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# Microsimulation of tax-benefit systems in the Global South: a comparative assessment

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**Abstract:** This paper analyses the effectiveness of tax-benefit systems in reducing poverty and inequality across 13 countries in the Global South. Using national survey data and tax-benefit microsimulation models from the SOUTHMOD project, we provide a cross-country perspective on the redistributive impact of fiscal policies. Our analysis involves decomposing the sources of disposable income across the income distribution and estimating the contributions of different policy instruments to poverty and inequality. Additionally, we assess gender disparities in outcomes, quantify the distributional effects of recent policy changes, and simulate two budget-neutral tax-benefit reforms, focusing on their targeting efficiency and effects on work incentives. Studying the variability of these effects across countries illustrates how better policy design can improve welfare outcomes.

**Key words:** tax-benefit systems, microsimulation, poverty, inequality, social protection, gender, work incentives

**JEL classification:** D31, H23, I38, J22

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# 1 Introduction

Poverty and inequality present significant challenges to sustainable and equitable development, particularly in countries of the Global South. Tax-benefit systems play a crucial role in addressing these issues by redistributing income and providing social protection. However, the effectiveness of tax and social protection arrangements varies considerably across countries. This paper offers a comparative analysis of the redistributive impact of taxes and benefits across 13 countries in the Global South, with the aim of identifying key differences and best practices and providing evidence-based recommendations for policy reforms.

The study covers eight countries in Africa (Ethiopia, Ghana, Mozambique, Rwanda, Mainland Tanzania, Uganda, Zambia, Zanzibar), four in Latin America (Bolivia, Colombia, Ecuador, Peru), and one in Southeast Asia (Viet Nam). These regions face unique economic challenges. While the Latin American countries and Viet Nam have relatively better living standards and lower poverty rates, the African countries, despite recent economic growth, still face severe poverty and have underdeveloped social protection systems. Compared to developed welfare states, all nations in the study further suffer from high levels of inequality, restricted access to social protection and insurance, and limited fiscal space for reforms. The aftermath of the global pandemic has further strained public finances in these economies, highlighting the urgent need for cost-effective policy interventions (see, e.g., Gasior et al. 2022b).

We employ tax-benefit microsimulation models from the SOUTHMOD family, underpinned by nationally representative survey data, which allow for a detailed examination of how fiscal policies affect income distribution. In the analysis, we decompose the sources of disposable income, illuminating the relative roles of market income, social protection benefits, and taxes in shaping distributional outcomes. We further investigate gender disparities and quantify the economic impact of policy changes from 2019 to 2023. Finally, we simulate two illustrative budget-neutral policy reforms to investigate the potential for more effective and equitable policy designs across the countries.

This research contributes to the literature on fiscal policy and inequality in several ways. First, our cross-country perspective, facilitated by employing the full suite of SOUTHMOD models, offers a broad understanding of how tax-benefit systems operate in different institutional contexts within the Global South (see, e.g., Atkinson and Bourguignon 2015; Lustig 2022). By studying countries with varied policy structures and levels of welfare, we can highlight regional differences and identify potential best practices. The nuanced and harmonized modelling of policy rules, together with the availability of granular microdata to underpin the models, allows us to analyse distributional outcomes with precision, going beyond aggregate measures and revealing the differential effects of policy changes on specific population groups. The microsimulation approach also allows for decomposing the impacts of tax and benefit policies on household incomes and income distribution.

Second, our secondary focus on gender provides timely insights for policy-makers, considering the changing dynamics of labour markets and evolving social protection needs in the Global South. Existing literature points to a critical role of gender inequality in influencing economic development, suggesting that addressing gender disparities can have significant economic benefits and contribute to more equitable and sustainable economic growth (Cuberes and Teignier 2014; Santos Silva and Klasen 2021). Despite numerous initiatives to promote gender equality, the lack of commitment to policy implementation continues to pose challenges. By disaggregating

distributional outcomes by gender, we demonstrate the differential impact of fiscal policies on women and men and provide policy-makers with insights for closing these gaps.

Third, our simulations highlight the potential for cost-effective policy reforms to reduce poverty and inequality, also contributing to the long-standing debate on optimal fiscal policy design (see, e.g., Bastagli et al. 2012; Piketty et al. 2014). Most notably, we contribute to debates between targeting and universalism in social protection. The two social protection reforms we model include a universal basic income and a benefit top-up targeting existing recipients, both fully financed by increases in income tax rates. Our analysis draws from Shahir et al. (2023) and Jara and Palacio Ludeña (2024), who use the SOUTHMOD models for Ethiopia and Ecuador, respectively. Both studies evaluate the distributional effects and poverty-reduction efficiency of a set of hypothetical social protection benefits, comparing universal and more targeted approaches.

Fourth, we take advantage of (new) analysis tools available from the EUROMOD modelling software. EUROMOD has been used to develop the SOUTHMOD models and, before that, a set of harmonized microsimulation models for the EU member states and the United Kingdom. In particular, our paper complements existing scant literature highlighting the mechanisms by which taxes and benefits influence work incentives in developing countries (see, e.g., Banerjee et al. 2017). Standard simulations obtained with SOUTHMOD models are static in the sense that they abstract from the behavioural reactions of individuals, such as changes in labour supply that result from tax-benefit reforms. These models can, however, be used to calculate a variety of work incentive indicators. In this study, we complement the ex-ante distributional analysis of the two counterfactual policy reforms by computing marginal effective tax rates (METRs) in the baseline scenario and under the reforms. METR refers to the proportion of a marginal increase in earnings that would be taxed away due to increased social security and tax liabilities and reduced social benefits. This analysis draws from EUROMOD baseline reports (see, e.g., Maier and Ricci 2022), which analyse METRs in the European context, and Jara and Palacio Ludeña (2024), who evaluate the potential effects of hypothetical social assistance reforms using the tax-benefit microsimulation model for Ecuador.

The current paper expands previous comparative work assessing the performance of tax-benefit systems in the Global South based on SOUTHMOD models (see Bargain et al. 2022; Gasior et al. 2022a; Lastunen et al. 2023). Our work extends the scope of these papers by incorporating additional countries, made possible by new microsimulation models, and by examining a number of outcomes in greater detail. The rich work done under the Commitment to Equity (CEQ) research programme, summarized in Lustig (2022), is also closely related. In the current paper, we highlight some of the comparative advantages of the SOUTHMOD approach, which include examining the impacts of policy reforms across time, automized computation of work incentives, and detailed analysis of the impacts of social and tax policy reforms. The latter could also readily be made more (country) specific, since the users of the SOUTHMOD family of models are provided with all the coding of the relevant policy rules, which can be amended in reform analysis by the users. For related training and guidance material, see UNU-WIDER (2024a).

The paper is organized as follows. Section 2 introduces the methodology and data. It also briefly describes the tax and social assistance policies modelled in SOUTHMOD. Section 3 provides the main simulation results, with a cross-country comparative assessment of the tax-benefit systems and the effects of different policy instruments on poverty, inequality, and gender-specific outcomes. Section 4 describes the results from hypothetical reform simulations, including the effects of these reforms on marginal effective tax rates. Section 5 concludes.

## 2 Methodology, country context, and data

Our study uses microsimulation techniques applied to nationally representative household survey data to compute various metrics about the effectiveness of tax-benefit systems in the Global South.

This section provides an introduction to tax-benefit microsimulation modelling in a developing country context and policies modelled in SOUTHMOD (Section 2.1), national survey datasets used in the analysis (2.2), and a description of relevant welfare concepts (2.3).

### 2.1 Tax-benefit microsimulation modelling and policy context

Tax-benefit microsimulation modelling serves as an analytical framework for assessing the distributional and budgetary implications of public policies and policy reforms. The methodology allows for an in-depth examination of the potential effects of tax and social protection policies on income distribution and government budgets, providing policy-makers with evidence-based insights to inform decision-making.

SOUTHMOD is a collection of tax-benefit microsimulation models developed for low- and middle-income countries in the Global South. The models are maintained and managed by the United Nations University World Institute for Development Economics Research (UNU-WIDER), together with partners, including Southern African Social Policy Research Insights (SASPRI) and the International Inequalities Institute at LSE (see UNU-WIDER 2024a for details).

As of May 2024, the SOUTHMOD bundle comprises models for 12 countries, including seven in Africa (Ethiopia, Ghana, Mozambique, Rwanda, Tanzania, Uganda, Zambia), four in Latin America (Bolivia, Colombia, Ecuador, Peru), and one in Southeast Asia (Viet Nam). Notably, the bundle contains separate models for Mainland Tanzania and Zanzibar, bringing the overall model count to 13. All SOUTHMOD models are accessible for non-commercial research purposes, although some restrictions remain regarding access to input data.

SOUTHMOD models have been developed on the open-access EUROMOD software platform (ISER and JRC 2024; for detailed explanations of the model, see Sutherland and Figari 2013). Originally maintained, developed, and managed by the Institute for Social and Economic Research (ISER), since 2021 EUROMOD has been managed by the Joint Research Centre (JRC) of the European Commission, in collaboration with Eurostat and national teams from the EU countries.

Apart from the software, each country model in SOUTHMOD is based on two components: coded policy rules and input microdata. The policies included in the models, presented in Table 2.1, comprise direct and indirect taxes, social insurance contributions, cash benefits, and, in some instances, in-kind benefits. In-kind benefits are excluded from this analysis for the sake of comparability across models.

The policy rules in SOUTHMOD models are generally updated to the existing policies once per year based on national legislation. The models are also harmonized according to common conventions (UNU-WIDER 2024c), allowing for outputs that are comparable across countries. The analysis in this paper is based on the latest policy rules as of 2023. In addition, Section 3.5 compares the current tax-benefit system with the system in place prior to the COVID-19 pandemic in 2019. Where possible, simulation results have been validated against official statistics (details are available in the SOUTHMOD Country Reports; see UNU-WIDER 2024b).

Table 2.1: Summary of modelled policies as of 2023

| Country | Cash benefits | SIC | Direct taxes | Indirect taxes |
|---|---|---|---|---|
| Ethiopia | Productive Safety Net Programme (PSNP, incl. public work and direct support); contributory old-age pension *(from data)* | Employee SIC | Personal income tax (PIT), business profit tax (self-employment) | Value-added tax (VAT), turnover tax (TOT), excise duties |
| Ghana | Livelihood Empowerment Against Poverty (LEAP) transfer programme, Senior High School benefit; contributory old-age pension *(from data)* | Employee SIC | PIT, capital income tax (CIT), presumptive tax | VAT, health insurance and recovery levies, education levy, excise duties |
| Mozambique | Basic Social Subsidy Programme (BSSP); contributory old-age and survivors' pension *(from data)* | Employee and self-employed SIC | PIT, simplified tax on turnover | VAT, excise duties, fuel taxes |
| Rwanda | Vision 2020 Umurenge Programme (VUP, incl. public works and direct support), national old age; disability and survivors' pension (RSSB; *from data*); Rwanda Demobilisation and Reintegration Programme (RDRP; *from data*), and Genocide Survivors Support (FARG; *from data*) | Employee SIC, pensioner health insurance SIC | PIT, presumptive tax, rental income tax (RIT) | VAT, excise duties |
| Tanzania | Productive Social Safety Net (PSSN) basic cash transfer, PSSN conditional cash transfer | Employee SIC | PIT, presumptive tax | VAT, excise duties |
| Uganda | Senior Citizens Grant | Employee SIC | PIT, presumptive tax, RIT, local service tax | VAT, excise duties |
| Zambia | Social cash transfer (SCT) for rural and urban areas, Supporting Women's Livelihood (SWL), Electronic Farmer Input Support Programme (E-FISP); contributory old-age pension *(from data)* | Employee and self-employed SIC | PIT, turnover tax | VAT, excise duties |
| Zanzibar | Productive Social Safety Net (PSSN) basic cash transfer, PSSN conditional cash transfer, Zanzibar Universal Pension Scheme (ZUPS) | Employee SIC | PIT, presumptive tax | VAT, excise duties |
| Viet Nam | Support of school expenses, electricity subsidy, pension benefits for poor older people living alone; contributory old-age pension and various other benefits *(from data)* | Employee SIC | PIT, CIT | VAT, excise duties (special sales tax) |
| Bolivia | Juancito Pinto transfer, Juana Azurduy transfer, Renta Dignidad (non-contributory old-age pension); contributory pensions and various other benefits *(from data)* | Employee and self-employed SIC | Employee and self-employed PIT; property tax *(from data)* | VAT |
| Colombia | Unemployment benefit, social assistance subsidized pension (Colombia Mayor), social assistance child CCT (Familias en Acción), social assistance tertiary education (Jóvenes en Acción), VAT return transfer; contributory pensions and various other benefits *(from data)* | Employee and self-employed SIC, pensioner and other SIC | PIT; property tax and car tax *(from data)* | VAT, excise duties (consumption tax) |
| Ecuador | Human Development Transfer, Disability carer benefit (Joaquín Gallegos Lara transfer); contributory pensions and other benefits *(from data)* | Employee and self-employed SIC | PIT; other direct taxes *(from data)* | VAT, excise duties |
| Peru | Social assistance old-age, social assistance conditional cash transfer; contributory pensions *(from data)* | Employee and self-employed SIC | PIT | VAT, excise duties (special consumption tax) |

Note: in-kind benefits such as school meals or food baskets that are simulated in SOUTHMOD models are excluded from the analysis and thus not shown in this table. Similarly, employer-related SIC are simulated in the models but not included in the analysis. Some of the listed policies cannot be simulated due to data limitations; instead, reported monetary amounts for individuals or households are obtained directly from the survey data (specified *'from data'*). SIC = social insurance contributions.

Source: authors' representation based on SOUTMOD A2.0.

## 2.2 Data

The input datasets underlying the models are derived from nationally representative household surveys and, like the modelling, are standardized across countries. The datasets contain gross market incomes, consumption expenditures, labour market information, and other socio-economic characteristics at the individual and household level. Many of the variables are used in the models for specifying tax and benefit rules needed for simulations.

Table 2.2 lists the survey datasets and data waves used in the respective models in the study. Priority was given to datasets that were surveyed before the COVID-19 pandemic to assess tax-benefit systems in 'normal' times rather than during these exceptional times.

Table 2.2: Summary of datasets and country models

| Country | Dataset | Wave | Model version |
|---|---|---|---|
| Ethiopia | Ethiopian Socioeconomic Survey (ESS) | 2018/19 | ETMOD v3.1 |
| Ghana | Ghana Living Standard Survey (GLSS 7) | 2017 | GHAMOD v2.7 |
| Mozambique | Inquérito ao Orçamento Familiar (IOF) | 2014/15 | MOZMOD v3.0 |
| Rwanda | Integrated Household Living Conditions Survey (EICV) | 2016/17 | RWAMOD v1.1 |
| Tanzania | Tanzania Household Budget Survey (HBS) | 2017/18 | TAZMOD v2.9 |
| Uganda | Uganda National Household Survey (UNHS) | 2016/17 | UGAMOD v2.1 |
| Zambia | Living Conditions Monitoring Survey (LCMS) | 2015 | MicroZAMOD v2.16 |
| Zanzibar | Zanzibar Household Budget Survey (HBS) | 2019/20 | ZANMOD v1.1 |
| Viet Nam | Viet Nam Household Living Standards Survey (VHLSS) | 2017/18 | VNMOD v3.4 |
| Bolivia | Encuestas de Hogares (EH) | 2019 | BOLMOD v2.1 |
| Colombia | Great Integrated Household Survey (GEIH) | 2019 | COLMOD v2.4 |
| Ecuador | Encuesta Nacional de Empleo, Desempleo y Subempleo (ENEMDU) | 2019 | ECUAMOD v4.3 |
| Peru | Encuesta Nacional de Hogares (ENAHO) | 2019 | PERUMOD v2.5 |

Source: authors' compilation based on SOUTHMOD Country Reports (UNU-WIDER 2024b).

## 2.3 Description of welfare concepts

The analysis focuses on poverty and inequality.

For poverty, we use the Foster-Greer-Thorbecke (FGT) headcount indicator, FGT(0), to measure the percentage of individuals below established poverty lines. Additionally, we take advantage of the poverty gap index, FGT(1), to assess the intensity of poverty. The poverty gap denotes the average shortfall of the impoverished from the poverty line.

The poverty thresholds used are the World Bank's International Extreme Poverty Line ($2.15 PPP 2017) and the Upper-Middle Income Class Poverty Line ($6.85 PPP 2017), with an emphasis on the former. The poverty lines have been adjusted using the correction described in Ferreira et al. (2016) to accurately reflect the relative purchasing power between countries in the main year of analysis (2023). For instance, $pov\_line_{2023} = pov\_line_{2017} \times CPI_{2023}/CPI_{2017} \times PPP_{2017}/PPP_{2023}$, where CPIs refer to national consumer price indices and PPPs refer to the Purchasing Power Parity (PPP) conversion factors from the World Bank (2024). The values are available in Tables A3 and A4 in the Appendix.

In Table 3.1, national definitions of the poverty rate (relying on consumption data in Africa) serve as a benchmark, aligning our results with official national poverty estimates.

Inequality is assessed using the Gini coefficient, with 0 representing perfect equality and 100 representing maximum inequality. For a nuanced view of income distribution, we supplement the Gini with mean and median incomes, quintile shares, and, as part of analysing gender-specific inequality outcomes, Theil's T index (or Theil's first measure). The index quantifies inequality by examining the logarithmic difference between the actual income distribution and an equal distribution among segments of the population.

All monetary estimates are expressed in international dollars, using the PPP factors. PPP ensures comparability by adjusting for the relative cost of goods and services across nations.

Recognizing the influence of household composition on welfare measures, we consistently apply a per capita equivalence scale. This standardizes comparisons across countries with varying household sizes and age structures.

The distributional analysis is applied to three income concepts:

i. **Original income:** Market income (income before taxes and benefits), which is made up of employment income, self-employment income (including agricultural income), and other market income;[1]
ii. **Disposable income:** Income available after benefits, direct taxes and social insurance contributions (SIC), where transfers are limited to public pensions (where available) and cash benefits (leaving out in-kind benefits), while SIC include contributions by employees and the self-employed; and
iii. **Disposable income after indirect taxes**, namely after VAT and excise duties, reflecting the final purchasing power of individuals and households.

## 3 Baseline results

The first set of results focuses on baseline findings, i.e., current tax-benefit systems in the countries. They provide a comparative overview of standard distributional indicators (Section 3.1), insights into the importance of different income sources and tax-benefit elements (3.2), the impact of the tax-benefit system on inequality and poverty (3.3), the role of gender in distributional outcomes (3.4), and the effects of policy changes between 2019 and 2023 on the income distribution (3.5).

### 3.1 An overview of standard indicators

Table 3.1 lists median and mean disposable income, the Gini coefficient, and poverty gaps and poverty rates based on international and national definitions[2].

The outcomes highlight significant economic disparities between countries in the Global South, with Latin American countries and Viet Nam in one group and African countries in another.

[1] A full list of country-specific income sources can be found in SOUTHMOD Country Reports (UNU-WIDER 2024b).

[2] See Table A2 in the Appendix for the same outcomes for selected sub-population groups based on age and type of income earned.

Zanzibar stands as an exception among the African countries studied, with some outcomes more closely aligned with those of Latin American countries and Viet Nam.

African countries are characterized by significantly lower median and mean disposable incomes as well as very high levels of income inequality. Ethiopia has the highest estimated Gini coefficient of 83.2. African countries also report dramatically higher poverty rates and gaps, with most individuals living under $2.15 per day.

Conversely, Latin American countries and Viet Nam display much higher median and mean disposable incomes and substantially lower Ginis, which are between 43 and 52 in all countries. Poverty rates and gaps in these countries are similarly much lower, with Ecuador showing a poverty rate as low as 3.6 per cent and a poverty gap of 1.4 per cent.

Table 3.1: Standard indicators based on equivalized disposable household incomes, 2023

| **Country** *(Unit)* | **Median annual disposable income** *($)* | **Mean annual disposable income** *($)* | **Gini coefficient** *(0–100)* | **Poverty gap** *(<$2.15/day, %)* | **Poverty rate** *(<$2.15/day, %)* | **Poverty rate** *(<$6.85/day, %)* | **Poverty rate** *(national definition, %)* |
|---|---|---|---|---|---|---|---|
| Ethiopia | 155 | 949 | 83.2 | 72.3 | 88.1 | 97.2 | 36.5[a] |
| Ghana | 772 | 2,983 | 78.9 | 36.8 | 53.2 | 79.4 | 24.9[a] |
| Mozambique | 100 | 677 | 80.2 | 69.4 | 84.2 | 96.1 | 81.5[a] |
| Rwanda | 337 | 1,041 | 69.7 | 56.3 | 79.4 | 93.7 | 37.9[a] |
| Tanzania | 285 | 919 | 71.4 | 55.9 | 73.5 | 93.6 | 26.3[a] |
| Uganda | 358 | 867 | 66.5 | 53.4 | 76.2 | 94.5 | 21.9[a] |
| Zambia | 334 | 1,190 | 72.3 | 54.8 | 73.9 | 90.6 | 36.4[a] |
| Zanzibar | 1,149 | 1,472 | 43.4 | 19.7 | 42.0 | 90.1 | 35.8[a] |
| Viet Nam | 4,630 | 6,123 | 43.6 | 3.1 | 6.4 | 31.7 | 10.4[b] |
| Bolivia | 5,176 | 6,932 | 43.4 | 2.7 | 5.5 | 24.7 | 37.4[b] |
| Colombia | 4,797 | 7,761 | 51.2 | 2.3 | 5.7 | 33.2 | 39.3[b] |
| Ecuador | 3,860 | 5,624 | 45.7 | 1.4 | 3.6 | 33.0 | 22.6[b] |
| Peru | 3,594 | 5,007 | 47.3 | 5.7 | 12.2 | 44.6 | 38.2[b] |

Note: monetary amounts are presented in international dollars. The last column includes headcount poverty rates based on national poverty lines, national definitions of equivalence scales, and, in the case of African countries, outcomes based on consumption instead of income. Specifically, [a] refers to consumption-based estimates and [b] to income-based estimates.

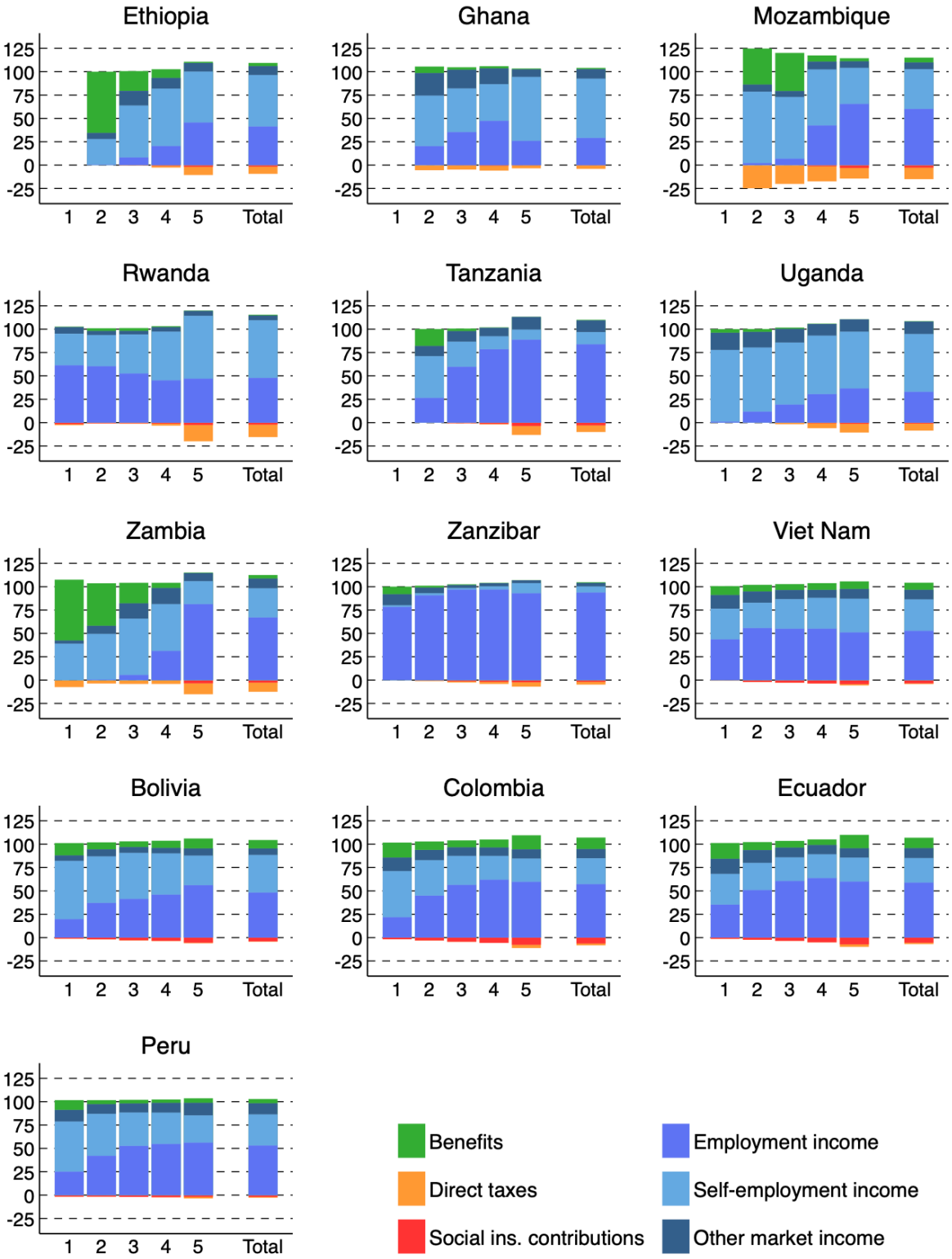
Source: authors' calculations based on SOUTHMOD A2.0. International dollar equivalents are derived using the Purchasing Power Parity (PPP) conversion factors provided by the World Bank.

## 3.2 Decomposition of disposable income

Figure 3.1 shows the relative contribution of different income components by income groups. Individuals are ranked according to their equivalized disposable household income and divided into income quintiles. The mean disposable income of each quintile is decomposed into the contribution of benefits, direct taxes, social insurance contributions (SIC), employment income, self-employment income, and other market income.

The decomposition highlights important differences in the characteristics of tax-benefit systems and the role of market incomes across the Global South.

Figure 3.1: Decomposition of equivalized disposable household incomes by income group, 2023




Note: the quintiles are based on equivalized disposable household incomes. Results show the relative share of each income component on the overall disposable income in the income group. The mean disposable income of quintile 1 is equal to zero in Ghana, Mozambique, and Tanzania.

Source: authors' calculations based on SOUTHMOD A2.0.

First, direct taxes play a more pronounced role in African countries, compared to social insurance contributions in Latin America and Viet Nam. The role of SIC in the latter countries can be explained by the mixture of a relatively large formal sector (compared to sub-Saharan Africa) and high social security contribution rates. In Bolivia, for example, the contribution rate for pensions alone is set at 10 per cent of labour income. In Colombia and Ecuador, the shares of adults aged 18 to 64 who pay social contributions are 70.1 and 56.7 per cent, respectively, compared to 40.5 per cent on average in the 13 countries in the study.

Households in higher income groups usually bear the tax burden in the African countries. Mozambique presents a different pattern, as direct taxes are paid mainly by the middle class. This is explained by the fact that numerous individuals in the middle quintiles are agricultural workers who pay a flat tax on their turnover. This tax often has a strongly negative impact on their net incomes. In Latin American countries, the small role of direct taxes is explained especially by the large exempt income bracket that applies to personal income tax calculations so that, as a result, effectively only individuals in the top quintile pay income tax.

Second, benefits play a more pronounced role at the bottom of the distribution in African countries, compared to their role across the distribution in the other countries. Especially in Zambia, Ethiopia, and Mozambique, social-assistance-related benefits represent a non-negligible share of the disposable income of poor households. The role of social-security-related benefits is higher in Latin American countries, which explains their contribution to mean incomes across the distribution.

Third, incomes from self-employment (including agricultural income) play a more important role than incomes from employment in most African countries. The exceptions are Tanzania (including Zanzibar) and Rwanda. The contribution of income from employment increases for higher-income groups. This is also the case in Latin American countries and Viet Nam. The contribution of income from self-employment is typically lower than in African countries.

It is noteworthy that in some African countries, where a significant share of the population lives off small-scale agriculture and other informal jobs, a large number of individuals report incomes of zero or close to zero. This explains the absence of disposable income decomposition for the bottom quintiles in Ethiopia, Ghana, Mozambique, and Tanzania.

### 3.3 Inequality and poverty impact of tax-benefit systems

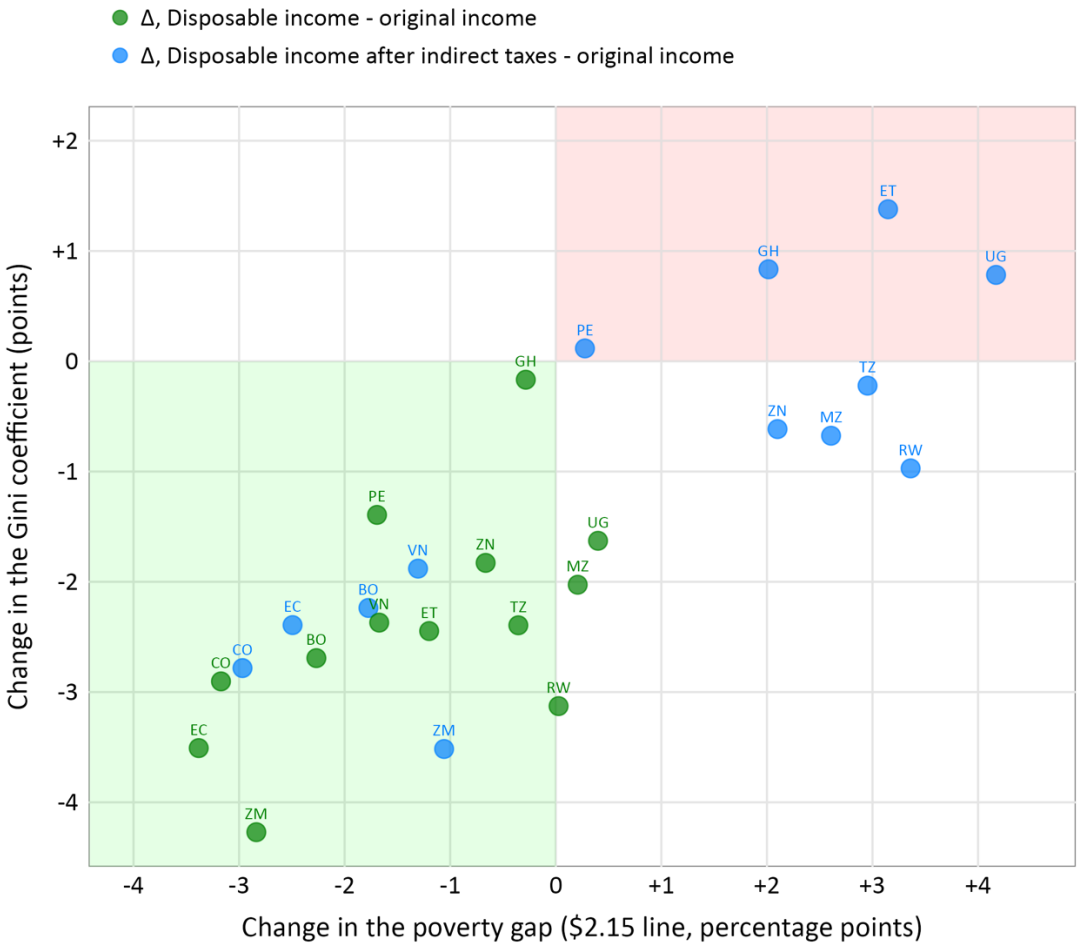
*Overall effects*

The following figures focus on the impact of taxes and benefits on inequality (Gini coefficient) as well as the poverty rate and poverty gap (using the $2.15/day poverty line). Results for other poverty thresholds and supplemental graphs are available in the Appendix. The indicators based on disposable income (as presented in Section 3.1) are compared to the same indicators based on original income (market incomes before benefits, taxes, and SIC). The difference between the two income concepts shows the impact of the tax-benefit systems.

Additionally, the figures include results based on a third income concept—disposable income after indirect taxes. Indirect taxes often play a more pronounced role than direct taxes in the Global South. Thus, including them in this part of the analysis provides further insights into the distributional effects of tax-benefit systems in these countries.

The main results are summarized in Figure 3.2, which shows a scatter plot comparing the inequality impacts (using Gini) and poverty impacts (using poverty gaps) of tax-benefit systems. Measures based on disposable income both before and after indirect taxes are included.

Figure 3.2: The impact of tax-benefit systems on the Gini coefficient vs poverty gap (<$2.15/day), 2023

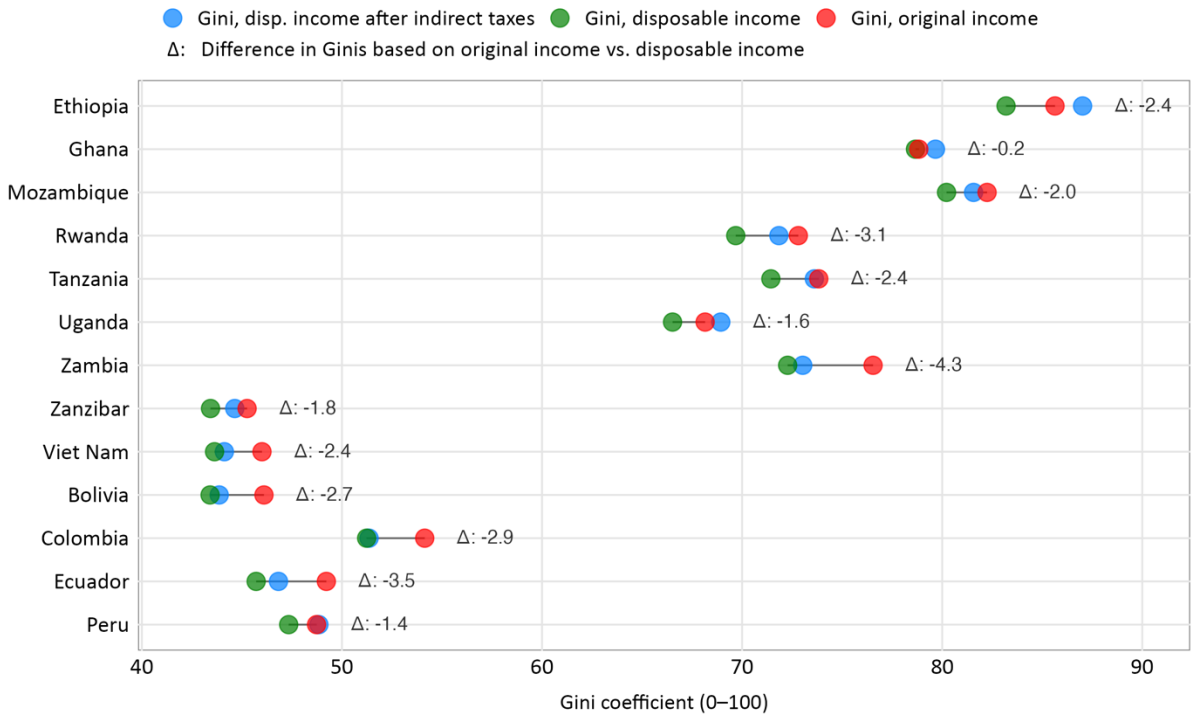



Source: authors' calculations based on SOUTHMOD A2.0.

Figure 3.3 shows the role of the tax-benefit system in reducing inequality. Comparing the Gini coefficient of original income (red dots) with the Gini of disposable income (green dots) shows that all tax-benefit systems reduce the Gini coefficient. The Ghanaian tax-benefit system has the lowest impact with 0.2, and the Zambian system has the highest impact with 4.3. Different from the results presented before, there is no clear geographical divide in the tax-benefit systems' impact on inequality.

This changes after indirect taxes are also considered (blue dots). Indirect taxes lead to an increase in inequality in Ethiopia, Ghana, Uganda, and Peru, or Gini coefficients close to those of original income in Mozambique, Tanzania, and Zanzibar. Indirect tax payments would most likely appear less regressive against consumption than income. While revenues from indirect tax may, of course, also finance pro-poor spending, relying more on direct tax instruments would be better aligned with redistributive goals, at least in sub-Saharan Africa. This is less the case for Viet Nam and the Latin American countries, except for Peru. In these countries, inequality increases after considering indirect taxes but is still close to the outcomes based on disposable income.

Figure 3.3: The inequality impact of tax-benefit systems using the Gini coefficient, 2023



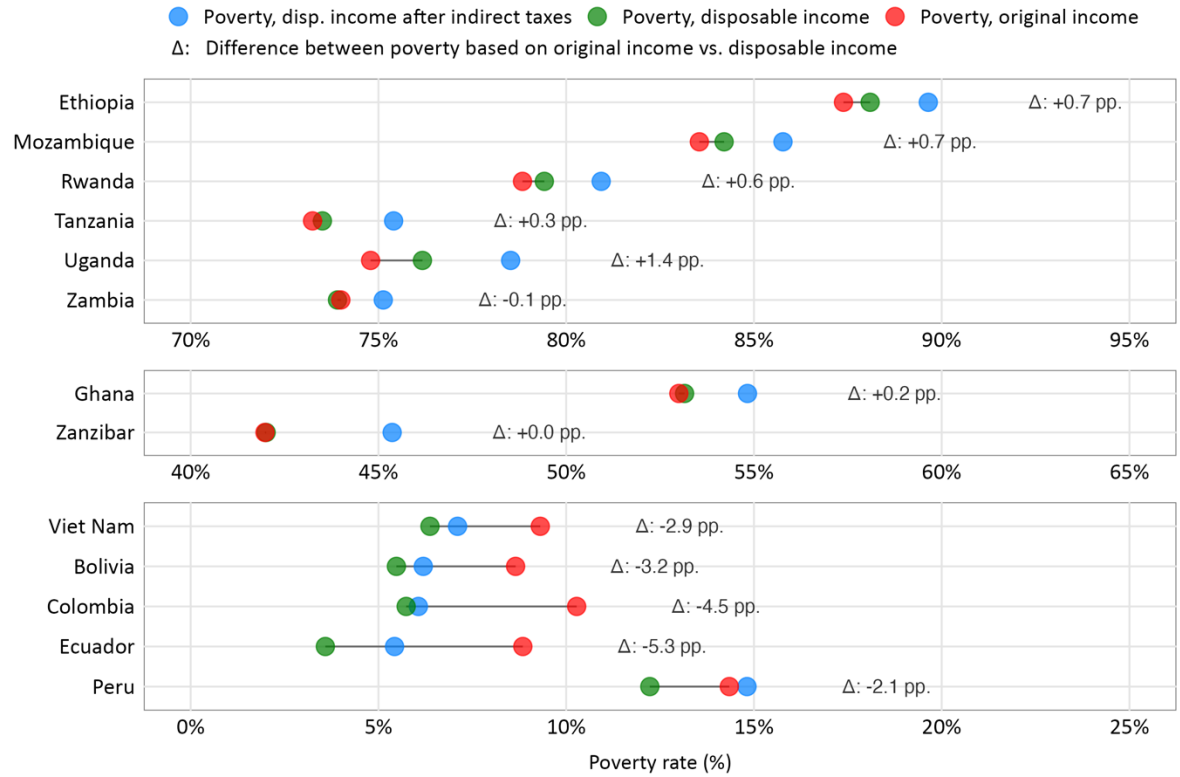

Source: authors' calculations based on SOUTHMOD A2.0.

Figure 3.4 provides the corresponding contributions of tax-benefit systems to the poverty rate in each country, using the international $2.15/day poverty line. Not accounting for indirect taxes, tax and social protection policies are estimated to increase poverty rates in all African countries (except for Zambia) and reduce them in Latin America and Viet Nam. Accounting for indirect taxes further increases poverty rates in African countries and reduces the positive impact of the tax-benefit system in Latin America and Viet Nam.

Notably, however, a sizeable part of the negative effects of tax-benefit systems on inequality and poverty, when accounting for indirect taxes, results from the fact that indirect taxes are likely over-estimated in the models; poorer households disproportionately spend on informal stores that evade or are not subject to indirect taxes (see, e.g., Bachas et al. 2023), which cannot be currently accounted for in the models.

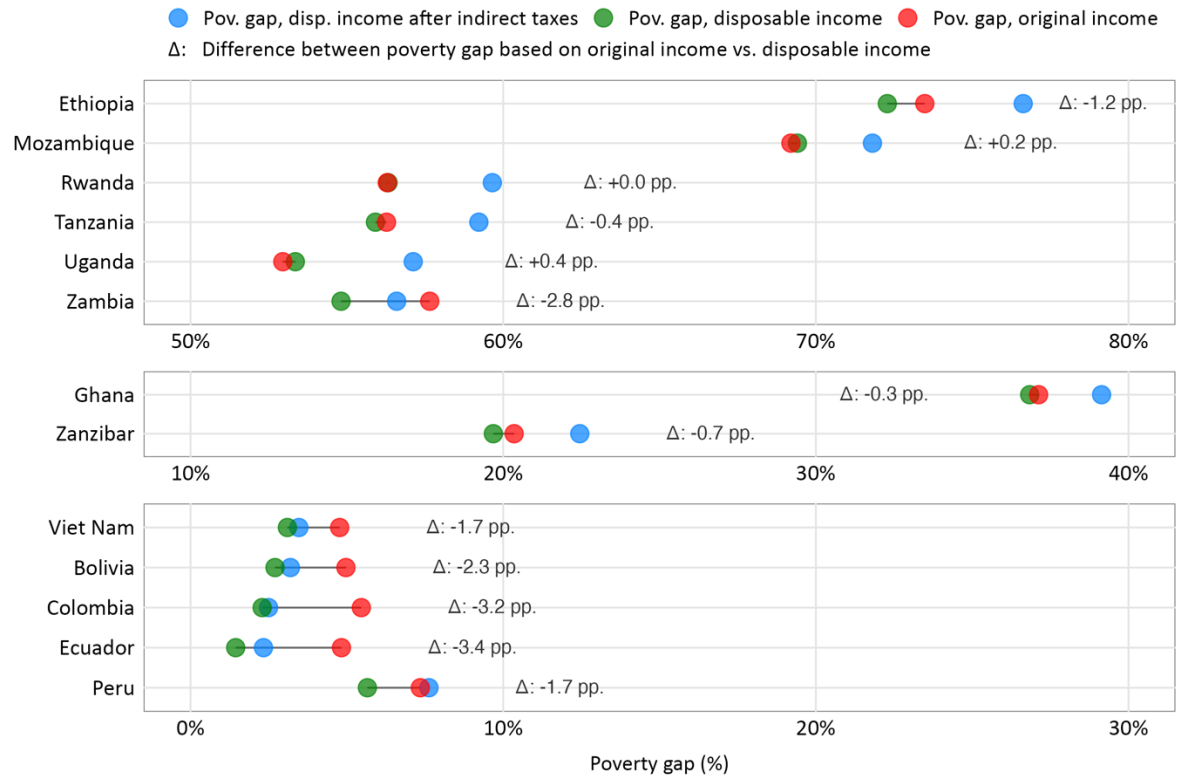
Finally, Figure 3.5 plots the contributions of tax-benefit systems to the estimated poverty gaps, again using the $2.15/day line. The conclusions are similar to the poverty rate estimates for Latin American countries and Viet Nam but different for some African countries. Even though the tax-benefit system increases the poverty rate in Ethiopia, Ghana, and Tanzania, it reduces the poverty gap. Furthermore, the adverse effects on poverty in Mozambique, Rwanda, and Uganda are negligible when focusing on the poverty gap. Thus, even though the tax-benefit systems do not show large effects on the poverty rate, they do manage to move households closer to the poverty line.

Figure 3.4: The poverty impact of the tax-benefit systems using poverty rate (<$2.15/day), 2023




Source: authors' calculations based on SOUTHMOD A2.0.

Figure 3.5: The poverty impact of the tax-benefit systems using poverty gap (<$2.15/day), 2023




Source: authors' calculations based on SOUTHMOD A2.0

*Marginal contributions of policy instruments*

The overall effects presented above can be further decomposed into contributions of pensions, social benefits, SIC, and direct taxes. The visualizations in Figures 3.6 and 3.7 help to understand how different tax-benefit elements contribute to the presented impact of the tax-benefit system and how this differs in terms of inequality versus poverty impact. The effects of indirect taxes are not discussed here but are available in the Appendix.

The decomposition is achieved by computing the respective indicator first based on disposable income and then recalculating it after omitting pensions, benefits, direct taxes, and SIC one at a time from the calculation of disposable income. The graph shows the change in the indicator without the policy in focus.

Starting with pensions shows that their effect on inequality is very small across countries. The largest impact can be found in Peru and Viet Nam where the Gini coefficient is reduced by about 0.5 points. Both countries comprise a generous pension system that covers a large share of the elderly population. Turning to the poverty indicators shows that pensions contribute to significant decreases in the poverty rate and poverty gap in Colombia and Ecuador. The two countries have the most generous pension systems in terms of aggregate spending, as total pensions amount to 12.6 and 10.9 per cent of total earnings, respectively, which can be compared with the average of 3.5 per cent in the 13 countries in the study.

Across countries, benefits other than pensions play a more pronounced role. This is the case for decreasing inequality as well as poverty rate and gap. However, the magnitude differs. Inequality-reducing effects of benefits are comparably small in Ghana, Rwanda, Uganda, and Zanzibar. Effects are furthermore small in terms of reducing poverty rate across African countries, apart from Zambia. Instead, benefits often play a more important role in reducing the poverty gap in these countries. This is different in Latin American countries and Viet Nam where effects on the poverty gap are generally smaller than on the poverty rate.

The strong performance of benefits in Zambia is largely due to a proxy means-tested social cash transfer. Households with a higher likelihood of being vulnerable are eligible in certain cases for a social assistance benefit. However, it needs to be emphasized that even though the Zambian tax-benefit system manages to improve the social situation of households, inequality and poverty are still very high. While social-assistance-related benefits move people closer to the poverty line, they do not lift a large share of the poor above the poverty line. This is driven by benefit amounts that are not sufficiently generous as well as notable gaps in coverage (Gasior et al. 2021).

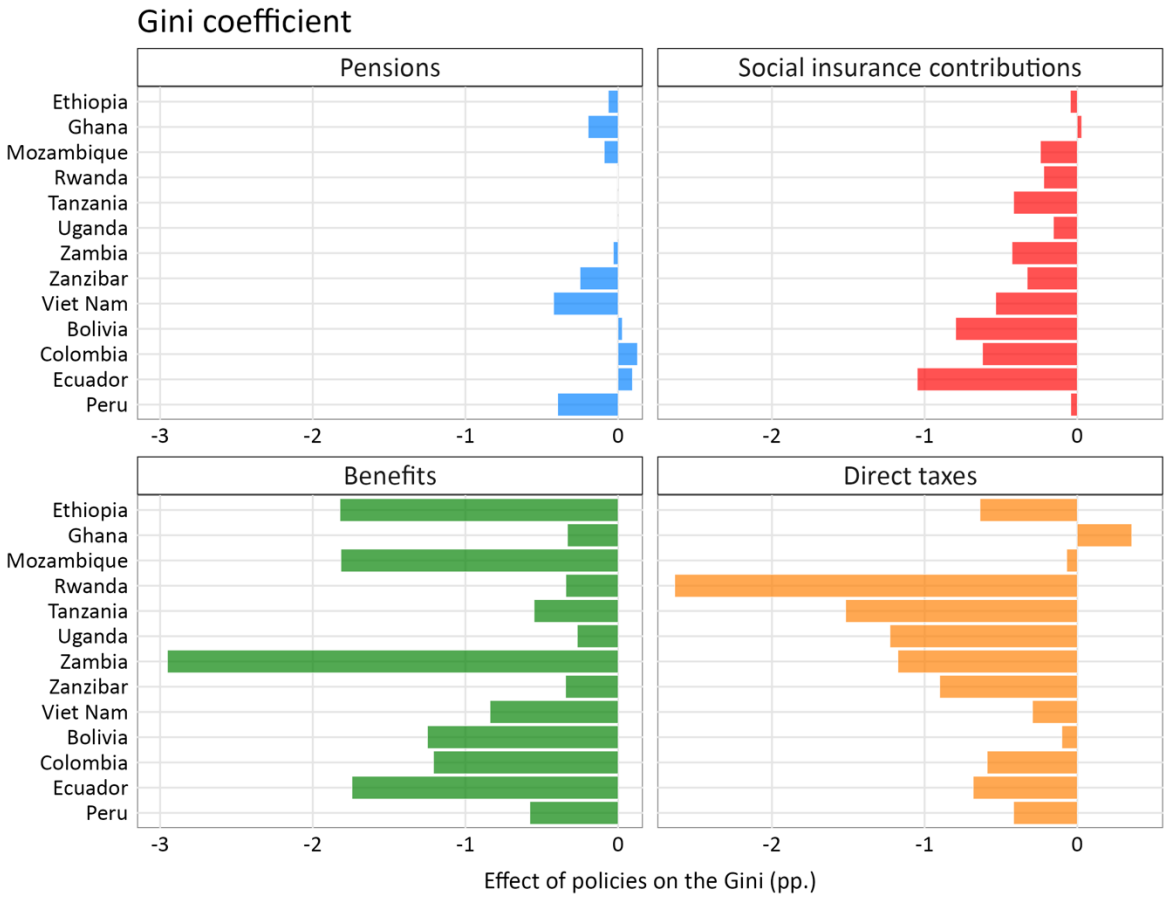
In terms of poverty rate reduction, the benefits in Ecuador stand out as they allow a decrease of percentage points, mainly thanks to the generous Human Development Transfer ('*Bono de Desarrollo Humano*'). This benefit is also proxy-means tested and targets three population sub-groups: families with children younger than 18 years, elderly adults who do not receive any other pension, and individuals with a disability and no other pension. Besides population characteristics used to compute a welfare index, eligible families and individuals must meet specified criteria, such as school attendance, health checks, and refraining from child labour.

Social security contributions and direct taxes slightly reduce inequalities and increase poverty in most countries. This result is driven by the large share of social security contributions and direct taxes paid by formally employed workers who, on average, have higher earnings than the rest of the population. As some formal workers do, however, belong to relatively poor households, SIC and direct taxes increase the poverty rate and the poverty gap. This effect is known as the 'impoverishment' of tax-benefit systems (Higgins and Lustig 2013) and is the main cause of the

increase in poverty rate when comparing original incomes with disposable income in Ethiopia, Mozambique, Rwanda, and Uganda.

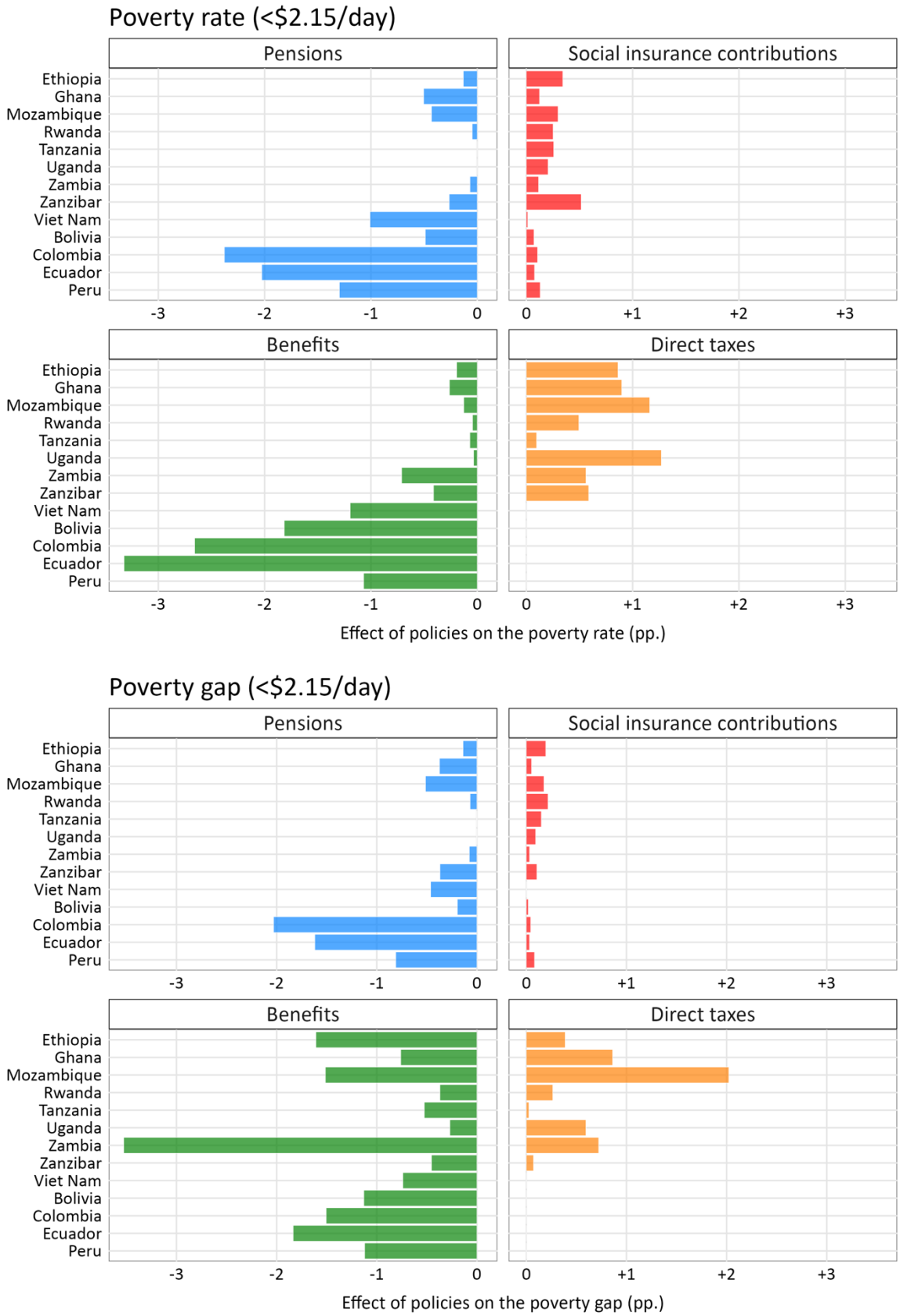
The only exception to the inequality effect of direct taxes and SIC is Ghana, where both instruments slightly increase inequalities, as can be seen in Figure 3.6. The burden of direct taxes in Ghana is less concentrated at the top quintile: only 68.6 per cent of direct taxes are paid by the 20 per cent of richest households, while the average in the 13 countries is 87.8 per cent. This can be explained by the fact that self-employment income, which is in large part earned by the richer households, is largely untaxed in Ghana, as it is usually earned informally and undeclared. In the four Latin American countries, direct taxes have no effect on poverty. This is due to the presence of a high exempted threshold in the design of personal income tax, which as a result, excludes a large proportion of the population from income tax payments.

Figure 3.6: Decomposed contributions of taxes and benefits to the Gini coefficient, 2023




Source: authors' calculations based on SOUTHMOD A2.0.

Figure 3.7: Decomposed contributions of taxes and benefits to the poverty rate and gap (<$2.15/day), 2023




Source: authors' calculations based on SOUTHMOD A2.0.

## 3.4 Gender differences

Table 3.2 shows gender differences in poverty rate and poverty gap using the international $2.15 per day poverty threshold. Results are presented for the gender of individuals as well as for individuals who live either in a female-headed or male-headed household.[3]

The results highlight whether women or men are more likely to live in households with equivalized disposable incomes below the poverty threshold and the extent to which the gender of the household head matters for the situation of the household. While gender is an interesting lens for analysing the role of the welfare state, it is only one example of how tax-benefit microsimulation models can be used to assess the situation of population groups and specific vulnerable groups.

Table 3.2: Gender differentials in poverty rates and gaps, 2023

| | Poverty rate | | | | Poverty gap | | | |
|---|---|---|---|---|---|---|---|---|
| | *Individual level* | | *Household heads* | | *Individual level* | | *Household heads* | |
| | **Higher rate among** | **Women-men diff., pp. (%)** | **Higher rate among** | **Women-men diff., pp. (%)** | **Higher gap among** | **Women-men diff., pp. (%)** | **Higher gap among** | **Women-men diff., pp. (%)** |
| Ethiopia | Women | +0.8 (+1%) | Men | -0.5 (-1%) | Women | +0.5 (+1%) | Men | -1.2 (-2%) |
| Ghana | Women | +2.2 (+4%) | Women | +7.9 (+15%) | Women | +0.8 (+2%) | Women | +11.9 (+22%) |
| Mozamb. | Women | +1.0 (+1%) | Women | +4.7 (+5%) | Women | +1.0 (+1%) | Women | +6.1 (+8%) |
| Rwanda | Women | +2.6 (+3%) | Women | +10.7 (+13%) | Women | +2.6 (+4%) | Women | +12.3 (+19%) |
| Tanzania | Women | +1.6 (+2%) | Women | +9.5 (+12%) | Women | +1.5 (+3%) | Women | +9.2 (+15%) |
| Uganda | Women | +1.0 (+1%) | Women | +6.8 (+9%) | Women | +0.5 (+1%) | Women | +4.2 (+8%) |
| Zambia | Women | +0.7 (+1%) | Women | +3.8 (+5%) | Men | -0.1 (-0%) | Women | +12.5 (+18%) |
| Zanzibar | Women | +2.6 (+6%) | Women | +12.7 (+27%) | Women | +1.8 (+9%) | Women | +7.8 (+34%) |
| Viet Nam | Men | -0.3 (-5%) | Men | -3.5 (-131%) | Men | -0.2 (-6%) | Men | -1.9 (-181%) |
| Bolivia | Men | -0.4 (-8%) | Men | -1.2 (-33%) | Men | -0.2 (-9%) | Women | +0.3 (+11%) |
| Colombia | Women | +0.4 (+6%) | Women | +1.2 (+20%) | Women | +0.1 (+6%) | Women | +0.7 (+25%) |
| Ecuador | Men | -0.1 (-2%) | Men | -0.6 (-22%) | Men | -0.0 (-3%) | Women | +0.2 (+10%) |
| Peru | Women | +0.7 (+5%) | Men | -0.1 (-1%) | Women | +0.4 (+6%) | Women | +0.5 (+7%) |

Note: results are based on the $2.15/day poverty line. Individual gender refers to the gender of individuals, Gender of household head refers to all individuals living in a household where the head is either a woman or a man.

Source: authors' calculations based on SOUTHMOD A2.0.

The table underlines that, in Africa, extreme poverty is more prevalent among women and individuals living in female-headed households. This is not the case in Latin America and Viet Nam, where men and male-headed households are often faced with higher poverty rates.

While gender differences are comparably small by individual gender across countries, the gender of the household head seems to be quite important in African countries. Individuals living in female-headed households in Rwanda and Tanzania (including Zanzibar) have a 10-percentage point higher poverty rate than individuals living in male-headed households. Even though male-headed households have a higher poverty rate in Ethiopia, Viet Nam, Bolivia, Ecuador, and Peru, the difference to female-headed households is mostly very small in absolute terms.

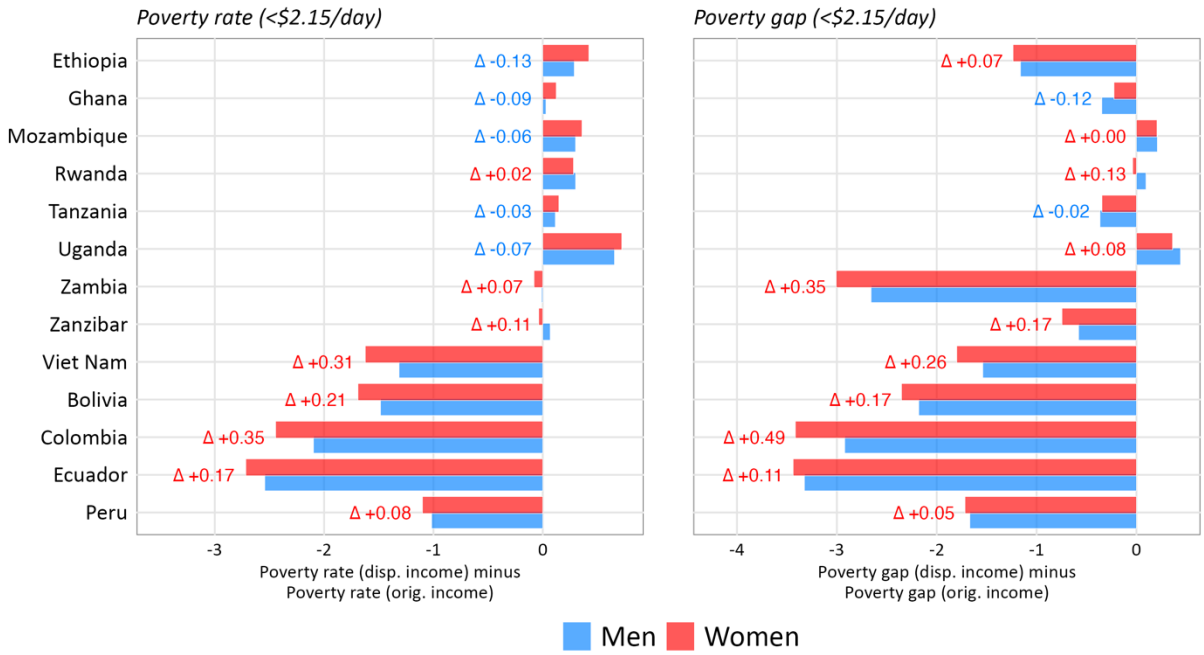
[3] Household head definitions are based on either original data definitions (mostly in African countries) or selecting the highest-earning member as the head (Latin American countries).

Gender differences in the poverty gap are typically very similar to gender differences in poverty rate, with a few notable exceptions. Differences in the poverty gap are more pronounced for female-headed households in Zambia, meaning that their income is much further from the poverty line than in male-headed households. Additionally, the higher poverty rate of male-headed households turns into a higher poverty gap for female-headed households in Bolivia, Ecuador, and Peru. Note, however, that gender differences are generally very small in these three countries.

Figure 3.8 plots the contribution of the entire tax-benefit system to the poverty rate and gap by individual gender. The bars (red for women and blue for men) compare the poverty measures based on original income with those based on disposable income. The delta labels indicate the absolute differences between effects for men and women. The labels are positive and coloured red when tax-benefit systems are more beneficial (or less detrimental) for women, and vice versa.

The results show that the impact of the tax-benefit system is very similar for men and women in Africa. This is the case for the poverty rate and the poverty gap. Gender differences are slightly more pronounced in Latin America and Viet Nam. The tax-benefit system in these countries reduces the poverty risk and poverty gap of women more than it does for men.

Figure 3.8: The poverty impact of the tax-benefit system by gender, 2023

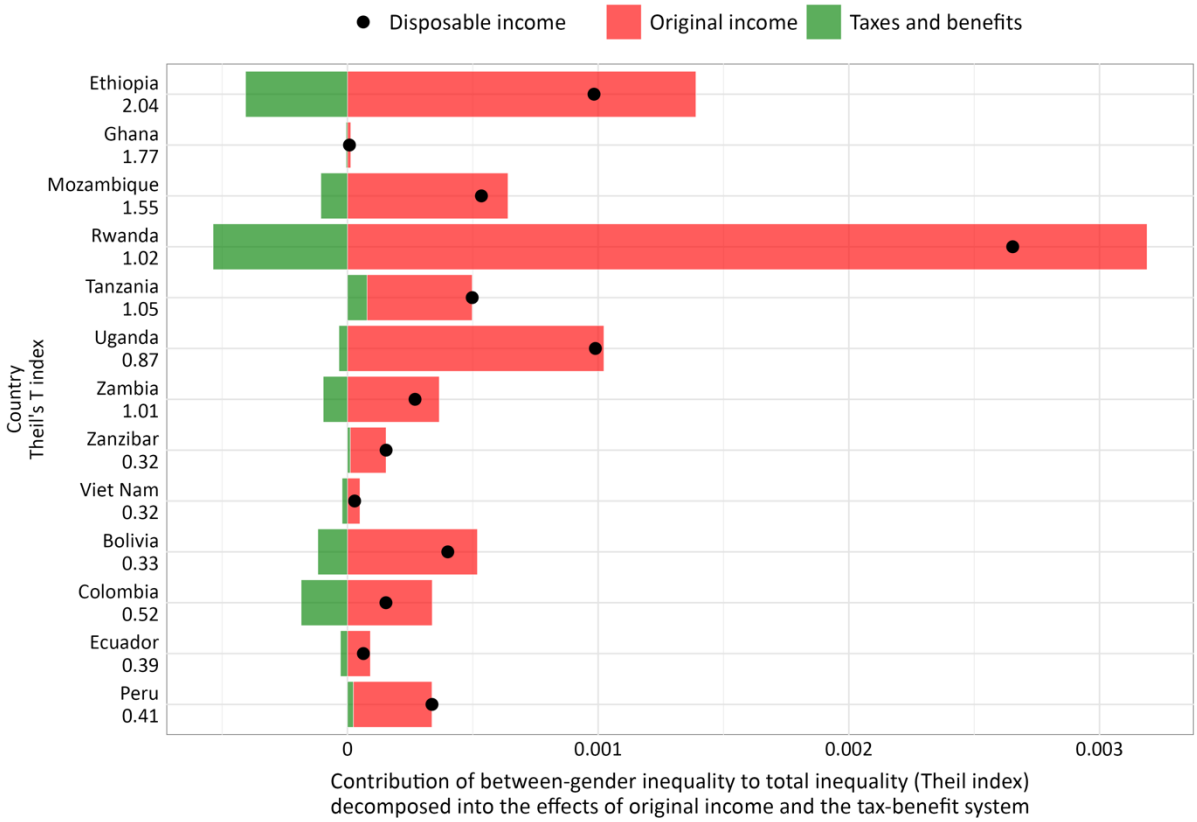



Note: the outcomes are derived based on equivalized disposable household income for either women (red) or men (blue).

Source: authors' calculations based on SOUTHMOD A2.0.

To shed further light on the role of gender differences and the tax-benefit system, Figure 3.9 shows a two-dimensional decomposition of the Theil index (T index or Theil's first measure) as per Giammatteo (2007). The Theil index shows the extent to which disposable income inequalities in the country are driven by gender and whether this is due to differences in original incomes or due to differences in the tax-benefit system. The overall inequality is included next to the country labels while the black dots in the graph show the extent to which this overall level is explained by gender differences.

Figure 3.9: Theil decomposition—contribution of between-gender inequality to total inequality, 2023




Note: Theil's T index is calculated using equivalized disposable household income. The index contains a natural logarithm in its formula, so non-positive values of total income are shocked by a very small constant during calculation.

Source: authors' calculations based on SOUTHMOD A2.0.

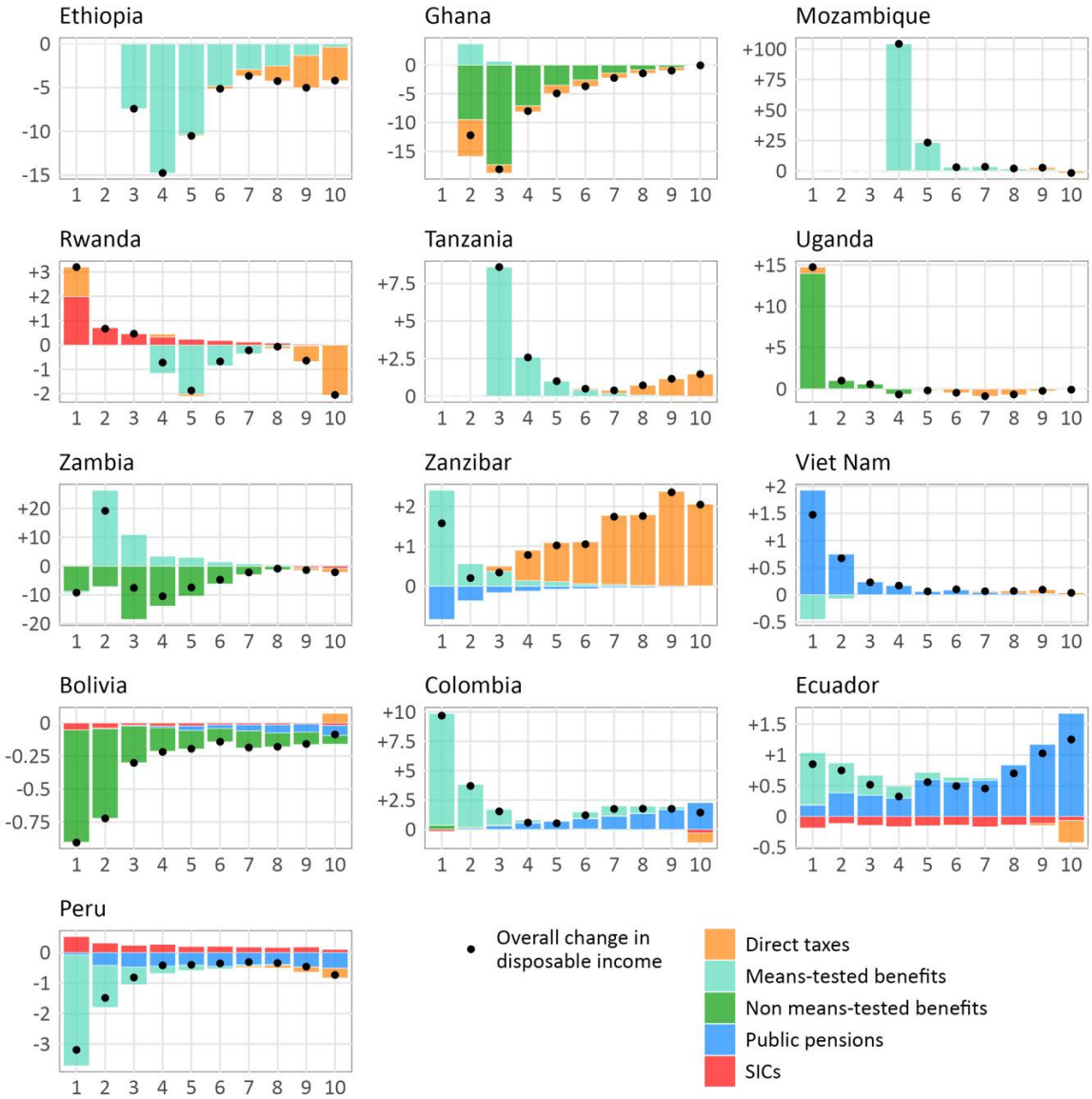
The contribution of gender differences is small across countries. For example, in Ethiopia, only about 0.001 of Theil's T of 2.04 (0.05 per cent) is explained by inequality between men and women. The effect is barely noticeable in Ghana, Zanzibar, Viet Nam, and Ecuador. Rwanda stands out with a slightly larger effect. The small contributions are largely explained by how poverty is measured. Incomes are typically assessed at the household level, which disregards income inequalities within the household assuming that all income sources are equally shared between household members.

The results further show that the small contribution of gender to overall inequality is driven by differences in original incomes (red bars). While the tax-benefit system mostly reduces between-gender inequality, in Tanzania, it appears to increase differences.

## 3.5 Policy effects from 2019 to 2023

Figure 3.10 illustrates the impact of policy changes—and the lack of uprating of monetary parameters to account for inflation—from 2019 to 2023. The effects are estimated on mean equivalized household disposable income by income component and income decile group, as a percentage of mean equivalized household disposable income in 2019. The effect is the difference between simulated household disposable income under the 2023 tax-benefit policies (deflating market incomes by the national CPI) and disposable income simulated under 2019 policies, as a percentage of the latter. Note that the y-scales differ across countries.

Figure 3.10: Policy effects from 2019 to 2023, using CPI indexation—change in mean equivalized household disposable income by decile (%)




Note: the results are shown as a percentage change in mean equivalized household disposable income by income component and income decile group. Income decile groups are based on equivalized household disposable income in 2019, using a per-capita equivalence scale. The results are produced using the built-in Policy Effects Tool in EUROMOD software. Similar to Figure 3.1, the mean disposable income is zero in selected deciles in Ethiopia, Ghana, Mozambique, and Tanzania, so the results are omitted automatically by the tool.

Source: authors' calculations based on SOUTHMOD models and associated input data.

Methodologically, the analysis isolates policy effects from other income distribution changes, including changes in real incomes, by keeping household characteristics constant. It adjusts for nominal income-level changes using a benchmark indexation factor. Following the practice of EUROMOD country reports, we use national consumer price indices (CPI) for indexation.[4]

[4] Note that choosing a particular benchmark indexation factor—a benchmark against which to measure the progress of government policies—implies a specific economic interpretation. For a discussion on the merits of using CPI versus other indexation factors, such as Market Income Index (MII) that reflects growth in average market incomes, see Paulus et al. (2020: Chapter 4).

The policy effects in the graph capture the effects of (i) discretionary tax-benefit policy changes and (ii) the lack of indexation of policy parameters, such as tax bracket thresholds and benefits amounts. The former covers notable reforms, such as the introduction or removal of taxes and benefits, and modifications to the design of existing policies (e.g., changes in tax rates or eligibility criteria). The latter comprises fiscal drag or bracket creep (people 'falling' into higher tax brackets as income brackets are not adjusted to inflation) and benefit erosion (decreasing relative value of cash benefits).

The results are discussed below for all 13 countries. As for general trends, we find that tax-benefit policy arrangements have become increasingly regressive from 2019 to 2023, especially in Ethiopia, Ghana, Zambia, and Peru. In other countries, namely Mozambique, Rwanda, Tanzania, Uganda, and Colombia, policies have increased disposable incomes disproportionally more at the bottom of the distribution. In the rest of the countries, estimated policy effects across quintiles have remained in the range of -3 to 3 per cent of 2019 incomes.

*Africa*

**Ethiopia.** In Ethiopia, the entire population experienced a significant inflation-adjusted reduction in disposable income, with more marked reductions among the bottom half of the household distribution. Losses were up to 15 per cent in the fourth decile. Among poorer households, the decline was driven by real reductions in means-tested benefits. While the Urban Productive Safety Net Program (PSNP) was rolled out to more districts with increased amounts, the increase lagged behind inflation. Inflation was notably high between 2019 and 2023; the CPI was 2.8 times higher in 2023 compared to 2019. Additionally, the personal income tax schedule remained unchanged during these years, contributing to the drop in incomes in the top deciles. Note that the mean disposable income in the first two deciles was zero in both years, so changes cannot be computed.

**Ghana.** In Ghana, policy changes led to large and regressive income reductions, with the largest loss of nearly 20 per cent in the third decile. The reductions were driven primarily by non-means-tested benefits and secondarily by direct taxes. The senior high school benefit remained unchanged, resulting in an overall decrease in disposable income for several income groups. Smaller income losses were influenced by slight adjustments in the personal income tax schedule, which did not keep pace with changes in the CPI. Moreover, the introduction of the COVID-19 health recovery levy to the presumptive tax system particularly affected small-scale self-employed workers in the second decile, explaining the higher reduction due to taxes in this group. Conversely, the LEAP transfer programme's benefit amounts were doubled, leading to income increases almost exclusively for the second decile. The mean disposable income in the first decile was near zero in both years, so changes were not computed.

**Mozambique.** In Mozambique, the income test threshold for direct and basic Social Security Programmes's (SSP) benefits was increased above price increases, offering notable relief for poorer households. While changes could not be computed for the bottom three deciles, disposable incomes doubled in the fourth decile and increased by 25 per cent in the fifth decile due to this policy change. Disposable income in the top decile was reduced slightly, as the income tax schedule was not adjusted during the period.

**Rwanda.** In Rwanda, real changes in disposable income were small across the income distribution, with up to a 3 per cent gain in the bottom decile and around 2 per cent reductions in deciles 5 and 10. Among the main policy changes, the country saw substantial increases in the threshold of the first income tax band, reducing the number of individuals liable for personal income tax, particularly those with low earnings at the bottom of the distribution. Other policy parameters were not adjusted, leading to real income losses at the top. The increase in disposable income due

to SIC at the bottom can be attributed to the fixed annual contribution to health insurance by informal workers, which remained unchanged and thus decreased in real terms. No adjustments were made to the amounts of means-tested benefits, leading to a deflation of support especially in the middle of the distribution.

**Tanzania.** In Tanzania, poorer households benefited via increased means-tested benefits, with an increase in disposable income of up to 8 per cent in the third decile. Specifically, Tanzania implemented reforms in the Productive Social Safety Net (PSSN) variable conditional cash transfer, resulting in overall higher benefit levels than in the old system. Note that the mean disposable income in the first two deciles was zero in both years. Small changes in the presumptive tax had minimal impact on disposable income. However, adjustments in the personal income tax schedule led to income increases at the top of the distribution, especially as CPI changes were moderate and tax adjustments exceeded CPI changes from 2019 to 2023. These changes included a reduction of the lowest tax rate from 9 to 8 per cent and higher income thresholds for all brackets.

**Uganda.** In Uganda, changes in disposable income were minimal except for the bottom decile, where mean disposable income increased by nearly 15 per cent, owing to non-means tested benefits. Specifically, while the value of the senior citizen's grant remained unadjusted, its wider rollout provided universal access for individuals aged 80 and older.

**Zambia.** In Zambia, disposable income was reduced by roughly 10 per cent at the bottom of the distribution, apart from the second decile. The reductions were driven by the lack of increase in the values of non-means-tested benefits. The poorest households in the second decile, in particular, benefited from significant increases in social cash transfer amounts, for both standard rates and additional amounts for individuals with disabilities, implemented above inflation rates. Additionally, the country introduced a new health insurance contribution that marginally affected incomes at the top of the distribution due to its minimal rate of 1 per cent of earnings. Income tax brackets were increased but not in pace with inflation, also resulting in a slight negative impact on incomes at the top.

**Zanzibar.** In Zanzibar, real changes in disposable income were positive but small across the income distribution, with a 1–2 per cent mean improvement in the bottom decile and the top half of the distributions. The gains at the middle and top of the distribution were driven by reduced income tax liabilities. Like Mainland Tanzania, Zanzibar adjusted the personal income tax schedule, including a reduction in the bottom tax rate and increased income thresholds for all brackets. Poorer households in turn benefited from larger means-tested benefits. Similar to Mainland Tanzania, Zanzibar saw reforms in the PSSN variable conditional cash transfer, leading to higher benefit levels than in the old system. The amount of the universal public pension was not adjusted, causing slight decreases that more significantly affected the bottom than the top of the distribution, given the relative importance of old-age pensions among poorer households.

*Asia*

**Viet Nam.** In Viet Nam, real changes in income resulting from policy changes were small but progressive, with poorer households benefitting from larger non-contributory pensions. This resulted from notable income increases from 2019 to 2023 in benefit amounts for poor older individuals. The increased incomes due to higher pension benefits countered the small loss of income in the bottom decile due to the erosion of means-tested benefits. These reductions stemmed from the lack of or limited uprating of various benefits to account for inflation, including support for school expenses and the national electricity subsidy.

*Latin America*

**Bolivia.** In Bolivia, real changes in disposable income were very small across the income distribution as no changes in policies were implemented between 2019 and 2023. The small drop in non-means-tested benefits at the bottom of the distribution (around 0.8 per cent in the first decile) was due to benefit amounts being kept fixed over time, translating into a reduction in real terms. Something similar is observed for contributory pensions, which are uprated by average earnings, and their growth was slower than inflation. The positive (yet small) contribution of direct taxes in the top decile is due to the fact that the unique tax threshold of personal income tax was uprated at a higher rate than earnings and inflation, meaning that fewer people would be liable to personal income tax.

**Colombia.** In Colombia, changes in disposable income were small except for the first and second deciles, where mean disposable income increased. This was due to the increase of means-tested benefit amounts of the *Familias en Acción* and *Colombia Mayor* cash transfer programmes. Moreover, the VAT devolution transfer, maintained since the onset of the pandemic, also played a role as an additional transfer for beneficiaries of the main benefit programmes. The increase in contributory pensions was due to uprating linked to wage growth, which was higher than inflation. Finally, the drop in income due to direct taxes is linked to a reform to personal income tax introduced in 2022, as part of which the limit for tax exemptions and deductions was decreased.

**Ecuador.** In Ecuador, real changes in disposable income were very small across the income distribution. At the bottom of the distribution, the increase in means-tested benefits is due to a slight increase in benefit amounts of the different components of the Human Development Transfer. The increase in contributory pensions is due to uprating linked to the minimum wage, which increased from US$394 to US$400, an increase larger than that of inflation. Finally, the drop in income due to direct taxes is linked to a reform to personal income tax introduced in 2022, which made the tax schedule more progressive, lowering the threshold of the four top tax bands and introducing an additional top band with a marginal tax rate of 37 per cent (2 percentage points higher than the previous top tax rate). Additionally, the maximum amount of deductions for personal expenditures was lowered.

**Peru.** In Peru, real changes in disposable income were small across the income distribution, with the largest decrease in the bottom decile and smaller drops in the middle and top of the income distribution. The small drop in non-means-tested benefits at the bottom of the distribution was due to unadjusted benefit amounts, translating into a reduction in real terms. Something similar is observed for contributory pensions, which were uprated by the minimum wage, which experienced a smaller increase than inflation. Changes in SIC and personal income tax were very small, as no policy reforms were introduced between 2019 and 2023.

## 4 Effects of a budget-neutral policy reform

This section describes two hypothetical reforms (Section 4.1) and the effects of these reforms on distributional outcomes across countries (4.2). In addition to the ex-ante distributional analysis, we assess the potential effects of these reforms on work incentives (4.3). The reforms illustrate the possibility of conducting cross-country research with SOUTHMOD models as well as the potential of tax-benefit systems to contribute to national poverty and inequality reduction goals.

## 4.1 Description of reforms

Both hypothetical reforms are budget neutral, meaning that the sum of the changes in taxes collected plus the sum of the changes in benefits distributed equals zero. As the model is non-behavioural (e.g. labour supply is assumed fixed), this is the same as saying that the sum of disposable incomes across the population remains constant after the reform.

On the tax side, reforms 1 and 2 are identical: income tax rates are multiplied by a factor such that the highest marginal tax rate reaches 50 per cent. In other words, if a country has a marginal income tax rate of 20 per cent on a first income bracket and a 40 per cent rate on a second income bracket, both rates are multiplied by 1.25, which leads to marginal rates of 25 and 50 per cent, respectively.

On the benefit side, reforms 1 and 2 differ: the first reform redistributes the additional tax revenues in the form of a basic income (BI) to all individuals aged 18 or more. The second reform uses a more targeted approach: only benefit recipients (i.e., individuals receiving benefits in the baseline system) aged 18 or more receive the cash transfer. In this way, it is possible to assess how well a universal scheme performs in reducing poverty and inequality when compared to targeted schemes. Admittedly, this approach has some limitations, as some contributory benefits are not designed to support poor households but are rather based on the logic of an insurance scheme. Nonetheless, comparing both reforms allows for assessing how well the existing benefit systems target vulnerable households overall when compared to universal systems.

## 4.2 Distributional effects

The simulation results are summarized in Tables 4.1 and 4.2. Re-scaling the personal income tax rates such that the highest rate equals 50 per cent leads to significant increases in tax revenues for the governments. This is particularly the case in countries that have low pre-existing tax rates and low bracket thresholds.

Redistributing the additional tax revenues in the form of supplementary cash transfers allows for reducing inequalities and poverty (both gaps and rates) in all countries. Moreover, the simulations show that very few individuals become poor after the reform, while many graduate out of poverty.

In the first reform (Table 4.1), more than one per cent of the poor escape poverty in Rwanda and Zanzibar. The reductions in the Gini coefficients are significant in several countries.

Table 4.1: Reform 1 (BI)—standard indicators, equivalized income, individual level, 2023

| Country | Δ Gini coefficient | Δ Poverty rate | Δ Poverty gap | Poor to non-poor | Non-poor to poor | Benefit level | Adult benefit recipients |
|---|---|---|---|---|---|---|---|
| *Unit* | *Gini points* | *pp.* | *pp.* | *%* | *%* | *2017 int. $* | *%* |
| Ethiopia | -1.75 | -0.23 | -1.1 | 0.28 | 0.06 | 1.7 | 100 |
| Ghana | -0.41 | -0.4 | -0.94 | 0.43 | 0.03 | 2.5 | 100 |
| Mozambique | -2.37 | -0.29 | -1.35 | 0.30 | 0 | 2.4 | 100 |
| Rwanda | -6.91 | -1.21 | -5.47 | 1.45 | 0.24 | 9.4 | 100 |
| Tanzania | -4.14 | -0.88 | -3.04 | 0.88 | 0 | 5.8 | 100 |
| Uganda | -1.22 | 0 | -0.84 | 0.21 | 0.21 | 2.1 | 100 |
| Zambia | -2.17 | -0.55 | -1.95 | 0.55 | 0 | 3.8 | 100 |
| Zanzibar | -1.27 | -1.03 | -1.07 | 1.09 | 0.05 | 3.9 | 100 |
| Viet Nam | -0.28 | -0.13 | -0.11 | 0.14 | 0 | 2.3 | 100 |
| Bolivia | -0.41 | -0.12 | -0.14 | 0.12 | 0 | 3.7 | 100 |
| Colombia | -0.43 | -0.26 | -0.16 | 0.26 | 0 | 3.5 | 100 |
| Ecuador | -0.42 | -0.18 | -0.1 | 0.17 | 0 | 3.3 | 100 |
| Peru | -0.53 | -0.45 | -0.32 | 0.45 | 0 | 2.7 | 100 |

Source: authors' calculations based on SOUTHMOD A2.0.

In the second reform (Table 4.2), the cash transfer is more targeted as it will be only distributed to individuals receiving benefits in the baseline tax-benefit system. For this reason, the level of support per person is also higher.

Under the targeted reform, the percentage of people exiting poverty is larger than 1 per cent in Rwanda, Tanzania, Zanzibar, and Peru. Depending on how well the existing benefits target poor households, the second reform will either further reduce poverty and inequality, or, on the contrary, 'over-target' some households while leaving other needy households behind.

Table 4.2: Reform 2 (transfer to existing beneficiaries)—standard indicators, equivalized income, individual level, 2023

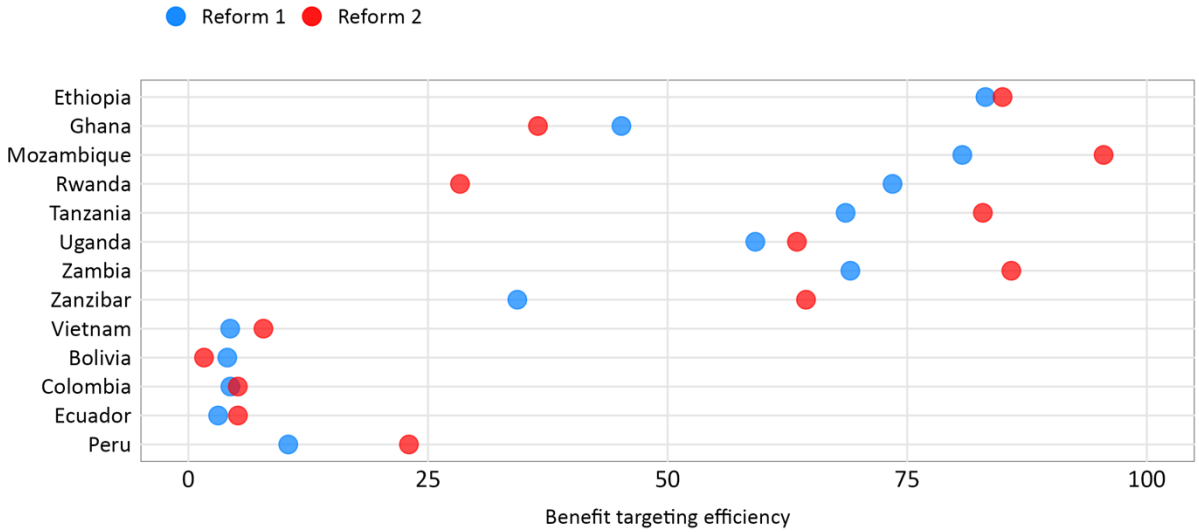
| Country | Δ Gini coefficient | Δ Poverty rate | Δ Poverty gap | Poor to non-poor | Non-poor to poor | Benefit level | Adult benefit recipients |
|---|---|---|---|---|---|---|---|
| *Unit* | *Gini points* | *pp.* | *pp.* | *%* | *%* | *2017 int. $* | *%* |
| Ethiopia | -1.42 | -0.27 | -1.12 | 0.32 | 0.05 | 11.5 | 14.8 |
| Ghana | -0.33 | -0.52 | -0.76 | 0.55 | 0.04 | 31.8 | 7.8 |
| Mozambique | -2.07 | -0.29 | -1.59 | 0.30 | 0 | 26.4 | 9.2 |
| Rwanda | -2.21 | -2.57 | -2.11 | 3.07 | 0.51 | 433.3 | 2.2 |
| Tanzania | -3.60 | -1.37 | -3.68 | 1.38 | 0.01 | 240.4 | 2.4 |
| Uganda | -1.01 | -0.29 | -0.90 | 0.51 | 0.22 | 71.6 | 2.9 |
| Zambia | -2.40 | -0.48 | -2.42 | 0.47 | 0 | 20.5 | 18.4 |
| Zanzibar | -2.02 | -1.40 | -2.00 | 1.49 | 0.10 | 180.0 | 2.2 |
| Viet Nam | -0.33 | -0.30 | -0.19 | 0.30 | 0 | 10.9 | 20.9 |
| Bolivia | -0.38 | -0.11 | -0.06 | 0.10 | 0 | 16.7 | 21.9 |
| Colombia | -0.61 | -0.46 | -0.19 | 0.46 | 0 | 21.0 | 16.5 |
| Ecuador | -0.65 | -0.36 | -0.16 | 0.36 | 0 | 51.6 | 6.3 |
| Peru | -0.86 | -1.17 | -0.7 | 1.17 | 0 | 53.2 | 5.2 |

Source: authors' calculations based on SOUTHMOD A2.0.

This is illustrated in Figure 4.1, where targeting efficiency is defined as the share of the cash transfer that contributes to reducing the poverty gap. In most countries, the targeted benefit scores better, by far. In Ghana and Rwanda, and to a lesser extent in Bolivia, this is not the case. This finding stems in part from the observations that individuals receiving benefits in the baseline are not always

poor and that adding the new cash transfer to existing benefits raises the disposable income of some poor households well above the poverty threshold.

Figure 4.1: Targeting efficiency in reform 1 (universal benefit) vs reform 2 (targeted benefit)




Note: benefit targeting efficiency is the share of the cash transfer that will contribute to reducing the poverty gap.

Source: authors' calculations based on SOUTHMOD A2.0.

## 4.3 Work incentives

As noted by Kanbur et al. (1994), perfect targeting efficiency can be achieved with sufficient resources in a trivial manner, but only in the absence of incentive effects. This section explores the effects of existing tax-benefit arrangements and the two hypothetical reforms on work incentives in each country under consideration.

We use marginal effective tax rates (METRs), which denote the proportion of a marginal increase in earnings that is taxed away due to social insurance and tax liabilities and loss of benefit entitlement. The calculations are conducted using EUROMOD's Marginal Tax Rate (MTR) add-on, developed based on Jara and Tumino (2013) and Jara et al. (2020), where METR is computed for individuals with positive earnings by increasing their earnings by 3 per cent and recalculating their household disposable income.[5] For households with more than one earner, the procedure is applied to each earner while holding the information of other earners fixed. METR captures work incentives at the intensive margin of labour supply; higher rates imply lower financial incentives to earn more via increased working hours or increased pay.[6]

[5] In our specification, we additionally limit the sample to those with positive tax payments and/or SIC payments in the baseline. This is because informal workers who do not pay taxes and workers not affiliated with social security do not see any effect on their disposable income as a result of increased earnings, leading to zero METRs.

[6] Building on the analysis of METRs, another angle to consider is the exploration of Participation Tax Rates (PTRs). In the context of SOUTHMOD, these rates could be redefined as formality tax rates to highlight how taxes and benefits offset the wage premium in the formal sector, a critical issue in developing countries. The analysis can be conducted using the Net Replacement Rate add-on in EUROMOD, which estimates indicators of potential labour supply changes in the extensive margin, considering the influence of the tax-benefit system. For more details, see the document 'EUROMOD Net Replacement Rate (NRR) Add-on – technical note', available at https://euromod-web.jrc.ec.europa.eu/resources/model-documentation.

In Table 4.3, we show mean METRs among positive earners across countries, both in the baseline scenario and under the alternative reforms.

Table 4.3: Baseline scenario and reforms—mean marginal effective tax rates among workers with positive earnings, 2023

| | *Sample:* | *METRs:* | | |
|---|---|---|---|---|
| **Country** | **Share retained** | **Baseline** | **Reforms** | **Reforms, change from baseline** |
| *Unit* | *%* | *%* | *%* | *pp.* |
| Ethiopia | 3.5 | 31.4 | 35.5 | *+4.1* |
| Mozambique | 12.6 | 3.0 | 3.6 | *+0.6* |
| Rwanda | 19.6 | 5.7 | 8.5 | *+2.8* |
| Tanzania | 4.3 | 18.6 | 26.7 | *+8.1* |
| Uganda | 8.5 | 13.3 | 16.2 | *+3.0* |
| Zambia | 18.2 | 4.1 | 5.2 | *+1.1* |
| Zanzibar | 5.1 | 23.1 | 34.5 | *+11.4* |
| Viet Nam | 14.2 | 11.5 | 12.6 | *+1.1* |
| Bolivia | 10.2 | 10.6 | 11.9 | *+1.3* |
| Colombia | 19.6 | 7.4 | 7.8 | *+0.4* |
| Ecuador | 14.6 | 10.2 | 10.9 | *+0.7* |
| Peru | 9.3 | 8.1 | 10.2 | *+2.1* |

Notes: the first column refers to the survey-weighted share of positive earners who pay tax or SIC of the total population in each country. Following the EUROMOD baseline report by Maier and Ricci (2022), METR estimates are computed for individuals who have more than 1 unit of national currency of monthly earnings. Additionally, the sample is restricted to those with positive tax and/or SIC payments in the baseline. METRs are produced using the Marginal Tax Rate (MTR) add-on in EUROMOD.[7] The results for Ghana are omitted due to model specification and data issues, such as negative disposable incomes, which lead to a large share of negative METRs and make it difficult to produce valid estimates using the add-on.

Source: authors' calculations based on SOUTHMOD A2.0.

The mean estimates in the baseline are the lowest in Mozambique (3.0 per cent), Zambia (4.1 per cent), and Rwanda (5.7 per cent), while the highest METRs are found in Ethiopia (31.4 per cent), Zanzibar (23.1 per cent), and Mainland Tanzania (18.6 per cent). In the latter countries, the high average marginal rates reflect the very small shares of positive earners who pay any tax or SIC. Viet Nam and Latin American countries rank in the middle, with mean METRs in the sample ranging from 7.4 to 11.5 per cent. At large, the estimates are considerably lower than METRs estimated for developed countries that can reach up to 50 per cent (see, e.g., the EUROMOD Baseline report by Maier and Ricci 2022).

Low METRs in the Global South can be attributed to the less developed nature of tax-benefit systems in the countries considered. In part owing to broad informality, their tax systems are not as expansive or progressive as those in developed countries, resulting in fewer taxes levied on additional earnings. Additionally, the scope and reach of social benefits are more limited, meaning that fewer benefits are withdrawn as income increases, which contributes to lower METRs. Since incomes are not observed, benefits are targeted in a proxy-means manner, implying that benefit entitlement is only evaluated once new information about eligibility is gathered. This may often take years. Income-means-tested benefits, which are designed to be phased out as earnings rise in developed countries, are considerably less prevalent in low- and middle-income countries.

[7] For more details, see the document 'Marginal Tax Rate (MTR) Add-on – technical note', available at https://euromod-web.jrc.ec.europa.eu/resources/model-documentation.

The average METRs in the two reforms are always the same. This is because the reforms are identical on the tax side, and in both cases the new cash transfers are not means tested. Compared to the baseline, the tax reforms increase the METRs in all countries, the most in Zanzibar (11.4 percentage points [pp.]), followed by Tanzania (8.1 pp.) and Ethiopia (4.1 pp). Changes from baseline are small in Latin America and Viet Nam.

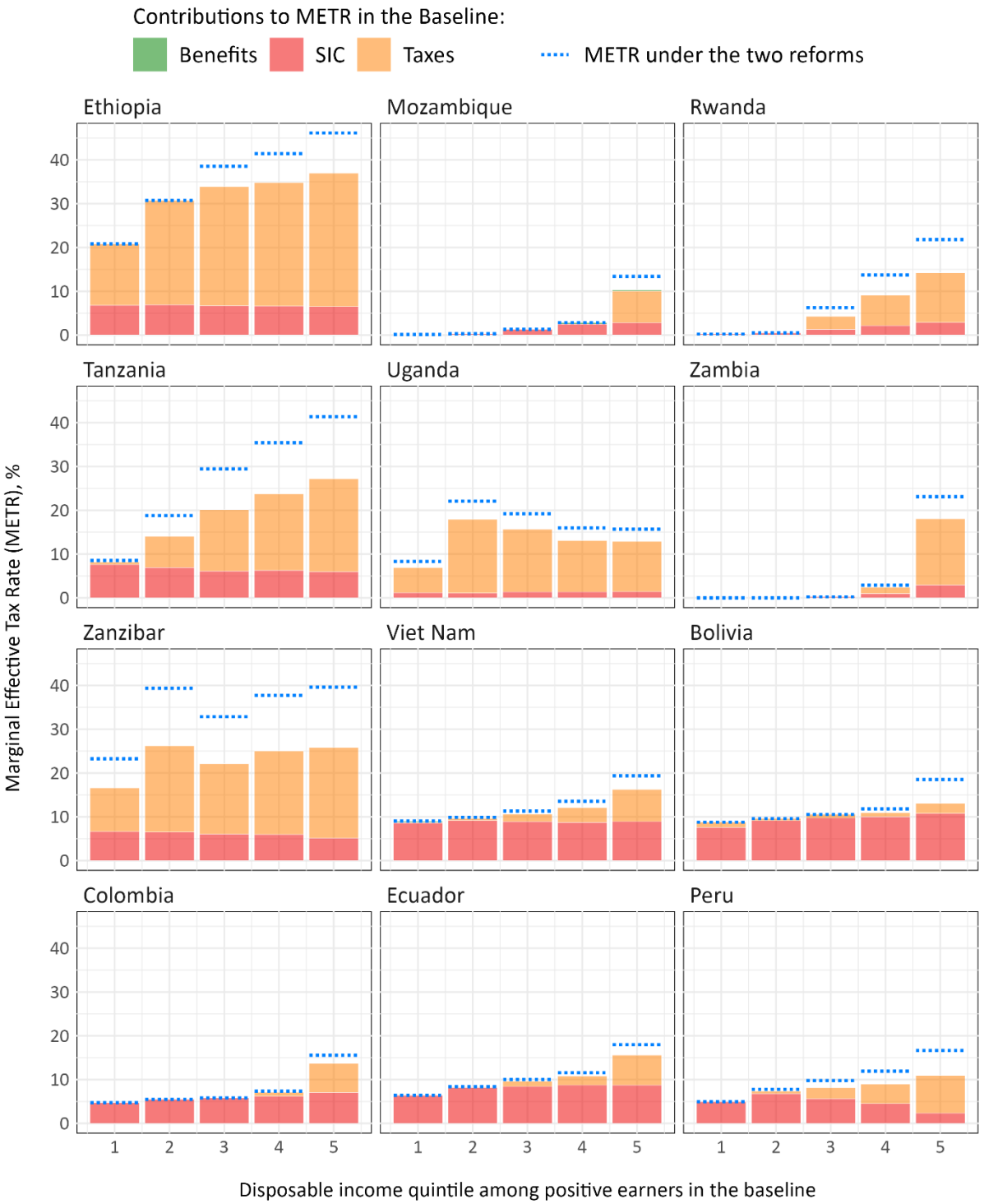
While average rates provide a first look into intensive-margin work incentives across countries, the distributional pattern and composition of METRs offer a more complete picture. Figure 4.2 presents the average METRs by quintile of disposable income among positive earners who pay SIC or tax in the baseline (bar totals) and under the two reforms (horizontal lines). In the baseline, quintile means are further decomposed into the shares from benefits, taxes, and SIC.

In most countries, average METRs increase towards the top of the income distribution. In Mozambique, Rwanda, and Zambia, the bottom half of earners face negligible or zero rates. METRs are however more equally spread across the income distribution in countries like Uganda, Zanzibar, and Bolivia. In the African countries, baseline METRs are driven by an increase in direct taxes paid by households as earnings increase. On the contrary, effective rates in Latin American countries and Viet Nam are driven by SIC, with taxes only having a noticeable impact at the top of the distribution.

Following the patterns of baseline rates, the two reforms increase METRs typically in the top quintiles. While not shown in the figure, the increases in effective rates under the reforms result almost exclusively from higher taxes paid due to the personal income tax adjustments.

It is worth noting that we do not observe an effect on work incentives from lost benefits, in the baseline scenario or otherwise. As discussed, in most countries, benefit eligibility or amounts do not depend on household income but are conditional on specific demographic or housing characteristics. In these cases, a marginal increase in earnings will not result in a withdrawal of benefits, meaning that they do not contribute to METR estimates. Additionally, in our specification, individuals in the retained sample who pay any tax or SIC are generally relatively affluent and do not receive any income-dependent benefits in the first place, meaning that benefits do not affect their METRs.

Figure 4.2: Baseline scenario and reforms—mean marginal effective tax rates (METRs) among workers with positive earnings across income quintiles and a decomposition of baseline METRs, 2023




Notes: see notes under Table 4.3. Average METRs are shown by disposable income quintile. In the baseline, METRs are decomposed into benefits (the average reduction in benefits and pensions paid at the household level as a proportion of the increase in individual gross earnings) as well as taxes and social contributions (the average increase in taxes or SIC paid at the household level as a proportion of the increase in earnings).

Source: authors' calculations based on SOUTHMOD A2.0.

## 5 Conclusion

This study provides a comprehensive comparative analysis of tax-benefit systems in 13 Global South countries, highlighting their redistributive impacts. By using all tax-benefit microsimulation models from the SOUTHMOD family for the first time, we provide new insights into the role that fiscal policies play across these countries.

The backdrop of this study is the significant variation in baseline welfare levels observed across the 13 countries. Comparing the outcomes across countries allows for identifying areas for potential improvement and reform.

When examining the decomposition and distribution of disposable income, the study highlights distinct patterns that are shaped by differences in local economies and tax-benefit arrangements. Among other results, richer households primarily earn their income from employment and self-employment, whereas for poorer households in countries like Zambia, Ethiopia, and Mozambique, social transfers are critical for supplementing market incomes. Higher-income households carry most of the direct tax burden. Social insurance contributions (SIC), in turn, make up a significant portion of disposable income in Latin America, owing to relatively large formal sectors, high social security rates, and the lack of a tax-free threshold for personal incomes.

Turning to the redistributive impacts of the tax-benefit systems, we find that benefits play a major role in reducing inequalities, especially in Latin America and countries like Ethiopia, Mozambique, and Zambia, while pensions play a considerably smaller role. Direct taxes and, in part, SIC, also reduce the Gini coefficient. However, in most African countries, the importance of direct taxes and transfers in reducing market income inequality is extremely limited.

Both pensions and benefits are relatively ineffective in reducing the poverty rates in Africa—mainly due to very large pre-transfer poverty—but they are quite effective in Viet Nam and Latin America. Benefits in the African countries are clearly more effective in reducing the poverty gap, i.e., bringing the poorest individuals closer to the poverty line. This impact is particularly strong in Zambia, where targeted social cash transfers successfully reach vulnerable groups. However, the analysis suggests that in sub-Saharan Africa, SIC and direct taxes tend to increase both poverty rates and gaps considerably. Many formal workers in these countries belong to poor households, meaning that SIC and tax liabilities affect their incomes. These poverty effects are often negative also after accounting for benefits and pensions. At large, the findings are in line with earlier research highlighting the limited effectiveness of tax-benefits systems in sub-Saharan Africa to redistribute resources and reduce poverty (e.g., Inchauste and Lustig 2017; Brown et al. 2018; Bargain et al. 2022; Gasior et al. 2022a).

The addition of indirect taxes to the analysis demonstrates their regressive nature, which is estimated to increase poverty, especially in Africa. A part of this result can be explained by the fact that many vulnerable households consume goods from stores that do not remit VAT on their purchases, which cannot be readily accounted for in the microsimulation models.

Our paper also contributes to the literature by focusing on gender disparities, offering insights on the differential impact of fiscal policies on women and men and underscoring the imperative to include gender statistics in ex-ante evaluations of tax and social protection reforms. We find that tax-benefit systems tend to favour women in Viet Nam and in Latin America, whereas in most African countries, men gain more (or are hurt less). These findings indicate underlying differences in income sources and consumption patterns between genders, especially male- and female-headed households, which policy-makers should consider when promoting equitable economic growth.

We also offer an analysis of how recent tax-benefit policy changes have contributed to income developments across households. These impacts are mostly driven by inflation adjustments to benefit amounts and tax brackets, or the lack of them. This analysis underscores the need to keep up the benefit levels with inflation—perhaps by indexation—to preserve their real value.

Finally, the paper demonstrates how microsimulation modelling can be used to assess the potential for realistic, budget-neutral policy reforms to reduce poverty and inequality further, contributing to the ongoing debate on feasible fiscal policy design. We model two alternative policy reforms. In both cases, the income tax rates are raised so that the highest marginal tax rate reaches 50 per cent, and the revenue is used for either uniform transfers to all adults or top-up transfers to existing benefit recipients. Therefore, the results of these simulations also offer new insights on the targeting efficiency of existing vs universal benefits.

Both reforms are estimated to reduce poverty and inequality in all countries, with no net cost to the government. The first reform demonstrates that poverty can be alleviated through a basic income without inadvertently causing more individuals to fall into poverty. The targeted approach generally enhances the efficiency of poverty alleviation efforts by directing resources to those already identified as beneficiaries, with larger redistributive effects when compared to the first reform. However, the effectiveness varies by country and there are notable disparities in targeting efficiency. In Ghana and Rwanda, and to a lesser extent in Bolivia, the reform does not align as well with poverty reduction, partly because not all current beneficiaries are among the poorest. This misalignment suggests a need for more refined targeting mechanisms to ensure that additional resources reach the most vulnerable households.

In terms of work incentives, the baseline marginal effective tax rates (METRs) computed for the countries studied are considerably lower than those observed in developed economies. This difference is largely attributable to less developed tax systems and extensive informality, which result in a limited tax base and less progressive taxation. Social benefits in these countries are also rarely dependent on earnings, contributing to lower METRs. Interestingly, SIC contribute to overall METRs significantly in Latin America and Viet Nam, while direct taxes play a larger role in the African countries.

METRs increase slightly under the hypothetical reforms but remain relatively low compared to global standards. The increase is most pronounced in the higher income quintiles, reflecting the progressive nature of the income tax adjustments. These findings underscore the potential of tax-benefit reforms to achieve more equitable economic outcomes without adverse effects on work incentives.

Future research would significantly benefit from replicating this analysis for countries not currently covered by the SOUTHMOD or EUROMOD model families. This would enhance the comparability of the effects of tax-benefit systems across a broader range of economic and social contexts. As for SOUTHMOD models, improving the realism of indirect tax modelling is crucial, especially for models for African countries where informality plays a significant role. In Rwanda and Mozambique, for example, omitting the VAT paid on purchases from informal stores is already possible by using information from existing household surveys. Such an adjustment would allow for more accurate assessments of the redistributive impacts of indirect taxes. Another valuable direction for model improvement involves refining the analysis of gender outcomes by modelling additional policies at the individual rather than the household level. This necessitates improvements in the underlying household surveys.

Considering the policy reforms, one option offered by the SOUTHMOD tool is policy swap analysis, where an existing policy from another country is imported to a new setting, with

appropriate amendments. In the context of the current study, an example might be examining the consequences of adopting a social protection policy system from a Latin American country in the African economies. Expanded analyses on the behavioural and dynamic impacts of hypothetical and welfare-increasing reforms would also be warranted. While SOUTHMOD models are currently static, they may be combined with externally estimated behavioural reactions, as in Gasior et al. (2022c). Additionally, analysing the administrative feasibility and public acceptance of hypothetical reforms such as those explored in this study would provide insights into the practical challenges and societal readiness for implementing them.

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# Appendix

Table A1: Overview of basic population characteristics

| | Population | Avr age | Avr hh size | Share of female-headed hh's | Aged 0–14 | Aged 15–17 | Aged 18–59 | Aged 60+ | Share with employment income | Share with self-empl. income |
|---|---|---|---|---|---|---|---|---|---|---|
| | (millions) | | | (%) | (%) | (%) | (%) | (%) | (%) | (%) |
| Ethiopia | 98.7 | 23 | 4.4 | 26 | 42 | 8 | 45 | 5 | 6 | 11 |
| Ghana | 28.4 | 25 | 3.9 | 33 | 38 | 7 | 48 | 7 | 11 | 13 |
| Mozamb. | 27.4 | 21 | 4.8 | 29 | 49 | 6 | 40 | 5 | 6 | 9 |
| Rwanda | 11.9 | 23 | 4.4 | 25 | 41 | 7 | 47 | 5 | 31 | 20 |
| Tanzania | 52.7 | 24 | 4.6 | 28 | 43 | 7 | 44 | 7 | 19 | 10 |
| Uganda | 39.6 | 20 | 4.7 | 30 | 48 | 7 | 41 | 4 | 7 | 19 |
| Zambia | 15.5 | 22 | 5.1 | 23 | 43 | 8 | 45 | 4 | 7 | 17 |
| Zanzibar | 1.6 | 23 | 5.4 | 24 | 42 | 6 | 46 | 5 | 35 | 3 |
| Viet Nam | 96.9 | 35 | 3.7 | 26 | 24 | 4 | 57 | 15 | 30 | 17 |
| Bolivia | 11.5 | 30 | 3.3 | 28 | 31 | 6 | 52 | 11 | 17 | 22 |
| Colombia | 48.8 | 32 | 3.3 | 37 | 25 | 5 | 57 | 13 | 25 | 21 |
| Ecuador | 17.4 | 31 | 3.7 | 28 | 29 | 6 | 52 | 13 | 29 | 15 |
| Peru | 31.5 | 35 | 3.4 | 31 | 22 | 6 | 56 | 17 | 25 | 28 |

Note: 'hh' refers to households.

Source: authors' calculations based on SOUTHMOD A2.0.

Table A2: Poverty rates and poverty gaps of sub-population groups, $2.15/day poverty threshold, 2023

| | Poverty rate | | | | | | Poverty gap | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Age groups* | | | | *Income* | | *Age groups* | | | | *Income* | |
| | 0–14 | 15–17 | 18–59 | 60+ | With empl. income | With self-empl. income | 0–14 | 15–17 | 18–59 | 60+ | With empl. income | With self-empl. income |
| Ethiopia | 92.1 | 90.5 | 83.9 | 89.1 | 43.3 | 84.8 | 77.4 | 74.5 | 67.6 | 68.9 | 21.0 | 61.5 |
| Ghana | 57.8 | 57.8 | 48.5 | 55.0 | 17.1 | 41.4 | 43.2 | 58.6 | 35.9 | 57.0 | 27.9 | 39.7 |
| Mozamb. | 87.7 | 82.4 | 80.0 | 86.4 | 39.9 | 77.9 | 73.0 | 66.7 | 65.1 | 72.9 | 18.3 | 56.6 |
| Rwanda | 83.4 | 80.6 | 74.7 | 88.8 | 77.5 | 75.8 | 60.8 | 60.2 | 51.9 | 67.4 | 54.3 | 51.8 |
| Tanzania | 78.3 | 72.5 | 68.0 | 79.4 | 44.3 | 68.4 | 60.1 | 54.5 | 50.8 | 63.9 | 23.6 | 49.4 |
| Uganda | 81.2 | 78.7 | 69.2 | 81.7 | 43.8 | 69.8 | 57.9 | 54.9 | 47.4 | 57.4 | 21.2 | 46.6 |
| Zambia | 78.7 | 74.0 | 68.9 | 78.4 | 16.7 | 64.9 | 61.1 | 66.1 | 52.0 | 73.5 | 35.6 | 50.5 |
| Zanzibar | 47.7 | 46.8 | 35.5 | 48.0 | 30.9 | 25.3 | 22.9 | 22.5 | 15.9 | 23.1 | 12.9 | 10.5 |
| Viet Nam | 8.8 | 8.2 | 6.1 | 3.1 | 2.2 | 5.0 | 4.6 | 4.1 | 2.9 | 1.3 | 0.5 | 2.0 |
| Bolivia | 7.7 | 7.3 | 4.9 | 1.2 | 0.5 | 4.5 | 4.0 | 5.3 | 2.6 | 1.4 | 0.9 | 2.2 |
| Colomb. | 8.8 | 7.5 | 4.4 | 4.9 | 0.6 | 5.2 | 3.4 | 3.3 | 1.8 | 2.1 | 0.2 | 1.8 |
| Ecuador | 4.2 | 4.5 | 3.1 | 3.5 | 1.5 | 2.0 | 1.4 | 2.0 | 1.3 | 2.3 | 0.6 | 0.7 |
| Peru | 16.5 | 14.8 | 9.3 | 15.4 | 3.2 | 12.7 | 7.9 | 7.7 | 4.3 | 7.5 | 1.2 | 5.8 |

Note: see notes under Table 3.1.

Source: authors' calculations based on SOUTHMOD A2.0.

Table A3: PPP conversion factors, 2015–22

| | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|---|---|
| Ethiopia | 7.8 | 8.1 | 8.5 | 9.4 | 10.4 | 12.1 | 14.1 | 17.7 |
| Ghana | 1.3 | 1.5 | 1.8 | 1.9 | 2.0 | 2.2 | 2.4 | 2.8 |
| Mozambique | 18.3 | 19.8 | 22.9 | 23.2 | 23.8 | 24.3 | 24.3 | 24.1 |
| Rwanda | 300 | 311 | 325 | 315 | 317 | 334 | 329 | 356 |
| Tanzania (incl. Zanzibar) | 804 | 849 | 885 | 890 | 895 | 940 | 923 | 886 |
| Uganda | 1125 | 1212 | 1271 | 1296 | 1311 | 1330 | 1305 | 1279 |
| Zambia | 3.4 | 3.9 | 4.2 | 4.4 | 4.6 | 5.2 | 6.3 | 6.2 |
| Viet Nam | 7413 | 7316 | 7395 | 7484 | 7530 | 7542 | 7418 | 7198 |
| Bolivia | 2.9 | 2.8 | 2.7 | 2.8 | 2.7 | 2.6 | 2.6 | 2.6 |
| Colombia | 1276 | 1298 | 1328 | 1322 | 1331 | 1297 | 1353 | 1391 |
| Ecuador | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Peru | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.8 | 1.9 | 1.8 |

Note: conversation factors for 2023 have not been released at the time of writing. 2022 factors are used for 2023 in this study.

Source: authors' compilation based on World Bank (2024), International Comparison Program database.

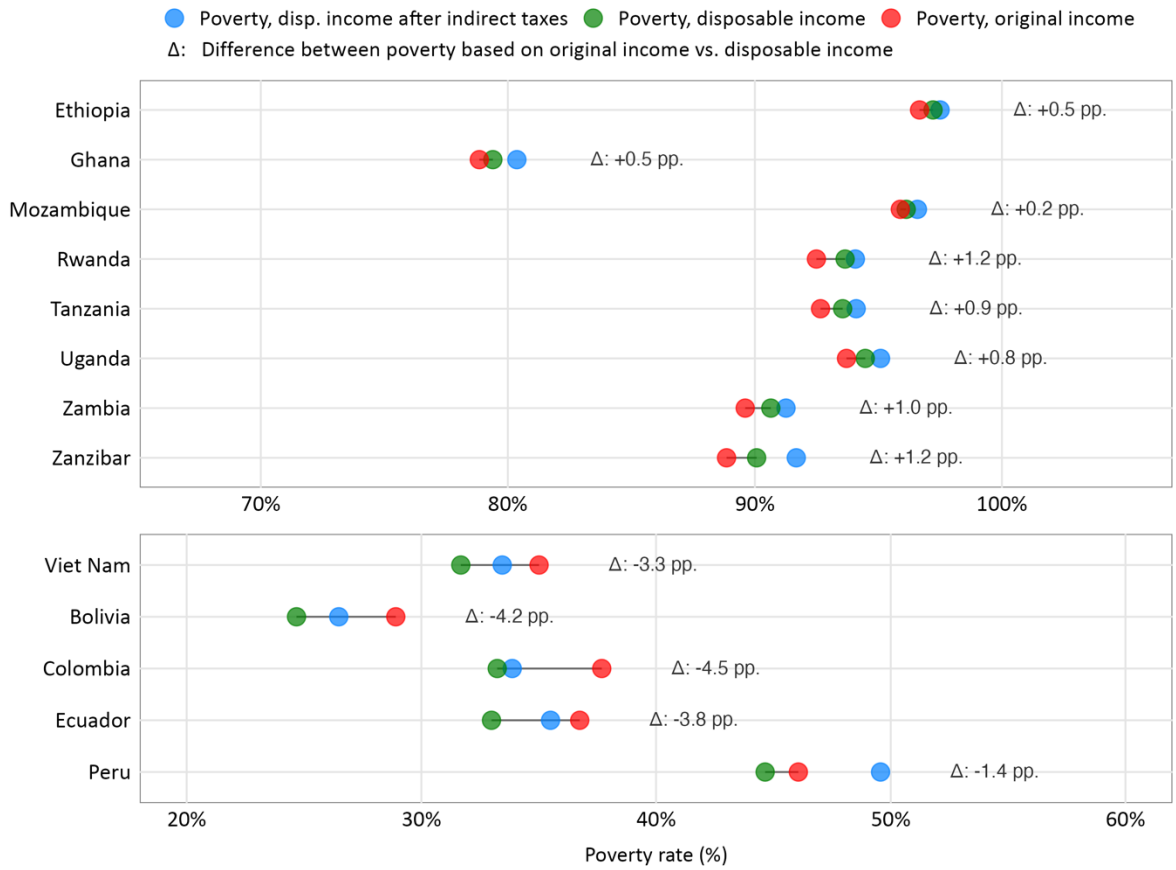
Table A4: National Consumer Price Indices (2017=100), 2015–23

| | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|---|
| Ethiopia | 79.5 | 85.3 | 100 | 112.5 | 135.0 | 162.2 | 217.1 | 287.7 | 381.2 |
| Ghana | 75.8 | 89.0 | 100 | 107.8 | 115.5 | 126.9 | 136.3 | 158.2 | 178.7 |
| Mozambique | 70.7 | 84.1 | 100 | 103.7 | 106.1 | 109.4 | 116.5 | 129.8 | 138.7 |
| Rwanda | 85.9 | 92.5 | 100 | 100.6 | 102.2 | 114.0 | 112.7 | 134.8 | 158.1 |
| Tanzania | 90.5 | 95.1 | 100 | 103.3 | 107.1 | 110.7 | 114.9 | 120.1 | 124.1 |
| Uganda | 90.0 | 94.6 | 100 | 103.1 | 105.7 | 110.7 | 113.0 | 122.0 | 126.7 |
| Zambia | 77.3 | 93.6 | 100 | 107.4 | 116.7 | 135.3 | 168.6 | 185.0 | 203.1 |
| Zanzibar | - | - | 100 | 103.9 | 105.9 | 110.6 | 113.0 | 117.7 | 121.2 |
| Viet Nam | 94.1 | 96.6 | 100 | 103.6 | 106.4 | 109.9 | 111.8 | 115.4 | 120.1 |
| Bolivia | 93.9 | 97.3 | 100 | 102.3 | 104.2 | 105.1 | 105.9 | 107.8 | 109.6 |
| Colombia | 88.5 | 96.2 | 100 | 103.2 | 106.7 | 109.1 | 113.0 | 124.0 | 139.0 |
| Ecuador | 99.1 | 100.2 | 100 | 100.3 | 100.8 | 99.9 | 99.9 | 100.0 | 102.5 |
| Peru | 95.8 | 99.0 | 100 | 102.1 | 104.2 | 106.3 | 113.5 | 122.9 | 132.3 |

Note: these estimates generally use the CPIs from July each year.

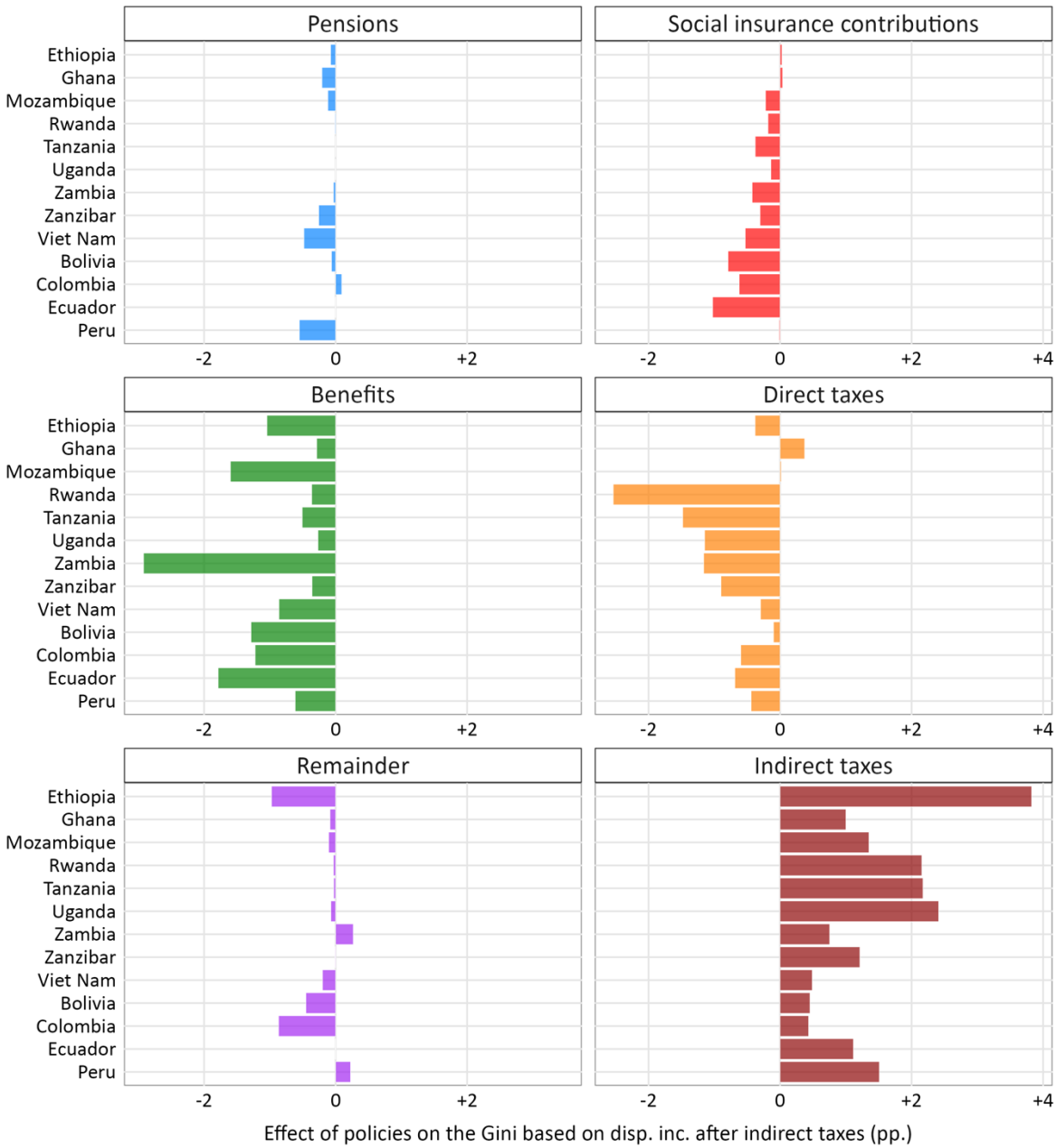
Source: authors' calculations based on data from national data agencies.

Figure A1: The effect of the tax-benefit system on the poverty rate (<$6.85/day), 2023



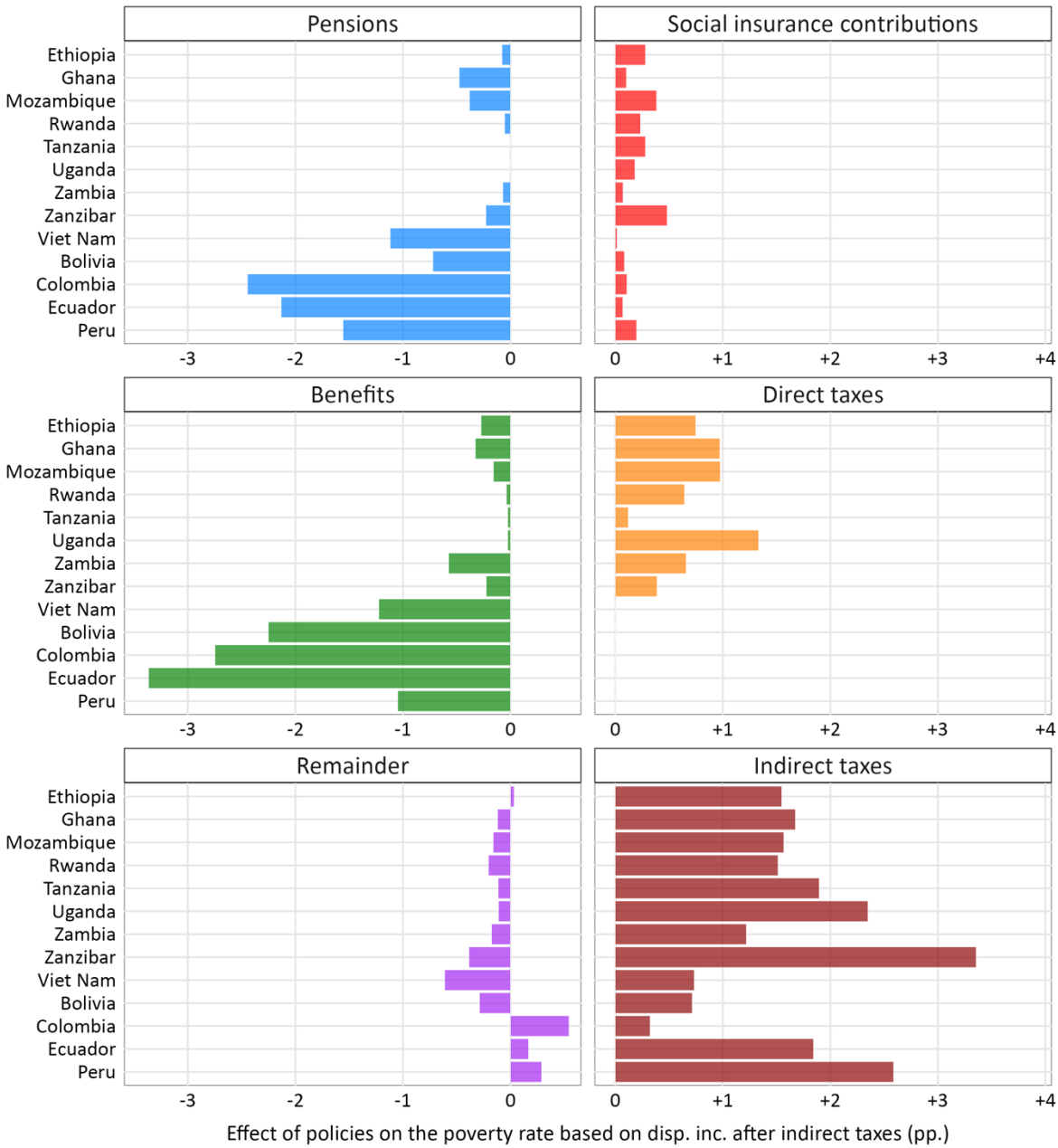

Source: authors' calculations based on SOUTHMOD A2.0.

Figure A2: Decomposed contributions of taxes and benefits to the Gini coefficient based on disposable income after indirect taxes, 2023



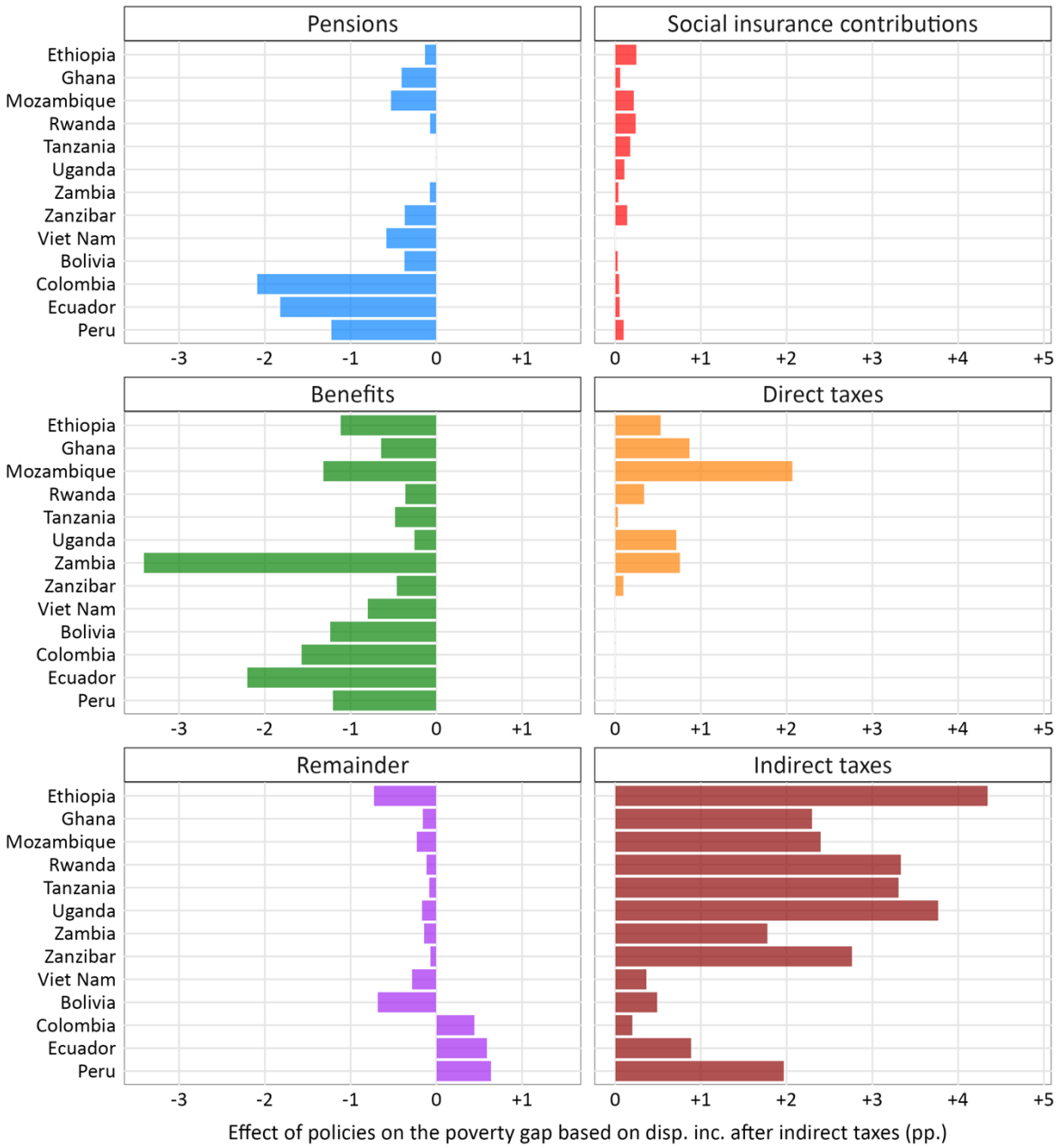

Source: authors' calculations based on SOUTHMOD A2.0.

Figure A3: Decomposed contributions of taxes and benefits to the poverty rate based on disposable income after indirect taxes (<$2.15/day), 2023




Source: authors' calculations based on SOUTHMOD A2.0.

Figure A4: Decomposed contributions of taxes and benefits to the poverty gap based on disposable income after indirect taxes (<$2.15/day), 2023




Source: authors' calculations based on SOUTHMOD A2.0.