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ABSTRACT

Learning from the "Best": The Impact of Tax-Benefit Systems in Africa[1]

Redistributive systems in Africa are still in their infancy but are constantly expanding in order to finance increasing public spending. This paper aims at characterizing the redistributive potential of six African countries: Ghana, Zambia, Mozambique, Tanzania, Ethiopia and South Africa. These countries show contrasted situations in terms of income distribution. We assess the role of tax-benefit systems to explain these differences. Using newly developed tax-benefit microsimulations for all six countries, we produce counterfactual simulations whereby the system of the most (least) redistributive country is applied to the population of all other countries. In this way, we can decompose the total country difference in income distribution between the contribution of tax-benefit policies versus the contribution of other factors (market income distributions, demographics, etc.). This analysis contributes to the recent literature on the redistributive role of socio-fiscal policies in developing countries and highlights the role of microsimulation techniques to characterize how different African countries can learn from each other to improve social protection and reduce inequality.

JEL Classification: H23, H53, I32
Keywords: tax-benefit policy, microsimulation, inequality, poverty, Africa

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1. Introduction

Many developing countries are currently building up their redistributive and social protection systems. Given the high rates of poverty and inequality in some African regions, it is crucial to gauge the extent to which tax-benefit policies are able to reduce income disparity and alleviate poverty – at least when focusing on policies that are realistically implementable, as those in force in neighbouring countries. The development of direct forms of taxes and transfers is a challenge in countries where a majority of households work in the informal sector and whose consumption is disconnected from standard income streams. Nonetheless, it does not seem too early to give it a try. It has been shown that the recent reduction in household income inequality and poverty experienced in Latin America, for instance, was not all due to wage compression but also on account of tax-benefit redistribution in the form of more progressive income taxation and higher cash transfers to vulnerable populations.[2]

Arguably, social protection systems are already in place in some regions of Latin America while redistributive systems in Africa are still in their infancy and cannot achieve their full potential due to a very large informal sector. Nevertheless, taxation is constantly expanding, in order to finance increasing public spending, and social programs are being scaled up in many African countries. Financing public expenditure and redistribution is especially important in an African context characterized by widespread poverty and social tensions. A comprehensive analysis of how existing systems – and notably the "best" systems of the region – could affect income distribution is crucially needed and requires the development of appropriate tools. This paper suggests such an analysis for six African countries, namely Ghana, Zambia, Mozambique, Tanzania, Ethiopia and South Africa.

We rely on microsimulation models, i.e. computer programs performing the computation of taxes and social contribution paid, and benefits received, by a household depending on its income and demographic characteristics. Plugged to large representative household surveys, these programs can reproduce the existing redistribution operated by actual policies or perform counterfactual simulations (for instance after a major tax reform). To date, they offer the most precise and comprehensive way to assess the effect of existing or alternative redistributive systems on public finance (tax revenue, social spending, etc.) and disposable income distribution (inequality, poverty). This technology has been used in many rich countries to analyse the distributional potential of national socio-fiscal systems but also to compare the degree of redistribution achieved by neighbouring countries (Atkinson and Bourguignon, 1990). In the case of Europe, the model EUROMOD suggests integrated simulations of different European countries to facilitate and perform this type of international comparison.

The present paper proposes a similar approach for Africa. It takes advantage of the very recent development of microsimulation capacity for six African countries, following the SOUTHMOD

[2] According to Cord et al. (2014), around one-third of changes in income inequality in Latin America in the 2000s can be attributed to the development of redistributive systems.

initiative launched by the United Nations University World Institute for Development Economics Research (UNU-WIDER), the EUROMOD team at the Institute for Social and Economic Research (ISER), and the Southern African Social Policy Research Insights (SASPRI). This project gave birth to integrated tax-benefit microsimulation models for Ghana, Zambia, Mozambique, Tanzania, Ethiopia and South Africa. Relying on national surveys and the information they provide on household market income, demographic and employment status, these models calculate taxes and contributions paid by formal sector workers as well as the benefits received by eligible households. Since these models allow simulating country both existing tax-benefit systems and alternative scenarios, we suggest original simulations whereby the *whole* system of country A is applied to the population of country B. As we will show, this type of counterfactual simulation offers the cleanest way to assess the redistributive impact of each national tax systems in comparison with the others.

Precisely, levels of income poverty and inequality in a country are resulting from a combination of population factors (including market income distribution and demographic composition) and redistributive policies (the impact of direct taxes, social contributions, transfers, etc.). Simulating the systems of countries A and B on the population of country B allows neutralizing the population factors so that the pure policy effects of both countries can be extracted and compared. We suggest a simple analytical framework based on such counterfactual simulations. Rather than undertaking cumbersome swaps for 36 combinations (6 systems x 6 populations), we simply apply the most redistributive system (the one of South Africa) to the five other countries. Indeed, despite South Africa being one of the most unequal countries in the world, its redistributive system is slightly more developed than in the other African countries under study. Alternatively, we will also apply one of the least redistributive systems (the one of Mozambique) to the other populations.

Our results confirm the small redistributive power of current tax-benefit systems in Ghana, Zambia, Mozambique, Tanzania and Ethiopia, and the larger redistributive effect of the South African system. Part of the inequality gap between South Africa and the other countries – and, to a less extent, part of the poverty gap – could be eliminated by exporting the South African system to these countries. Under this counterfactual scenario, a reduction in their Gini coefficient would range from 3.3 points in Ghana to 19.3 points in Ethiopia. Income poverty would be decreased by 2.2 points in Mozambique and by up to 17.8 points in Tanzania. These effects are due the relatively more generous social benefits in force in South Africa and, in the case of inequality only, to a small contribution of the South African tax progressivity. Alternative simulations that consist in exporting one of the least redistributive system (Mozambique) show consistent results: it would increase the Gini and the poverty rate in South Africa by a margin equivalent to the redistributive property of this country (it main establishes the weakness of Mozambican social benefits compared to those in South Africa); Mozambican policies have little effects elsewhere – as the difference with other countries is essentially on account of other factors (market income distribution and demographics) – or deteriorate inequality indices, notably in Tanzania, mainly because of the regressive nature of the Mozambican tax system.

Further research should attempt to model behavioural responses to assess the possible impact of these major reforms on employment (employment levels and selection into formal or informal work), which in turn would affect the effectiveness of the system through the degree of tax compliance.

The remainder of this paper is structured as follows. Section 2 presents statistics on tax-benefit systems in Africa and the countries under studies. It also summarises previous research on the redistributive effect of tax-benefit systems in Africa. Section 3 describes the data, the microsimulation models and presents the decomposition approach used in the analysis. Section 4 shows and discusses the results while section 5 concludes.

2. Policy background and existing literature on tax-benefit redistribution in Africa

This section provides a general overview of the characteristics of tax-benefit systems in Africa – notably their size, composition (by type of instruments) and redistributive effect – compared to rich countries and Latin American economies.

2.1 African countries in a comparative perspective

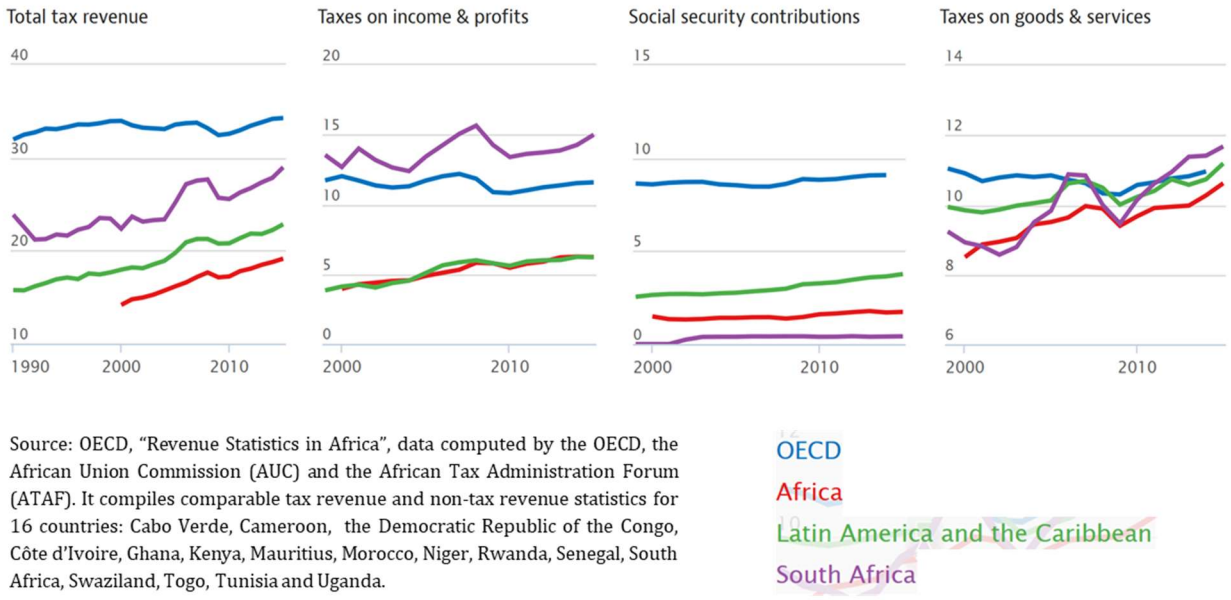
Taxation and social contributions. We start with a general overview of tax-benefit redistribution in Africa. **Figure 1** suggests descriptive statistics for broad regions including the OECD, Latin America and 16 African countries, as collected for the `Revenue Statistics in Africa' by the OECD. Looking at the last year available, we see that in Africa, taxes represent about 20% of GDP, which is below the rate in Latin America (23%) or in OECD countries (34.3%). There are some exception and notably South Africa, with tax revenue progressing from 20% to 30% since the early 1990s. On average in Africa, tax revenues are mainly due to taxes on goods and services (11 points) followed by taxes on incomes and profits (6 points).

Social security systems are in their infancy or inexistent, hence the very low rate of tax collection through contributions (2 points). The overall trend is relatively encouraging regarding tax revenue in general. The increase from 15 to 20% GDP between 2000 and 2015 reflects continuing efforts to mobilise domestic resources in African countries as well as the result of tax reforms and modernisation of fiscal systems and administrations. The main driver has been a rise in taxes on income and profits in Africa (from 4 to 6%) and – catching up on Latin America – a substantial increase in taxes on goods and services (from 8 to 11%). The trend is relatively comparable in South Africa. Overall, Africa is not as far from Latin America as could be imagined and, in any case, it is much closer to this other continent than the latter to OECD countries.

We now focus on the heterogeneity within Africa. Among the poorest countries, many are still significantly dependent on non-tax revenues, and more specifically on grants such as foreign aid and resource rents. The latter resources tend to be more volatile than tax revenues and make

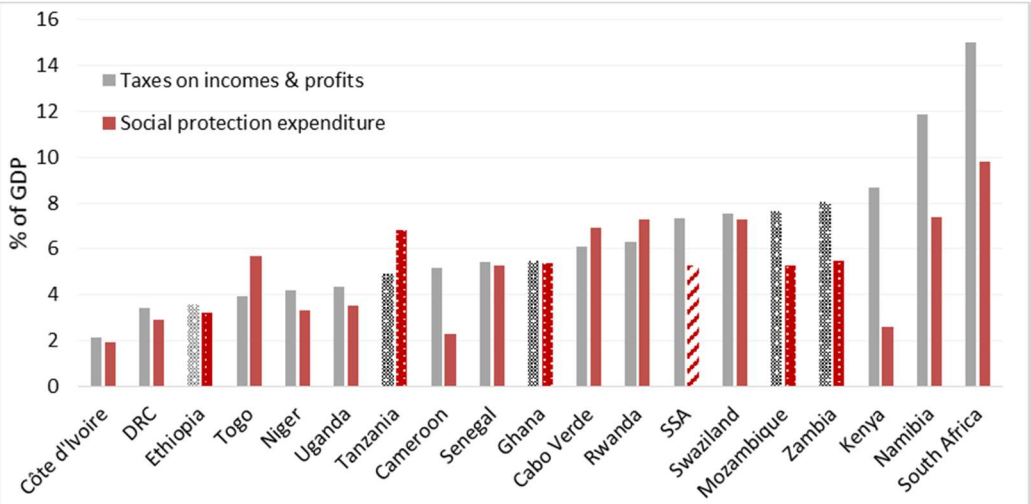
the finances and redistributive programs of these countries less stable. **Figure 2** shows that tax collection via income and corporate taxes, which have the highest potential to redistribute income, varies very substantially across African countries: levels are similar to those in the OECD for South Africa, as seen above, but only a third of it in Ghana and very small in the poorest countries including Ethiopia. An interesting aspect of the sample of countries used in the present study is that they cover the broad range of between the poorest countries and South Africa.

Figure 1: Tax revenues in Africa, Latin American and the OECD, 2015 (in % of GDP)



Source: OECD, "Revenue Statistics in Africa", data computed by the OECD, the African Union Commission (AUC) and the African Tax Administration Forum (ATAF). It compiles comparable tax revenue and non-tax revenue statistics for 16 countries: Cabo Verde, Cameroon, the Democratic Republic of the Congo, Côte d'Ivoire, Ghana, Kenya, Mauritius, Morocco, Niger, Rwanda, Senegal, South Africa, Swaziland, Togo, Tunisia and Uganda.

Figure 2: Tax revenues and social protection expenditure in Africa (in % of GDP)



Taxes on incomes & profits, year 2015, social protection expenditure, years 2011-2013. Source: World Bank, 2015, 2017; ILO 2013, 2018; OECD, 2016.

Transfers. Figure 2 also indicates the level of social spending in proportion of GDP. It remains low in all countries: around 5% on average and 10% in the best cases (including South Africa), compared to Latin America (15% on average) and especially compared to OECD countries (25% on average). For poor countries, it is only in the last decade that there has been a shift from emergency aid to more permanent social protection programs, leading to pilots of cash and in-kind transfer programs, particularly in Ghana, Kenya, Malawi, Nigeria, Uganda and Zambia (Barrientos, 2010). As much as for tax collection, the extent of social coverage varies enormously across countries. Again, our sample includes contrasted cases, with marginal spending in Ethiopia, intermediary situations (Tanzania, Ghana, Mozambique and Zambia) and higher levels of social expenditure (South Africa).

Inequality and poverty. With low levels of redistribution, Sub-Saharan African countries are saddled by high levels of poverty and inequality. Poverty is pervasive throughout the continent. Using per capita consumption and the standard poverty line of $1.90 per day, poverty headcount reached 42.3% in sub-Saharan Africa compared to 31% in Latin America (World Bank, 2013). Income inequality as measured by the Gini coefficient was 41.1 in 2000–2009 compared to 36.7 for Asia (Odusola, 2017) but below the levels observed in Latin America (52.1 in the 2000s according to World Bank, 2013, decreasing to 48 in the 2010s, according to Lustig, 2017).

Table 1: Socio-Economic Indicators for the African Countries under Study

	Population (millions)	Income level	GDP/capita (US$)	HDI rank	Total tax revenue to GDP (%)	Taxes on income & profits to GDP (%)	Social expenditure to GDP (%)
South Africa	55	upper middle	12,106	119	27.3	7.4	9.8
Mozambique	28	low	1,070	181	21.9	7.7	5.3
Zambia	16.2	lower middle	3,800	139	16.8	8.1	5.5
Ghana	27.4	lower middle	3,864	139	15.0	5.2	5.4
Ethiopia	99.4	low	1,336	174	11.8	7.5	3.2
Tanzania	53.5	low	1,718	151	13.6	8.7	6.8

Figures are for year 2015, excepted social expenditure for 2011-2013. Source: World Bank, 2015, 2017; ILO 2013, 2018; OECD, 2016.

2.2. Countries under study

We now provide a closer look at the six countries under study. Table 1 summarises selected development indicators. As noted above, we observe a large heterogeneity of situations. South Africa is the richest country while Zambia and Ghana are classified as lower middle countries and Mozambique, Ethiopia and Tanzania as low income countries. GDP/capita levels harmonise with other social indicators (e.g. human capital and life-expectancy) as per the United Nations' Human Development Index (HDI). In 2015, the HDI of these countries fell within medium and low development categories (World Bank, 2017). Mozambique, Ethiopia and Tanzania fared worse as they correspondingly ranked 181, 174 and 151 out of 188 countries in the world.

South Africa (119), Ghana and Zambia (139) ranked as having medium human development (World Bank, 2017).

For the six countries studied herein, the major socio-fiscal instruments include indirect taxes, progressive direct taxes and pro-poor social spending, as summarized in **Tables A.1-A.3** in the Appendix. We observe large heterogeneity across countries, especially with regards to social spending. South Africa has a relatively sophisticated system, progressively developed as part of its national rebuilding programme since the end of political apartheid. This country spends for instance on non-contributory means tested old-age grants while the other countries do not. It reaches almost 10% of GDP on social spending including 3.3 percentage points dedicated to social assistance transfers. Yet this is low on international standard, as discussed above. In this context, South Africa's middle income status hides a large extent of poverty and one of the highest inequality rate in the world, suggesting that the resources devoted to social expenditure have not yielded much dividends towards solving its social challenges. It is nonetheless comparably bigger than related expenditures for the other select countries, which leads our choice of this country as the relatively better system used for counterfactual simulations.

Several studies also suggest that poverty and inequality in South Africa could have been higher still without its current socio-fiscal policy, which is relatively more redistributive than in most African countries (Inchauste et al., 2015; Higgins and Lustig, 2016; Lustig 2017; World Bank, 2017). These studies are based on an incidence-based method, which consists in imputing taxes and benefits to households using surveys containing both household characteristics and information on tax liability and benefit receipt. Our approach is different and based on microsimulation techniques, which facilitate the simulation of counterfactual scenarios. Among these studies, Inchauste et al. (2015) showed that South Africa fared better in reducing income inequality compared to most African countries but also compared to several Latin American countries (Brazil, Mexico, Bolivia, Costa Rica, Guatemala, Peru, Uruguay, El, Salvador), Indonesia and Armenia.[3]

Further evidence using fiscal incidence analyses shows that for Zambia, Tanzania and Ghana, the poor are impoverished by the fiscal system; headcount poverty increased after taxes and state transfers compared to the before scenario (Higgins and Lustig, 2016; Lustig, 2017; de la Fuente et al., 2017). As shown later, we find supporting evidence using microsimulation techniques: in all countries but South Africa, and in particular Ghana, Zambia and Mozambique, poverty increases after taxes and transfers while inequality is only marginally reduced.

As argued in the introduction, a proper characterisation of the relatively more/less redistributive capacities of the different systems requires analytical frameworks such as

[3] Its 2010 Gini coefficient for market income decreased by 18 points when considering final income encompassing taxes and government spending. This reduction is higher compared to other middle income and African countries (the Gini decreased by 14 points in Brazil, 8 points in Mexico and 2.3 points in Ethiopia). Direct taxes and cash transfers also reduced the level of poverty in South Africa from 52.3% to 45.1%. We suggest our assessment using microsimulation techniques and more recent data in what follows.

microsimulation models with room for comparability across countries and the possibility to perform counterfactual simulations. Currently, such literature lacks in an African context and the present study make a first attempt at such a comparison.

3. Methodology

We start this section by presenting the context in which microsimulation models and decompositions are used to characterize socio-fiscal redistribution in rich and poor countries. We then provide a detailed description of the decomposition approach used to evaluate the redistributive effect of African tax-benefit systems. Finally, we briefly describe the tax-benefit microsimulation models and the associated datasets used in our simulation. We present the policies covered by the models, modelling assumptions and how simulations compare to external statistics.

3.1 Microsimulation and decomposition in context

Tax-benefit microsimulation in a comparative framework. The present paper takes advantage of the recent development of harmonized microsimulation models for African countries in the framework of the SOUTHMOD project. On this basis, we provide one of the first comparative microsimulation studies for African countries. The six microsimulation models are based on large representative household microdata, one for each country. These models were developed as separate national models embedded in the structure of EUROMOD (a pioneering international microsimulation program designed for Europe – see below). Part of the work undertaken by Gasior et al. (2018) and in the present paper has consisted in improving the harmonization and comparability of the models to build a multi-country microsimulation platform for the purpose of comparative analysis. The different models follows the same modelling conventions and offer similar data treatment for source income and household characteristics, hence guaranteeing a harmonized framework for international comparisons (see Sutherland and Figari, 2013). In this way, we can easily perform policy swaps and assess the distributional potential of African tax-benefit systems in a comparative way.

The original idea of international platforms designed to simulate tax-benefit systems in a specific region (such as the EU or the African continent) was suggested by the pioneering work of Atkinson et al. (1988), who used national tax-benefit models to compare policy effects in France and the UK. This study inspired the development of the European microsimulation model EUROMOD, i.e. the first example of a common interface piloting harmonized microsimulation models allowing proper international comparisons. Very recently, this idea was transposed to the African context with the SOUTHMOD initiative, which gave birth to integrated tax-benefit microsimulation models for several developing countries including the six African countries studied here. The importance of building tax-benefit microsimulation models for developing countries was already highlighted by Atkinson and Bourguignon (1990),

as such models should "lead to a comprehensive, powerful and yet simple instrument for the design of an efficient redistribution system adapted to the specificity of developing countries".

Exporting policy instruments across countries. The present paper applies a decomposition framework based on counterfactual simulations whereby the policy system of country A is applied to the data of country B (or vice versa). Originally, this approach had been used to compare the same country between two points in time A and B, a period over which both the system and the underlying population have substantially changed (Bargain and Callan 2010; Bargain 2012). Yet it is also possible, in principle, to consider any pair of system-population bundles to perform swap exercises embedded in the decomposition framework (see the broad discussion in Bargain, 2017). Note also that most of the research based on EUROMOD has consisted in applying specific policy instruments – if not the whole system – of a country A on a nearby country B. Examples of this kind of "policy learning" experiments include swap simulations of unemployment benefit schemes in Belgium and the Netherlands (De Lathouwer, 1996) or of child and family benefits in France and the UK (Atkinson et al., 1988), Austria, Spain and the UK (Levy et al., 2007) or Baltic and Eastern European countries (Salanauskaite and Verbist 2013). The present study is one of the first to perform a swap of the whole system between pairs of countries. The other example we are aware of is the exercise conducted using models for Ecuador and Colombia (i.e. the ECUAMOD model described in Jara et al. 2017 and COLMOD presented in Rodriguez, 2017), whereby complete system swaps are suggested and analysed (see Bargain et al., 2017).

3.2 Decomposition framework

We now move to the decomposition framework that helps to precisely define and exploit counterfactual simulation. Let us first introduce some notation and terminology. By household 'gross (or market) income', we mean the total amount of labour income, capital income and private pensions, before taxes and benefits. 'Disposable income' is the household income that remains after payment of taxes/social contributions and receipt of all cash transfers, as widely used to measure poverty and inequality. Let matrix y_c describe the population contained in the data of country c: for each household, it contains a stream of information about the household's market income sources, socio-demographic characteristics, etc. Let d_c denote the 'tax-benefit function' transforming, for each household, market/gross incomes and household characteristics into a certain level of disposable income. Tax-benefit calculations depend also on a set of monetary parameters p_c (including the maximum benefit amounts, the threshold level of tax brackets, etc.). Household disposable income is thus represented by $d_i(p_j, y_k)$ for a hypothetical scenario focusing on the population of country k, the tax-benefit parameters of country j and the tax-benefit structure of country i. A measure of inequality (e.g. the Gini) or poverty (e.g. the headcount ratio) can be calculated on the basis of the distribution of disposable income and is denoted $I[d_c]$.

Given different currencies, we cannot directly apply the system of country 1 (including its monetary parameters like tax bands, benefit eligibility levels, etc.) on the market incomes of country 2. We must consider the possibility of nominally adjusting both monetary parameters and incomes by an uprating factor α. Differences in income levels between country 1 and country 2 can be neutralized by a nominal adjustment using the indexation factor α defined as the mean income of country 2 divided by the mean income of country 1. As a result, αy_1 retains the market income *distribution* of country 1 but adopt the mean income *level* prevailing in country 2. Also, when evaluating the distribution obtained with the policy system of country 1 applied to the population of country 2, we can simulate counterfactual disposable incomes $d_1(\alpha p_1, y_2)$, whereby tax-benefit parameters are nominally adjusted to country 2's levels using the same factor α.

With these notations, the total difference Δ in the welfare indicator I between country 1 and country 2 can be represented by:

$$\Delta = I[d_2(p_2, y_2)] - I[d_1(p_1, y_1)] \tag{1}$$

Next, the difference in the distribution of disposable income, as summarized by index I, can be decomposed into the contribution of the change in the tax-benefit rules ('policy effect') and the contribution of changes in the underlying gross income distribution (or any other effects not directly linked to policy changes). The former effect corresponds to a shift from $d_1(p_1, .)$ to $d_2(p_2, .)$ while the latter corresponds to the move from data of country 1, y_1, to data of country 2, y_2. Formally, this decomposition can be represented as:

$$\begin{aligned}\Delta = &\{I[d_2(p_2, y_2)] - I[d_1(\alpha p_1, y_2)]\} \text{ (tax-benefit policy effect)} \\ &+ \{I[d_1(\alpha p_1, y_2)] - I[d_1(\alpha p_1, \alpha y_1)]\} \text{ (other effects)} \\ &+ \{I[d_1(\alpha p_1, \alpha y_1)] - I[d_1(p_1, y_1)]\} \text{ (nominal adjustments).}\end{aligned} \tag{2}$$

The third component in equation (2) should be zero ("nominal adjustments"). Indeed, tax-benefit function $d_c(p_c, y_c)$ are usually linearly homogenous in p_c and y_c, so that a simultaneous change in nominal levels of both incomes and parameters should not affect the relative location of households in the distribution of disposable income. This is true when applying any factor α, for instance when converting national currency to dollars. We will rely on the final decomposition:

$$\begin{aligned}\Delta = &\{I[d_2(p_2, y_2)] - I[d_1(\alpha p_1, y_2)]\} \text{ (tax-benefit policy effect)} \\ &+ \{I[d_1(\alpha p_1, y_2)] - I[d_1(p_1, y_1)]\}. \text{ (other effects)}\end{aligned} \tag{3}$$

It consists of a shift from country 1 data to country 2 data conditional on the policy rules of country 1 ("other effects"), followed by a move from policy of country 1 to policy of country 2 based on country 2 data ("policy effect"). The "other effects" include country differences in market income distribution but also comprise other population differences that may affect per

capita (or equivalized) disposable income distribution, such as differences in demographic structures. The "policy effect" isolates the direct role of country-specific tax-benefit regimes, i.e. our main focus.

At this stage, we need to highlight two limitations. First, remark that another symmetrical decomposition could be performed to obtain the policy effect characterized by a change in policy (from 1 to 2) evaluated on the basis of (nominally adjusted) country 1 data, followed by a change in underlying data (from 1 to 2) conditional on the policy of country 2. We could not proceed in this way given that some of the `backward' swaps cannot be fully completed for some countries for which not all the policy instruments are simulated, as explained below. [4]
Second, we could in principle simulate the policy system of every country in our sample on the data of any other country following the approach outlined above. However, simulating the 36 possible combinations would be cumbersome and results would be difficult to interpret. We suggest a simpler design whereby the system of the most redistributive country, South Africa, is applied to the populations of all other countries (also, one whereby the system of one of the least redistributive country, Mozambique, is applied to the populations of all the other countries). A reason for this choice is also the limitation emphasized above. For these two countries, all the tax-benefit policies are simulated so that applying them to other countries can be done. Yet, for some other countries (notably Ethiopia), only part of the redistributive system is simulated so that it would not be possible to fully apply it to other countries.

3.2. Data and microsimulation models

Our study makes use of newly developed tax-benefit microsimulation models for African countries: GHAMOD (Ghana), MicroZAMOD (Zambia), MOZMOD (Mozambique), TAZMOD (Tanzania), ETMOD (Ethiopia) and SAMOD (South Africa). A model for Namibia (NAMOD) should be used in future research. These models, listed in **Table 2**, combine detailed country-specific coded policy rules with cross-sectional micro-data in order to simulate direct taxes and social insurance contributions (assumed to be paid by formal sector workers only), as well as cash transfers for the household population of the six countries under study. Datasets at use are nationally representative household surveys, also specified in **Table 2**, which contain detailed information on household and personal characteristics, employment, earnings and income from non-labour sources. Income concepts have been harmonised in all datasets with the aim to achieve comparability in the simulation results (see Gasior et al., 2018, for detailed explanations).

Tax-benefit microsimulations designed as part of the SOUTHMOD project have been implemented using the EUROMOD software, which enables users to analyse the effect of tax-benefit policies on the income distribution in a comparable manner across countries. All models

[4] Nevertheless, previous studies show very little path dependence on the way the decomposition is performed: results are not too sensitive to the underlying population used for the decomposition (see e.g. Bargain and Callan, 2011, and Bargain et al., 2017).

are static in the sense that tax-benefit simulations abstract from behavioural reactions of individuals; we come back to this point below.

Table 2: Summary of Data Sources and Microsimulation Models

Country	Data Source	Year of Data Collection	# of individuals	# of households	Microsimulation Model	Policy Years simulated
South Africa	National Income Dynamics (NIDS)	2015	88,908	23,380	SAMOD	2014-2017
Mozambique	Inquérito ao Orcamento Familiar (IOF)	2015	109,119	21,879	MOZMOD	2015-2017
Zambia	Living Conditions Monitoring Survey (LCMS)	2015	62,879	12,251	MicroZAMOD	2010, 2015-2017
Ghana	Ghana Living Standards Survey (GLSS)	2013	72,372	16,772	GHAMOD	2013-2017
Ethiopia	Living Standards Measurement Study (LSMS)	2014	23,776	5,262	ETMOD	2014-2017
Tanzania	Household Budget Survey (HBS)	2012	46,593	10,186	TAZMOD	2012, 2015-2017

Sources: SOUTHMOD documentation and authors' simulation choices. Policy year simulated by the models indicated are all the available systems but our simulations focus on the year 2015 (difference between year of data collection and 2015 are accounted for by adjusting all incomes by appropriate uprating factors).

3.3. Assumptions for Baseline and Counterfactual Simulations

Informal labour, Compliance and Benefit Take-up. Assumptions about compliance with social insurance contributions and personal income tax (PIT) go as follows. All datasets provide information on whether individuals are employed in the formal or the informal sector of the economy.[5] Both in the baseline and swap scenarios, we simulate PIT and contributions only for those formally employed.

Arguably, the proportion of formal employees may change with major tax reforms, so that further work should attempt to model behavioural responses to a change in tax policies. We further discuss this possible extension in the conclusion. Our simulations represent a first-order approximation, which may be reasonable if sector choices are not so dependent on actual taxation. Using the same countries and tax-benefit microsimulation models, McKay et al. (2018) actually show that transitions between formal and informal sectors do not respond very strongly to tax-benefit policy variation over time and across countries.

In all countries, full benefit take-up is assumed in general, except in cases where claiming rate are actually low so that simulations deserve specific adjustments. An example of such adjustment is Mozambique, for which we calibrate the number of beneficiaries of the Direct Social Support Programme to match administrative data due to the major over-simulation of his benefit under the assumption of full take-up.

[5] With the datasets at hand, it was not possible, however, to suggest a harmonized definition across countries. Informality rests on occupation types in most countries (e.g. self-employment is deemed informal while public sector is deemed formal) and additionally depends on information regarding whether the person holds a formal job entitlement (South Africa and Zambia) or work in a firm of less than 5 employees (Zambia and Ethiopia).

Scope of the simulations. Our analysis focuses on the concept of disposable income, as previously defined (market income after payment of taxes and contributions and receipt of cash benefits). Indirect taxes are not considered because simulation of such instruments has not been harmonized across countries, which prevents us from including them in the counterfactual simulations. Thus, we focus on *direct* taxation and transfers. While **Table 2** indicates all the policy years available under SOUTHMOD models, our analysis takes 2015 policies (as on June 30th) in all countries as the starting point. In the case of Ethiopia, Tanzania and Ghana, where the year of data collection does not match the policy year simulations, market incomes and non-simulated tax-benefit variables in the data are adjusted to 2015 levels using source-specific updating factors.[6]

A detailed description of each instrument is provided in **Tables A.1-A.3** in the appendix while **Table A.4** provides an overview of all income components used in our simulation models and an explanation of what is simulated, non-existent or taken from the data. In all countries employee social insurance contributions and personal income tax are simulated.[7] So are the main cash transfers, with some exception. First, cash transfers which require information about the degree of disability of individuals cannot be simulated due to lack of information in the input data of other countries. In particular, the South African Grant in Aid cannot be simulated as eligibility requires identifying individuals needing full-time care. Note that it represents only a small share of the total redistributive program of this country, so that ignoring it in our counterfactual simulations is not hugely detrimental to the analysis. Second, Ethiopia represents a particular case, in the sense that benefits could not be simulated for the 2015 policy year, due to the lack of specific eligibility information (notably for the Rural Productive Safety Net Programme), and are taken directly from the data for inclusion in disposable income. For this reason, the Ethiopian system cannot be applied to other countries for policy swaps, as explained above.[8] Third, there are a few other exceptions. In particular, Ghana also shows limited applicability for the swap exercise since the simulation of benefits requires variables that do not exist in other countries (e.g. vulnerable children, pregnant women, attending public schools).

Baseline simulations and external sources. In the Appendix, **Table A.5** reports baseline simulation for the six countries (Gini and poverty headcount). Per capita income inequality is extremely high in all countries. Poverty based on the $1.9/day absolute line varies dramatically, with lower levels in countries like South Africa and Ghana and very high levels elsewhere. We also provide external statistics: they are not directly comparable since they rely on consumption expenditure data rather than income data. Many households do consume a lot more than actual

[6] See Country Reports for more information, on www.wider.unu.edu/project/southmod-simulating-tax-and-benefit-policies-development

[7] In addition, self-employed SICs are levied in Mozambique and simulated; capital income tax is simulated in Ghana, and the Medical levy of Zambia has been included in MicroZAMOD.

[8] Note also that we consistently remove the non-simulated instruments from a country's disposable income simulations when the South African/Mozambique systems are applied to this country. In particular, when applying these systems on Ethiopian data, the South African/ Mozambique benefits are simulated and replace the Ethiopian benefit variables taken from the data when calculating disposable income.

reported income (and the fraction that is consumed is larger in poor households) because of the large extent of (i) household production in poor countries, (ii) unreported transfers (in the extended family or remittances from migrants') and (iii) other sources of measurement errors on income (nonresponse, under-reporting, etc).

Few studies actually focus on income in the African context but when they do, distributional measures are more similar to our simulations. For instance, Lusambo reports a Gini above .70 for Tanzania and poverty rates close to ours.[9] Note that for poverty rates in **Table A.5**, income and consumption provide a similar country ranking: the correlation is .73 (and .98 without Ethiopia). The use of income allows for a more accurate simulation of tax policies and how they impact living standards, leading to an improved understanding of the redistributive capacity of the overall tax-benefit system of these countries. Yet, further work should attempt to model saving and self-production behaviour to modify disposable income simulations in the way that come closer to final household consumption.

3. Empirical results

This section presents the results of our comparative assessment of the redistributive role of tax-benefit systems in six African for the policy year 2015. We first discuss the baseline impact of national tax-benefit systems on poverty and inequality in each country, as well as a breakdown of income distribution effect by policy instrument. Then, we present the main results of our decomposition exercise to disentangle the role of tax-benefit policies in explaining differences in income poverty and inequality between countries. Finally, we discuss the contribution of particular policy instruments, within our decomposition framework, in reducing poverty and inequality.

4.1. Relative size of tax-benefit components

We start with a simple characterization of the total impact of tax-benefit systems on inequality and poverty in each country. **Table 3** compares the Gini coefficient and poverty headcount measures for household disposable income and market household income.[10] Results are reported for per-capita measures as well as equivalized household income using the OECD scale. An absolute global poverty line based on the World Bank of $1.90 per day per person is applied on household PPP adjusted household income per capita and OECD equivalized household income.

[9] Distributional measures based on income have only been used in the case of South Africa; none of the remaining five countries have constructed them, even though this information is now readily available in official survey data. The use of income data allows for a more accurate simulation of policies such as personal income tax and social insurance contributions, leading to an improved understanding of the redistributive capacity of the overall tax-benefit system of these countries.

[10] See also Gasior et al. (2018) for a complete characterization of the distributional impact of the socio-fiscal systems of the countries under study.

Results for South Africa indicate that inequality based on market income is 10.1 points higher than that based on disposable income when considering the per capita measures. The corresponding figure is 11.2 points when equivalised household income is applied. This suggests that the South African tax-benefit system tends to have some equalising effect. To a lesser extent, the Gini is also reduced in Ethiopia and Tanzania. These effects are small, a reduction of 3-4 points, but not necessarily much smaller than in other developing regions of the world. On average, tax-benefit systems in Latin America decrease the Gini coefficient by 2.7 points (from 50.8 to 48.1), according to Lustig (2017) for the year 2011. Admittedly, a lot more redistribution is operated in rich countries: the Gini coefficient for the EU28 falls from 50.1 to 29.2 on average when market income is compared to disposable income.[11]

Table 3: Effect of tax-benefit systems on income inequality and poverty

	Per capita measures					
	Inequality (Gini coefficient %)			Poverty (FGT0%)*		
	Disposable income	Market income	Difference	Disposable income	Market income	Difference
South Africa	63.4	73.5	-10.1	13.1	35.2	-22.1
Mozambique	81.8	82.3	-0.4	84.0	83.1	0.9
Zambia	74.7	76.4	-1.8	70.5	69.9	0.6
Ghana	71.0	71.3	-0.3	31.0	30.6	0.4
Ethiopia	84.1	87.9	-3.8	85.5	85.2	0.2
Tanzania	80.5	83.2	-2.7	72.6	72.5	0.1
	Equivalised measures**					
	Inequality (Gini coefficient %)			Poverty (FGT0%)*		
	Disposable income	Market income	Difference	Disposable income	Market income	Difference
South Africa	60.6	71.9	-11.2	3.9	28.0	-24.1
Mozambique	80.8	81.1	-0.3	72.4	71.2	1.2
Zambia	73.3	75.2	-1.9	57.8	57.7	0.1
Ghana	69.7	69.9	-0.2	18.5	18.3	0.2
Ethiopia	83.6	87.5	-3.9	66.6	66.9	-0.4
Tanzania	79.6	82.5	-3.0	59.2	59.6	-0.4

Notes: * Poverty line = $1.90 per day per person. **OECD scale applied (i.e., 1 assigned to first adult; 0.5 other adults and 0.3 assigned to a child). Source: authors' simulations based on Southmod microsimulation models and associated data: the South African National Income Dynamics Study (2014); the Mozambican Inquérito ao Orcamento Familiar (2008-9); the Zambian Living Conditions Monitoring Survey (2010); the Ghana Living Standards Survey, version 6 (2012-13); Ethiopian Living Standards Measurement Study (2013-14) and the Tanzanian Household Budget Survey (2011-12) data.

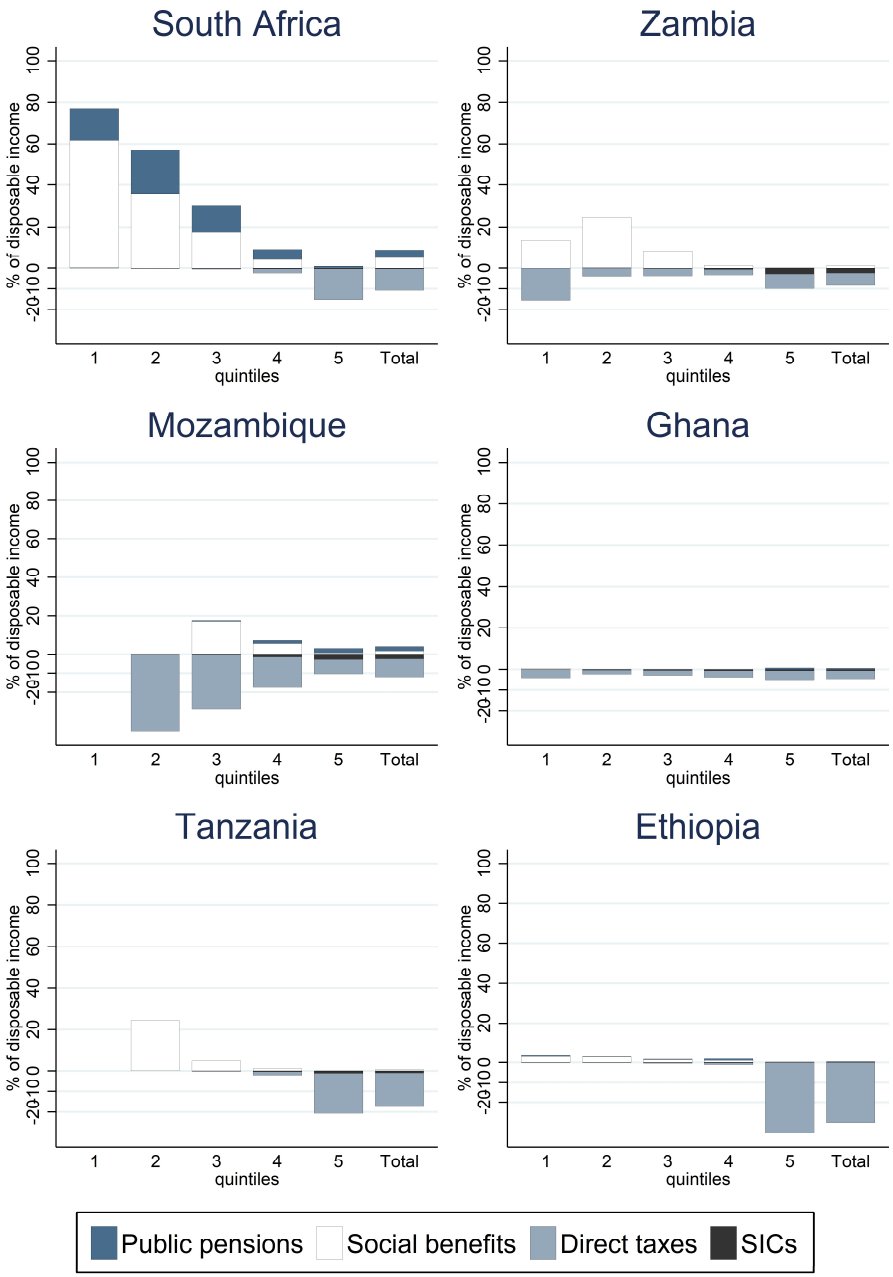
Interestingly, a much larger redistributive effect is registered in South Africa when it comes to the incidence of poverty. It is reduced by 22.1 points, especially thanks to a generous social assistance support that reaches a third of its population. The redistributive systems of other countries are not as developed and have much less incidence on poverty. In fact, as highlighted in our literature review and in line with past studies based on incidence methods, they actually tend to increase poverty. Ghana and Mozambique are actually the least redistributive system in

[11] See EUROMOD statistics accessed at www.euromod.ac.uk/using-euromod/statistics

terms of Gini reduction while Mozambique has the most anti-redistributive effect regarding poverty. In our decomposition, we will choose as Mozambique for the characterization based on the least redistributive systems.

Figure 3 describes the contribution of each broad policy instrument to disposable income by quintile. We see that social benefits clearly explain the larger redistribution at low income levels in South Africa. Taxation is progressive in this country as well as in Tanzania and Ethiopia but regressive in Zambia and Mozambique. Ghana shows very limited impact of tax-benefit instruments on income at every points of the distribution.

Figure 3: Impact of different policy instruments on disposable income by quintile



4.2. Decomposition results

We move to our decomposition analysis. It aims to quantify the contribution of tax-benefit policies to differences in income inequality and poverty between countries. For that purpose, we use the most redistributive tax-benefit system (South Africa) as a comparison point for all the other system. One of the least redistributive system (Mozambique) is also chosen as the other polar reference policy.

The results of our decomposition analysis are presented in **Table 4** (using the South African system as benchmark) and **Table 5** (using the Mozambique system). In rows, we indicate the series of inequality and poverty indices that are used as the main distributional outputs. All these measures are based on household disposable incomes, per capita or per adult equivalent. For inequality, we focus on the Gini index as well as the Atkinson index with two levels of inequality aversion. Absolute poverty is measured using a poverty line of USD 1.90 PPP per day. We report the poverty headcount (FGT0), the poverty gap (FGT1) and the poverty severity (FGT2).

In column, we report the different simulations used in our decomposition. Let us focus on **Table 4.** Column (1) gives the baseline situation for the reference country, South Africa (SA), for instance a Gini of 63.4 using per capita disposable incomes. The different columns (2) report the baselines for each of the other countries: Mozambique (MZ), Zambia (ZM), Ghana (GH), Ethiopia (ET) and Tanzania (TZ), for instance a Gini of 81.8 for MZ. Then, column (2') reports for each country the counterfactual situation where all incomes (in the data) and all tax-benefit monetary parameters (in the tax-benefit simulations) are uprated to South African levels. Uprating factors (captured by the parameter α in the equations above) are calculated as the ratio of mean incomes between South African and each of the other countries. We confirm that the homogeneity property is respected: (2) and (2') are equal for all indices, which means that the difference between two countries (for instance SA and MZ) can be decomposed in two components (the tax-benefit policy effect and the other effects).

The column labelled (C) shows our main counterfactual scenario whereby the South African system is applied to the population of other countries, after nominal adjustments of market incomes to South African levels as in the intermediary step (2'). We see for instance that if the South African tax-benefit system was applied to Mozambique, inequality as measured by the Gini coefficient would decrease from 81.8 (Mozambican baseline) to 66.6 (the Mozambican counterfactual based on the South Africa system). The overall difference in inequality/poverty between the reference country (South Africa) and the target country (Mozambique) is also indicated as (2)-(1), for instance 18.4 regarding Gini indices. Finally, the two components of the decomposition are reported: the policy effect and other effects, indicated as (2)-(C) and (C)-(1) respectively.[12] In the case of Mozambique, we see that the policy effect is responsible for 83% of

[12] For the interpretation, bear in mind that the 'other effects' include all the factors not related to tax-benefit policies as simulated in our exercises, and notably differences in market income inequality and in demographics. They also

the better performances of South Africa in terms of inequality (15.3 points out of the total Gini difference of 18.4 points). In a similar way, the poverty rate of Mozambique would be 81.8% if the South African tax-benefit system was in place in this country rather than 84% in the baseline, i.e. a policy effect of 2.2 points (3.1% of the country difference).

Results go as follows. As seen in **Table 4**, exporting the South African system would eliminate most of the gap in Gini coefficients with the other countries except Ghana (where it would reduce the Gini by 3.3 points, i.e. 43% of the existing difference). Note that these results are not only due to the progressive effect of the South African system: it also reflects varying degree of redistribution across the tax systems of the other countries. Decomposition results based on Atkinson indices show an equally pronounced effect. Especially when inequality aversion is higher, tax-benefit policies explain most of the differences between South African and other countries (again, with the exception of Ghana: half of the difference is explained by the policy effect in this case).

Regarding poverty, baseline results have shown that income poverty is lower in South Africa than in all the other countries under study. Nonetheless, the decomposition table indicates that most of the gap in terms of poverty headcount between South Africa and other countries is driven by the `other effects', i.e. market income distributions and demographic compositions of these countries explain most of the difference in population density below the per capita poverty line. The differences in socio-fiscal policies explain only 1.3 points (1.8%) of the gap with Ethiopia, 2.2 points (3.1%) with Mozambique and 6.7 points (11.6%) with Zambia; there is a more substantial policy effect when compared with Ghana and Tanzania: the South African system closes 7.9 and 17.8 points (43.7% and 29.8%) of the poverty differentials with these countries respectively. The policy contribution becomes more significant when looking at the intensity of poverty. With FGT1, the role of tax-benefit policies amounts to 20.2% of the total gap with Mozambique and up to 57.6% with Ghana and 60% with Tanzania. Note that results are not greatly affected by the use of equivalence scales in place of per capita income.

The end of **Table 4** suggests budgetary implications of the policy swaps. Exporting the South African system to other countries would be costly in terms of net tax revenue, i.e. the difference between total tax/contribution collection and transfer payments. The net revenue would indeed increase by almost 100% in Ghana and Ethiopia, 160-180% in Mozambique and Zambia, and up to 240% in Tanzania. If we now put this extra cost against the number of persons alleviated from poverty thanks to the policy change, the cost effectiveness is highest in Zambia, Ghana and Tanzania (less than 20 PPP USD per person taken out of poverty). It is more substantial in Mozambique (30 PPP USD) and particularly in Ethiopia (212 PPP USD).

comprise country differences in non-simulated tax-benefit components, such as contributory pensions. The policy effect only captures differences in social assistance benefits, personal income tax and social insurance contributions between countries.

Table 4. Decomposing differences in the income distribution between countries (reference: South Africa, SA)

data country:	SA	MZ	MZ	MZ		Decomposition		ZM	ZM	ZM		Decomposition		GH	GH	GH		Decomposition		ET	ET	ET		Decomposition		TZ	TZ	TZ		Decomposition	
uprated to:			SA	SA	Total diff.	Tax-ben. policy effect	Other effect		SA	SA	Total diff.	Tax-ben. policy effect	Other effect		SA	SA	Total diff.	Tax-ben. policy effect	Other effect		SA	SA	Total diff.	Tax-ben. policy effect	Other effect		SA	SA	Total diff.	Tax-ben. policy effect	Other effect
policy country:	SA	MZ	MZ	SA				ZM	ZM	SA				GH	GH	SA				ET	ET	SA				TZ	TZ	SA			
uprated to:			SA						SA						SA						SA						SA			
	(1)	(2)	(2')	(C)	(2)-(1)	(2)-(C)	(C)-(1)	(2)	(2')	(C)	(2)-(1)	(2)-(C)	(C)-(1)	(2)	(2')	(C)	(2)-(1)	(2)-(C)	(C)-(1)	(2)	(2')	(C)	(2)-(1)	(2)-(C)	(C)-(1)	(2)	(2')	(C)	(2)-(1)	(2)-(C)	(C)-(1)
Panel A: Per capita measures																															
Inequality																															
Gini	63.4	81.8	81.8	66.6	18.4	15.3	3.1	74.7	74.7	62.3	11.2	12.4	-1.1	71.0	71.0	67.7	7.6	3.3	4.3	84.1	84.1	64.7	20.7	19.3	1.3	80.5	80.5	65.7	17.1	14.9	2.2
Atkinson 0.5	32.5	45.2	45.2	36.6	12.7	8.7	4.0	43.3	43.3	31.3	10.7	12.0	-1.2	41.9	41.9	39.2	9.4	2.7	6.7	69.2	69.2	46.6	36.7	22.6	14.1	51.5	51.5	37.5	18.9	14.0	4.9
Atkinson 1	53.9	71.3	71.3	55.5	17.4	15.8	1.6	72.8	72.8	50.9	18.9	21.9	-3.0	64.7	64.7	59.4	10.8	5.4	5.5	79.4	79.4	54.6	25.5	24.9	0.6	76.8	76.8	54.2	22.9	22.6	0.3
*Poverty**																															
FGT0 (%)	13.1	84.0	84.0	81.8	71.0	2.2	68.8	70.5	70.5	63.8	57.4	6.7	50.7	31.0	31.0	23.2	18.0	7.9	10.1	85.5	85.5	84.1	72.4	1.3	71.1	72.6	72.6	54.9	59.6	17.8	41.8
FGT1 (%)	4.6	69.6	69.6	56.4	64.9	13.1	51.8	52.9	52.9	34.9	48.2	18.0	30.2	18.0	18.0	10.3	13.4	7.7	5.7	57.1	57.1	42.4	52.5	14.7	37.8	55.1	55.1	24.9	50.5	30.2	20.2
FGT2 (%)	2.4	63.0	63.0	43.9	60.6	19.1	41.5	44.7	44.7	22.6	42.3	22.2	20.2	13.7	13.7	6.3	11.3	7.4	4.0	43.3	43.3	24.9	40.9	18.4	22.5	46.9	46.9	14.2	44.5	32.7	11.9
Panel B: Equivalised measures**																															
Inequality																															
Gini	60.6	80.8	80.8	64.5	20.2	16.3	3.9	73.3	73.3	60.0	12.7	13.3	-0.6	69.7	69.7	66.1	9.0	3.6	5.5	83.6	83.6	63.2	22.9	20.4	2.5	79.6	79.6	63.6	18.9	15.9	3.0
Atkinson 0.5	29.6	43.1	43.1	34.1	13.5	8.9	4.6	41.3	41.3	28.9	11.7	12.4	-0.7	40.1	40.1	37.2	10.5	2.8	7.7	68.9	68.9	45.7	39.3	23.2	16.1	49.8	49.8	35.5	20.2	14.3	5.9
Atkinson 1	49.9	69.4	69.4	52.9	19.5	16.5	3.0	70.9	70.9	48.0	21.0	22.9	-1.9	62.8	62.8	57.1	12.9	5.6	7.3	78.8	78.8	53.3	28.9	25.5	3.4	75.3	75.3	51.9	25.4	23.4	2.0
Poverty																															
FGT0 (%)	3.9	72.4	72.4	64.9	68.5	7.6	61.0	57.8	57.8	39.0	53.9	18.8	35.2	18.5	18.5	10.1	14.6	8.4	6.2	66.6	66.6	46.6	62.7	19.9	42.7	59.2	59.2	22.4	55.3	36.7	18.6
FGT1 (%)	1.5	60.0	60.0	38.1	58.6	21.9	36.6	41.2	41.2	15.5	39.7	25.7	14.0	11.7	11.7	4.4	10.2	7.3	2.9	37.0	37.0	14.1	35.5	22.9	12.6	43.1	43.1	7.9	41.7	35.2	6.4
FGT2 (%)	1.0	54.6	54.6	26.0	53.6	28.6	25.0	34.0	34.0	8.2	33.1	25.9	7.2	9.6	9.6	2.8	8.6	6.8	1.8	25.4	25.4	6.4	24.5	19.0	5.4	36.2	36.2	4.4	35.2	31.8	3.5

Panel C: Budget implications***	MZ	ZM	GH	ET	TZ
Change in net tax revenue	-184%	-168%	-97%	-98%	-240%
Cost per alleviated poor (PPP USD)	-30.9	-17.4	-19.3	-212.1	-19.8

Notes: South Africa=SA; Mozambique=MZ; Zambia=ZM; Ghana = GH; Ethiopia=ET; Tanzania=TZ. Policy year 2015. Source: Author's calculation based on SOUTHMOD microsimulation models and associated data: the South African National Income Dynamics Study (2014); the Mozambican Inquérito ao Orcamento Familiar (2008-9); Zambian Living Conditions Monitoring Survey (2010); the Ghana Living Standards Survey, version 6 (2012-13); the Ethiopian Living Standards Measurement Study (2013-14) and the Tanzanian Household Budget Survey (2011-12) data.

* Poverty line = $1.90 per day per person

**OECD scale applied (i.e., 1 assigned to first adult; 0.5 other adults and 0.3 assigned to a child).

*** Net tax revenue is aggregated taxes and social contributions minus transfers. The cost-efficiency in poverty reduction is calculated as the change in state budget required per person taken out of poverty.

Table 5. Decomposing differences in the income distribution between countries (reference: Mozambique, MZ)

data country:	MZ	ZM	ZM	ZM		Decomposition		SA	SA	SA		Decomposition		GH	GH	GH		Decomposition		ET	ET	ET		Decomposition		TZ	TZ	TZ		Decomposition	
uprated to:			MZ	MZ	Total diff.	Tax-ben. policy effect	Other effect		MZ	MZ	Total diff.	Tax-ben. policy effect	Other effect		MZ	MZ	Total diff.	Tax-ben. policy effect	Other effect		MZ	MZ	Total diff.	Tax-ben. policy effect	Other effect		MZ	MZ	Total diff.	Tax-ben. policy effect	Other effect
policy country:	MZ	ZM	ZM	MZ				SA	SA	MZ				GH	GH	MZ				ET	ET	MZ				TZ	TZ	MZ			
uprated to:			MZ						MZ						MZ						MZ						MZ			
	(1)	(2)	(2')	(C)	(2)-(1)	(2)-(C)	(C)-(1)	(2)	(2')	(C)	(2)-(1)	(2)-(C)	(C)-(1)	(2)	(2')	(C)	(2)-(1)	(2)-(C)	(C)-(1)	(2)	(2')	(C)	(2)-(1)	(2)-(C)	(C)-(1)	(2)	(2')	(C)	(2)-(1)	(2)-(C)	(C)-(1)
Panel A: Per capita measures																															
Inequality																															
Gini	81.8	74.7	74.7	76.2	-7.2	-1.6	-5.6	63.4	63.4	72.9	-18.4	-9.4	-9.0	71.0	71.0	71.0	-10.8	0.0	-10.8	84.1	84.1	83.2	2.2	0.9	1.3	80.5	80.5	82.2	-1.3	-1.7	0.4
Atkinson 0.5	45.2	43.3	43.3	44.6	-1.9	-1.3	-0.7	32.5	32.5	39.0	-12.7	-6.4	-6.2	41.9	41.9	42.0	-3.3	-0.1	-3.2	69.2	69.2	66.8	24.0	2.4	21.6	51.5	51.5	54.0	6.2	-2.5	8.7
Atkinson 1	71.3	72.8	72.8	75.2	1.5	-2.4	3.9	53.9	53.9	66.8	-17.4	-12.9	-4.5	64.7	64.7	64.9	-6.6	-0.2	-6.4	79.4	79.4	78.4	8.1	1.1	7.0	76.8	76.8	79.2	5.5	-2.4	7.9
Poverty*																															
FGT0 (%)	84.0	70.5	70.5	70.5	-13.6	0.0	-13.6	13.1	13.1	35.0	-71.0	-22.0	-49.0	31.0	31.0	30.8	-53.0	0.3	-53.3	85.5	85.5	83.0	1.4	2.5	-1.1	72.6	72.6	72.1	-11.4	0.5	-11.9
FGT1 (%)	69.6	52.9	52.9	54.0	-16.7	-1.1	-15.6	4.6	4.6	26.2	-64.9	-21.6	-43.3	18.0	18.0	17.8	-51.5	0.2	-51.8	57.1	57.1	54.6	-12.5	2.5	-15.0	55.1	55.1	54.7	-14.5	0.4	-14.9
FGT2 (%)	63.0	44.7	44.7	46.4	-18.2	-1.7	-16.6	2.4	2.4	22.9	-60.6	-20.5	-40.0	13.7	13.7	13.4	-49.2	0.3	-49.5	43.3	43.3	41.2	-19.6	2.1	-21.7	46.9	46.9	46.9	-16.0	0.1	-16.1
Panel B: Equivalised measures**																															
Inequality																															
Gini	80.8	73.3	73.3	75.0	-7.5	-1.7	-5.8	60.6	60.6	71.2	-20.2	-10.6	-9.6	69.7	69.7	69.7	-11.1	0.0	-11.1	83.6	83.6	82.6	2.8	1.0	1.8	79.6	79.6	81.5	-1.2	-1.9	0.7
Atkinson 0.5	43.1	41.3	41.3	42.6	-1.8	-1.4	-0.4	29.6	29.6	36.6	-13.5	-7.0	-6.5	40.1	40.1	40.1	-3.0	-0.1	-2.9	68.9	68.9	66.4	25.8	2.5	23.3	49.8	49.8	52.6	6.7	-2.8	9.5
Atkinson 1	69.4	70.9	70.9	73.5	1.5	-2.6	4.1	49.9	49.9	63.9	-19.5	-14.0	-5.5	62.8	62.8	63.0	-6.7	-0.2	-6.5	78.8	78.8	77.6	9.4	1.2	8.1	75.3	75.3	77.9	5.8	-2.6	8.5
Poverty																															
FGT0 (%)	72.4	57.8	57.8	58.2	-14.6	-0.4	-14.2	3.9	3.9	27.2	-68.5	-23.3	-45.2	18.5	18.5	18.4	-53.9	0.1	-54.0	66.6	66.6	63.2	-5.8	3.4	-9.2	59.2	59.2	58.8	-13.3	0.4	-13.7
FGT1 (%)	60.0	41.2	41.2	43.1	-18.9	-2.0	-16.9	1.5	1.5	21.4	-58.6	-20.0	-38.6	11.7	11.7	11.5	-48.3	0.2	-48.6	37.0	37.0	35.0	-23.1	2.0	-25.1	43.1	43.1	43.1	-16.9	0.1	-17.0
FGT2 (%)	54.6	34.0	34.0	36.7	-20.5	-2.7	-17.8	1.0	1.0	19.5	-53.6	-18.5	-35.1	9.6	9.6	9.2	-45.0	0.4	-45.4	25.4	25.4	24.1	-29.1	1.3	-30.4	36.2	36.2	36.8	-18.4	-0.6	-17.8

Notes: South Africa=SA; Mozambique=MZ; Zambia=ZM; Ghana = GH; Ethiopia=ET; Tanzania=TZ. Policy year 2015. Source: Author's calculation based on SOUTHMOD microsimulation models and associated data: the South African National Income Dynamics Study (2014); the Mozambican Inquérito ao Orcamento Familiar (2008-9); Zambian Living Conditions Monitoring Survey (2010); the Ghana Living Standards Survey, version 6 (2012-13); the Ethiopian Living Standards Measurement Study (2013-14) and the Tanzanian Household Budget Survey (2011-12) data.

* Poverty line = $1.90 per day per person

**OECD scale applied (i.e., 1 assigned to first adult; 0.5 other adults and 0.3 assigned to a child).

The alternative counterfactual simulations using Mozambique as the reference system are reported in **Table 5**. It shows that applying Mozambican policies in South Africa would increase the Gini by more than 9 points and increase poverty by 22 points: we will see in section 4.3 that these effects are essentially due to the weakness of Mozambican social benefits compared to those from South Africa (in the case of taxation, this is combined with the move towards a regressive Mozambican tax system). In Ghana and Zambia, policy effects are almost null: most of the difference with Mozambique is due to other factors, while the tax and benefit systems in Mozambique are equally modest as in these countries, so that the policy swap does not alter income distribution measures much. In Tanzania, applying the socio-fiscal policies of Mozambique deteriorate inequality indices (which is due again, as we will see, to regressive Mozambican taxation).

4.3. Marginal contributions of tax-benefit components and interpretations

To better understand these effects, we suggest a final exercise zooming on the effect of particular tax-benefit instruments (social benefits, income tax and social contributions). Following the same decomposition logic, we characterize how the effect of each instrument on inequality and poverty changes under our counterfactual scenarios. Results are reported in Appendix **Tables A.6 and A.7** when using South Africa and Mozambique, respectively, as comparison points. For social benefits, taxes and contributions respectively, we calculate their marginal contribution to inequality or poverty measures (summarized by the Gini coefficient and the headcount poverty, respectively). For instance, every figure in the first row is calculated as the Gini based on disposable incomes and the Gini based on disposable income before addition of social benefits. In **Table A.6**, for the South African baseline (1), these figures are respectively 63.4 % and 71.4%, i.e. social benefits contributes to a decrease of 8 points of the Gini index. The second row shows that withdrawing income taxes from household budgets contributes to a reduction of 2.7 of the South African Gini index. The second column, (2), shows that in Mozambique, social benefits decrease the Gini by only 1 point while taxation *increases* the Gini by 0.6 points (this regressive effect was previously observed in **Figure 3**). When applying the South African system to Mozambique, the counterfactual scenario points to a strong equalitarian effect of the South African social benefits (the Gini decreases by 14 points, i.e. more than in South Africa itself) as well as an equalitarian effect of taxation (the Gini decreases by 2.8 points, i.e. a similar performance as what the South African tax system accomplishes in South Africa). Social contributions have very little effect in general. Overall, **Table A.6** indicates that the strong impact of the South African system on the Gini of Mozambique, Zambia, Tanzania and especially Ethiopia is due to the redistributive power of the South African social benefit system (relatively to other countries' social benefit schemes) and, to a much lesser extent, to the South African tax system. South African policies, both social benefits and taxes, have a more modest effect in Ghana, hence the aforementioned result of a lower Gini reduction in this country.

Turning to poverty, we see in **Table A.6** that social benefits are what radically diminish the poverty count in South Africa (22.2 points). Similarly, the poverty reduction induced by the South African system exported to other countries is entirely due to its social benefit policies (not to taxation or contributions). The effects reported in **Table 4** regarding poverty are broadly consistent with the impact of the South African social benefits as observed in **Table A.6**: the impact is not sufficient to alleviate poverty much in Mozambique (1.6 point); it is moderate in Zambia and Ethiopia; it is largest in Ghana and Tanzania: South African social benefits would reduce poverty by 7.5 and 17.7 points in these countries, respectively.

From the set of results above, we suggest some interpretations about the larger "policy effects" on inequality relative to poverty. It is likely due to the joint effect of South African social benefits and income tax, as both are contributing to the reduction in inequality – even if the contribution on the side of social benefits is much larger. Both marginal contributions, shown in **Table A.6**, contribute to inequality reduction by positively affecting both tails of the distribution. The smaller "policy effects" for poverty are related, to some extent, to the fact that only social benefits are contributing to poverty reduction, and their effect is relatively smaller than that on inequality (cf. **Table A.6**). "Other effects" might mostly be capturing differences in market incomes and the fact that in some countries many observations have zero or low earnings. Following the SA swap, incomes at the bottom of the distribution in other countries are positively affected by the social benefits from South Africa. However, benefit amounts are nominally adjusted to standards of living in each country meaning that the amounts in some cases might not result in lifting some individuals above the poverty line, resulting in a smaller "policy effect" for poverty.

Finally, the other set of simulation using Mozambique as an alternative reference system is reported in **Table A.7**. It shows that the social assistance scheme in force in Mozambique has a tiny effect on the Gini (-1 point) and on poverty (-0.5 point) but would have hardly any effect on the inequality and poverty of other countries in our sample. In South Africa, it would annihilate the strong redistributive effect of the system in place, i.e. the 22 points reduction in poverty and the 8 points reduction in poverty. In Ethiopia and Tanzania, it would not do worse than the existing systems: it would equally reduce inequality and poverty by a small margin. The income tax scheme in Mozambique has a regressive effect, as commented above, increasing the Gini by 0.6 point and poverty by 1.3 point. This anti-redistributive effect is partly conveyed to Zambia (especially in terms of poverty). In other countries, it has at best hardly any effect on inequality and poverty; or it generates a tiny redistributive effect that is not as good as the national system (obviously in South Africa, but also in Tanzania with a reduction in Gini of 2.1 points with the Tanzanian system and of 0.3 point only with the Mozambican policy). Only in Ethiopia does it reduce the Gini by a similar margin as the system in place (-3.4 points).

4. Conclusions

The emergence of social systems in Africa must face the double challenge of expanding the domestic tax base and performing a degree of redistribution that could alleviate poverty and reduce the considerable extent of income inequality. Exploiting newly developed microsimulation models for six African countries, we characterize the redistributive potential of their tax-benefit systems. Our main innovation consists of counterfactual simulations aimed to elicit the degree of extra redistribution induced by transposing the "best" system (that of South Africa) to all the other countries. These simulations are embedded in a decomposition framework that allows quantifying the contribution of the policy swap compared to other differences (market income distributions, demographic compositions, etc.) between South Africa and the other countries. Results show that part of the inequality gap between South Africa and the other countries – and, to a less extent, part of the poverty gap – could be eliminated by exporting the system of this country and in particular its relatively more generous social benefits.

Two main extensions could be considered for future research. First, improving microsimulations with the addition of indirect taxes and in-kind benefits seems important in order to extend our analysis to a more general setting. This was beyond the scope of the present work. Second, our paper captures only the next-day effect of swapping tax-benefit rules in the decomposition. That is, we characterize the redistribution that can be operated by means of exporting the "best" regional socio-fiscal system while assuming that market incomes would remain fixed in that case. Yet, potential behavioural responses or general equilibrium effects of performing such a substantial tax-benefit reform should be considered in the future. In particular, given the extremely large share of informal employment in the African context, even a small response to tax reforms in terms of transition between formal and informal employment may have significant redistributive consequences. That is, a change in socio-fiscal policies due to a policy swap may change the tax base and affect the distributional impact of the simulated reform. To perform behavioural simulations, estimates of the tax-elasticity of occupation/sector choices are required. For identification of these behavioural parameters, other projects based on the SOUTHMOD microsimulation models have actually used time and space heterogeneity in tax-benefit systems in African labour markets (McKay et al., 2018), finding very small responses to taxation overall. Further work should attempt to consolidate these findings and elicit the potential responsiveness in each specific country, a broad task that may require extensive research projects.

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Appendix

Table A.1. Summary of Tax-benefit Instruments in Tanzania and Ghana (2012-17)

TANZANIA	GHANA
Employee Social Insurance Contributions	
• All formal sector employees are liable to pay National health insurance • Contribution base is gross employment income • Contribution rate is 3% • Employees can voluntarily or involuntarily contribute to numerous fragmented pension schemes at rates of 5-15%.	• Employees are liable to pay SICs • Contribution base is gross employment income • Contribution rate is between 5% and 5.5%.
Personal Income Tax	
• Tax unit is the individual • Paid by employed and self-employed (with turnover > TZS20million • Definition of taxable income is labour income dependent on many different individual circumstances, see Leyaro et al. (2015) • Tax schedule is formed of five tax bands and rates between 0% and 35% • Presumptive tax (self-employment turnover < TZS20 million p.a) - individual level (0-5.25%) • Capital gains tax - (interest on land/buildings) 10% for residents). 20% for non-residents	• Tax unit is the individual (but for allowances an extended family is defined • Taxable income is labour income • Tax schedule is formed of five bands, rates are between 0% and 25% • Presumptive tax: turnover from non-farm income GHc10 000 - 120 000, at a flat tax rate 3%. • Capital income tax - (investment income/capital gains) - 15% in 2016-2017). In 2016, 8% tax introduced on rental
Value added Tax and Excise duties	
• VAT (18%) + zero rated goods • Excise duty (alcohol, tobacco, vehicles, fuel – rates range from 5-50% - see Leyaro et al. (2015) for specific rates	• VAT (13% in 2013; 13% in 2014 onwards but an additional 2.5% on goods subject to an excise tax (NHIL)) + zero rated goods • Excise duty (alcohol, petroleum, soft drinks bottled water and tobacco - tax rates range from 2.5 -171%, see Adu-Ababio, 2017 for specific rates)
Social Assistance benefits	
• Fixed basic cash transfer • Target low income households • Variable conditional cash transfer • Target, top-up cash transfer to low income households with children who cannot afford their education and health requirements • Eligibility for public works to earn extra income for four months of the lean season • Target individuals from low income households and must have been part of the basic cash transfer programme for at least 6 months	• Leap (Live empowerment against poverty) benefit transfer programme • Eligibility poor households that experience chronic food shortages and lack of capacity to engage in social risk mitigation • School capitation grant • Targets pupils in public primary schools • Each pupil under the scheme was covered by GHc 0.30 a day as at 2008.

Source: authors' compilation based on countries' SOUTHMOD reports
Notes: SIC – social insurance contributions; these countries also have other taxes such as taxes on gifts tax and fringe benefits, have only included those that are more relevant for this study.

Table A.2: Summary of Tax-benefit Instruments in South Africa and Ethiopia (2014-16)

SOUTH AFRICA	ETHIOPIA
Employee Social Insurance Contributions	
• All formal sector employees are liable to pay National health insurance • Contribution base is gross employment income • Contribution rate is 1% • Employees can also contribute towards different medical aid and pension schemes at variable rates depending on affordability.	• Employees are liable to pay SICs • Contribution base is gross employment income • Contribution rate is 7% for pension • Employer social contribution (11%)
Personal Income Tax	
• Tax unit is the individual • Paid by employees • Income tax payable is calculated as tax payable on (general taxable income plus income from interest payments less tax deductions on pension contributions) plus tax payable on lump sums less tax rebate and medical tax benefits • Tax schedule is formed of seven tax bands and rates from 18% to R53 2041 + 45% of taxable income above R1. 5 million). • Property income tax (0% -R85 000 +11% of property value). • Transfer duty (0% to R933 000 + 13% of value above R 10 million). • Dividends tax, 20%.	• Tax unit is the individual • Taxable income is labour income • Tax schedule is formed of seven bands, rates are between 10% and 35% • Business profit tax for self-employed - 10-35% • Turn over tax proclamation 2% on gross receipts of goods sold locally. • Tax on rentals of buildings - 0-35%. • Capital income tax - (investment income/capital gains) - 10% for business buildings; 30% for company shares. • Tax on interest income and tax on royalties, 5%. • Dividend gains tax - 10%.
Value added Tax and Excise duties	
• VAT (15%) + zero rated goods • Excise duty (alcohol, tobacco, vehicles, fuel – tax rates range from 0-45% • Customs duty 0-45%	• VAT (15%) + zero rated goods • Customs duty 0-20% on items for productive purposes; 30-35% for luxury items. • Excise tax, 10 bands ranging from 10-100%
Social Assistance benefits	
• Cash transfers • Means tested-old age pension (R1 410/1 430 per month), • Eligibility for 60+ year olds • Means test threshold is R64 680 per year for single people, R129 360 for couples • Disability grant (R1 430 per month) • Eligibility low income and disabled aged 18-59 years • War veterans grant (R1 430 per month) • Eligibility 60 years plus and fought in the second world or Korean war • Grant in aid (R330) • Child support grant (R330) • Foster childcare grant (R860) • Care dependency grant (R1 410) • Target care giver of permanently severely disabled child below 18 years and	• old age pension/ retirement pension and gratuity • Targets public servants • Rate 30% of average salary for last three years before retirement • Survivor's pension (15-50% of deceased public servant's pension given to spouse and children) • Private sector employee's pension • Conditional cash transfer under the public works programme • Targets individuals in poorest households with able bodies members who need more work • If four members of the household are enrolled each receives ETB 60 per day for 60 days in a year

Source: authors' compilation from Country's SOUTHMOD reports. Notes: SIC – social insurance contributions; these countries also have other taxes such as taxes on gifts tax and fringe benefits and games of chance, have only included those that are more relevant for this study.

Table A. 3. Summary of Tax-benefit instruments in Mozambique and Zambia (2015)

MOZAMBIQUE	ZAMBIA
Employee Social Insurance Contributions	
• All formal sector employees are liable to pay SICs • Contribution base is gross employment income • Contribution rate: private sector (self and not self-employed 7% i.e., 4% employer +3% employee; Public sector 7%	• Employees are liable to pay SICs • Employee pension contribution • Contribution base is gross employment income • Contribution rate is between 5% and 10%- subject to a ceiling of ZMW796 per month • Employer pension contribution is at 5%
Personal Income Tax	
• Tax unit is the individual • Personal income tax 1 (employment) • Tax Rate 0-32% • Personal income tax 2 (self-employment turnover< Mt 2.5million pa), tax rate 3% • Personal income 3 (Other - 10-32% fewer brackets) • Capital gains tax - (interest on land/buildings) 10% for residents). 20% for non-residents	• Tax unit is the individual • Taxable income includes labour income form employment self-employment, property and capital is labour income • Tax schedule is formed of four bands, rates are between 0% and 35% • Personal income tax (self-employment turnover < ZMW800 000pa) • Tax Rate = 3%
Value added Tax and Excise duties	
• VAT (17%) + zero rated goods • Excise duty (Beer - 40%; wine - 55%; spirits - 65%; tobacco -75%) • Fuel tax (7.21Mt/litre petrol & 4.27/litre diesel)	• VAT (16%) + zero rated goods • Excise duty (alcohol, tobacco petrol, diesel – various tax rates by type)
Social Assistance benefits	
• Basic social support programme • Unconditional regular cash transfers • Target low income households with a household member permanently unable to work due to illness or permanent disability • Age 55+ for females and 50+ for males • Applicant's income has to be equal to or lower than one third of national minimum wage • Amount ranges from Mt310 to Mt610 for one person household and five or more people in household • Direct social support programme • Consists of in-kind subsidies for a limited period of time to various situations of vulnerability e.g. child headed households and households with a member with chronic diseases • Average amounts range from Mt630 per month to Mt2383 per months for one person and more than three people in a household.	• Social cash transfer –urban • Target critically poor households and those with disabled members to reduce intergenerational transmission of poverty • Amount received: ZMW140 every two months • Social cash transfer rural • Home grown school feeding programme • Target is to provide free school meals to learners from public schools • Farmer input support programme • Public welfare assistance scheme

Source: authors' compilation based on countries' SOUTHMOD reports. Notes: SIC – social insurance contributions; these countries also have other taxes such as taxes on gifts tax and fringe benefits, have only included those that are more relevant for this study.

Table A.4: Treatment of income components in SOUTHMOD models – policy year 2015

Income component	SAMOD	MOZMOD	MicroZAMOD	GHAMOD	ETMOD	TAZMOD
Market income	Taken from the data	Taken from the data	Taken from the data	Taken from the data	Taken from the data	Taken from the data
Simulated taxes and social insurance contributions						
Employees SICs	Simulated	Simulated	Simulated	Simulated	Simulated	Simulated
Self-employed SICs	-	Simulated	-	-	-	-
Personal income tax	Simulated	Simulated	Simulated	Simulated	Simulated	Simulated
Turnover tax	-	Simulated	Simulated	Simulated	-	Simulated
Capital income tax	-	-	-	Simulated	-	-
Medical levy	-	-	Simulated	-	-	-
Simulated cash transfers						
Child benefits	Simulated	-	-	-	-	-
Disability benefits	Simulated	-	-	-	-	-
Social assistance benefits	-	Simulated	Simulated	Simulated	-	Simulated
Simulated in-kind transfers						
Direct Social Support Programme	-	Simulated	-	-	-	-
School capitation grant*	-	-	-	Simulated	-	-
Non-simulated tax-benefit instruments						
Contributory public pensions	-	Taken from the data	-	Taken from the data	Taken from the data	-
Social assistance benefits	-	-	-	-	Taken from the data	-

Source: Authors' elaboration based on SOUTHMOD documentation.

Notes: The school capitation grant in Ghana is simulated but not included in the concept of disposable income

Table A.5: Comparison of Simulated Income Distribution Measures with External Sources

	Gini coefficient		Poverty (FGT0, %)*		External Source
	Disposable income	External Source	Disposable income	External Source	
South Africa	63.4	63.0	13.1	18.8	IBRD/WB 2018, using Living Conditions Survey
Mozambique	81.8	54.0	84.0	62.9	World Bank development indicators 2015
Zambia	74.7	69.0	70.5	57.5	Central Statistical office (CSO) 2016 / WB dev. indicators 2015
Ghana	71.0	42.3	31.0	24.2	2016 Ghana Poverty and Inequality Report, using GLSS data
Ethiopia	84.1	33.6	85.5	30.0	WB dev. indicators 2015
Tanzania	80.5	38.0	72.6	49.1	WB dev. indicators 2015

Notes: Per capita income measures of inequality and poverty. External sources based on consumption data rather than income data. Poverty line = $1.90 per day per person. Source: Disposable income simulated by the authors using SOUTHMOD microsimulation models and the associated datasets: the South African National Income Dynamics Study (2014); the Mozambican Inquérito ao Orcamento Familiar (2008-9); the Zambian Living Conditions Monitoring Survey (2010); the Ghana Living Standards Survey, version 6 (2012-13); Ethiopian Living Standards Measurement Study (2013-14) and the Tanzanian Household Budget Survey (2011-12). Source of external data as indicated.

Table A.6: Effect of tax-benefit components on poverty and inequality (ref.: South Africa)

data country:	SA	MZ	MZ	MZ	ZM	ZM	ZM	GH	GH	GH	ET	ET	ET	TZ	TZ	TZ
uprated to:			SA	SA		SA	SA		SA	SA		SA	SA		SA	SA
policy country:	SA	MZ	MZ	SA	ZM	ZM	SA	GH	GH	SA	ET	ET	SA	TZ	TZ	SA
uprated to:			SA			SA			SA			SA			SA	
	(1)	(2)	(2')	(C)	(2)	(2')	(C)	(2)	(2')	(C)	(2)	(2')	(C)	(2)	(2')	(C)
Panel A: Per capita measures																
Δ *Gini Coefficient*																
disp. income - social benefits	-8.0	-1.0	-1.0	-14.0	-1.0	-1.0	-12.4	0.1	0.1	-3.0	-0.3	-0.3	-18.5	-0.60	-0.60	-16.7
disp. income + income tax	-2.7	0.6	0.6	-2.8	-0.6	-0.6	-2.5	-0.3	-0.3	-0.7	-3.6	-3.6	-7.1	-2.1	-2.1	-1.4
disp. income + social contributions	0.0	-0.2	-0.2	0.0	-0.3	-0.3	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0
Δ *Poverty headcount**																
disp. income - social benefits	-22.2	-0.5	-0.5	-1.6	-0.1	-0.1	-6.2	-0.1	-0.1	-7.5	-0.2	-0.2	-6.9	-0.1	-0.1	-17.7
disp. income + income tax	0.0	1.3	1.3	0.3	0.6	0.6	0.0	0.4	0.4	0.0	0.4	0.4	0.0	0.2	0.2	0.0
disp. income + social contributions	0.0	0.2	0.2	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0
Panel B: Equivalised measures**																
Δ *Gini Coefficient*																
disp. income - social benefits	-9.0	-1.0	-1.0	-14.9	-1.0	-1.0	-13.4	0.1	0.1	-3.2	-0.3	-0.3	-19.5	-0.7	-0.7	-18.0
disp. income + income tax	-2.9	0.7	0.7	-2.8	-0.6	-0.6	-2.6	-0.3	-0.3	-0.7	-3.7	-3.7	-7.5	-2.3	-2.3	-1.5
disp. income + social contributions	0.0	-0.1	-0.1	0.0	-0.3	-0.3	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0
Δ *Poverty headcount**																
disp. income - social benefits	-24.1	-1.1	-1.1	-6.4	-0.5	-0.5	-18.7	-0.1	-0.1	-8.2	-0.7	-0.7	-34.1	-0.5	-0.5	-37.2
disp. income + income tax	0.0	2.2	2.2	0.0	0.6	0.6	0.0	0.2	0.2	0.0	0.2	0.2	0.0	0.0	0.0	0.0
disp. income + social contributions	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.0

Notes: South Africa=SA; Mozambique=MZ; Zambia=ZM; Ghana = GH; Ethiopia=ET; Tanzania=TZ. Policy year 2015. * Poverty line = $1.90 per day per person. **OECD scale applied (i.e., 1 assigned to first adult; 0.5 other adults and 0.3 assigned to a child). Source: Author's calculation based on SOUTHMOD microsimulation models and associated data: the South African National Income Dynamics Study (2014); the Mozambican Inquérito ao Orcamento Familiar (2008-9); Zambian Living Conditions Monitoring Survey (2010); the Ghana Living Standards Survey, version 6 (2012-13); the Ethiopian Living Standards Measurement Study (2013-14) and the Tanzanian Household Budget Survey (2011-12) data.

Table A.7: Effect of tax-benefit components on poverty and inequality (ref.: Mozambique)

data country:	MZ	ZM	ZM	ZM	SA	SA	SA	GH	GH	GH	ET	ET	ET	TZ	TZ	TZ
uprated to:			MZ	MZ		MZ	MZ		MZ	MZ		MZ	MZ		MZ	MZ
policy country:	MZ	ZM	ZM	MZ	SA	SA	MZ	GH	GH	MZ	ET	ET	MZ	TZ	TZ	MZ
uprated to:			MZ			MZ			MZ			MZ			MZ	
	(1)	(2)	(2')	(C)	(2)	(2')	(C)	(2)	(2')	(C)	(2)	(2')	(C)	(2)	(2')	(C)
Panel A: Per capita measures																
Δ *Gini Coefficient*																
disp. income - social benefits	-1.0	-1.0	-1.0	-0.2	-8.0	-8.0	-0.2	0.1	0.1	0.0	-0.3	-0.3	-0.3	-0.6	-0.6	-0.7
disp. income + income tax	0.6	-0.6	-0.6	0.1	-2.7	-2.7	-0.4	-0.3	-0.3	-0.3	-3.6	-3.6	-3.4	-2.1	-2.1	-0.3
disp. income + social contributions	-0.2	-0.3	-0.3	-0.2	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	-0.9	-0.1	-0.1	-0.1
Δ *Poverty headcount**																
disp. income - social benefits	-0.5	-0.1	-0.1	0.0	-22.2	-22.2	-0.3	-0.1	-0.1	-0.1	-0.2	-0.2	-0.3	-0.1	-0.1	-0.6
disp. income + income tax	1.3	0.6	0.6	0.6	0.0	0.0	0.0	0.4	0.4	0.1	0.4	0.4	0.0	0.2	0.2	0.1
disp. income + social contributions	0.2	0.1	0.1	0.0	0.0	0.0	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1
Panel B: Equivalised measures**																
Δ *Gini Coefficient*																
disp. income - social benefits	-1.0	-1.0	-1.0	-0.2	-9.0	-9.0	-0.2	0.1	0.1	0.0	-0.3	-0.3	-0.3	-0.7	-0.7	-0.7
disp. income + income tax	0.7	-0.6	-0.6	0.1	-2.9	-2.9	-0.4	-0.3	-0.3	-0.3	-3.7	-3.7	-3.6	-2.3	-2.3	-0.3
disp. income + social contributions	-0.1	-0.3	-0.3	-0.2	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	-0.9	-0.1	-0.1	-0.1
Δ *Poverty headcount**																
disp. income - social benefits	-1.1	-0.5	-0.5	-0.1	-24.1	-24.1	-0.7	-0.1	-0.1	-0.1	-0.7	-0.7	-1.0	-0.5	-0.5	-1.1
disp. income + income tax	2.2	0.6	0.6	0.6	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.2
disp. income + social contributions	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1

Notes: South Africa=SA; Mozambique=MZ; Zambia=ZM; Ghana = GH; Ethiopia=ET; Tanzania=TZ. Policy year 2015. * Poverty line = $1.90 per day per person. **OECD scale applied (i.e., 1 assigned to first adult; 0.5 other adults and 0.3 assigned to a child). Source: Author's calculation based on SOUTHMOD microsimulation models and associated data: the South African National Income Dynamics Study (2014); the Mozambican Inquérito ao Orcamento Familiar (2008-9); Zambian Living Conditions Monitoring Survey (2010); the Ghana Living Standards Survey, version 6 (2012-13); the Ethiopian Living Standards Measurement Study (2013-14) and the Tanzanian Household Budget Survey (2011-12) data.