0	19.0	12.2	10.6
Trade/GDP ratio	66.9	68.3	73.9	79.3
Kaopen Index of capital account openness*	-0.91	-0.82	-0.59	-0.56
Index of domestic financial liberalization**	4.5	5.1	6.6	7.4
Exchange rate regime for non CFA countries (1=peg; 5=Free falling)	1.81	2.77	2.98	2.43
External shocks				
Terms of trade (goods) 2000=100	107.2	100.77	100.57	98.49
Aid Flows (% of GNI)	14.9	16.4	11.1	10.0
FDI (% of GDP)	0.91	1.77	3.34	3.86
Macroeconomic outcomes				
Budget balance/GDP (deficit<0)	-5.1	-3.9	-3.5	-0.7
Government revenue/GDP		...	21.2	24.8
Rate of inflation (CPI)	20.1	165.5	35.0	8.2
Average yearly change in RER 2005=100)	-20.00	-2.10	-5.13	7.32
1/ Public Debt/GDP ratio	93.1	105.8	105.0	69.2
CA balance/GDP (including grants)	-6.9	-6.5	-2.5	-0.8
External debt stocks (% of GNI)	103.4	118.2	107.0	47.9
Currency reserves as a share of GDP	7.0	10.1	12.1	15.9
Development performance				
Growth Rate of GDP*	3.6	2.7	3.7	5.3
Growth rate of GDP/capita	0.7	0.2	1.1	2.8
Investment/GDP ratio	19.2	20.2	19.9	22.2

Source: Excerpted from Cornia (2014) on the basis of: \*Economic Freedom Dataset (2011 version), \*\*World Development Indicators (2011 version) and \*\*\*Chinn and Ito (2011). Notes: The Kaopen index rises with capital openness. The Index of Domestic Financial Liberalization ranges from 0-10 (highest degree of liberalization).

Third, the near totality of the SSA countries, especially the HIPC ones, experienced a reduction in the foreign debt/GDP ratio (Table 9) with favourable effects. In turn, on average the Real Effective Exchange Rate (REER) was substantially devalued between the 1990s and 2003/4. However, it then appreciated in the mining economies affected by the Dutch Disease and since 2003/4 in the exporters of agricultural goods and CFA Franc zone (Figure 10).

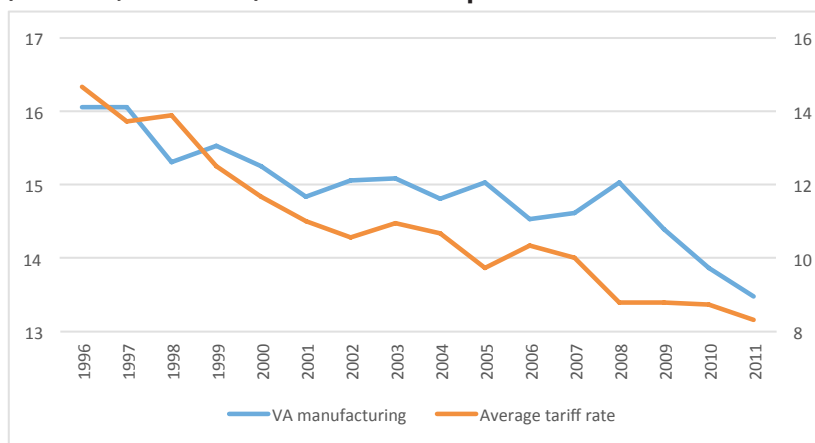
Figure 10. Trends in the REER by country groups, 1991–2011



Source: Author’s elaboration on data compiled by Martorano and Cornia (2015)

Finally, average tariff rates were cut in half (Table 9). Yet, such measure contributed to reducing the size of the labour-intensive manufacturing sector created after Independence, with likely dis-equalizing effects (Figure 11) as liberalization shifted resources from low-inequality manufacturing to high-inequality services. Figure 11 confirms the results of an overview of the literature (Koujianou Goldberg and Pavcnik 2007) that shows that trade liberalization raises inequality for several years after its introduction. However, data about tariffs are available only five to six years and not for all countries, making it impossible to include this variable in regression.

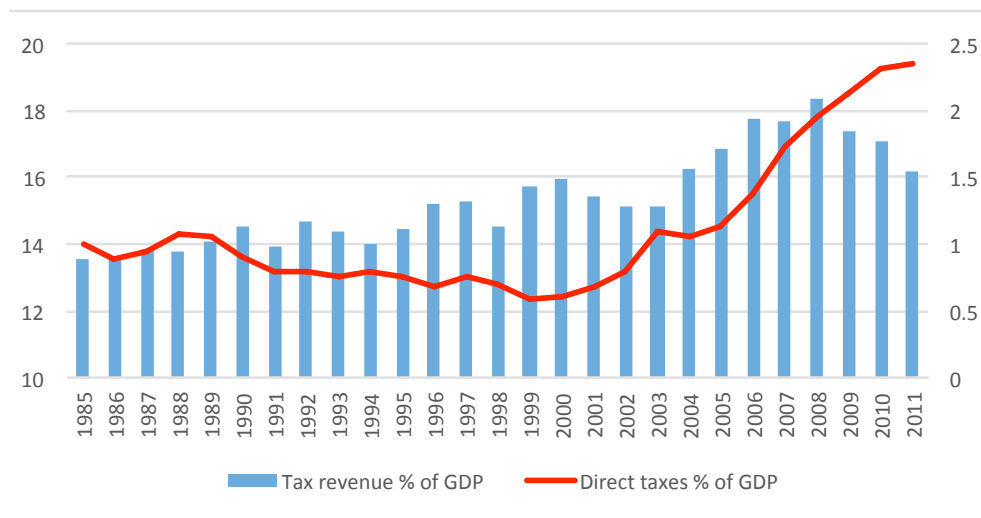
Figure 11. Average regional tariff rate (blue line, right scale) and average value added of the manufacturing sector (red line, left scale) for the 29 sample countries.



Source: Author’s elaboration on Martorano and Cornia (2015). Note: outliers (i.e., manufacturing value added shares >30 or < 10) were dropped.

**- Tax policy.** Until the end of the 1990s, tax/GDP ratio stagnated, and revenue generation depended mainly on regressive trade and indirect taxes. However, the tax/GDP ratio has risen since 2003 (Figure 12). The weight of regressive VAT and trade taxes did not rise, while that of income taxes rose by two points together with that of ‘other revenues’ (mostly royalties) (UNCTAD 2012). The distributional impact of the latter increase depends, however, on whether their revenue is redistributed. According to Ndikumana (2014), this has seldom been the case in oil/mining economies suffering from tax-dodging and capital flights. Also Christian Aid (2014) offers a pessimistic assessment of the taxation of natural resources-inequality nexus on the basis of analyses of Ghana, Kenya, Malawi, Nigeria, Sierra Leone, South Africa, Zambia and Zimbabwe. Yet, a rise in direct tax revenue/GDP is likely equalizing and such variable was thus included in the regression.

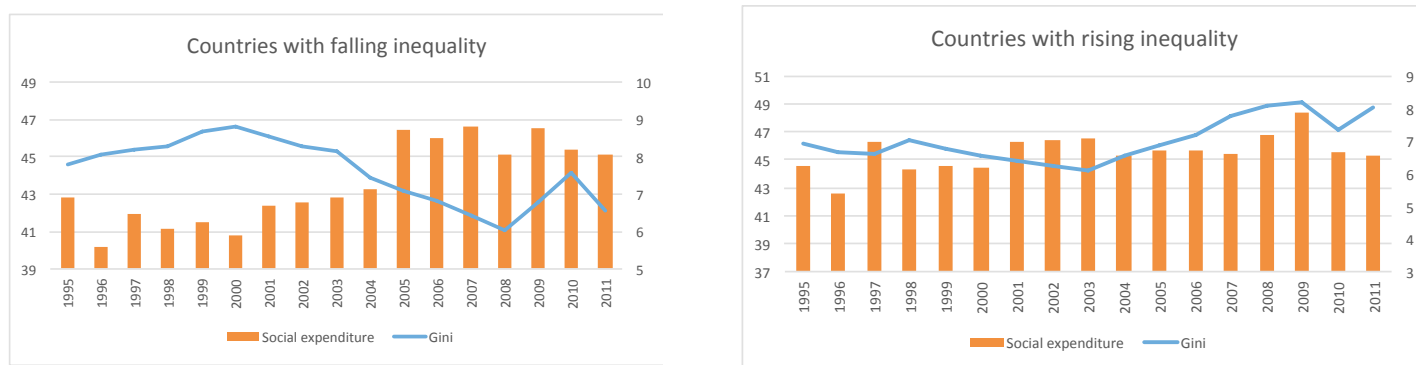
**Figure 12. Mean tax/GDP ratio (left scale) and direct taxes/GDP ratio (right scale)**



Source: Author's elaboration on Martorano and Cornia (2015)

- **Social transfers in cash and kind.** An increase in public social spending as a proportion of a generally rising GDP is likely to be equalizing even if the share received by the top quintiles is greater than that of the bottom ones. Public spending on health and education rose in much of the region, and its targeting improved in part because of the emphasis placed on the poor by MDGs. While greater availability of social services does not increase household monetary consumption, it replaces private outlays in these areas, thus raising the consumption of other basic items. The left panel of Figure 13 shows that an increase in social spending was associated with falling inequality but this was not true in the right panel where inequality stagnated.

**Figure 13. Evolution of public spending on health, education and social transfers as a share of GDP and Gini coefficient in countries with falling Gini (left panel) and rising Gini (right panel)**



Source. Author's elaboration on data from Martorano and Cornia (2015)

What about changes in social insurance and assistance? Niño-Zarazúa et al. (2012) and the ILO (2014) show that over 1998–2005, social insurance covered between 1.2 percent (Niger) and 51 percent (Mauritius) of the working age population, with a regional average of 4–5 percent. Such schemes are regressive. In contrast, non-contributory old age pensions have become more common in Southern Africa where white-only transfers were extended to all citizens at a cost of 0.4–3.0 percent of GDP (Table 10). In other SSA countries, the number of non-contributory cash transfer programmes increased quickly (up to 123 in 2012), but most of them are at the pilot stage and depend on donor-financing (Garcia and Moore 2012). They are likely equitable at the local level, but are too small to affect national inequality. Yet, social assistance transfers can be expanded massively in oil/mineral rich countries. To capture these effects, we introduced in regression the variable 'health, education and transfers/GDP', expecting it to have a negative sign.

Table 10. Non-contributory pension programmes in Southern Africa

Country	Age of eligibility	Selection criteria	Monthly Income Transfer (US\$)	% of targeted population	Cost as % of GDP
Botswana	65+	Age and means test	27	85	0.4
Lesotho	70+	Age and citizenship	21	53	1.4
Mauritius	60	Age	61–260 dep. on age	100	1.7
Namibia	60+	Age and citizenship	28	87	2.0
Seychelles	63	Age	165	80	3.0
South Africa	63+ men 60+ women	Age and means test	109	60	1.4
Swaziland	60+	Citizenship and means test	14	60	n.a.

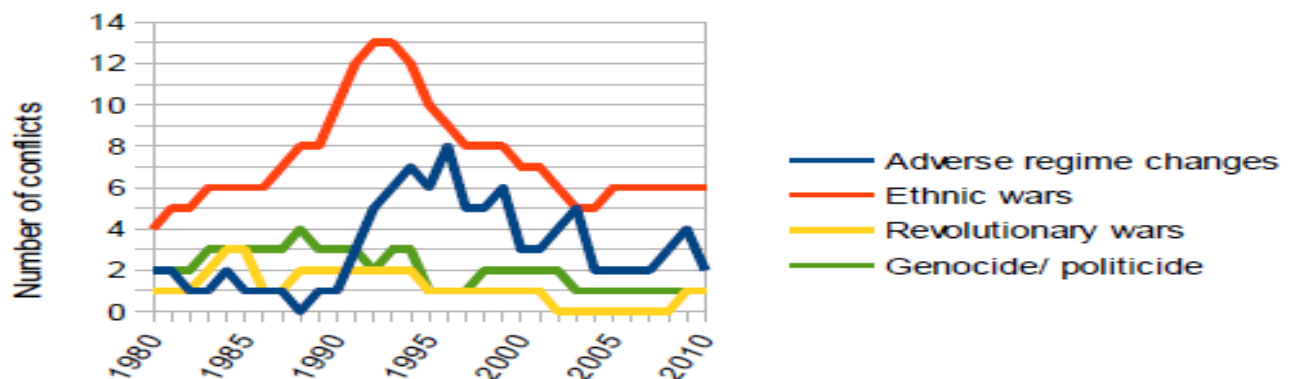
Source: Niño-Zarazúa et al. (2012)

**(iii) Distributive impact of exogenous shocks.**

- **Ethnic-horizontal conflicts and inequality.** While there are strong ethical and economic reasons for reducing horizontal inequality between ethnic, religious or other groups, social psychologists have pointed to the difficulty of achieving a ‘fair distribution’ in heterogeneous societies, since people’s sense of fairness is limited to those within a particular community (Stewart 2014). Kimenyi (2006) notes that in SSA, the distribution of public jobs, contracts and access to education often takes place on the basis of ethnicity, and that this affects regional and overall inequality as public policy is characterized by the under-provision of ‘public goods’ and the diffusion of ‘patronage goods’. At the same time, market forces or epochal changes (decolonization or the end of Apartheid) possibly may reduce ‘ethnic inequality’, as in the case of South Africa over 1975–91.

During the first half of the 1990s the number of ethnic wars, coups and other conflicts rose markedly (Figure 14). Collier and Hoeffler (2000) have attributed them to ‘greed’ for the control of mining resources or ‘grievances’ caused by political repression. In turn, Stewart (2000) has emphasized the role of ‘horizontal inequality’ as a trigger of these conflicts. Yet, since 1993–4 the number and intensity of conflicts fell from 25 in 1993 to 10 in 2010 (Figure 14), with positive effects on inequality. The definition of ‘war intensity’ is not simple. In this paper we use the ‘Major Episodes of Political Violence, 1946–2014’ database, developed by the Centre for Systemic Peace (<http://www.systemicpeace.org/warlist/warlist.htm>). A war is observed when it involves at least 500 “directly-related deaths” over a period and at least 100 directly-related deaths per year.

Figure 14. Trend over time in the number of conflicts per year



Source: Menchi Rogai (2011)

- **Distributive impact of HIV/AIDS.** The HIV/AIDS epidemic has severely affected SSA. In 2011, 80 percent of the 34 million HIV-infected people lived in SSA. An even higher share of the related deaths occurred therein. Since the early 1990s, HIV/AIDS incidence rose in all SSA regions, although at different rates (Table 11). Microeconomic evidence indicates that the HIV/AIDS epidemics affected both growth and inequality. GDP dropped by an estimated 0.2–0.3 per year in low HIV-prevalence countries and 1.3 percent in those with prevalence rates greater than 20 percent (Cornia and Zagonari 2007). HIV/AIDS sharpened the income gap between non-infected and infected households who forego the income of their sick adults and of the family members who care for them, while having to bear large medical and funeral costs (ibid.). With the spread of prevention campaigns and greater availability of antiretrovirals, the HIV-prevalence rate has fallen moderately, though this was less likely the case among poor rural families. To capture this effect, the variable ‘adult HIV/AIDS incidence rate’<sup>6</sup> was included in regression, expecting its sign to be positive.

**Table 11. HIV prevalence among 15–49-year-olds in countries with rates greater than 5 percent**

	1990	1995	2000	2005	2011
Southern Africa	3.3	14.3	21.1	21.1	19.7
West Africa	2.4	5.7	5.8	4.6	4.3
East Africa	6.1	8.9	8.5	8.0	7.5
Average SSA	3.9	9.6	11.8	11.2	10.5

Source: Author’s compilation on the basis of WDI data

- **Technological shocks.** The last decade has witnessed diffusions of low-cost and highly divisible technologies such as cell phones, Internet and solar power that have facilitated the market integration of previously excluded poor producers and consumers in the field of transport, postal services, information and mobile banking. The new technologies with the highest potential effects on equity are the Internet and cell phones. For both, the number of subscriptions has increased rapidly since 1998. Between 2004 and 2011, the average number of people with access to mobile phones rose from 10 to 60 percent and that of Internet users to 10 percent. While the growth effect of this shock was favourable, its effect on inequality is likely concave as these technologies are initially acquired by the middle class. Only when their use is sufficiently widespread, may inequality start falling. To test the inequality impact of this shock, we introduced in regression the number of cell phones per 100 people, expecting its sign to be positive, since during the sample period most countries were in the initial phase of their diffusion.

- **Impact of democratization on horizontal/vertical inequality.** Genuine democracy and electoral participation can reduce the concentration of power and facilitate the transition towards non-clientelistic policies that correlate with inequality (Gyimah-Brempong 2001). Though democracy is difficult to theorize, define and measure, most analyses conclude that it started improving since the mid-1990s. The end of the Cold War and demise of ‘client states’ opened the door to a slow process of democratization. Meanwhile, the decline of autocratic regimes allowed a return to more accountable institutions in about 20 countries. Yet, institutions are ‘persistent’, their evolution takes time, and there is no evidence that with this shift to democracy, horizontal inequality declined (Stewart 2014). Even democratically elected regimes only partially uprooted the deep-seated corruption existing in most of the region. The Corruption Perception Index for 2005 and 2014 suggests modest improvements in about 30 countries (with only 12 of them recording gains of more than 10–15 points) but a deterioration in 7 countries and no change in 2 of them.

The measure used in this paper to proxy democracy consists of two complementary indexes (Vanhanen, 2014). The first (‘political competition’) measures the electoral success of small parties aimed at moderating the monopoly of traditional parties. The second (‘political participation’) measures the voting turnout, assuming that the higher it is, the greater the democratic control. The product of the two is the ‘democracy index’. To capture changes in governance, the variable ‘quality of public administration’ was also introduced in regression. These variables should be equalizing, though the difficulties in measuring democracy through aggregate indexes may reduce their correlation with inequality.

<sup>6</sup> A precise specification of this variable would require introducing a lag equal to the number of years the HIV virus takes to become conflagrated AIDS. However, this would entail a major loss of degrees of freedom.



## V. Dataset, variables description, estimation strategy and regression results

In this section, we test econometrically the impact on inequality of the immediate and underlying determinants of consumption inequality for the period 1991–2011. It is important to remember that the Gini coefficient of the distribution of household consumption per capita included in the IID-SSA database, as well as those of any other inequality database, are a lower-bound estimate of the true but unobservable Gini. If the distance between the IID-SSA Gini and the true Gini remains constant over time and across countries, such effect is absorbed by the constant. Things may be more complex if the Gini's measurement bias varies over time, as this may reduce the precision of the parameters' estimates. Therefore, the regression results need to be interpreted with caution, making sure they are consistent with the theoretical framework articulated above. Second, the use of nationwide data for the inequality determinants may not allow to capture effects that are observable only at the microeconomic level. This is the case, for instance, of the impact of population growth and dependency rate that are statistically significant in microeconomic studies but not in the macroeconomic ones.

The conjectures presented in Section 4 about the inequality impact of the immediate and underlying causes of inequality were tested on panel data compiled by Martorano and Cornia (2015) for the 29 countries with IID-SSA Gini data for the years 1991/3–2011. A few data for 1985–1991/3 were added to increase the sample size. The panel has a theoretical dimension of about 800 cells that, nonetheless, falls substantially due to missing data for several explanatory variables. Their list, metric and data sources are included in Annex Table 2. The dependent variable is the Gini coefficient of the distribution of average household consumption expenditure per capita. The explanatory variables were grouped into the following clusters: (i) immediate causes of inequality that comprise the growth rate of GDP per capita, the 'growth pattern' (that aims to capture 'between-sector' inequality), and the distribution of production endowment in urban and rural areas, which aims at measuring 'within sector' inequality. Due to lack of data on the distribution of land and capital, we rely only on the distribution of human capital proxied by ratio between workers with secondary and tertiary education over that of workers with lower or no education. To capture the impact of human capital in agriculture, we use the share of workers with secondary education interacted with the share of rural population. We include in this group also demographic variables such as the dependency rate and the first difference of the urbanization rate. (ii) the underlying causes of inequality that include: changes in global economic conditions, economic and social policy changes; and exogenous shocks in the field of technology, health and conflicts; and lastly, (iii) democracy and governance proxied by the Vanhanen et al. (2014) indexes.

The matrix of bilateral correlation coefficients of the 24 variables used in regression shows that, of the 264 bilateral correlation coefficients, only 2 (marked in yellow in Annex Table 3) are sizeable and could cause problems of multicollinearity. The test for omitted variables bias ( $F=0.5334$ ) fails to reject the null hypothesis, thus negating the existence of such bias. Given the panel structure of our SSA database, the estimation must take into account that each country is observed over several years. The model best suited for this kind of data is the Least Square Dummy Variable (LSDV) with fixed effect (also called the 'one-way error component model'). This estimator includes in the regression a dummy for every country and generates country-specific intercepts reflecting differences in geography, institutions and unobservables. The estimator thus takes the following form:  $GINI_{it} = \alpha + \beta X_{it} + \eta_i + e_{it}$

where  $GINI_{it}$  is the Gini coefficient of the distribution of household consumption expenditure per capita, and  $X_{it}$  is a vector of 24 explanatory variables, the subscripts  $i$  and  $t$  refer to the countries and panel years,  $\eta_i$  is the time-invariant country's fixed effect,  $e_{it}$  the idiosyncratic error term, and  $\alpha$  and  $\beta$  parameters. The seven groups of regressors discussed above were introduced in a step-wise mode starting with Model 1 that includes the growth rate of GDP, the value added shares of key sectors and demographic variables. Models 2, 3 and 4 gradually add the other variables discussed above.

Model 2 has also been estimated using the LSDV with country and year fixed effects estimator (or 'two-way

error component model') so as to check whether the relationships identified with the above LSDV estimator changed in some of the sample years for 1991–2011. However, this model generates values of the parameters (not shown for reasons of space) that are practically identical to those obtained with the LSDV estimator. This suggests that there was no impact of specific unobservable factors in any given year. An F-test confirms that this set of yearly dummies is not jointly significant. In addition, Model 2 was also regressed with the WITHIN estimator that aims to remove unobserved heterogeneity across countries by regressing the first difference of Gini over time on the first difference of the regressors. Such estimator generates the same parameters and statistical significance obtained with the LSDV estimator though, as expected, the R2 fell from 0.934 to 0.522. In conclusion, the parameters in Model 2 are robust to different types of estimators. Finally, Model 5 adopts the SYS-GMM estimator (using as a reference Model 2) so as to tackle potential problems of endogeneity by using the lagged values of the relevant explanatory variables, as it is practically impossible to identify meaningful instrumental variables for each of the variable for which there might be circular causation with the Gini index. In addition, by introducing the lagged Gini among the regressors, Model 5 deals with the issue of Gini persistence over time.

Missing data cause a drop in the number of years/countries with complete data from a theoretical number of about 800 to 430 in Model 1 and 169 in Model 4. Yet, the regression results confirm most conjectures presented in Section 4 about the average regional impact of the immediate and underlying causes of the bifurcation of inequality trends among the African countries. Estimates are fairly consistent across Models 1 to 4 as there are few sign or significance changes when adding new regressors. Overall the results of the regression models presented in Table 12 suggest that:

(i) while the 'rate of growth' of GDP/c is uncorrelated with consumption inequality, the 'pattern of growth' is relevant, as a rise in the value added share of agriculture, manufacturing and 'other services' respectively reduce inequality, do not affect it significantly, and raise it (though with loss of significance in Models 3 and 4); (ii) a more equitable distribution of human capital reduces inequality in both urban and rural areas; (iii) urbanization and dependency rates are significant in micro-studies but not in our macro-panel due to their limited variability in our sample. (iv) among the underlying causes of inequality, the gains in terms of trade of the 2000s contributed significantly to the recent drop of inequality, except when they were interacted with a 'mineral rich dummy'. In this case they became dis-equalizing. In turn, migrant remittances are equalizing in all specifications, while the FDI stock/GDP (mostly in mining) raises inequality significantly. Finally, the net ODA/GDP ratio is not significant, despite the arguments presented in Section 4 about its recent pro-poor allocation; (v) as for the impact of public policy, the share of direct taxes in total revenue, social spending/GDP, CPI, the first difference of REER and external debt/GDP have the expected sign and are statistically significant, confirming that public policy can affect inequality; (vi) war intensity consistently raises inequality while, except in Model 4, HIV/AIDS incidence raises inequality modestly but significantly because of its cross-country variability (Table 11). The percentage of people with cell phones does not affect inequality, possibly because its effects may be concave rather than linear. Lastly, (vii) political competition and participation and the quality of public administration are not statistically significant, confirming the difficulties met when trying to capture the effect of complex political and governance systems with synthetic indexes.



Table 12. Regression results on the Gini of average household consumption per capita, 1985–2011

	Sign expected ex-ante	1	2	3	4	5
		LSDV	LSDV	LSDV	LSDV	SYS-GMM
1. Gini (t-1)	+	....	....	....	....	0.76***
<b>Immediate causes of inequality</b>						
<b>(i) Growth rate and pattern</b>						
2. GDP growth rate	-, ns	- 0.07**	0.01	-0.09	-0.09	-0.07**
3. % VA agriculture	-	- 0.15*	-0.30***	-0.14	-0.31**	-0.14*
4. % VA manufacturing	ns	- 0.00	-0.15	-0.10	0.04	-0.22*
5. % VA 'other services'	+	0.33***	0.18*	0.13	0.00	-0.06
<b>(ii) Distribution of prod. factors</b>						
6. Workers with 2ary-3ary edu/ or with lower education	+	0.61***	1.05***	1.25***	1.38**	0.47**
7. % workers 2ary education *	-	- 0.02***	- 0.02***	- 0.02***	- 0.02***	- 0.01
% of rural population						
<b>(iii) Demographic variables</b>						
8. $\Delta$ % urban population	+, ns	3.87***	....	-1.37	2.39	....
9. Age dependency ratio	+, ns	- 0.36***	....	0.02	0.13	....
<b>Underlying causes of inequality</b>						
<b>(iv) Changing global context</b>						
10. Terms of trade (ToT)	+,-		-0.02	-0.05***	-0.09***	0.00
11. ToT *mineral rich dummy	+		0.12***	0.13***	0.17***	0.06
12. Remittances (% of GDP)	ns, -		-0.15***	-0.20***	-0.67***	-0.07***
13. FDI (% GDP)	+		0.13***	0.04	-0.25**	0.01
14. Net ODA/GDP	-		0.09	-0.00	0.10	0.13***
<b>(v) Economic/social policies</b>						
15. Direct taxes/total taxes	-		- 0.05***	-0.10***	-0.09***	0.02
16. Social spending/GDP	-		-0.16^	-0.24*	-0.46**	-0.19*
17. $\Delta$ REER	+		0.03*	0.04**	0.05**	0.03*
18. $\Delta$ external debt/GDP	+		0.03**	0.03**	0.03**	0.01
<b>(vi) Exogenous shocks</b>						
19. War intensity	+		0.58^	0.74*	1.15**	0.16
20. $\Delta$ HIV/AIDS incidence	+		....	0.68*	-0.51	....
21. % of people with cell phones	+		....	0.01	0.03	....
<b>(vii) Democracy-governance</b>						
22. Political inequality	+				0.01	
23. Political participation	-				0.03	
24. Quality public admin	-				-6.58	
Constant		117.93***	58.24***	68.61***	62.89***	15.65
Country dummies		Yes	Yes	Yes	Yes	Yes
Observations		430	245	218	169	241
R-squared		0.797	0.934	0.943	0.946	
Sargan test						0.233

Source: Author's elaboration on Annex Table 1 data. Note: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1, ^ p<0.15; ns= non-significant

The parameters in Table 12 reflect the average regional impact of the regressors on inequality over 1985–2011. Their impact may differ according to the structural characteristics of each country. In Table 12, the problem of structural heterogeneity is handled by introducing among the regressors variables that reflect different production structures (variables 3 to 5), the share of rural population (variable 7), the increment in urbanization rate (variable 8) and a ‘mineral rich dummy’ (variable 11). Except for one, all variables reflecting country heterogeneity are significant.

As noted, Model 5 tries to address the issues of inequality persistence and circular causation. SYS-GMM is a suitable estimator to deal with these problems, though its effectiveness may be reduced by the limited size of the sample (241 observations). Before commenting on the results of this test, it is necessary to underscore that, of the 586 IID-SSA’s Gini coefficients used for the 29 sample countries and the years 1985–2011, only 169 were actually observed, while the remaining 417 were interpolated linearly. Therefore, by construction, the Gini data between every pair of observed data-points exhibits a stable linear trend (see Annex 1 in Cornia and Martorano, 2016). The high number of linearly interpolated data thus explains to a good degree the high parameter of the lagged Gini (0.76). As a result, the size of the other parameters declines while their significance falls, since the explanatory variables are more weakly associated with the ‘residual Gini’ while their standard deviations remain the same. This physiological reduction of the value and significance of the parameters is observed for 13 of 16 variables of Model 5. Their signs, however, remained the same.

As for the problems of endogeneity, reverse causation can plausibly be ruled out on theoretical grounds in the case of global economic conditions (variables 10–14), HIV/AIDS incidence and cell-phone diffusion (variables 20–21), structure of the economy and demographic changes (variables 3–5 and 8–9). But reverse causation cannot be excluded in the case of GDP/c growth (since low inequality may raise growth), and the ratio of social spending/GDP (as a more egalitarian distribution may promote the diffusion of social services). Likewise, high inequality affects the distribution of human capital (variables 6 and 7) since households and the state cannot finance the cost of education due to low income and elites’ resistance to taxation, while governments may increase social spending/GDP to control an unfair distribution of market incomes. Last, if inequality rises beyond an alarm threshold, social tensions may evolve into open wars. To deal with endogeneity, the SYS-GMM estimator instruments the endogenous variables mentioned above by using the moment conditions of the lagged difference instruments for the differenced equations as well as for the level equations. In this way, SYS-GMM generates estimates of the parameters that take into account the circularity of the relationship between the Gini index and the potentially endogenous variables. The test conducted with the SYS-GMM estimator confirm the validity of this analysis. The AR2 test negates the presence of autocorrelation of order 2. In addition, the Sargan test of overidentification restrictions concerning the validity of our instruments accepts the null hypothesis, and thus the instruments pass the test. The results of Model 5 shows that, in relation to Model 2, there are three sign changes: the GDP/c growth rate becomes inequality-reducing, while the value added share of ‘other services’ and the share of direct taxes in total revenue (equalizing in Model 2) become non-significant<sup>8</sup>.

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<sup>8</sup> We also carried out a robustness check of the parameters estimated over 1985–2011, using Model 2 as a reference and restricting the estimation period to 1995–2011, to countries with rising or falling inequality, and only to non-interpolated Gini. In view of the limited number of observations of each subsample (that in some cases is only twice as large as the number of parameters to be estimated), it was expected to obtain only moderately satisfactory results. The parameters of the value added share of agriculture, GDP growth, distribution of human capital, secondary education in rural areas, terms of trade (alone and interacted with the mineral rich dummy) and net ODA confirm to a large extent the findings of reference Model 2. For the other variables, there is a loss of significance and, in a few cases, a sign change.

## VI. Conclusions, policy recommendations and scope for further research

A key finding of this paper is that over 1991–2011, there was a divergence of inequality trends among the 29 countries analysed. Policy-wise, a good understanding of such bifurcation is essential to design policies that raise the region's low poverty alleviation elasticity of growth. The achievement of the SDGs over the next 15 years is evidently dependent, both per se and instrumentally, on reducing inequality in countries where it rose or remained high.

This paper presents one of the first attempts to explore by means of a macro-econometric panel analysis the causes of SSA inequality bifurcation over the last two decades by means of a macroeconometric panel analysis. While caution is in order due to limited data availability, errors in variables and pending theoretical issues about the direction of causality, the evidence presented offers an initial plausible narrative of what happened to SSA inequality during the 1990s and 2000s. The regression results confirm most of the conjectures discussed in Section 4 and are broadly consistent with microeconomic decompositions carried out for Ethiopia and Malawi. Key findings are:

Section 5 suggests that raising the growth rate of GDP per capita does not ensure achieving lower inequality. The SYS-GMM estimates of Model 5 in Table 12 nuance this statement a bit by suggesting the existence of a virtuous circle by which lower inequality promotes growth that, in turn, further reduces inequality. But this is not true in countries with a high initial inequality.

There is clear evidence, instead, that the growth pattern impacts inequality. Increases in land yields accelerate growth while reducing inequality or keeping it at acceptable levels (World Bank 2014). This is the main message of the Ranis-Fei (1961) model that emphasizes that early investments in agriculture are essential for industrialization and the development of complementary modern services<sup>9</sup>. Such approach requires supportive agricultural policies, the creation of infrastructure, an equitable land distribution, the diffusion of secondary education in rural areas and a competitive exchange rate. An increase in rural incomes also prevents distress migration to the dis-equalizing urban informal sector or a return to subsistence agriculture if efforts at rural modernization fail (Annex Table 1). Despite the broad acceptance of this policy paradigm, the evidence presented in this paper suggests that in several SSA countries, the value added composition evolved towards un-equalizing mining enclaves, cash crop estates and urban services that are capital- and skill-intensive or highly informal (*ibid*). Less common was an evolution towards high-yielding labour-intensive agriculture, manufacturing, construction and labour-intensive formal services. This sub-optimal transition was due in part to the limited modernization of agriculture, limited FDI in manufacturing, a rise in world commodity prices, and policy mistakes that led to de-industrialization, re-primarization, and urban informalization, all of which tend to be un-equalizing.

The growth of the mining/oil sector observed in 10 countries (Annex Table 1) has been dis-equalizing. Of course, an increase in mining wealth is welcome news, but to sustain an equitable long-term growth, this bonanza needs to be managed carefully to minimize capital flights, avoid the 'curse of natural resources', create redistributive institutions and strive to diversify the economy over the medium term. In contrast, a pattern of growth emphasizing manufacturing keeps inequality at a low level while modernizing the economy by generating economies of scale, learning by doing, overall technological upgrading and positive spillovers. Yet, as shown in Annex Table 1, over the last 20 years only three countries raised their value added share of manufacturing. Overall, several SSA countries experienced a sub-optimal structural transformation that affected inequality.

Within-sector inequality depends on the distribution of production assets. Yet, there is little empirical information in this regard. Given the still high share of rural population in most of SSA, greater efforts at documenting the evolution of land distribution cannot be postponed. The limited available evidence suggests that tenancy reforms improved the conditions of tillers but that there were only very few redistributive

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<sup>9</sup> Ecolani and Zheng Wei (2012) argue that the success of China's growth since 1978 depended on a policy sequence similar to that postulated by the Ranis-Fei model.

land reforms, while land grabs and population pressure raised land concentration. As a result, the rural-urban income gap rose, despite structural-adjustment-programme-driven liberalization and devaluation which, in the absence of adequate infrastructure, raised the urban bias of public policy. Low investment in manufacturing and modern services, a slow increase in rural schooling, and the informalization of the labour market are behind the slow rate of urbanization of much of SSA, a trend that poses a challenge for internal and international migration and income inequality in the future. In contrast, the regression results shows that an increase in secondary graduates reduces inequality as it lowers the skill premium in urban areas and facilitates the spread of modern technologies in rural areas. At the moment, the evidence points to slowly increasing enrolments in secondary education, while Figure 8 shows that its increase was still skewed in favour of the top quintiles in three quarters of the countries. The need to invest in secondary education is especially acute when noting that also SSA started recording a technological revolution that raises the demand for skilled workers, especially in urban areas.

Still high TFR, population growth, dependency rates, labour supply and their effect on inequality need to receive greater attention. Only a few countries in the region have benefitted or are about to benefit from a 'demographic dividend'. Except for Southern Africa, Mauritius, and a few other countries, the population growth rate remained unchanged at around 2.5–2.7 percent and accelerated in parts of the continent. Population growth raised inequality because of rising pressure on the land, distress urbanization, high dependency rates among the poor, falling wage rates and a smaller scope for equalization through social spending. To benefit from the 'demographic dividend', policy makers have to intensify efforts to lower TFR so as to moderate the pressures on inequality and environmental sustainability (World Bank 2015). Active population policies have been implemented in some countries (e.g. Ethiopia and Rwanda) but need to be mainstreamed. This is a central—but neglected—development issue that needs to be addressed vigorously by public policy if a further increase in inequality and environmental degradation are to be avoided.

Changes in external conditions had a mixed effect on inequality. Contrary to the predictions of mainstream theory, remittances appear to have been equalizing (due to their specific nature in the African context) as were gains in terms of trade. In contrast, FDI/GDP and the terms of trade of mineral rich countries turned out—unsurprisingly—to generate a dis-equalizing partial equilibrium effect. Net ODA/GDP was statistically non-significant, but the cancellation of public debt in HIPC-eligible countries entailed an estimated average drop of three Gini points.

An encouraging finding of our econometric analysis is that 'policy matters' and that some of the recent policy changes were focused on reaching basic MDGs targets. The trend towards rising taxation and its greater progressiveness impacted inequality favourably, if modestly. If additional fiscal space is created (i.e., if progressive taxes are increased and export windfalls are redistributed), there might be an opportunity in the years ahead to reap large inequality gains (as suggested by the parameters of variables 15 and 16 in Table 12). The main task now is to create redistributive institutions with broad coverage. Yet social expenditure is still not sufficiently well funded, and targeted and educational inequality still contributes to feeding intra-urban and rural-urban inequality.

Revenue/GDP ratio has risen, but lack of tax incidence data suggests suspending judgement about their progressivity, except where direct taxes rose. Despite a large increase in the number of small transfer programmes, the absence of fiscal space and economy-wide institutions of social protection have retarded a progressive redistribution, with the exception of Southern Africa, Ethiopia and a few other countries. Yet, in countries that experienced export windfalls, there is now sufficient 'fiscal space' for redistribution. The main task now is to get the institutions and politics right.

Appropriate macroeconomic policies can help reduce inequality. The impact of domestic policy changes was mixed. The correction of past policy biases stabilized the macroeconomy, with positive effects. Yet, REER appreciated in several countries during the last decade, and trade liberalization did not help preserve the

nucleus of manufacturing created after Independence. Whenever subsidies for rural modernization and infrastructure were cut, both between- and within-sector inequality rose. The opposite was also true. In contrast, a competitive REER was found to be equalizing as it shifted production towards the labour-intensive tradable sector while providing protection from competing imports. Therefore, its recent real appreciation needs to be halted. Lowering inflation was found to be equalizing. Data availability permitting, FPI should also be included in regression in years of sharp food price rises.

Finally, lack of data on import tariffs did not allow to test formally the impact of trade liberalization on inequality, but Figure 11 and the related literature suggest it contributed to the decline of the share of manufacturing value added. Reversing the de-industrialization experienced by SSA countries is a key policy challenge for the development of Africa. As in Latin America (Ocampo, 2012), trade liberalization has led to a 're-primarization' of exports and output and persistent vulnerability to long-term changes in terms of trade. This pattern of integration in the world economy is unlikely to promote industrialization and reduce inequality.

The exogenous shocks that affected the region during the last twenty years generated contrasting effects. The modest fall in HIV/AIDS reduced inequality marginally in some models but not in others, though this may be due to the forced adoption of an inadequate lag structure in the chosen specifications. Given the still high prevalence of HIV/AIDS (as well as malaria and tuberculosis) inequality can be reduced appreciably in the years ahead by expanding the fight against these diseases that affect impoverished households the most. In turn, the observed decline in war intensity has been equalizing, though its impact and significance varies according to the econometric specification chosen. Finally, the regression results show consistently that diffusion of cell phones is not yet statistically significant.

Democracy spread to one third of the region, while the number of autocracies declined. The distributive effect of democratization and improvements in the quality of public administration remain elusive and need to be further explored with the help of political scientists. Yet, it is unlikely that the spread of democracy so far led to a non-ethnic based redistribution, due to deeply-rooted ethnic fractionalization and high levels of corruption existing in many SSA countries. In turn, lack of data on the interpersonal distribution of income does not allow to assess whether the gender bias declined. Gains in MDG-driven female education and health have *ceteris paribus*, reduced it, but data on land ownership, employment and political participation suggest the opposite, as found for instance by a case study on Malawi (Cornia and Martorano, 2016a).

The results of our analysis can be improved in two main ways. First, additional efforts are required in the field of data collection, standardization and tabulation. As noted, our narrative is based on some 200 well-spaced and checked Gini data and 417 reasonably interpolated ones. For some 20 countries including large ones like the Democratic Republic of Congo and Zimbabwe, there are no data whatsoever. While the number and quality of surveys have increased since the 2000s, the region still suffers from a large information gap compared to Latin America and Asia. If the SDG poverty and inequality objectives are to be achieved, and if policy design has to increasingly become evidence-based, then national statistical offices and international agencies need to massively step up efforts in this area.

Data on gender, ethnic and asset inequality are scarce—and this biases both the causal analyses and policy design, leaving policy-makers in the dark or with too much discretionary power. Additional data generation efforts are also needed for those explanatory variables (FPI, tariff rates, social transfers, remittances and so on) that could not be included in regressions since only a few data-points were available. Even for those introduced in regression, existing data gaps reduced the precision of the estimates. For some of the most data-intensive topics, ad hoc sectoral studies are needed to complete the picture of inequality evolution in the region, as in the case of the service sector, rural non-agricultural activities, and the relationship between education, supply of skilled workers and skill premium. Finally, there is a need to improve the quality and pertinence of variables measuring the degree of democracy as well as the political orientation of the ruling regimes, so as to get a better grasp on the 'politics of policy making' and of its impact on inequality.



A second area in which research can be improved is the empirical strategy used for the estimation of the causal relationships discussed above. Though various econometric estimators were used and a large number of tests were carried out, all explanatory variables were specified only in linear form. Likewise, it might be useful to introduce a greater number of interaction variables. A third area for refinement concerns the chosen modelling approach. The multivariate reduced-form regression approach followed in this paper needs to be complemented with the results of a greater number of microeconomic case studies and—where feasible—SAM-based models.

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## Appendices

**Appendix Table 1:** Changes in value added shares by sector, 1990–2011, 38 countries, UNCTADSTAT data

	Agriculture		Manufacturing		Mining + Util		Construction		Services		Gini	Mean GDP growth rate 1990-11
	VA share 1990	VA share 2011	VA share 1990	VA share 2011	VA share 1990	VA share 2011	VA share 1990	VA share 2011	VA share 1990	VA share 2011		
<b>a) Agricultural economies that experienced a further rise of the agricultural VA share</b>												
B. Faso	28.7	34.9	14.3	7.8	1.8	14.3	4.9	4.1	50.2	38.8	44.0	5.3
CAR	47.5	54.8	11.3	6.5	4.7	2.8	3.7	4.4	32.7	31.4	52.0	2.7
Gambia	17.8	22.7	8.2	5.8	0.5	4.5	5.0	4.6	68.4	62.3	52.1	3.2
Guinea	19.5	24.6	3.0	6.2	21.6	20.2	8.7	6.8	47.1	42.2	40.3	3.3
Sierra Leone	48.1	56.1	3.5	2.3	3.2	4.5	2.3	1.3	42.8	35.8	47.3	2.4
Liberia	53.4	70.0	11.2	5.7	2.0	3.0	3.3	2.6	30.0	18.6	...	3.1
Ethiopia	41.1	45.2	11.1	3.8	1.7	2.6	3.6	4.1	42.5	44.2	30.1	6.0
Niger	34.0	41.4	6.4	5.1	8.4	9.5	2.5	2.7	48.5	41.1	44.8	3.0
Togo	37.9	46.6	10.5	8.3	11.3	6.7	3.4	3.4	36.9	34.9	...	2.4
Average of 9	36.4	44.0	8.8	5.7	6.1	7.6	4.2	3.8	44.3	38.8	44.4	3.5
<b>b) Mining economies (+ utilities) experiencing a further rise of the mining VA share</b>												
Angola	18.0	9.5	5.0	6.1	33.0	49.7	2.9	7.8	41.0	26.8	49.7	6.0
Chad	35.1	18.2	11.1	6.0	1.2	47.5	2.2	1.7	50.4	26.6	...	6.0
DR of Congo	30.9	22.0	11.3	16.2	13.0	22.3	4.6	4.7	40.2	34.9	...	-0.3
Rep. of Congo	12.9	3.6	8.4	3.5	29.1	72.1	3.2	3.0	46.5	17.7	...	3.0
Equat. Guinea	61.9	1.4	1.6	0.1	4.2	89.4	4.7	6.1	27.6	3.1	...	2.0
Gabon	6.9	3.8	5.6	5.8	35.5	48.9	4.1	5.8	47.9	35.8	...	24.1
Mauritania	45.7	23.6	7.7	6.4	12.2	24.9	3.1	7.1	31.1	37.9	40.0	3.8
Lesotho	18.5	8.6	9.6	12.1	2.1	14.7	7.3	6.3	62.4	58.2	59.1	3.9
Mali	47.7	39.1	8.1	6.3	2.3	10.0	3.0	5.8	38.8	38.7	41.6	4.6
Sudan	41.4	33.9	6.0	8.0	1.2	15.3	4.9	4.2	46.5	38.6	...	5.3
Average of 10	31.9	16.4	7.4	7.1	13.4	39.5	4.0	5.3	43.2	31.8	47.6	5.8
<b>c) Economies with a rising share of manufacturing</b>												
Guinea	44.6	47.0	7.4	11.5	0.8	0.4	10.0	1.2	37.1	39.9	40.5	2.0
Bissau	31.8	27.7	12.2	14.3	1.0	1.6	0.8	3.7	54.1	52.5	42.5	2.2
Madagascar	10.4	7.0	36.8	41.2	3.3	1.5	3.0	2.1	46.5	48.1	52.1	3.3
Average of 3	28.9	27.2	18.8	22.3	1.7	1.2	4.6	2.3	45.9	46.8	45.0	2.5
<b>d) Economies with a rising share of VA in the non-tradable sector: construction</b>												
Cote d'Ivoire	29.7	32.1	19.8	14.9	2.4	5.5	1.8	4.9	46.3	42.6	41.2	1.3
Ghana	34.5	25.3	10.6	6.8	1.9	9.7	1.9	8.9	46.3	49.1	38.1	5.4
Tanzania	30.9	28.5	11.2	9.0	2.0	5.9	4.8	8.6	50.9	48.0	36.0	5.2
Uganda	41.8	24.3	5.3	8.9	2.1	4.0	6.7	14.0	44.0	48.8	41.1	7.0
Average of 4	34.2	27.6	11.7	9.9	2.1	6.3	3.8	9.1	46.9	47.1	39.1	4.7
<b>e) Economies with a rising share of VA in services</b>												
Botswana	4.6	2.8	5.8	6.3	42.5	27.3	8.2	6.6	38.9	57.0	57.8	4.6
Burundi	52.4	38.2	0.8	0.9	16.8	9.6	3.4	3.5	26.5	47.7	...	1.0
Malawi	42.8	32.1	18.4	11.1	4.4	2.3	6.5	2.9	27.8	51.5	46.5	4.2
Rwanda	43.1	34.1	12.1	7.0	1.3	1.6	5.2	8.8	38.3	48.3	47.8	5.3
Senegal	19.1	14.8	17.2	14.7	3.2	5.7	2.9	4.6	57.6	60.2	41.9	3.3
Zambia	17.6	19.2	30.5	8.3	15.6	6.4	3.2	22.1	32.9	44.0	50.9	3.2
Kenya	29.9	27.1	13.9	10.7	3.8	2.0	3.1	4.6	49.2	55.5	45.7	3.1
Mauritius	11.9	3.7	26.4	17.6	1.6	1.8	6.3	6.6	53.8	70.2	37.5	4.6
South Africa	4.6	2.5	23.6	12.8	13.2	12.6	3.3	3.8	55.3	68.3	61.4	2.6
Average of 9	25.1	19.4	16.5	9.9	11.4	7.7	4.7	7.1	42.3	55.9	48.7	3.5
<b>f) Countries with stable VA shares</b>												
Cameroon	21.7	23.4	19.8	14.6	7.3	9.3	3.5	5.5	47.8	47.2	45.2	2.1
Mozambique	37.1	30.8	12.7	12.7	1.1	5.9	4.5	3.1	44.4	47.5	44.2	6.5
Nigeria	31.5	31.0	5.5	1.9	38.1	41.2	1.6	1.2	23.2	24.7	44.6	5.8
Average of 3	30.1	28.4	12.7	9.7	15.5	18.8	3.2	3.3	38.5	39.8	44.7	4.8
Total (38 countries)	31.1	27.2	12.7	10.8	8.4	13.5	4.1	5.1	43.5	43.4	44.9	4.1

**Appendix Table 2: Data description, measurement unit and sources**

Variable	Description	Unit of Measurement	Source
Gini	Gini index	Index (0–100)	IID-SSA
GDP growth	GDP growth rate	Growth rate	World Development Indicators
% VA agric.	VA Agriculture, hunting, forestry, fishing	Share Value Added	UnctadStat
% VA manufact	VA Manufacturing	Share Value Added	UnctadStat
% VA other services	VA Other activities	Share Value Added	UnctadStat
% urban pop	Population in urban areas	Percentage of total population	World Development Indicators
Skill premium	Share of pop with 2ary & 3ary edu. over the share of pop with primary or no edu.	Ratio	Barro and Lee (2011)
% rural pop	Population in rural areas	Percentage of total population	World Development Indicators
Age dep ratio	Age dependency ratio (% of working-age population)	% of working-age population	World Development Indicators
CPI	Consumer price index	Index 2005=100	World Development Indicators
Direct taxes (% of total taxes)	Direct taxes on total revenue	Ratio	ICTD Government Revenue Dataset
Social spending/GDP	Spending on education, health and welfare	Percentage of GDP	SPEED database and World Development Indicators
HIV/AIDS incidence	Prevalence of HIV, total (% of population aged 15–49 years)	% of population aged 15–49 years	World Development Indicators
War intensity	War intensity	Index	Center for Systemic Peace (CSP) Major Episodes of Violence, 1946–2013
% of people with cell ph.	Mobile cellular subscriptions	per 100 people	World Development Indicators
Terms of trade	Net barter terms of trade index	Index 2000=100	World Development Indicators
Remit./GDP	Migrant remittance inflows	Percentage of GDP	African Development Indicators
FDI (%of GDP)	Foreign direct investment, net inflows	Percentage of GDP	African Development Indicators
External debt	External debt stocks	Percentage of GNI	World Development Indicators
Net ODA received	Net ODA received	Percentage of GDP	World Development Indicators
Political inequality	Share of votes of smaller parties	Ratio	Teorell <i>et al.</i> (2015), Vanhanen and K. Lundell (2014)
Political participation	Share of population who voted in the election	Ratio	Teorell <i>et al.</i> (2015), Vanhanen and K. Lundell (2014)
Quality of government	Indicator of Quality of Government	Index	Teorell <i>et al.</i> (2015)

Source: Author's compilation

**Annex Table 3.** Matrix of bilateral correlation coefficients for the variables used in regression

	Gini	GDP gr	Agri VA	Manu VA	Other serv	D Urb pop	Edu2*rural	Skill pri	Age dep	Direct tax %	Soc. transf	D REER	CPI	War	D HIV	Cell ph.	Tot	Tot-Min	Remittance	FDI	D Ext debt	Aid	Polit. ineq	Polit. partic	Qual. admin
Gini	1.00																								
GDP gr	-0.18	1.00																							
Agri VA	-0.74	0.05	1.00																						
Manu VA	0.03	-0.29	-0.20	1.00																					
Other serv VA	0.71	-0.16	-0.71	0.01	1.00																				
D.urban pop	0.30	-0.08	-0.43	-0.11	0.11	1.00																			
Edu2*rur	0.54	-0.08	-0.57	-0.11	0.48	0.61	1.00																		
Skill premium	0.63	-0.10	-0.65	-0.07	0.53	0.66	0.94	1.00																	
Age dep.	-0.62	0.13	0.65	-0.21	-0.59	-0.47	-0.68	-0.81	1.00																
Direct tax	-0.06	0.23	0.04	0.12	-0.15	-0.15	-0.23	-0.19	0.05	1.00															
Social tr.	0.28	0.04	-0.38	-0.44	0.42	0.23	0.41	0.39	-0.25	0.12	1.00														
DREER	0.03	0.02	0.02	-0.01	0.02	-0.04	-0.02	-0.04	-0.02	0.08	0.05	1.00													
CPI	0.09	0.20	-0.01	-0.01	0.07	-0.39	-0.33	-0.27	-0.01	0.11	0.04	0.09	1.00												
War index	-0.04	-0.05	0.06	-0.02	0.07	-0.17	-0.18	-0.16	0.26	-0.07	-0.06	-0.07	0.00	1.00											
DHIV % Cell phones	0.30	0.00	-0.41	-0.10	0.19	0.54	0.32	0.33	-0.14	0.05	0.19	0.00	-0.45	-0.17	1.00										
Tot.	0.51	-0.03	-0.45	0.03	0.49	0.06	0.26	0.39	-0.58	-0.02	0.16	0.03	0.55	-0.15	-0.17	1.00									
Tot-min	-0.11	0.07	0.07	0.12	-0.21	0.06	-0.05	-0.04	0.04	0.07	-0.20	0.17	0.14	0.08	-0.20	0.10	1.00								
Remitt.	0.48	0.05	-0.34	0.19	0.36	-0.05	0.28	0.28	-0.31	-0.06	-0.17	0.07	0.14	-0.10	0.00	0.37	0.34	1.00							
FDI/GDP	-0.19	0.14	-0.03	-0.12	-0.04	-0.19	-0.3	-0.26	0.30	-0.06	-0.02	-0.08	0.21	0.20	-0.07	0.08	-0.01	-0.16	1.00						
D	0.05	0.31	-0.09	-0.21	0.00	-0.09	0.01	0.04	-0.06	0.16	0.21	-0.05	0.33	0.01	-0.28	0.23	0.13	0.23	0.01	1.00					
Extdebt	0.15	-0.15	-0.14	-0.02	0.09	0.17	0.12	0.17	-0.12	-0.06	0.03	-0.49	-0.09	0.04	0.10	0.12	-0.23	-0.13	0.10	-0.06	1.00				
Aid/GDP	-0.54	0.34	0.64	-0.29	-0.51	-0.53	-0.51	-0.57	0.61	0.38	-0.04	-0.02	0.16	0.01	-0.25	-0.30	0.00	-0.13	0.08	0.23	-0.25	1.00			
Political ineq.	0.25	-0.15	-0.07	-0.21	0.24	-0.13	0.22	0.11	0.02	0.03	0.27	0.04	0.00	0.04	0.10	-0.04	-0.14	0.12	0.04	0.09	-0.06	0.13	1.00		
Political partic	0.16	0.11	-0.11	-0.12	0.19	-0.11	0.27	0.25	-0.19	-0.10	0.00	-0.10	0.07	0.04	-0.01	0.21	-0.18	0.21	-0.12	0.07	0.07	0.13	0.19	1.00	
Qual.adm	0.18	0.05	-0.41	-0.15	0.28	0.32	0.48	0.39	-0.12	-0.16	0.32	-0.06	-0.45	-0.05	0.44	-0.06	-0.22	0.01	-0.15	0.03	0.07	-0.16	0.10	0.25	1.00

Source: Author's calculations