

Growth, Inequality, and Poverty in Sub-Saharan Africa: Recent Progress in a Global Context

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Abstract

The present study employs recent World Bank data to shed light, in a global context, on the transformation of changes in income and inequality into poverty reduction for a large number of countries in sub-Saharan Africa (SSA). The study begins by discussing SSA's progress on poverty. Next, it presents data on how various African countries have fared in terms of the incidence of poverty relative to other countries, with special emphasis on the period since the mid-1990s, when SSA generally experienced a growth resurgence. The paper then decomposes performance on poverty into changes in income and inequality for a sample of SSA countries that have the requisite data. The paper finds that recent progress on poverty has been considerable, in contrast to the earlier, 1980-early 1990s, period. Compared with the progress in a global sample of countries, however, progress has been mixed: nonetheless, although African countries lag behind the BRIC group of countries as a whole, many of them have outperformed India. Furthermore, while income growth is found to be the main engine for poverty reduction in SSA in general, the role of inequality is crucial in certain countries. Viewed in a global context, the low levels of income have inhibited the effectiveness of income and inequality improvements in reducing poverty in many African countries.

1. Introduction

It is now well-established in the economic development literature that income inequality is an important mediating factor in the transformation of income growth into poverty reduction.¹ The current paper presents evidence on the effect of growth on poverty in sub-Saharan Africa (SSA), placing the recent progress on poverty in a global context. The paper sheds light on how specific African economies have performed, relative to other developing countries, in terms of translating growth into poverty reduction. The period of analysis in focus is the mid-1990s to the present, during which there appears to have been a structural shift both in terms of the growth performance of developing countries generally relative to developed countries, and of African economies in particular. The paper assesses the relative roles of income and inequality in progress on the incidence of poverty for each SSA country in a sample derived

¹ For a recent review of the literature, with a focus on sub-Saharan Africa, see Thorbecke (2013).

from the POVCALNET data of the World Bank.² Such an assessment is expected to be useful, as it provides a clear and systematic understanding of what the relative emphases on growth and inequality should be, from a country-specific perspective, in order to reduce poverty in SSA most effectively.

In Section 2, I analyse World Bank data that reveals the heterogeneous nature of the trends in poverty incidence at both the \$1.25 and \$2.50 levels since the early 1980s, comparing SSA with South Asia, where poverty rates have historically been similar to those of SSA. The progress since the mid-1990s in 23 African countries on the basis of data, derived from the World Bank POVCALNET which includes a global sample of 80 countries, is then presented and compared with the global evidence, with special attention to the Brazil, India, China and Russia (BRIC) group of emerging economies. Section 3 provides a brief literature review of the growth-inequality-poverty nexus. The 'identity' model linking poverty to economic growth and inequality changes is presented in Section 4. The model is estimated in Section 5, followed by a decomposition analysis, by country, of the progress on poverty since the early/mid-1990s to the present. Particularly emphasised are the roles played by initial inequality and the level of income in determining the effectiveness of the transformation of income and inequality changes into poverty reduction. Section 6 concludes the paper.

2. SSA's performance on poverty – heterogeneity in trends

There is currently a pervasive view that the situation as regards poverty in SSA has not changed much since the 1980s. As Thorbecke (2013, p. i16), for example, observes on the basis of World Bank data, "there was no progress in SSA where half of the population remained below the poverty line in 2005 – the same level as in 1981," unlike in other regions of the world. While this statement is technically correct, it fails to reflect the heterogeneity in trends in the poverty rate over time. As I present below in Table 1, using the same World Bank database as employed in Thorbecke (2013), it is apparent that SSA's performance on poverty since 1981 has not been uniform. While the headcount poverty incidence rate at the \$1.25 level increased by about 6.6 percentage points between 1981 and 1996, it actually fell by 6.0 percentage points during 1996-2005, and further by 3.6 percentage points between 2005 and 2010. However, at 9.2 percentage points and 8.4 percentage points, the rates of poverty decline during 1996-

² The specific data were sourced from World Bank (2009a, 2012). For a detailed discussion of this new, improved World Bank data see Chen and Ravallion (2008).

2005 and 2005-2010 were respectively faster for South Asia (SAS), a region of the world that has also experienced historically high levels of poverty.³

**Table 1: Historical Poverty Record (Headcount Ratio, %):
SSA vs. South Asia (SAS)**

		A. \$1.25 Standard			
		<u>1981</u>	<u>1996</u>	<u>2005</u>	<u>2010</u>
SSA		51.5	58.1	52.3	48.5
SAS		61.1	48.6	39.4	31.0
		B. \$2.50 Standard			
		<u>1981</u>	<u>1996</u>	<u>2005</u>	<u>2010</u>
SSA		79.5	84.0	81.6	78.1
SAS		92.9	89.1	84.0	79.5

Source: World Bank (2014)

Similar observations hold for the poverty incidence at the \$2.50 standard. This poverty rate rose by 4.5 percentage points between 1981 and 1996 for SSA, while it fell by 3.8 percentage points for SAS during the same period. In 1996-2005, however, poverty incidence declined at 2.4 percentage points for SSA and 5.1 percentage points for SAS. And, during 2005-2010, the rate further declined by 3.5 percentage points and 4.9 percentage points for SSA and SAS, respectively. Thus, at both \$1.25 and \$2.50 standards, SSA generally succeeded in transforming the relatively recent growth resurgence since the mid-1990s into considerable poverty reduction. Nonetheless, in a global context, poverty reduction in SAS for instance has been faster, in line with more rapid economic growth in that region of the world.⁴

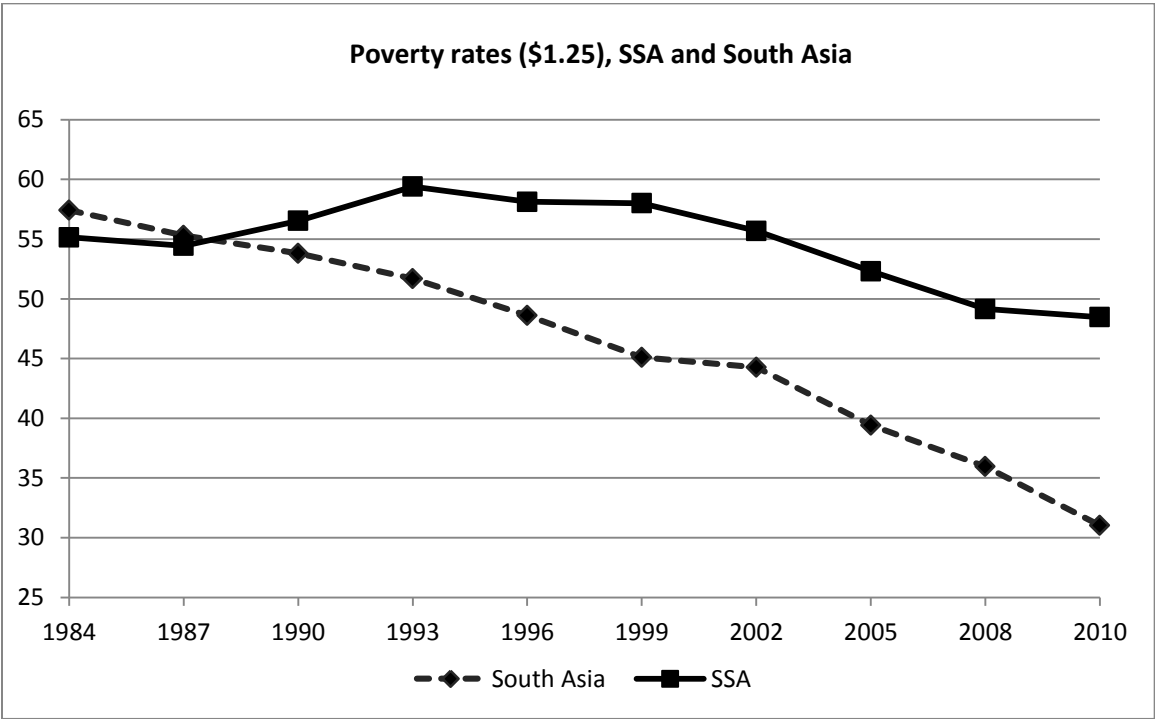
Figures 1 and 2 demonstrate SSA's progress on poverty incidence more clearly. Based on the most recent database (World Bank, 2014), SSA has indeed reversed its course since 1993, with the \$1.25 poverty rate falling by some 10 percentage points by 2010 (Figure 1). The progress seems quite

³ This finding is based on the revised POVCALNET data from World Bank (2012, 2014), while World Bank (2009a) indeed showed SAS and SSA as having reduced poverty at the \$1.25 level by 7 percentage points each.

⁴ One must, of course, heed the following warning: "Even though it [the World Bank database] is the most comprehensive and internally consistent data available on poverty and inequality, at the country level, it is particularly incomplete in its coverage of SSA and the World Bank apparently undertakes only a minimum of quality control." (Thorbecke, 2013, p. i16) Indeed, the more recent World Bank databases (World Bank, 2012, 2014) have significantly revised the relevant data in previous databases such as World Bank (2009a), now showing faster poverty declines in SAS relative to SSA.

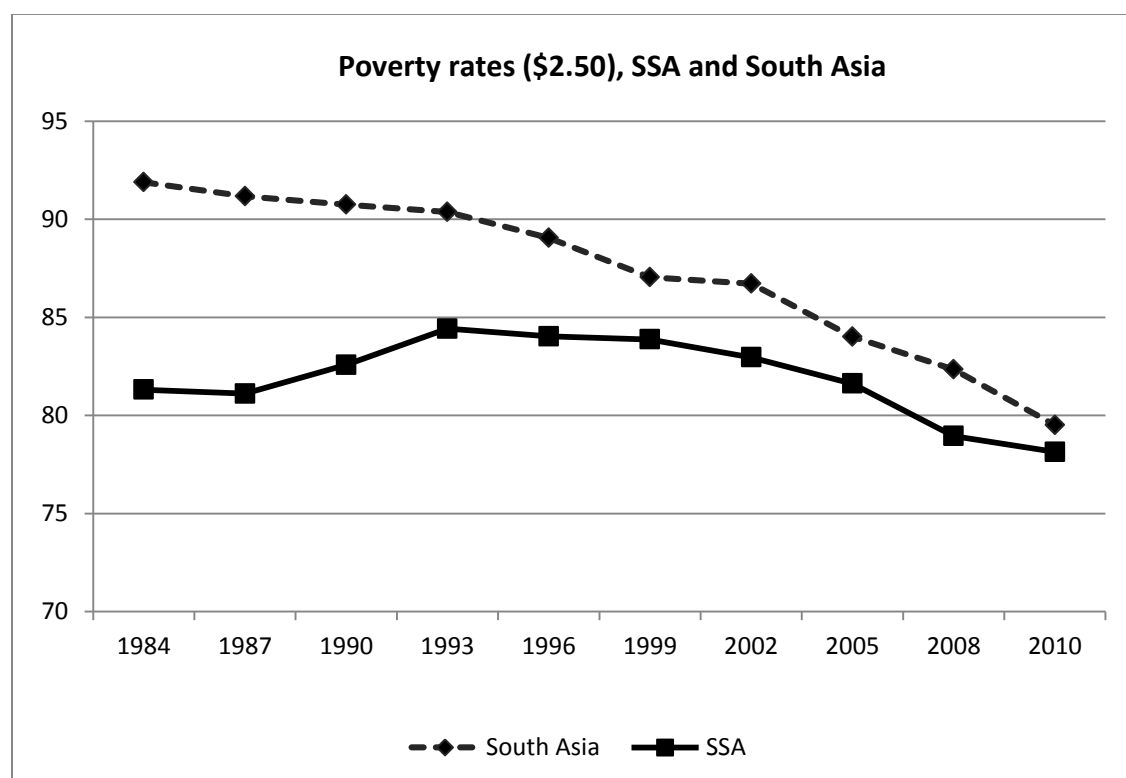
consistent, until about 2008 when there appears to be a slight reduction in the gradient of decline, perhaps due to the global crisis (Fosu, 2013). Comparatively, however, poverty reduction in SAS was about double that level, at 21 percentage points. A similar observation holds for the \$2.50 standard as well (Figure 2), with SSA’s poverty incidence falling by 6 percentage points between 1993 and 2010; over the same period, however, SAS’s poverty rate declined by 12 percentage points. Thus, with a historically higher poverty incidence than in SSA at the \$2.50 standard, and despite the significant progress in SSA since the mid-1990s, SAS has indeed been catching up, now exhibiting only a slightly higher level of poverty incidence than in SSA.

Figure 1: Progress on poverty, Sub-Saharan Africa (SSA) vs. South Asia, \$1.25



Source: Data from World Bank (2014).

Figure 2: Progress on poverty, Sub-Saharan Africa (SSA) vs. South Asia, \$2.50



Source: Data from World Bank (2014).

Country-level progress on poverty since the mid-1990s

Although SSA overall has performed rather well on poverty since the mid-1990s, there are considerable differences across countries. Among the 23 SSA countries in the global sample of 80 countries,⁵ Cameroon was the best performer on both the \$1.25 and \$2.50 standards, followed by Ethiopia, Niger, Swaziland, Ghana, Uganda, Senegal and Mali in that order, at the \$1.25 level; and similarly at the \$2.50 standard by Ghana, Swaziland, South Africa, Senegal, and Uganda (Table 2). The worst performers were led by Kenya, followed by Burundi, Cote d’Ivoire, Madagascar, Mauritania and Zambia, in alphabetical order, on the \$1.25 standard; and again by Kenya, followed alphabetically by Lesotho, Burundi, Guinea, Madagascar, Mauritania, Tanzania and Zambia at the \$2.50 level.

⁵ The global sample of 80 countries was selected based on the availability of data from the early-mid-1990s to the present (2000 or later), in order to be able to compute changes in poverty incidence over a reasonably comparable period across countries (for further details see Fosu, 2011).

Table 2: Headcount Poverty Ratio P_0 , and Growth of Per Capita GDP, Income, P_0 , and Inequality: Early/mid-1990s to Present,* Sample SSA Countries

Country	Year	P_0 , \$1.25	P_0 , \$2.50	PC GDP growth	PC Income growth	\$1.25 P_0 growth	\$2.50 P_0 growth	Gini growth
Burkina Faso	2009	44.60	82.21	3.182	2.13	-3.116	-0.625	-1.617
Burundi	2006	81.32	96.12	-2.532	0.756	-0.252	-0.091	-0.013
Cameroon	2007	9.56	42.88	1.694	3.137	-8.695	-3.749	-0.404
CAR	2008	62.83	86.20	-0.699	4.55	-1.751	-0.509	-0.535
Côte d'Ivoire	2008	23.75	58.69	-0.145	0.606	0.914	-0.413	0.95
Ethiopia	2010	30.65	79.85	2.706	1.941	-4.536	-0.864	-1.156
Ghana	2005	28.59	63.92	2.211	3.571	-4.144	-2.119	0.819
Guinea	2007	48.9	86.71	1.585	3.859	-3.327	-0.064	-1.641
Guinea-Bissau	2002	43.34	79.51	-2.205	-1.054	-1.316	-0.666	-2.127
Kenya	2005	43.37	76.63	0.34	-1.539	3.817	1.309	1.138
Lesotho	2002	43.41	70.81	2.503	-3.843	-0.765	0.894	-2.311
Madagascar	2010	81.29	95.37	0.126	-1.525	0.674	0.17	-0.262
Mali	2010	50.43	87.20	2.879	4.152	-3.342	-0.596	-2.663
Mauritania	2008	23.43	60.9	0.995	0.54	0.01	-0.149	0.628
Mozambique	2007	59.58	88.43	4.813	3.99	-2.746	-0.691	0.236
Niger	2007	43.62	85.01	-0.139	4.249	-4.487	-0.836	-1.415
Nigeria	2011	54.37	86.26	1.743	1.055	-1.541	-0.382	-1.047
Senegal	2011	29.61	67.49	1.778	2.324	-3.495	-1.479	-0.164
South Africa	2008	13.77	39.48	1.434	3.751	-3.402	-1.594	0.842
Swaziland	2009	40.63	69.04	1.046	5.615	-4.398	-1.96	-1.092
Tanzania	2007	67.87	92.75	2.546	0.664	-0.42	-0.16	0.657
Uganda	2009	38.01	76.00	3.58	4.155	-4.055	-1.424	1.358
Zambia	2010	74.45	90.56	0.98	-1.227	1.299	0.291	1.027

Notes: Data are annual or annualised averages and in percent. Per capita (PC) GDP growth rates are 1995-2005 means of annual values from World Bank (2009b). Growth rates of P_0 , Mean Income and Gini are calculated by the author as the log-differences using present and start-year (most recent in 1990-96) values, divided by the number of years between the two periods, x 100 percent, using data from World Bank, 2012 online. Note that in the World Bank's dataset, income refers to the consumption component of GDP and, thus, better reflects household income that is likely to be better linked, relative to GDP, with poverty. (Source: adapted from Fosu, 2011)

* 'Present' means the latest year for which data are available, beginning 2000, shown under 'Year'.

Table 3: Progress on Poverty by Decile: SSA Countries in a Global Context, Early/Mid-1990s to Present*

Country	(Top) Decile(\$1.25)	(Top) Decile(\$2.50)
Burkina Faso	7	7
Burundi	9	9
Cameroon	3	4
CAR	8	8
Côte d'Ivoire	9	8
Ethiopia	5	7
Ghana	5	5
Guinea	6	9
Guinea-Bissau	8	7
Kenya	10	10
Lesotho	8	10
Madagascar	9	9
Mali	6	7
Mauritania	9	9
Mozambique	7	7
Niger	5	7
Nigeria	8	8
Senegal	6	6
South Africa	6	6
Swaziland	5	5
Tanzania	8	9
Uganda	5	6
Zambia	9	9
<u>BRIC</u>		
Brazil	4	3
China-Rur.	4	4
China-Urb.	1	1
India-Rur.	7	8
India-Urb.	8	7
Russian Fed.	1	1

Notes: The classification is based on data provided in Table 2 for the SSA countries in the global sample of 80 countries with data for the early/mid-1990s to the present (for details see notes to Table 2). The 80 countries are then classified into deciles. The first decile represents the *best* (top), and the 10th the *worst*, performance on poverty reduction, etc. Thus Cameroon's placement in the third decile for the \$1.25 poverty standard means that its poverty reduction is in the third best decile (for further details see Fosu, 2011).

* 'Present' means the latest year for which data is available from the source, beginning in 2000.

I now examine the relative performance of individual African countries on poverty reduction in a global context. Table 3 presents the respective *top* deciles into which African countries fall, within the global sample of the 80 countries in the POVCALNET data. Among the 23 SSA countries in the sample, Cameroon is the first SSA country to appear in terms of having the highest level of poverty reduction, and is in the *top* third and fourth deciles of the whole sample, respectively, on the \$1.25 and \$2.50 poverty standards. The next set of SSA countries is not apparent until the fifth decile for the \$1.25 standard and comprises Ethiopia, Ghana, Niger, and Swaziland (in alphabetical order). In the case of the \$2.50 poverty line, Ghana and Swaziland are in the fifth decile, following Cameroon in the top fourth decile.

To further deepen the global comparison, I next compare African countries' progress on poverty incidence with that of the BRIC. At both the \$1.25 and \$2.50 levels, the BRIC members perform in at least the top fourth decile, with the exception of India, whose progress ranks in the top 7th or 8th decile, with rural India in the top 7th and 8th on the \$1.25 and \$2.50, respectively, and conversely for urban India (Table 3). The non-India BRIC countries therefore outperform nearly all the SSA countries in the sample except Cameroon.

In contrast with BRIC generally, India is outperformed by a large number of the SSA countries in the sample in terms of its success in reducing the incidence of poverty since the mid-1990s. On the \$1.25 poverty standard, and using the actual computed values,⁶ India-rural (India-urban) is outperformed by some 12 (12) SSA countries in the sample. At the \$2.50 level, 14 (6) SSA countries perform better than India-rural (India-urban). In effect, although the large majority of SSA countries in the sample certainly do not evince progress on poverty reduction that is anywhere near to the top globally, many fare rather well when compared with India's performance. Nonetheless, a significant number of the African countries, such as Burundi, Cote d'Ivoire, Kenya, Madagascar, Mauritania and Zambia, perform close to the bottom (in the bottom two deciles) in the global comparison on the \$1.25 standard. Similarly, for the \$2.50 poverty line, Burundi, Guinea, Kenya, Lesotho, Madagascar, Mauritania, Tanzania and Zambia are among the worst performers; these countries all fall into the bottom two deciles of the global sample. In effect, when situated in a global context, there appears to be substantial variation among SSA countries in their progress on poverty since the early/mid-1990s.

⁶ The respective annualised growth rates of the headcount poverty between 1993 and 2009 for India-Rural and India-Urban are computed as -4.015 and -2.14 for the \$1.25 standard, and -0.480 and -1.00 for the \$2.50 standard.

3. The growth-inequality-poverty nexus – a brief review of the literature

The critical role played by income distribution in poverty reduction is spelt out in great detail in the seminal studies of Datt and Ravallion (1992) and Kakwani (1993), inter alia. However, these are country-specific studies, and their results do not lend themselves to comparison with those of other countries. A number of authors have, however, extended the analysis to measure inter-country differences in the transformation of income growth into poverty reduction. Using cross-country African data, Ali and Thorbecke (2000), for example, find that poverty is more sensitive to inequality than it is to income changes.

A subset of such inter-country studies, moreover, underscores the important role of inequality in determining the *responsiveness* of poverty to economic growth (e.g., Adams, 2004; Easterly, 2000; Ravallion, 1997). These authors were especially interested in the role of inequality in the effectiveness of specific policies. Ravallion (1997), for instance, tested econometrically the "growth-elasticity argument" that states that while low inequality helps the poor share in the benefits of growth, it also exposes them to the risk of contraction. Likewise, assessing the effectiveness of the Bretton Woods Institutions' programmes, Easterly (2000) introduced an interactive variable of growth and the level of inequality in the poverty-growth equation, and observed that the impact of the programmes was enhanced by lower levels of inequality. Finally, Adams (2004) emphasised the importance of measuring growth, whether using survey income or GDP, but also presented elasticity estimates showing that the growth (absolute) elasticity of poverty is greater for the group of countries with a lower level of inequality.

To further underscore the crucial role played by inequality in the poverty-growth relationship, Fosu (2008, 2009, 2010a, 2010b, 2010c) has recently derived and estimated analysis-of-covariance and other interactive models. The first four of these studies are on African economies, while the last employs a global sample of developing countries. The results from the studies provide further support for the importance of inequality in the poverty-growth transformation. Although they find that decreasing inequality tends to be poverty-reducing generally, the studies also find that in certain cases, a perverse outcome might emerge. In very low-income countries, for instance, reducing inequality could actually *raise* poverty, mainly because more individuals, especially those at the margin, are likely to fall below the poverty line due to such policy action (Fosu, 2008, 2009, 2010a, 2010b, 2010c). For these countries,

therefore, the inequality elasticity of poverty might actually be *negative*, particularly in the case of poverty incidence. Such a finding further reinforces the notion that a country-specific approach, but one guided by a more general framework, should be pursued.

Furthermore, a small number of recent studies have used panel data to explore the growth-inequality-poverty relationship. They include Fosu (2009, 2010c, 2011) and Kalwij and Verschoor (2007). Such an approach helps control for the effects of unobservable country-specific factors that are often present in static cross-country studies. However, unlike the present paper, which is also based on panel data, none of these studies place the country-specific African evidence in a global context. Nor do any of the studies shed light on the decomposition of the progress on poverty into income and inequality changes.⁷ To achieve this objective of the paper, I first present the empirical model forming the basis of the panel-based studies.

4. Model specification

The 'Identity' model

Bourguignon (2003) derives a comprehensive growth-inequality-poverty nexus. This 'identity' model, based on an approximation to an assumed lognormal income distribution, allows us to explain the heterogeneity of the nexus across countries and time periods. The full Bourguignon model may be presented as:⁸

$$(1) \quad p = b_1 + b_2y + b_3yG^I + b_4y(Z/Y) + b_5g + b_6gG^I + b_7g(Z/Y) + b_8G^I + b_9Z/Y$$

⁷ More recently, Ravallion (2012) has found that initial poverty, rather than initial inequality, is the more pertinent variable explaining (the persistence of) poverty. What factors actually constitute initial poverty in such a structural model has yet to be identified, however. It should be noted, furthermore, that the Bourguignon model involving initial inequality is based on an 'identity' specification, suggesting that initial inequality is indeed pertinent in the poverty equation.

⁸ For details of the application of the Bourguignon model see, for example, Fosu (2009, 2011) and Kalwij and Verschoor (2007); see also Epaulard (2003) for a version of this model.

where p is the growth in the poverty rate, y is income growth, g is growth in the Gini coefficient, G' is the initial Gini coefficient (expressed as a natural logarithm), Z/Y is the ratio of the poverty line Z to income Y (expressed as a natural logarithm), and b_j ($j=1,2,\dots,9$) are the respective coefficients to be estimated.

The sign of b_2 is anticipated to be negative: an increase in income growth should reduce poverty growth, *ceteris paribus*. In contrast, b_3 is expected to be positive, for a higher level of initial inequality should decrease the rate at which growth acceleration is transformed into poverty reduction. The sign of b_4 should be positive as well, consistent with the hypothesis, based on the lognormal income distribution, that a larger income (relative to the poverty line) would have associated with it a higher income elasticity.⁹

The sign of b_5 is theoretically positive, for a worsening income distribution is expected to increase poverty, *ceteris paribus*. In contrast, b_6 is likely to be negative, given a diminishing poverty-increasing effect of rising inequality. The sign of b_7 is also likely to be negative, as in a relatively low-income economy (high Z/Y), improving income distribution (lowering g) might raise poverty by increasing the likelihood of more people falling into poverty. Finally, b_8 and b_9 are likely to be positive: rising initial inequality or an increase in the poverty line relative to income should, *ceteris paribus*, exacerbate poverty, in both cases, though these coefficients do not affect the income or inequality elasticity of poverty.

Hence, poverty reduction is expected to be greater when: (1) income growth is higher, (2) the decline in inequality is larger, (3) initial inequality is lower, or (4) income relative to the poverty line is higher. Furthermore, the effects on poverty of both income growth and a lowering of inequality are expected to be greater when: (a) initial inequality is lower and (b) income relative to the poverty line is higher. These last two effects, therefore, work via the income and inequality elasticities of poverty. That is, both elasticities would decrease with initial inequality but increase with income relative to the poverty line; hence, initial inequality plays only a part in this growth-into-poverty transformation process. I shall further illustrate these points later with specific examples.

5. Estimation and results

The above equation is estimated using country-level data derived from the recently revised World Bank global database (World Bank, 2009a). The sample comprises at most 392 usable unbalanced panel

⁹ I ignore the sign and adopt the convention of referring to the income elasticity by its magnitude.

observations involving some 123 countries, effectively over the period 1981-2007.¹⁰ Due to the potentially endogenous nature of income and inequality,¹¹ the two-step generalised method of moments (GMM) is employed for the estimation. The ‘best’ estimated equation is given by:¹²

$$(1') p = -0.20 - 9.76 y + 2.31 yG^I + 1.33 y(Z/Y) + 14.39 g - 3.65 gG^I - 2.75 g(Z/Y) + 0.05 G^I + 0.01 Z/Y$$

(-1.73) (-4.14) (3.54) (6.43) (4.22) (-3.97) (-7.06) (1.67) (1.24)

The figures in parentheses in equation (1') above are t ratios; the p value for the Hansen J statistic is 0.2, suggesting that the model is correctly specified. The income and inequality elasticities can therefore be estimated for the \$1.25 poverty line as:¹³

$$(2) E_y = -9.76 + 2.31 G^I + 1.33 Z/Y$$

$$(3) E_g = 14.39 - 3.65 G^I - 2.75 Z/Y$$

Based on equations (2) and (3), E_y and E_g are calculated for each of the 80 countries, with the values for the 23 SSA countries in the sample displayed in Table 5, provided later below.¹⁴

Using these elasticities, poverty changes are decomposed into income growth and changes in inequality over time. This decomposition is conducted for all the 80 countries, which have the required data, from the early/mid-1990s to the most recent survey year from the source (provided it is 2000 or beyond), applying the following formula:

¹⁰ There are 320 and 392 usable observations for the \$1.25 and \$2.50 poverty standards, respectively. India has data beginning in 1977, but none of the other countries have data prior to 1981.

¹¹ Note that the estimation assumes the directional effects emanate from income and inequality to poverty; there is no assessment of the potential reverse ‘causality’ from poverty to growth and/or inequality. For an excellent discussion of this reverse direction see, for instance, Thorbecke (2013)

¹² For further estimation details see Fosu (2011).

¹³ I restrict my analysis here to \$1.25, which is most likely the more relevant poverty line for SSA countries, as MDG1 for instance is based on this poverty standard.

¹⁴ Instead of breaking the flow of the paper with a discussion of the elasticities, I opt to present instead the poverty decomposition immediately following the estimation.

$$(4) p = yE_y + gE_g$$

The results for the 23 SSA countries are presented in Table 4.¹⁵ As in the global sample (Fosu, 2011), *on average* growth appears to explain the lion's share of changes in poverty for the group of countries experiencing poverty reduction; however, inequality changes seem to matter more for the group exhibiting poverty increases (see the respective 'mean' values in Table 4). Furthermore, there are considerable differences even across SSA countries. As Table 4 further shows, 18 of the 23 countries in the sample experienced poverty reduction. Of these, changes in inequality were predicted to reduce poverty in 10 countries, with income growth leading to poverty reduction in 15 of the countries. Furthermore, in 8 cases income growth and changes in inequality tended to reinforce each other in reducing poverty,¹⁶ while in 7 countries inequality changes lowered the rate at which positive income growth was transformed into poverty reduction.¹⁷

In four of the five African countries experiencing poverty increases at the \$1.25 level (Cote d'Ivoire, Kenya, Mauritania, and Zambia), inequality worsened (Table 4). Per capita income growth was also negative in three out of the five countries, with Cote d'Ivoire and Mauritania experiencing positive growth. Cote d'Ivoire's case is especially telling. Had inequality not worsened, the country's poverty rate, it is predicted, would have fallen by 1.5 percent annually, instead of the observed increase of 3.82 percent.¹⁸

In sum, income growth appears to be the main contributor to poverty reduction among SSA countries, which is consistent with the global evidence (Dollar and Kraay, 2002; Fosu, 2011). There are, however,

¹⁵ See Fosu (2011) for the results for the global sample of 80 countries.

¹⁶ These countries are: Cameroon, Ethiopia, Niger, Senegal, Burkina Faso, Mozambique, Nigeria, and Burundi.

¹⁷ These countries are: Swaziland, Ghana, Uganda, South Africa, Mali, Guinea, and Tanzania.

¹⁸ From Table 2, Cote d'Ivoire's income grew by an annualised average rate (in percent) of 0.606. Thus with E_y estimated at -2.495 (see Table 5), the predicted growth in poverty when there is no change in inequality equals: $(0.606)(-2.495) = -1.51$.

Table 4: Contributions of Changes in Inequality and Income to Poverty Reduction, Early/Mid-1990s to Present*, by SSA Country

A. Sub-Saharan African countries experiencing poverty reduction

Country	Povg	A	B	A + B	
		EY*dlnY	EG*dlnG	Pred Povg	
Burkina Faso	-3.116	-1.691	-0.42	-2.112	
Burundi	-0.252	-0.88	-0.007	-0.888	
Cameroon	-8.695	-4.53	-0.612	-5.142	
CAR**	-1.751	1.306	0.942	2.248	
Ethiopia	-4.536	-2.883	-1.642	-4.525	
Ghana	-4.144	-6.024	1.463	-4.561	
Guinea	-3.327	-1.713	1.032	-0.681	
Guinea-Bissau	-1.316	1.461	-3.216	-1.754	
Lesotho**	-0.765	4.588	-2.967	1.621	
Mali**	-3.342	-0.365	3.201	2.835	
Mozambique	-2.746	-2.629	-0.039	-2.669	
Niger	-4.487	-4.669	-0.837	-5.506	
Nigeria	-1.541	-1.239	-0.973	-2.212	
Senegal	-3.495	-2.615	-0.144	-2.759	
South Africa	-3.402	-8.793	3.043	-5.750	
Swaziland**	-4.398	-0.865	0.942	0.077	
Tanzania	-0.420	-0.962	0.762	-0.200	
Uganda	-4.055	-5.327	1.358	-3.969	
SSA	Mean	-3.099	-2.102	0.105	-1.997
Global	Mean	-8.392	-6.420	-0.871	-7.291

B. Sub-Saharan Africa countries experiencing poverty increases

Côte d'Ivoire	0.914	-1.512	3.243	1.731	
Kenya	3.817	2.782	2.655	5.437	
Madagascar	0.674	1.308	-0.075	1.233	
Mauritania	0.010	-1.049	1.548	0.498	
Zambia	1.299	0.935	0.304	1.239	
SSA	Mean	1.343	0.493	1.535	2.028
Global	Mean	5.333	3.770	2.808	6.579

Notes:

A: Predicted poverty growth by income, B: predicted poverty growth by inequality; A+B: predicted poverty growth by both income and inequality. 'Global' refers to the whole global sample of 80 countries.

* 'Present' means the latest year for which data is available from the source, beginning in 2000.

**Countries with perverse signs for predicted poverty (different from the observed): CAR (perverse signs for both income and inequality elasticities, with mean income < poverty line); Mali (perverse sign for inequality elasticity, with mean income < poverty line); Swaziland (perverse sign for inequality elasticity, with mean income < poverty line); Lesotho (correct signs for elasticities, borderline). However, note from Table 5 that Guinea and Mozambique also exhibit negative values of the inequality elasticity but the income effect dominates in either case.

considerable cross-country differences with respect to the relative contributions of income and inequality changes, a result that supports earlier findings (e.g., Ravallion, 2001). For example, the present article has found that income growth has been the primary contributor to poverty reduction in most of the sample African countries, suggesting that a focus on growth is critical. In a small number of countries (Guinea-Bissau and Lesotho), however, declining inequality was dominant in explaining the observed decreases in poverty. Among the countries where poverty declined, changes in inequality tended to complement the poverty-reducing role of income in about the same number of cases as in those countries where inequality changes had the opposite effect, tending to lessen the impact of income growth. Finally, of the few countries in the sample where poverty increased, declining income and worsening inequality were generally both culpable, though the latter was dominant on average. Thus while growth is important, increasing attention should be paid to inequality. Moreover, there need not be a trade-off between growth-enhancing and inequality-reducing policies. For example, improving physical infrastructure that increases market access for poor farmers should serve to increase growth as well as reduce inequality.

Income growth and inequality changes are not the whole story

As indicated above, changes in income and inequality are crucial elements explaining a country's performance on poverty. According to equations (2), (3) and (4), however, both initial inequality and the level of income (relative to the poverty line) play important roles in determining how these changes are translated into poverty reduction. Table 5 now reports the income and inequality elasticities for the 23 SSA countries in the sample. There is considerable variance among these values, ranging from near zero in Mali to -2.5 and -2.3 in Cote d'Ivoire and South Africa, respectively, in the case of the income elasticity.¹⁹ Similarly, the inequality elasticity ranged from -1.8 in the Central Africa Republic (CAR) to 3.4 and 3.6 in Cote d'Ivoire and South Africa, respectively.²⁰

¹⁹ This range excludes the perverse and inadmissible result that the income elasticity is positive for CAR (Table 5), a country where the mean income is considerably less than the poverty line.

²⁰ The negative inequality elasticity values are admissible: as mentioned (and also see in particular Fosu [2008, 2009, 2010a, b, c]), in very low-income countries, redistribution to reduce inequality might actually increase the poverty rate, since there is the increased risk of rendering poor those non-poor at the margin.

Table 5: Income and Inequality Elasticities by Sample SSA Country (P₀ poverty measure, \$1.25)

Country	Acronym	Income Elasticity	Inequality Elasticity
Burkina Faso	BFA	-0.794	0.260
Burundi	BDI	-1.164	0.556
Cameroon	CMR	-1.444	1.513
CAR	CAF	0.287*	-1.762*
Côte d'Ivoire	CIV	-2.495	3.415
Ethiopia	ETH	-1.485	1.421
Ghana	GHA	-1.687	1.787
Guinea	GN	-0.444	-0.629*
Guinea-Bissau	GNB	-1.387	1.512
Kenya	KEN	-1.807	2.333
Lesotho	LSO	-1.194	1.284
Madagascar	MDG	-0.858	0.285
Mali	MLI	-0.088	-1.202*
Mauritania	MRT	-1.943	2.466
Mozambique	MOZ	-0.659	-0.166*
Niger	NER	-1.099	0.591
Nigeria	NGA	-1.174	0.929
Senegal	SEN	-1.125	0.878
South Africa	ZAF	-2.344	3.612
Swaziland	SWZ	-0.154	-0.863*
Tanzania	TZA	-1.448	1.160
Uganda	UGA	-1.282	1.000
Zambia	ZMB	-0.762	0.296

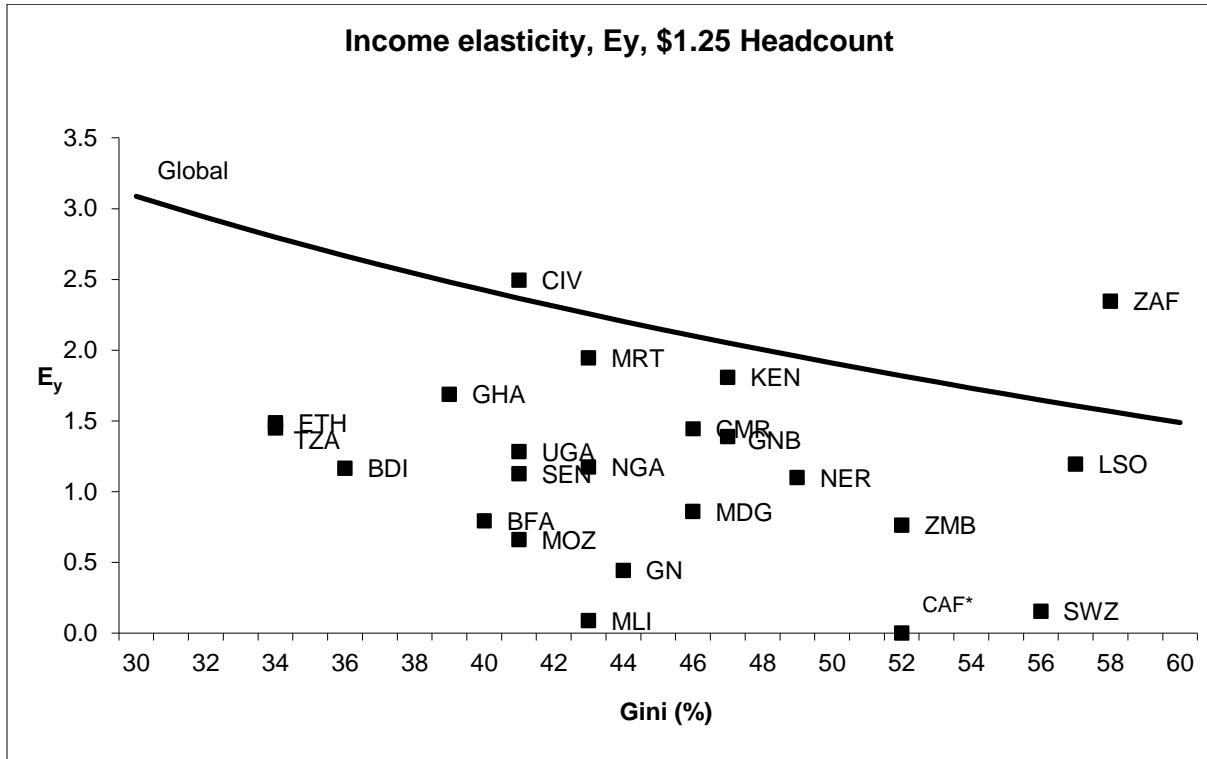
Notes: Values marked * are perverse and generally result from cases where the poverty line exceeds the mean income. The positive values of the income elasticity are not admissible and are truncated to zero, while negative values of the inequality elasticity are admissible, as discussed in the text (see also Fosu, 2011).

The important roles of initial inequality and the level of income in the effectiveness of changes in income and inequality for poverty reduction are further demonstrated in Figures 3 and 4. These graphs plot the income and inequality elasticities as functions of initial inequality, holding constant the level of income relative to the poverty line [see equations (2) and (3) above]. The magnitudes of both elasticities decrease with initial inequality but increase with the mean income relative to the poverty line.²¹ For example, high levels of initial inequality in countries such as Swaziland and Zambia have been translated into low values of income and inequality elasticities, while the relatively high elasticity values in Ethiopia and Tanzania may be attributable to their lower levels of initial inequality.

²¹ That the elasticities increase with the mean income relative to the poverty line may be made more apparent if one notes that either elasticity becomes larger with an increase in Y/Z , that is, a decrease in Z/Y (see equations (2) and (3)).

Figure 3: (Absolute-valued) Income Elasticity of Poverty vs. Initial Inequality

SSA Countries vs. Global Elasticity Curve (source: derived from data produced in Fosu, 2011)



Notes: See table 5 and text for details. The plot marked with the asterik (namely, CAF) is perverse, that is, it is an inadmissible positive value for the income elasticity, and is truncated to 0.

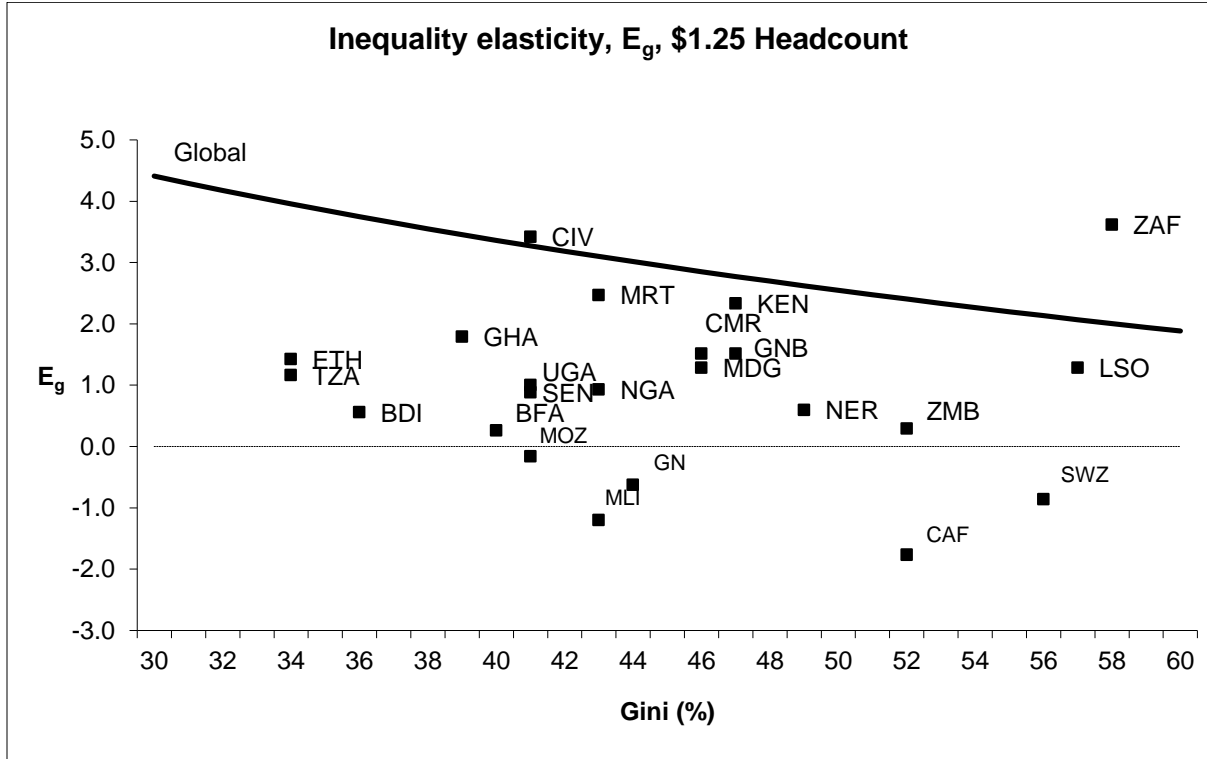
Since the 'global' line in Figures 3 and 4 assumes a constant global mean income (relative to the poverty line, which is fixed),²² points above the line have above-average incomes, while those below the line exhibit below-average incomes. It is noteworthy that among the 23 SSA countries, only Cote d'Ivoire and South Africa have incomes above the global mean. Furthermore, countries such as Uganda, Senegal and Mozambique all have practically the same level of inequality as in Cote d'Ivoire, but display much lower levels of income elasticity of poverty, given their considerably smaller income levels than Cote d'Ivoire's. Similar observations hold for the inequality elasticity. Hence, relative income also matters for the transformation of income growth and changes in inequality into poverty reduction. Specifically, lower

²² Note that one could conceivably show a distribution of the elasticities around an 'SSA' line, which would actually be flatter and fall below the global line; however, the SSA countries with usable data in the POVCALNET database could hardly be viewed as representative. Indeed the paucity of data is such that there are likely to be substantial compositional differences over time, thus rendering such an 'SSA' line quite unreliable.

Figure 4: Inequality Elasticity of Poverty vs. Initial Inequality

SSA Countries vs. Global Elasticity Curve

(Source: Derived from data generated in Fosu, 2011)



Note: See table 5 and text for details.

income levels can depress the rate at which income increases or inequality reductions are translated into eradicating poverty.

Globally, there are substantial differences among regions as well as across countries in the overall and initial-inequality-driven partial income and inequality elasticities (see Fosu, 2011). Although inequality has been quite high in SSA generally as compared to the rest of the world,²³ the main factor explaining the disparities in income and inequality elasticities between African and other countries are the relative income differences. For example, Burkina Faso and Chile had similar levels of initial inequality (0.51 and 0.55, respectively), their incomes grew by about the same amount during the early/mid-1990s to the

²³ The sample mean of the Gini coefficient is larger for SSA than for any of the other five regions except for LAC (Fosu, 2011).

present (1.5 percent annually), while inequality actually fell faster in Burkina Faso than in Chile (2.75 percent versus 0.57 percent annually). Yet poverty at the \$1.25 level declined much faster in Chile than in Burkina Faso (8.2 percent versus 2.6 percent annually). It turns out that the main difference in the poverty outcomes is explained by the higher income in Chile. Had Burkina Faso been endowed with the larger income of Chile (\$387 versus \$40 monthly), its poverty rate would be projected to have fallen by 23.6 percent annually, instead of the predicted yearly decline of only 1.9 percent (Fosu, 2011).

6. Conclusion

The present paper has shed light on the transformation of changes in income and inequality into poverty reduction in SSA countries, using the recently revised World Bank data from POVCALNET. The study first presents data on the evolution of poverty in SSA generally and among a large number of its constituent countries, especially since the mid-1990s, when there appears to have been a resurgence of growth in SSA as a whole. Then it provides evidence on the relative roles of income and inequality in explaining African countries' progress on poverty.

The paper finds that on average progress on poverty reduction since the mid-1990s has been quite considerable in SSA, in contrast to the dismal record in the period of the early eighties. On average, income growth has constituted the main engine for poverty reduction in SSA. In several African countries, however, inequality has been crucial. This role has had two parts: (1) declining inequality tended to decrease poverty (though not necessarily in very low-income countries), and (2) lower initial inequality raised the rate at which growth was transformed into poverty reduction. The former role may be impeded, however, by low incomes as well as by high levels of initial inequality. High levels of inequality have indeed constrained poverty reduction in many African countries. Thus it appears that according greater attention to reducing inequality constitutes a desirable objective, especially in certain African countries. Moreover, income-enhancing and inequality-reducing policies can be complementary. That being the case, then African countries would do well to promote such policies.²⁴

Viewed within a global context, however, the relatively low levels of income appear to be a major factor in inhibiting the effectiveness of income and inequality improvements in producing poverty reduction in SSA countries generally. Thus low-income African countries might, in particular, require income-

²⁴ As observed above, these would include infrastructural policies that improve market access for the poor. See, for instance, Thorbecke (2013) for more detailed examples of such policies, including those of social protection.

generating assistance, as they endeavour to grow their economies. More rapid growth should serve to decrease poverty by increasing income, at least in the short run. In the longer run, furthermore, such growth would increase the effectiveness with which any future improvements in income and its distribution are translated into poverty reduction.

A primary contribution of the current paper is that it provides a framework within a global context for exploring the idiosyncratic characteristics of African countries, which may yield country-specific policies for effective poverty reduction. In order to reduce poverty most effectively the emphasis on growth, relative to income distribution, would appear to differ across countries. But, what are the specific factors driving poverty-reducing growth in specific countries such as Burkina Faso, Cameroon, Ethiopia, Ghana, Mozambique, Niger, Senegal, South Africa, and Uganda? And, why did inequality decrease considerably in Burkina Faso, Ethiopia, Guinea, Guinea-Bissau, Lesotho, Mali and Niger, while rising appreciably in Kenya, Uganda and Zambia? Answering these questions properly requires detailed country studies which is beyond the scope of the present study. Nonetheless, the study presents a guidepost for identifying such important country-specific issues that require further research.

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