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Performance of tax-benefit systems amid COVID-19 crises in sub-Saharan Africa: A comparative perspective

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WIDER Working Paper 2023/130

Performance of tax-benefit systems amid COVID-19 crises in sub-Saharan Africa

A comparative perspective

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October 2023

Abstract: We examine the distributional effects of the COVID-19 pandemic and associated tax-benefit measures in seven sub-Saharan African countries, focusing on the onset of the crisis. We evaluate impacts on disposable incomes, considering variations across income groups; assess the effectiveness of tax-benefit policies in mitigating income losses; and analyse the influence of these measures on income-based poverty and inequality. We find notable reductions in disposable incomes, concentrated among higher-income households, and moderate increases in headcount poverty rates and poverty gaps. The study highlights the low effectiveness of pre-existing tax-benefit policies, with coverage gaps for the informal sector and a lack of income-dependent means-tested benefits. Discretionary tax-benefit policies in Mozambique and Zambia cushioned the shock for low-income households to a small extent. Conversely, school closures in Ethiopia and Ghana suppressed the provision of school meals, adding strain to households with school-age children.

Key words: COVID-19, income distribution, poverty, inequality, Africa

JEL classification: D31, E24, H24

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Note: The study received ethical approval from the Joint Ethical Review Board of the UNU (Ref. 202104/01) on 11 May 2021.

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1 Introduction

The global COVID-19 pandemic profoundly affected people's lives and economies worldwide. The resulting global recession was the deepest since the Second World War and led to the largest loss in per capita incomes since 1980 (Ayhan Kose and Sugawara 2020; Ohnsorge and Yu 2021). Developing countries in particular faced heightened vulnerabilities due to weaker healthcare and welfare systems, volatile commodity prices, and low living standards. Lockdown measures impacted a substantial portion of the global workforce, increasing poverty at both the national and international levels (Sumner et al. 2020). Te Velde (2020) indicates that Africa was hit by at least US\$100 billion in economic costs in 2020, while UNECA (2021) estimates a real GDP fall of between \$200 billion and \$220 billion. About 30 million Africans were pushed into extreme poverty (AfDB 2021). In sub-Saharan Africa, the world's most impoverished region, real GDP was reduced by \$37 billion, or 2 per cent, from 2019 (World Bank 2023a). Moreover, the pandemic increased inequalities across several domains of life, including employment, health, and family life—effects that will likely persist in the long term (Blundell et al. 2020).

In 2020–22, governments worldwide implemented lockdown measures to address the immediate health crisis and fiscal policy measures to mitigate income losses resulting from the lockdowns. Developing countries introduced various forms of income support, such as food baskets and new temporary benefits, alongside tax deferrals and waivers, despite operating in a constrained fiscal space. Understanding the effects on households of the COVID-19 pandemic and related policy measures is crucial for supporting developing-country policy-makers in navigating the crisis, necessitating a distinction between the economic impact of the pandemic and the impact of tax and benefit policies.

This paper examines the distributional effects of the pandemic and associated tax-benefit measures in seven sub-Saharan African (SSA) countries: Ethiopia, Ghana, Mozambique, Rwanda, Tanzania, Uganda, and Zambia. We revise an earlier analysis by Lastunen et al. (2021) using updated data and harmonized microsimulation models and extend the original study into two new countries: Ethiopia and Rwanda.

This study assesses the impact of the pandemic on disposable incomes, focusing on variations across income groups, and evaluates the effectiveness of tax-benefit policies in mitigating earnings losses. The analysis distinguishes between the automatic stabilizing effect of pre-existing tax-benefit systems and discretionary policy changes enacted in response to the crisis. We consider the diverse policy approaches taken by the countries, which all have in common a large informal sector and limited social protection coverage.

Our approach is similar to that of several studies, including Avellaneda et al. (2021), who compare the crisis impact in Andean countries; Cantó et al. (2021), who assess outcomes in Belgium, Italy, Spain, and the UK during the first month of the crisis; Gasior et al. (2023), who examine the role of social protection measures in cushioning income shocks in the European Union; and single-country studies by Figari and Fiorio (2020) and Gallo and Raitano (2023) for Italy, Christl et al. (2022) for Austria, Li et al. (2022) for Australia, Wright et al. (2021) for Indonesia, Barnes et al. (2021) for South Africa, and Jara et al. (2022) for Ecuador. Our estimates on increases in poverty align with forecasts by Sumner et al. (2020) and Valensisi (2020) for the developing world, and we build upon studies employing similar methodologies in developed countries, such as Brewer and Tasseva (2021) for the UK, Kyyrä et al. (2021) for Finland, and Christl et al. (2023) for Germany.

Our analysis necessitates (1) microdata reflecting households' pre-crisis and crisis income and labour market situations and (2) detailed modelling of countries' tax-benefit policies, including COVID-related reforms in 2020. The primary challenge in the first step is the lack of up-to-date microdata on household characteristics and earnings during the crisis. To address this, we reweight the data to capture structural demographic changes and proxy job loss by randomly allocating industry-level GDP shocks across workers. Using these steps, we estimate welfare measures and employ decomposition techniques to differentiate the distributional impact of earnings shock and tax-benefit policies. Through various combinations of datasets and tax-benefit scenarios, we examine the effects of different shocks on disposable income, poverty, and inequality, akin to a controlled experiment (Bourguignon and Spadaro 2006; Dolls et al. 2012). Additionally, we assess the extent to which tax-benefit systems stabilized disposable income and differentiate the economic impacts of policies from those of the crisis and lockdown measures, using the decomposition approach pioneered by Bargain and Callan (2010).

The results indicate modest increases in headcount poverty rates at the international poverty line of US\$1.90 in 2020, with more pronounced increases in the poverty gap due to high pre-existing poverty levels. Pandemic-driven earnings losses were the primary driver of reduced disposable incomes, with the middle and top quartiles experiencing larger relative reductions. The estimated mean losses of disposable income were largest in Rwanda (10.8 per cent), Zambia (6.4 per cent), and Uganda (5.7 per cent), with average losses in other countries falling between 1.7 and 3.7 per cent.

Automatic stabilizers had a negligible effect in cushioning against income losses, operating mainly in the top quartile of the distribution. This finding is in line with similar research (e.g. Avellaneda et al. 2021; Jara et al. 2022). Unlike developed countries, developing countries have large informal sectors, low social protection coverage, and means tests of benefits that are often not income-dependent, meaning that households do not automatically become eligible for benefits during recessions. Discretionary tax-benefit policies in Mozambique and Zambia provided partial relief to low-income households, whereas school closures in Ethiopia and Ghana disrupted ongoing social protection measures.

This research contributes to the literature by offering the most extensive cross-country comparative study for Africa analysing the distributional impact of tax-benefit policies during the pandemic. It highlights the limited role of automatic stabilizers in African countries, contributing to the limited evidence on how these countries fare in terms of the power of their redistributive systems, in general and during shocks (Bargain et al. 2022; Devarajan et al. 2013; Gasior et al. 2021). Additionally, the study examines the effectiveness of discretionary tax-benefit measures and related changes in alleviating shocks to households, and it provides estimates of changes in poverty and inequality during the pandemic in the selected countries.

The remainder of the paper is structured as follows. Section 2 describes the dynamics of the COVID-19 outbreak in 2020, countries' tax-benefit arrangements leading up to the crisis, and immediate policy responses. Section 3 describes the data and methodology, including microsimulation models, welfare measures, and decomposition methods. Section 4 covers the results and analyses the role of tax-benefit systems in mitigating the impact of the crisis. Section 5 concludes.

2 COVID-19 and government responses in 2020

2.1 The development of the pandemic in 2020

Most African countries reported their first COVID-19 case on almost the same date in March 2020. They also exhibited similar trends over time in terms of numbers of cases and deaths reported, with the peaks of the largest wave taking place in summer 2020, February 2021, July 2021, and January 2022—each peak higher than the last (Figures A1 and A2, Appendix A). However, the severity of the impact of COVID-19 in terms of cases and deaths reported was not homogeneous across time and space. Out of the countries analysed, Zambia, Uganda, and Rwanda were by far the most affected countries in terms of these estimates.

Taken together, it is notable that the epidemiological situation in the seven countries studied appears to have been less severe in 2020 than what was observed in many other parts of the world, including in other African countries such as South Africa and Namibia (Ritchie et al. 2020). While the debate is ongoing among epidemiologists, potential reasons for this include favourable demographics, cross-protection from local circulating coronaviruses, and limited testing capacity. Despite low numbers early in the crisis, the number of reported cases and deaths increased substantially after 2020, which is the study period covered by this paper. The increasing adverse health effects over 2021–22 likely reflect slow vaccination campaign rollouts and the fast-changing nature of the virus.

2.2 The economic situation leading up to the crisis and contraction of the economy in 2020

From 2000 to 2010, all of the economies studied experienced robust GDP growth rates of at least 4 per cent, often surpassing 5 per cent (World Bank 2023b). Towards the late 2010s Zambia and Mozambique experienced slower growth, while Ghana and Uganda rebounded after a slight dip. Tanzania had consistently maintained growth rates above 5 per cent since 2013. Poverty rates had remained relatively stable across countries post-2010 (World Bank 2023c). Inequality, as measured by the Gini index, had remained fairly constant for Uganda but had increased for Ghana and Mozambique (UNU-WIDER 2021). Except for Zambia, tax-to-GDP ratios slightly increased from 2000 to 2019.

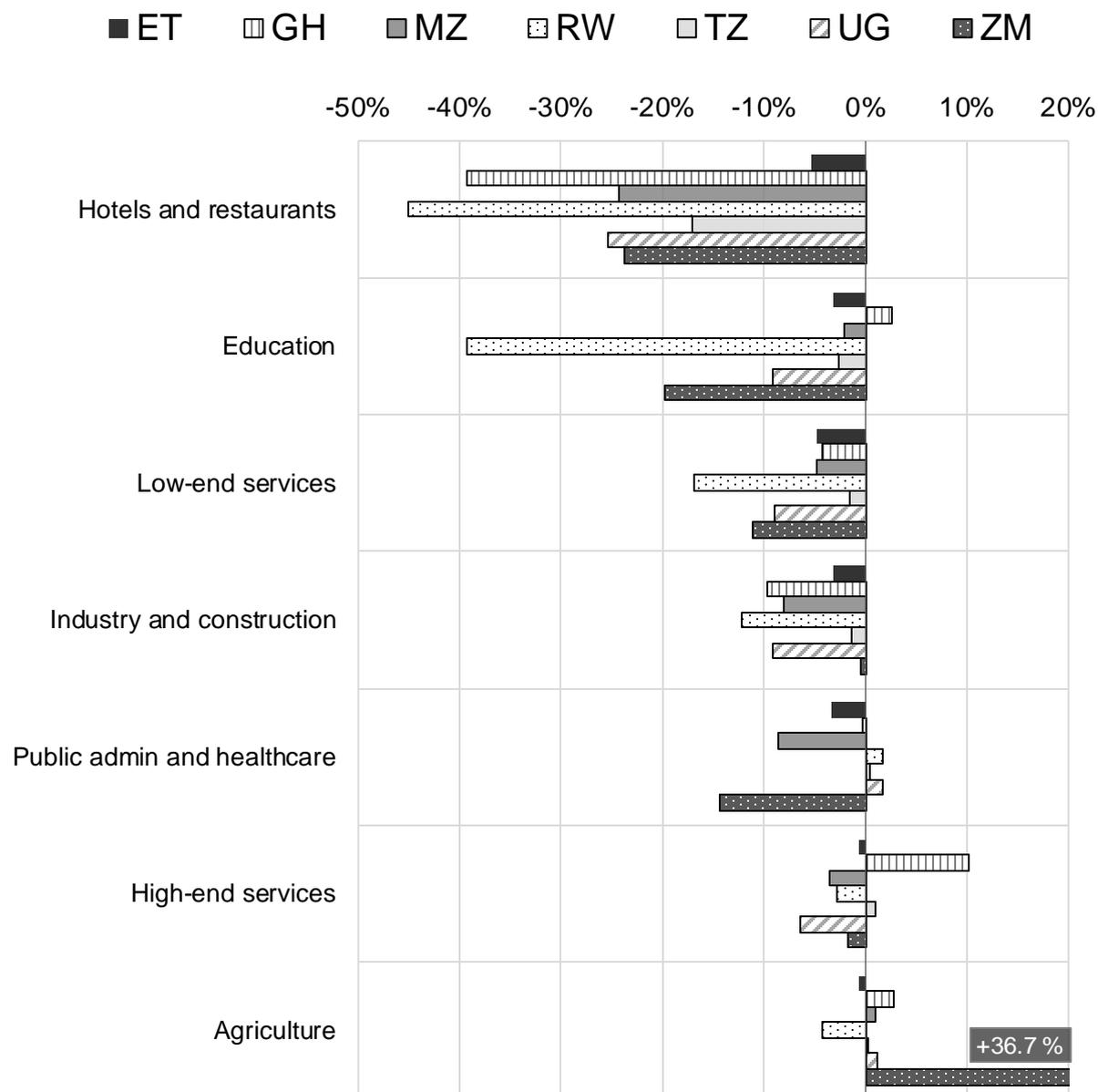
At the time of writing, detailed microdata for 2020 are limited, but industry-level GDP figures demonstrate the aggregate economic impacts of the COVID-19 pandemic. Rwanda had the largest GDP decrease, while Tanzania's economy was the least affected. The service sector, particularly hotels and restaurants, faced significant challenges. Impacts on other sectors varied by country, with education and construction heavily impacted in some countries but not in others. Agriculture, however, experienced growth in some countries, potentially mitigating the negative effects of the lockdown restrictions. Figure 1 visualizes the shocks in aggregated sectors of each economy.

Some patterns observed for specific industries hold across countries. The service sector was significantly affected by the pandemic in all countries. Economic activity in hotels and restaurants, in particular, was at least 20 per cent lower than expected based on pre-pandemic trends in most countries, with Ghana and Rwanda experiencing substantially larger losses. Many industries categorized under low-end services, such as administrative and support services, also suffered considerably.

In other sectors, variations between countries were larger. Education was hit hard in Zambia, Uganda, and Rwanda but not in the other countries. In Ghana, for example, teachers remained employed even as schools were closed for most of 2020. In addition to construction, the industry

and construction category includes extractive industries, utilities, and manufacturing, which faced overall shocks of around 10 per cent in Uganda, Rwanda, Mozambique, and Ghana but were not affected in Zambia and Tanzania.

Figure 1: GDP shocks in aggregated sectors, 2020



Note: GDP shocks reflect the relative difference between a sector's 2020 GDP and its trend estimate for 2020, derived based on the 2017–19 linear trend. 'Low-end services' includes wholesale and retail trade, repair activities, transportation and storage, administrative and support services, arts and entertainment, and domestic services. 'Industry and construction' includes mining and other extractive industries, manufacturing and utilities, and construction. 'High-end services' includes finance, insurance, real estate, information and communications, and professional, scientific, and technical activities.

Source: authors' illustration based on Bank of Tanzania (2022); Ghana Statistical Service (2022); Instituto Nacional de Estatística, Mozambique (2022); Ministry of Planning and Development, Ethiopia (2022); NISR (2022); Uganda Bureau of Statistics (2023); Zambia Statistics Agency (2019, 2020, 2021, 2022).

The adverse effects were generally smaller in public administration, healthcare, and high-end services such as trade, finance, and information and communications. The general overview shows

that occupations and activities particularly vulnerable to lockdown measures and customers avoiding crowds were affected most.

Importantly, agriculture did not suffer notably in the seven countries, and in some cases it grew compared with pre-crisis trends. Both Mozambique and Zambia experienced an excellent agricultural year (Club of Mozambique 2021; Geda 2021). Considering the large shares of the population engaged in agriculture in the countries analysed, and the more limited impact of lockdown measures on farming activities, farming likely cushioned some of the adverse effects of the pandemic.

Microdata from the World Bank Phone Surveys for Uganda (World Bank 2021a) confirm that the share of new households which entered into agricultural activities during the pandemic was considerably higher than the share of those exiting these activities. Similar patterns have also been found in Ethiopia, Malawi, and Nigeria (World Bank 2021b).

In terms of the economic shock, Tanzania stands out, with only a small share of its industries falling behind pre-COVID GDP trends in 2020. Similarly to other countries, the hardest hit industry in Tanzania was the accommodation and restaurant sector, which relies heavily on tourism.

2.3 Tax-benefit systems and governments' response to the pandemic

The tax and benefit systems in Ethiopia, Ghana, Mozambique, Rwanda, Tanzania, Uganda, and Zambia exhibit similar characteristics. These include a low level of coverage of personal income tax and social security entitlements, which cover a relatively small share of the population due to significant informalities. VAT and excise duty policies are commonly imposed, along with taxes on small business turnover. Despite the comparable tax practices adopted in these countries, there are significant variations in the specific implementation of the policies. Social protection schemes in Ethiopia, Ghana, Mozambique, Tanzania, and Zambia rely primarily on programmes that identify recipients through proxy means tests or categorical targeting. In Mozambique, this system is augmented using an income means test. In Rwanda, a household's entitlement to participate in certain social protection measures is determined largely by community-level assessment. In contrast, Uganda's primary national social protection initiative is the senior citizens' grant. For more detailed insights into the distinct tax-benefit systems of these countries, refer to the respective SOUTHMOD country reports.¹ Gasior et al. (2022) and Bargain et al. (2022) provide further insights into how the redistributive power of these systems compares across countries.

As the COVID-19 pandemic intensified in March 2020, governments grappled with critical decisions about when and whether to enforce lockdowns. This dilemma was heightened by several factors: a large portion of the population depended on a steady income, many had scant or no personal savings, government financial reserves were limited, and social assistance programmes depended heavily on contributions from international donors. While every country in the study initiated some form of lockdown in March 2020, their strategies evolved differently in the following months (see Appendix B). Most implemented a range of restrictions, from limiting gatherings and partially closing schools and workplaces to curtailing public transportation and restricting personal movement. Tanzania, however, charted a unique path. The government initially closed schools, halted sporting events, and shut down borders in April 2020. By May,

¹ The latest country reports, at the time of writing, are Adu-Ababio et al. (2023) for Ghana, Castelo et al. (2023) for Mozambique, de Mahieu et al. (2023) for Rwanda, Kalikeka et al. (2023) for Zambia, Leyaro et al. (2023) for Tanzania, Shahir et al. (2023) for Ethiopia, and Waiswa et al. (2023) for Uganda.

however, it began relaxing these restrictions and lifting quarantine mandates for incoming travellers. Moreover, the country stopped publicly tracking and reporting COVID-19 cases (Reporters Without Borders 2020). Meanwhile, the other countries in the study sustained, heightened, or adjusted their measures over the year, reflecting the varying levels of severity they had faced since the start of the pandemic (Hale et al. 2021).

In addition to making decisions about imposing lockdown measures, governments were faced with the challenge of determining whether to implement discretionary policies to mitigate the impact of the crisis and supplement the pre-existing measures, and if so, which ones.² In Section 3.3, we delve into the discretionary tax-benefit policies enacted across countries that influenced household incomes, also outlining how these policies were modelled. The extent of the policy responses varied notably among countries. Tanzania did not enact any discretionary tax-benefit measures in 2020, and measures in Ethiopia and Uganda were also limited. In contrast, numerous policy initiatives were proposed in other SSA countries.³

Mozambique and Zambia expanded their existing social protection initiatives by either increasing the benefit amounts or broadening the recipient base. Ghana took similar steps, to a lesser degree. In the early stages of the pandemic, initiatives like food baskets and face masks were introduced. Such measures were often temporary and lacked the finesse needed to reach the most vulnerable segments of society. The closure of schools in Ethiopia, Ghana, and Zambia carried unintended consequences, as it disrupted feeding programmes in public schools, forcing families to bear a greater responsibility for feeding their children.

To alleviate financial pressures on households, countries implemented policies such as the partial or full suspension of household utility bills. All countries with the exception of Tanzania introduced tax payment deferrals. While tax waivers were rare, Ghana was notable for exempting frontline and medical personnel from personal income tax for seven months in 2020. Additionally, most countries offered VAT exemptions on vital pandemic-related medical supplies and staple foods. Governments also rolled out supportive measures for small and medium-sized enterprises.

In some countries, these policies were continued and further measures were adopted in 2021 when the pandemic intensified (see Appendix A and B). Our analysis focuses on capturing the initial policy responses by governments in 2020, during the early stages of the crisis when the negative economic effects were largest. As will be detailed later, the years 2021 and 2022 brought about a steady recovery in most of the countries studied, aided by the gradual easing of lockdown measures (see Appendix C).

² See Gentilini et al. (2021) for an excellent and regularly updated overview on social protection measures taken across the world. For our analysis, we gathered more detailed information together with our local partners in each country.

³ Data on state-led policy responses were also gathered by other organizations, including ODI, the Social Protection Responses to COVID-19 Task Force, the OECD database on tax policy responses to COVID-19 by country, the University of Oxford's Government Response Tracker, the World Bank, and UNICEF's live document on social protection and job responses to COVID-19.

3 Data and methodology

We begin this section by discussing the primary features of the microdata underpinning the tax-benefit microsimulation models used in the analysis. We outline the process of updating the data to align with population trends and changes in prices before the pandemic. Further, we elaborate on adjustments undertaken to capture the changes in household income caused by the COVID-19 pandemic in 2020. Following this, we discuss the tax-benefit microsimulation models and how we model the policy landscape during the pandemic. Lastly, we explore the methodology applied to analyse how the crisis affected income distribution, and we present the decomposition technique employed to differentiate income shocks and tax-benefit-related effects.

3.1 Data and reweighting procedures

SOUTHMOD models are based on nationally representative household surveys, usually conducted every few years (see Decoster et al. 2019). For each country analysed, we use the latest survey wave available before the pandemic (see Table 1). The surveys contain information on household incomes, including labour and non-labour income, and information on household members' demographic characteristics. The surveys also include detailed expenditure modules. More information is available in each model's most recent country report.

Table 1: Data sources and models used

	Ethiopia	Ghana	Mozambique	Rwanda	Tanzania	Uganda	Zambia
Dataset and wave	Ethiopian Socioeconomic Survey (ESS), 2018/19	Ghana Living Standard Survey (GLSS 7), 2017	Inquérito ao Orçamento Familiar (IOF), 2014/15	Integrated Household Living Conditions Survey (EICV 5), 2016/17	Household Budget Survey (HBS), 2017/18	Uganda National Household Survey (UNHS), 2016/17	Living Conditions Monitoring Survey (LCMS), 2015
Industry-level GDP data used to estimate income shocks	GDP at constant 2016 prices	GDP at constant 2013 prices by economic activity	Quarterly GDP at constant 2014 prices by industry	GDP at constant 2017 prices by industry	GDP at 2015 prices by economic activity	Quarterly GDP at constant 2016/17 prices up to 2020 Q4	Quarterly gross value added by industry at constant 2010 prices
SOUTHMOD model version	ETMOD v3.0	GHAMOD v2.6	MOZMOD v2.10	RWAMOD v1.0	TAZMOD v2.8	UGAMOD v2.0	MicroZAMOD v2.6

Source: authors' construction; for sources of the GDP data, see the notes under Figure 1.

All underlying surveys were conducted before the onset of COVID-19. We therefore adjust the original data through a reweighting procedure, generating counterfactual datasets that mirror the population composition immediately before the outbreak of the pandemic in March 2020. Specifically, we alter the data to account for inherent changes in the age and gender distribution of the population in every country, using data from the UN Population Division's World Population Prospects (UNDESA 2022). In the process, we assume that the population had remained unchanged along other dimensions, such as the labour market profile, since the collection of the original data. In the following, we refer to these reweighted datasets as our pre-crisis or baseline datasets. For a detailed account of the steps undertaken in the reweighting procedure, refer to the technical note by McLennan (2021).

In addition to the demographic reweighting explained above, we apply standard uprating adjustments to incomes and expenditures in the original datasets (see each model's country report

for the specific indices used). This adjustment accounts for changes in price levels between the time of original data collection and 2020.

3.2 Adjusting earnings to the COVID-19 crisis situation

The pandemic is anticipated to have reduced market income in the countries analysed, a trend influenced by various factors. Government-imposed lockdowns and restrictions were poised to curtail international trade, global supply chains, and tourism, and cause business closures. Additionally, a voluntary reduction in consumption and mobility is among the key reasons for the expected income reductions. To capture the negative impacts on income, we develop a dataset that mirrors the shocks to earnings for both employees and the self-employed. We focus primarily on earnings as the main income source, setting aside adverse effects the pandemic might have had on other income types such as pensions, capital income, and remittances. Comprehensive data on the influence of the pandemic on these income categories remain scarce for the countries in question. Moreover, while the impact on pensions might not have been immediately evident in 2020, it could become more pronounced over time.

First, for each industry within every country, we determine the deviation of the 2020 real GDP from its pre-pandemic trend observed for 2017–19. This is achieved using annual industry-level GDP data (see Table 1 for data sources and Appendix D for the shock estimates). Second, we distribute the negative sectoral shocks to individual earnings by adjusting the reweighted pre-crisis baseline dataset.⁴ To accomplish this, we randomly assign workers in each sector to unemployment, ensuring their income is set to zero. This continues until the aggregate reduction in labour income aligns with the GDP shock for the corresponding sector. This procedure culminates in the formulation of what we term the ‘crisis dataset’. Further details on the process can be found in the technical notes by Oliveira et al. (2021) and Lastunen (2021).

While our methodology employs a straightforward approach to distributing sectoral shocks, it is useful to consider its potential shortcomings. By concentrating primarily on workers experiencing a total loss of income, we might not fully capture the nuanced reactions to the crisis within labour markets. Rather than complete unemployment, many workers may have transitioned to the informal sector or faced reductions in earnings, for instance by taking on part-time opportunities or accepting wage cuts to retain employment. Such transitions can vary by demographic factors, potentially leading to disparities in income adjustments across different worker profiles. Consequently, the actual distribution of income losses may differ from our estimates, with a smaller increase in the number of workers with zero earnings, even if the aggregate income losses are consistent with external estimates.

An alternative methodology would involve modelling labour market transitions using microdata. This approach has been adopted by several researchers, including Barnes et al. (2021) for South Africa; Cantó et al. (2021) for Belgium, Spain, and the UK; Christl et al. (2023) for Germany; and Jara et al. (2022) for Ecuador. In a separate technical note by Oliveira et al. (2021), we explore a labour market transition model tailored for Uganda, drawing on income loss imputation from microdata available in the World Bank Phone Survey for Uganda (World Bank 2021a). This technique facilitates a nuanced distribution of earnings shocks, both within sectors and across income brackets. Rather than indiscriminately assigning workers to unemployment, it considers individual profiles. For example, workers with certain attributes, such as age, gender, education

⁴ We concentrate here on negative sectoral GDP shocks and do not adjust earnings for positive sectoral GDP shocks. We consider the time of analysis to be too short for significant wage increases, given wage rigidities.

level, or those employed in the formal sector, might exhibit a higher likelihood of income loss. While microdata suitable for this approach are emerging for some of the studied countries, we opt for a randomized allocation across all countries to ensure comparability.

3.3 Tax-benefit policy measures in response to the crisis, and their implementation

Our study employs tax-benefit microsimulation models developed for seven countries: Ethiopia (ETMOD), Ghana (GHAMOD), Mozambique (MOZMOD), Rwanda (RWAMOD), Tanzania (TAZMOD), Uganda (UGAMOD), and Zambia (MicroZAMOD). These models shed light on both pre-existing tax-benefit systems and the new discretionary policies introduced in the wake of COVID-19 (for model versions, see Table 1). For our analysis, we integrate the COVID-specific tax-benefit policies and all policy changes that were implemented in 2020 regardless of COVID-19.

In normal times, governments modify their tax-benefit systems annually, with these changes generally remaining consistent throughout the year—whether fiscal or calendar-based. The conventional SOUTHMOD models, therefore, utilize a point-in-time perspective pegged to 30 June or 1 July of the respective year modelled (for a more comprehensive understanding, consult the SOUTHMOD modelling conventions; UNU-WIDER 2023).

Given the unique nature of the pandemic, modelling COVID-19-related policies is challenging in such a framework. Many of these policies were instated after the pandemic’s onset, and some were limited to only a few months in 2020. To encapsulate this, our analysis adopts a full-year perspective. In essence, we simulate benefits and tax rules solely for their effective months, which requires scaling them relative to a year (for further information, see the technical note by Gasior et al. 2022).

Our simulations do not encompass every measure introduced. This is for three main reasons. First, we opt not to simulate deferrals of tax (penalty) payments, viewing them as temporary and not as full waivers. Second, our modelling is limited by the level of detail available in the underlying microdata, especially concerning the precise formulation of tax-benefit rules. Third, while we factor in small household businesses and the self-employed, many schemes tailored to these groups are not fully transparent in their execution, or there is an absence of comprehensive microdata about their business activities for accurate modelling. In most cases, the results present the design effects of the tax-benefit systems if the system were perfectly implemented, thus assuming full take-up of the newly introduced benefits.

Table 2 lists the main COVID-19-related tax-benefit policies integrated into the models, with Appendix E offering an in-depth account of these measures and their modelling.⁵ Notably, Ghana, Mozambique, and Zambia enacted a broader range of policies in response to the crisis compared with Ethiopia, Rwanda, and Uganda. Tanzania refrained from significant action. Beyond the pandemic-related policies, our models encompass the tax-benefit measures as they stood at the start of the crisis.

⁵ The information was collected by each SOUTHMOD national team, often in conversation with government and its agencies, but also with donors. As far as they are available, we provide sources and weblinks for the information.

Table 2: Overview of major COVID-19-related policies included in the analysis, by country

Ethiopia	Ghana	Mozambique	Rwanda	Tanzania	Uganda	Zambia
Tax deferrals; limited school feeding due to school closures	Food rations for Livelihood Empowerment Against Poverty (LEAP) beneficiaries; utility tariffs reliefs; income tax waiver for medical and frontline staff; limitations to school feeding due to school closures	Top-up of existing unconditional cash transfer, the Basic Social Subsidy Program (BSSP); utility tariff reliefs	Tax deferrals; employment income waivers for low-income earners working in private schools, hotels, and the tourism sector	Barely any policies adopted; none modelled	Few policies adopted; none modelled	Top-up of existing unconditional cash transfer (Social Cash Transfer) via the Emergency Social Cash Transfer; limitations to school feeding due to school closures

Source: authors' construction based on sources outlined in Appendix E.

More specifically, our analysis incorporates tax-benefit policy changes related to COVID-19 in each country as follows.

Ethiopia

The federal government enacted a fiscal stimulus package including tax deferrals and remits on outstanding tax liabilities, also suspending taxes on imports of personal protective items. The tax policy response did not include any discretionary changes in tax rates and brackets. Instead, it employed a strategy combining the deferral of payments and the cancellation of accrued business tax debts spanning several years. While the rural Productive Safety Net Program (PSNP) suspended its public work facet, it continued to disburse the existing benefit amounts through lump sum payments.

In September 2020, the Addis Ababa city administration reintroduced the school feeding initiative in public schools. Although the programme was conceived much earlier and briefly rolled out in 2019, its early stages were curtailed following school shutdowns amid the pandemic. We interpret the suspension of the school feeding initiative as a (negative) policy change attributed to the pandemic. Our simulation of the programme is premised on a daily expenditure of 20 birr (ETB) per pupil. Given that the initiative was operational for only four months in 2020, the annual benefit amount was adjusted to reflect one-third of a year.

Ghana

At the outset of the pandemic, Ghana initiated a programme to provide food rations to vulnerable households already benefiting from LEAP transfers. This 21-day initiative began on 9 April 2020 in lockdown areas and is represented in our model as a top-up to LEAP recipients. The government introduced several additional measures, including a full waiver on water costs for nine months, a full electricity waiver for the most impoverished, and a 50 per cent waiver for electricity costs for other consumers (Presidency of the Republic of Ghana 2020a). Our ability to simulate these is limited due to data constraints, specifically the absence of monthly energy usage figures. Moreover, individuals employed in frontline and medical services in Ghana received an exemption from personal income tax between May and December 2020 (Presidency of the Republic of Ghana 2020b).

Unintended consequences arose from the closure of schools, which impacted the crucial school feeding programme in public institutions. The in-kind Home-Grown School Feeding initiative for

pre-high-school students was paused from 30 March until December 2020. Nevertheless, later in the year, meals resumed for final-year junior and senior high students (starting 9 April for three months) (Presidency of the Republic of Ghana 2020a) and for second-year senior high and junior high students (from 24 August to 18 September) across both public and private schools (Presidency of the Republic of Ghana 2020c). In our models, we equate the meals not supplied to public school students as lost income for households. This is based on the presumption that families needed to allocate personal resources to feeding their children during the school closures. The household's meal expense is approximated using the monetary value assigned to a meal within the programme.

Mozambique

The government enhanced its two primary social protection initiatives in the country. Recipients of the BSSP were granted an additional unconditional cash transfer, equivalent to three months of their standard benefit. The Direct Social Support Program experienced a comparable increase, although we could not simulate this enhancement due to data limitations.⁶ Further, we partially modelled the significant reductions in utility tariffs for consumers.⁷ In addition, our simulation encompasses the VAT exemption applied to sugar, cooking oil, and soap.

Zambia

On 28 July 2020, Zambia enacted the Emergency Social Cash Transfer. This programme not only augmented benefits for households already receiving the existing Social Cash Transfer ('vertical expansion') but also introduced a new benefit component for vulnerable households working in the informal sector ('horizontal expansion') (MCDSS and UNICEF 2021). Due to data limitations, our model incorporates only the vertical expansion. This benefit offers 400 kwacha (ZMW; slightly under US\$20) monthly to each household for half a year, spanning 22 districts.

When schools were closed from 17 March to 28 September 2020 because of the lockdown, Zambia's Home-Grown School Feeding Programme was temporarily halted.⁸ Consequently, students in public schools missed out on their usual meals. Mirroring our approach with Ethiopia and Ghana, we incorporated this into our model as a missed benefit, translating into a reduction in the incomes of households that would have initially benefited equating to the monetary value of a school meal. We excluded the modelling of suspended custom duties, VAT exemptions on medical supplies, and tax relief provided to businesses due to the inability of our data to accurately identify the particular goods.

Rwanda

Rwanda made a combination of discretionary and procedural changes to its tax policies in 2020. These adjustments encompassed personal income tax exemptions for low-income workers in private schools, hotels, and the tourism industry; VAT waivers for locally produced masks; and tax deferrals and waivers for outstanding liabilities. Moreover, the government extended food

⁶ For more details about BSSP, see de Lima Veira et al. (2020). At the end of 2020, the government also enacted the Post Emergency—Direct Social Support Program (PASD-PE). The programme targets low-income families not covered by the BSSP. Because most of the beneficiaries received the benefit in 2021, and due to lack of up-to-date data about this programme, we do not simulate it for 2020. See also EDM (2020).

⁷ The reduction for utility fees for electricity is simulated. However, the reduction in fees for water is not simulated as it is not possible to distinguish between public and private water sources in the underpinning dataset.

⁸ Based on information from staff at the Zambia Institute for Policy Analysis and Research (ZIPAR).

assistance to the vulnerable population. The simulations do not incorporate these interventions due to constraints in available data.

Uganda

Uganda implemented minor measures in response to the pandemic, including VAT exemptions on select products essential for combating the virus, widespread distribution of face masks, and food assistance for vulnerable groups. However, due to data limitations and insufficient detail in the rules, these actions cannot be accurately simulated. Still, it is worth noting that these policies are unlikely to have had a significant impact on overall household incomes.

Tanzania

Tanzania did not introduce any significant tax-benefit measures in 2020, and as such, none were modelled.

3.4 Measuring the impact of the crisis and the cushioning effect of tax-benefit systems

Evaluating the effectiveness of tax-benefit systems in mitigating the economic impacts of COVID-19 requires a multifaceted approach rather than a singular metric. Therefore, we approach the question from several angles, assessing the direct impact of the pandemic on several welfare metrics, delving deeper into policy effects, and differentiating between the effectiveness of automatic stabilizers and the COVID-related policy changes.

For consistency across countries, we employ financial metrics adjusted using purchasing power parity and use the international US\$1.90 poverty line, combined with a per capita equivalence scale. Consequently, our findings might not align perfectly with national standards for poverty and inequality, given that these typically rely on unique national poverty lines and varied equivalence scales, often rooted in calorie-based assessments.

Comparing pre-crisis and crisis welfare measures

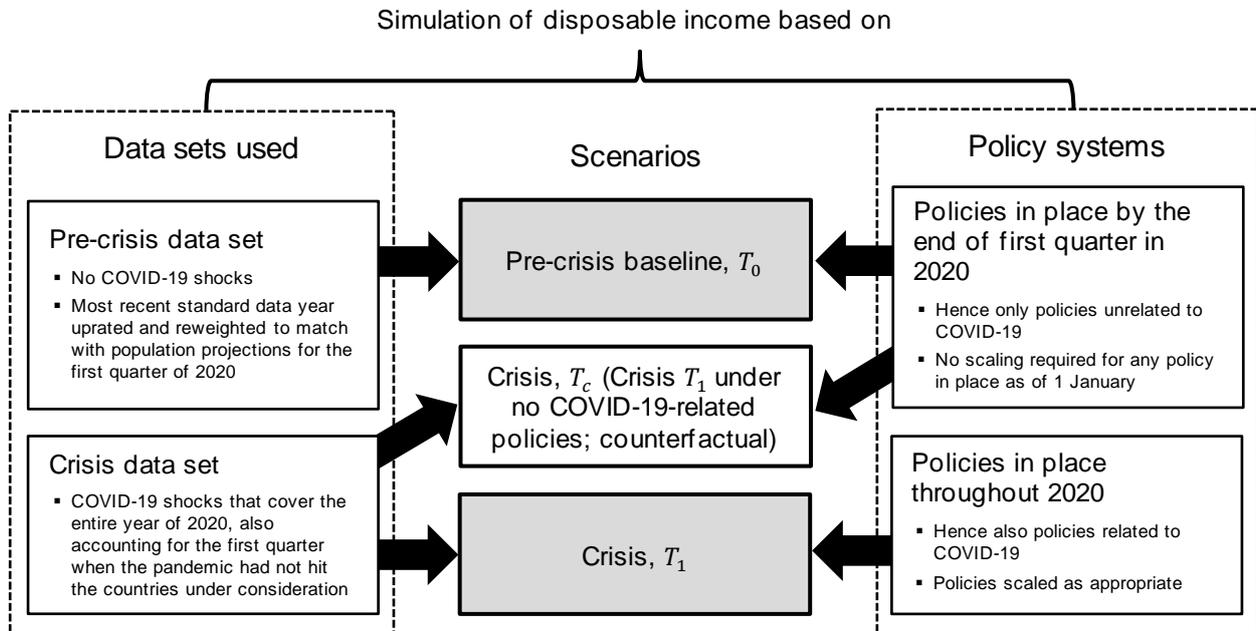
Our analysis focuses on the following welfare measures: average household disposable income, income-based headcount poverty (FGT0) and poverty gap (FGT1), and the Gini coefficient of income inequality. For each measure, we compare the baseline (pre-crisis) level to the COVID (crisis) situation. Defining y as pre-crisis gross market income, $t(y)$ as income tax and social security contributions, and $b(y)$ as government transfers, household disposable income in the pre-crisis baseline is shown by $D = y - t(y) + b(y)$. Similarly, crisis disposable income is defined as $D' = y' - t''(y') + b''(y')$, where y' stands for crisis market income, $t''(y')$ for the income tax and social security contributions on crisis market income, and $b''(y')$ for government transfers in the crisis scenario.⁹ Single quotation marks stand for the impact of the crisis and double quotation marks for reforms. The total difference Δ in welfare index I is then:

$$\Delta = I \left[\underbrace{y' - t''(y') + b''(y')}_{\text{crisis scenario}} \right] - I \left[\underbrace{y - t(y) + b(y)}_{\text{pre-crisis scenario}} \right]$$

⁹ Market income is composed of labour, business, capital, property, and other income sources. In the analysis, we restrict the shock to earnings by employees, the self-employed, and farmers as the most important and often exclusive income source for the majority of the population.

Welfare indices I can be estimated based on the simulated distributions of disposable income in the pre-crisis and crisis scenarios. As the first step, we compare mean incomes, poverty, and inequality in the pre-crisis baseline scenario T_0 with the crisis scenario T_1 , combining data and policy systems as depicted in Figure 2. The figure also shows a third, counterfactual scenario, T_c , explained in the decomposition section below.

Figure 2: Simulation datasets and policy modelling resulting in three modelling scenarios



Source: authors' illustration.

Decomposition of changes to the distribution of disposable income

In the third step, we delve deeper into the tax-benefit system, analysing the contributions to mitigating the shock of automatic stabilizers and discretionary COVID-19-related policy responses. We use the decomposition approach introduced by Bargain and Callan (2010), expanded upon by Paulus and Tasseva (2020) and most recently implemented by Brewer and Tasseva (2020) in the UK and Jara et al. (2022) in Ecuador. This methodology enables us to concentrate on the entire income distribution.

The decomposition method necessitates the simulation of a third scenario (T_c) that combines the crisis dataset with the tax-benefit system, excluding the COVID-19-related policy changes, as illustrated in Figure 2. Comparisons of the pre-crisis, crisis, and counterfactual scenarios permit us to allocate the distributional effects of the crisis to three primary components: (i) market income losses attributed to COVID-19, (ii) the stabilizing role of the prevailing tax-benefit system before the crisis, and (iii) the supplementary effects of discretionary policy changes adopted in response to the COVID-19 crisis. This last category encompasses the distinct support from added social protection benefits and the discontinuation of school feeding in Ethiopia, Ghana, and Zambia, as previously detailed.

For the decomposition, we start with Δ , the total difference in welfare index, I , defined above. This difference can be decomposed into the contributions of the COVID-related benefits and other effects:

$$\Delta = \overbrace{\{I[y' - t''(y') + b''(y')] - I[y' - t(y') + b(y')]\}}^{\text{COVID-related policy changes (scenario } T_r \text{—scenario } T_c)} + \underbrace{\{I[y' - t(y') + b(y')] - I[y - t(y) + b(y)]\}}_{\text{Other effects (scenario } T_c \text{—scenario } T_0)}$$

In the case of additively decomposable measures, such as the mean of a distribution, the latter term (other effects) can be split out into the contribution of changes in gross market income (including earnings) and the contribution of automatic stabilizers:¹⁰

$$\Delta = \overbrace{\{I[y' - t''(y') + b''(y')] - I[y' - t(y') + b(y')]\}}^{\text{Policy changes (scenario } T_r \text{—scenario } T_c)} + \overbrace{\{I[y'] - I[y]\}}^{\text{Earnings changes}} + \underbrace{\{I[t(y)] - I[t(y')]\}}_{\text{Taxes/SICs as automatic stabilizers}} + \underbrace{\{I[b(y')] - I[b(y)]\}}_{\text{Benefits as automatic stabilizers}} + \underbrace{\eta}_{\text{Residual term}}$$

4 Impact of the crisis on incomes, poverty, and inequality, and the role of tax-benefit policies

We begin by discussing the impact of the pandemic on disposable income across countries. We explore the extent to which tax-benefit policies succeeded in stabilizing incomes following the shock, comparing the performance of automatic stabilizers against emergency policy measures. This assessment is conducted both at the mean of the distribution and across the income distribution. Then we delve into the effects of the crisis on poverty and inequality, measured based on disposable income.

4.1 Impact of the crisis on mean disposable income

Table 3 compares mean disposable household incomes in international dollars in the pre-crisis and crisis scenarios for 2020. All countries in this study encountered a reduction in household disposable incomes, with the largest drops observed in Ghana and the smallest in Tanzania (column A).

Overall, the pandemic induced a relatively modest reduction in income across the seven countries, which can be attributed to the concentration of negative shocks in segments of the economy that employ a disproportionately small portion of the population. The reduction in household incomes is less pronounced than that observed in studies for South Africa (Barnes et al. 2021) and the Andean region (Avellaneda et al. 2021), which experienced more substantial earnings shocks.

¹⁰ Applying the last step to non-additively decomposable measures such as poverty and inequality is challenging, as one is left with a non-zero residual term; see also Paulus and Tasseva (2020) on the implications.

Table 3: Impact of COVID-19 on mean disposable income, by country

	Total change	Decomposition of total change		
	(A)	Effect of policy changes due to COVID-19 (B)	Effect of automatic stabilizers (C)	COVID-19-driven reduction in earnings (D)
Ethiopia	-15.45*** -2.5%	-1.65*** -0.3%	+2.11 +0.3%	-15.91 -2.5%
Ghana	-106.98*** -3.7%	-8.58*** -0.3%	+2.33 +0.1%	-100.74 -3.5%
Mozambique	-14.79*** -2.6%	+2.56*** +0.5%	+3.01 +0.5%	-20.36 -3.6%
Rwanda	-87.79*** -10.8%	-	+15.18 +1.9%	-102.97 -12.7%
Tanzania	-13.44*** -1.7%	-	+0.75 +0.1%	-14.19 -1.7%
Uganda	-42.60*** -5.7%	-	+4.26 +0.6%	-46.86 -6.3%
Zambia	-60.77*** -6.4%	+8.02*** +0.8%	+9.79 +1.0%	-78.58 -8.3%

Note: the table presents estimates of the impact of the COVID-19 pandemic on mean incomes, shown in international dollars and derived based on harmonized equivalence scales in the respective countries in 2020; column A shows the change in mean disposable income for individuals in the scenarios without and with shocks from COVID-19, i.e., the overall effects of the crisis; across rows, the absolute change is shown for each country above (with statistical significance) and the corresponding percentage change below; the crisis scenario also accounts for COVID-19—related tax-benefit policy changes made in 2020; columns B, C, and D show the independent effects of discretionary policy changes made during the crisis, automatic stabilization of the tax-benefit system, and the COVID-19—induced earnings shock, respectively, again in both absolute and relative terms; statistical significance for columns A and B is based on bootstrapped standard errors after 200 replications; significance levels are indicated as * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Source: authors' construction based on SOUTHMOD tax-benefit microsimulation models and survey data for the respective countries.

Columns B to D decompose the total change in disposable income into sub-components. It is evident that the decrease in disposable income is predominantly due to the earnings shock (column D) in each country, which ranges from 1.7 per cent of mean disposable income in Tanzania to 12.7 per cent in Rwanda.

The prevailing tax-benefit policy system, in the form of automatic stabilizers (column C), played a limited role in mitigating the negative effects on disposable income. Automatic stabilizers increased incomes by between 0.1 per cent (Tanzania and Ghana) and 1.9 per cent (Rwanda), as households paid slightly lower taxes and social insurance contributions due to their reduced market incomes.

As discussed, the governments in Ethiopia, Ghana, Mozambique, and Zambia also introduced discretionary tax-benefit policy measures in response to the pandemic, but with limited effectiveness. Strikingly, the suspension of school feeding in Ethiopia and Ghana during the early stage of the crisis led to a minor reduction in mean disposable income. In Uganda, and to a smaller extent in Rwanda, some policy measures were implemented that due to data limitations could not be modelled comprehensively. Nevertheless, based on the available information it seems

reasonable to assume that including these measures would not have significantly altered the primary outcomes of our analysis.

4.2 Impact of the crisis and tax-benefit policies along the income distribution

In this section, we examine how different elements of disposable income are altered across the income distribution. Figure 3 presents these statistics for Ethiopia, Ghana, Mozambique, and Zambia, while Figure 4 covers Rwanda, Tanzania, and Uganda. For each country, we present two illustrations: (1) the left-hand panel for each country shows the decomposition of the relative change in mean disposable household incomes by income quartiles (analogous to the preceding analysis for the mean); and (2) the right-hand panels show the relative income change attributed exclusively to the automatic stabilization features of the pre-existing tax-benefit system. In addition to quartile-specific effects, each graph also includes an ‘Overall’ bar, representing the decompositions for the entire population. In the left-hand panels, these bars repeat the information in Table 3.

Across countries—with the exception of Ghana—the reductions in disposable income are more pronounced at the upper half of the pre-crisis distribution of household income (the white dots in the left-hand panels of Figures 3 and 4), measured in terms of relative income changes. The income reductions for the top quartile range from more than 12 per cent in Rwanda to less than 2 per cent in Tanzania.¹¹

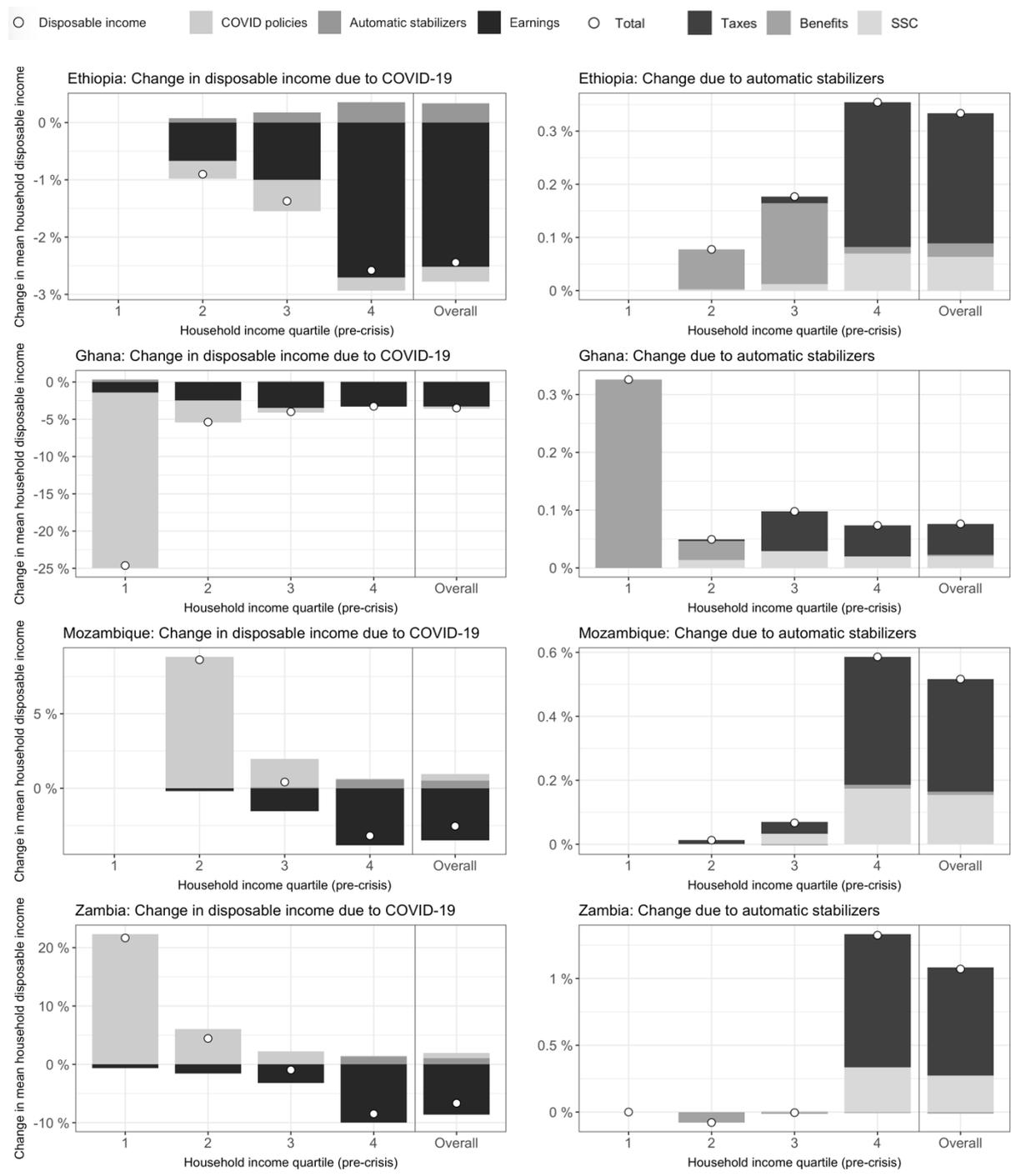
The figures underscore that the primary factor behind the patterns of disposable income in the countries considered is the shock on earnings (represented by the black bars in the left-hand panels of Figures 3 and 4). The crisis resulted in a more pronounced effect on households at the top half of the income distribution. This trend aligns with findings for South Africa and the Andean countries (Avellaneda et al. 2021; Barnes et al. 2021; Jara et al. 2022). The result also implies that a substantial share of households at the bottom of the income distribution engage in agricultural activities, which were less affected by the restrictions imposed during lockdowns (as visible in Appendix D). A corresponding observation by the World Bank (2021b) suggests that households in SSA increased their agricultural pursuits during the pandemic, potentially acting as an additional buffer against economic shocks.

In contrast, the patterns of earning shocks differ significantly for European countries, with much of the existing literature indicating a comparatively large decline in earnings for those at the bottom of the income distribution. Christl et al. (2023) investigate the impacts of the crisis in Germany; Cantó et al. (2021) in Belgium, Italy, Spain, and the UK; and Figari and Fiorio (2020) in Italy.

Automatic stabilizers had a negligible effect in mitigating against income losses (depicted by the dark grey bar in the left-hand panels of Figures 3 and 4, with the full decomposition shown in the right-hand panels). Across countries, stabilizers worked (to a limited extent) almost exclusively for the top quartile of households, ranging from around 0.1 per cent in Ghana and Tanzania to more than 2 per cent in Rwanda. This finding is similar to those for the Andean countries and South Africa. It differs significantly from evidence from European countries, where automatic stabilizers played a more important role, owing to more extensive tax coverage and benefits also acting as automatic stabilizers (Cantó et al. 2021).

¹¹ In Ethiopia, household disposable incomes in the bottom quartile evaluate to zero, as many households report no income (yet all households report non-zero consumption). We therefore cannot calculate the relative change in income for the bottom quartile.

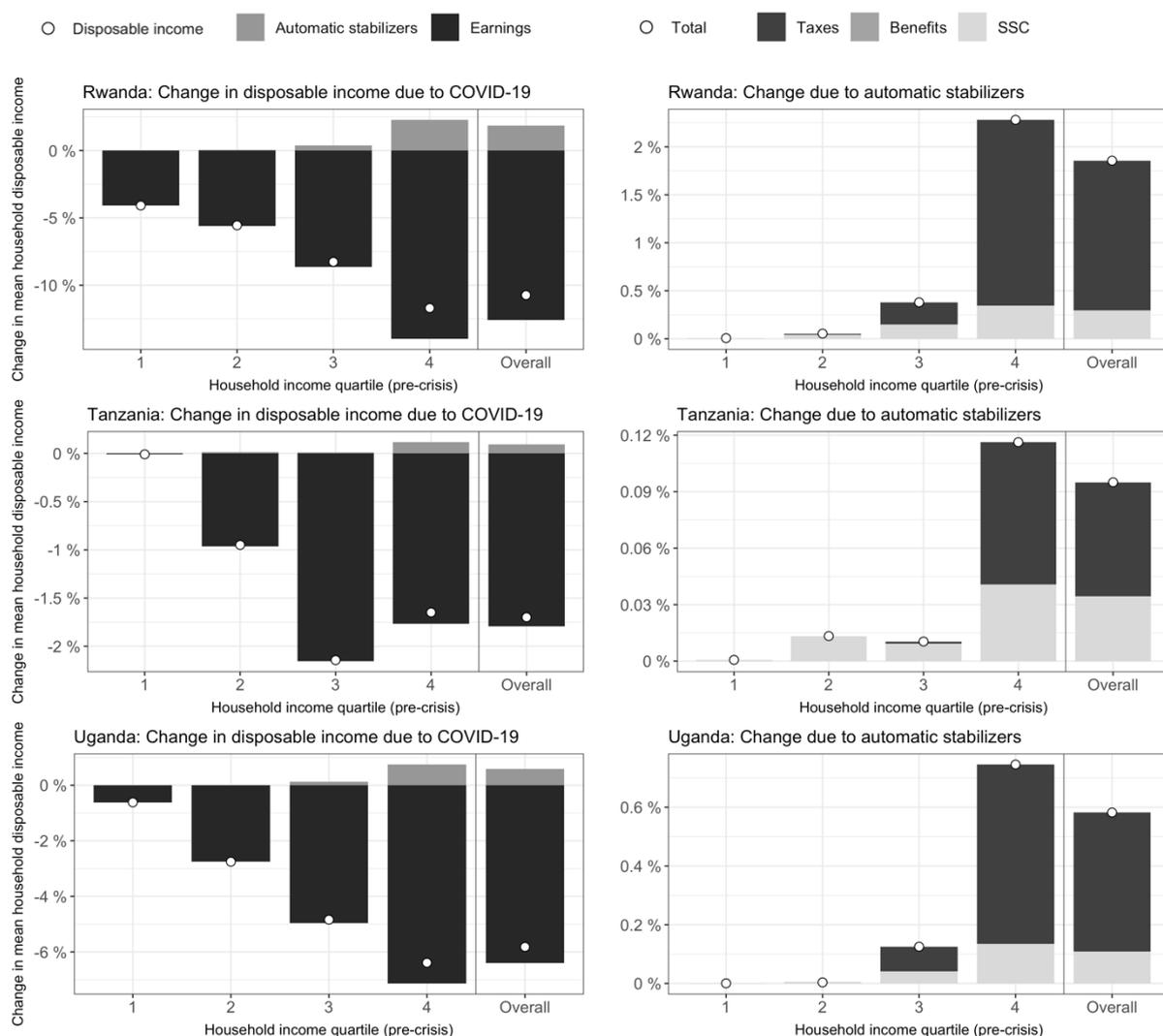
Figure 3: Decomposition of changes in mean disposable household income by quartile in Ethiopia, Ghana, Mozambique, and Zambia, 2020



Note: the figures decompose the income shock from COVID-19 in Ethiopia, Ghana, Mozambique, and Zambia in 2020 into contributions from different sources; the figures on the left decompose the shock on mean per capita household disposable incomes into (i) earnings losses resulting from the pandemic (black), (ii) the effects of COVID-19-related policy changes (light grey), and (iii) the automatic stabilization of the tax-benefit system (dark grey); net impact on disposable household income is shown by the white dots; the figures on the right decompose the automatic stabilization of the tax-benefit system into (i) savings from reduced tax payments (black), (ii) savings from additional social benefits (dark grey), and (iii) savings from social insurance contributions (SSC) (light grey); in both figures, effects are shown separately for different income quartiles and across the entire population, with changes derived with respect to disposable household income in the pre-crisis scenario; in Ethiopia and Mozambique, the mean per capita household disposable income of quartile 1 is equal to zero, so relative changes for that quartile cannot be computed.

Source: authors' illustration based on SOUTHMOD tax-benefit microsimulation models for the respective countries.

Figure 4: Decomposition of changes in mean disposable household income by quartile in Rwanda, Tanzania, and Uganda, 2020



Note: the figures decompose the income shock from COVID-19 in 2020 into contributions from different sources; see notes under Figure 3 for details.

Source: authors' illustration based on SOUTHMOD tax-benefit microsimulation models for the respective countries.

Our analysis underscores two major disparities between the majority of developing countries and their developed counterparts. First, the prevalence of a vast informal sector in the economy suggests that the personal income tax and social security system (as illustrated by the black and light grey bars in the right-hand panels of Figures 3 and 4) possess limited capacity to stabilize incomes via reduced contributions during the crisis.

Second, the social security systems in SSA countries are marked by both restricted population coverage and modest benefit amounts. Moreover, the selection of beneficiaries often overlooks market incomes (with stabilization from benefits illustrated by the dark grey bar in the right-hand panels of Figures 3 and 4). Social protection measures tend to lean on proxy means-testing or categorical targeting, thereby lacking the capacity to immediately incorporate new recipients in response to sudden income shocks.

In the wake of the pandemic, the discretionary tax-benefit policy measures that were instated had a significant positive impact on the poorest households in Zambia and, to a lesser degree, those in

Mozambique. Note that in Mozambique, the mean household disposable income for the bottom quartile is zero, so relative changes cannot be computed. In Zambia, the Emergency Cash Transfer served as a buffer against the modest earnings shock, predominantly affecting the lower half of the income distribution. The discontinuation of the school feeding programme, treated as a COVID-19-related policy change, was counteracted by the beneficial effects of the Emergency Cash Transfer. It is imperative to interpret this outcome as a lower-bound estimate due to the limitations in modelling the expansion of benefit coverage. Meanwhile, in Mozambique, COVID-19-related policies eliminated income losses for quartiles 2 and 3.¹² That said, the large relative income increases for the poorer quartiles in Zambia and Mozambique are still low in absolute terms and, as we will learn, did not substantially reduce poverty.

Select policy changes resulting from the pandemic are estimated to have reduced the disposable income of the poorest households in Ethiopia and especially Ghana. The discontinuation of major school feeding programmes left parents to feed their children using their own means, leading to a notable decrease in household disposable income. The situation in Ghana stands apart from that in other countries. The significant decrease in income among the bottom quartile (exceeding 30 per cent) can be associated primarily with the termination of the in-kind school feeding initiative for pre-high school students in public schools. Its adverse effects surpass the negative impact of the earnings shock and dominate the positive impact of all other discretionary measures, particularly for the bottom quartile. While the estimated reductions in disposable income are substantial, especially among the poorest households, the impact appears far less severe if assessed through consumption-based indicators.

As discussed above, no significant measures were adopted by Rwanda, Tanzania, or Uganda.

4.3 Small cushioning impact of tax-benefit policies on poverty and inequality

In this section, we discuss the effects of COVID-19 on disposable incomes, particularly in relation to poverty, using the internationally comparative US\$1.90/day threshold, and inequality, as gauged by the Gini coefficient (Table 4).

¹² The small mitigating effect of benefits in the top quartile is a result of some households becoming eligible for the BSSP, qualifying due to the means test at individual and household level given that even in the top quartile some households are not far from the poverty line.

Table 4: Impact of COVID-19 on poverty and inequality, and decomposition

		Welfare measure			Change in welfare measure		
		Pre-crisis scenario	Crisis scenario	Total change (%)	Total change (absolute)	Decomposition of total change (absolute)	
		(A)	(B)	(C)	(D)	Effect of COVID-19 policies	Earnings shock and automatic stabilizers
Ethiopia	Poverty rate	83.25	83.74	+0.59%	+0.49***	+0.09***	+0.40***
	Poverty gap	67.87	68.36	+0.72%	+0.49***	+0.10***	+0.39***
	Gini coefficient	83.41	83.53	+0.15%	+0.13**	+0.06***	+0.07
Ghana	Poverty rate	48.23	50.05	+3.77%	+1.82***	+0.26***	+1.56***
	Poverty gap	32.73	34.92	+6.69%	+2.19***	+0.81***	+1.38***
	Gini coefficient	78.61	79.38	+0.98%	+0.77***	+0.30***	+0.47***
Mozambique	Poverty rate	81.05	81.55	+0.62%	+0.50***	-0.04***	+0.54***
	Poverty gap	65.70	65.98	+0.42%	+0.28***	-0.36***	+0.63***
	Gini coefficient	79.82	79.63	-0.24%	-0.19***	-0.31***	+0.12*
Rwanda	Poverty rate	74.97	77.69	+3.64%	+2.73***	-	+2.73***
	Poverty gap	50.70	54.31	+7.12%	+3.61***	-	+3.61***
	Gini coefficient	69.73	70.84	+1.59%	+1.11***	-	+1.11***
Tanzania	Poverty rate	69.25	69.70	+0.65%	+0.45***	-	+0.45***
	Poverty gap	52.18	52.74	+1.06%	+0.55***	-	+0.55***
	Gini coefficient	71.44	71.71	+0.37%	+0.27***	-	+0.27***
Uganda	Poverty rate	71.44	73.32	+2.63%	+1.88***	-	+1.88***
	Poverty gap	48.73	50.65	+3.94%	+1.92***	-	+1.92***
	Gini coefficient	66.54	67.23	+1.03%	+0.68***	-	+0.68***
Zambia	Poverty rate	70.38	71.61	+1.75%	+1.23***	-0.31***	+1.54***
	Poverty gap	50.53	51.22	+1.37%	+0.69***	-0.89***	+1.58***
	Gini coefficient	72.07	71.71	-0.50%	-0.36**	-0.58***	+0.22***

Note: the table presents estimates of the impact of the COVID-19 pandemic on measures of poverty and inequality in the respective countries in 2020; columns A and B show the poverty rate, poverty gap, and Gini coefficient in the scenarios without and with shocks from COVID-19; the crisis scenario also accounts for COVID-19-related policy changes made in 2020, when modelled; outcomes are derived based on harmonized equivalence scales and a standard international poverty line (disposable income under US\$1.90 per day); columns C and D show the overall impact of the crisis in percentages (B/A-1) and as an absolute change (B-A), respectively; column E shows the independent effect of the discretionary policy changes made during the crisis; column F shows other effects, namely the automatic stabilization of the tax-benefit system and the COVID-19-induced earnings shock; statistical significance shown for the absolute changes (D, E, F) is based on bootstrapped standard errors after 200 replications; significance levels are indicated as * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Source: authors' construction based on SOUTHMOD tax-benefit microsimulation models and relevant survey data for the respective countries.

The findings suggest relatively small, negative impacts on absolute poverty rates, as gauged by the FGT(0) index. Columns C and D of Table 4 reveal that these impacts range from a rise of 2.7 percentage points (ppt) in Rwanda, equivalent to a relative increase of 3.6 per cent, to a rise of around 0.5 ppt in Ethiopia, Mozambique, and Tanzania, equivalent to roughly 0.6 per cent in all

countries.¹³ Despite differences in methodology, these findings align generally with existing literature on the impact of the COVID-19 pandemic on poverty in SSA.¹⁴ Sumner et al. (2020) and Valensisi (2020) estimate that the pandemic increased the poverty rate in SSA by 2.5 and 2.7 percentage points, respectively. The country-specific results of Sumner et al. (2020), based on a scenario of a 5 per cent contraction in consumption per capita, align closely with our estimates.

The international poverty line of US\$1.90 is arguably set relatively high, as almost half of Ghana's population and up to 83 per cent of Ethiopia's population were below this threshold before the pandemic. We calculate variations in the poverty gap, FGT(1), to further examine shifts in poverty trends beneath this threshold. Our analysis unveils a more pronounced negative effect using this measure, which is estimated to have surged from 7.1 per cent in Rwanda to 0.4 per cent in Mozambique.

Regarding income inequality, the most substantial increase is again found in Rwanda, with a 1.59 per cent rise in the Gini coefficient, even as significant (relative) income drops occurred at the upper parts of the distribution. Conversely, the pandemic is estimated to have curtailed the Gini coefficient in both Mozambique (by 0.24 per cent) and Zambia (0.50 per cent). The decline in inequality during the pandemic in these countries can be attributed, in particular, to the effective policy measures aimed at the poorest households.

Policy responses during COVID-19 in 2020 exhibited a limited contribution to mitigating the impact of the crisis on poverty and inequality (column E of Table 4). In a hypothetical scenario without any COVID-19-related measures, the rise in headcount poverty would have been more prominent in Zambia (1.54 ppt compared with 1.23 ppt with these policies in place) and Mozambique (0.54 ppt as opposed to 0.50 ppt). In Ghana, the pausing of the school feeding programme overshadowed the positive effects of all other COVID-19-related policy changes. Poverty grew by 1.82 ppt, compared with 1.56 ppt without any policy changes. Similarly in Ethiopia, poverty grew by 0.49 ppt, compared with 0.40 ppt without the discontinuation of its school feeding programme.

Regarding the poverty gap and inequality, the discretionary policy actions had a substantial effect in Zambia, mirroring the additional support directed to the poorest households through the Emergency Cash Transfer. A comparable trend can be observed in Mozambique, where the measures helped to soften the rise in both the poverty gap and the Gini index, unlike the poverty headcount results.

¹³ Younger et al. (2020) estimate a 7.9% increase in the poverty rate for Uganda, based on income shocks estimated by local experts (see appendix 1 in the study). The size of shocks assumed is considerably larger than what we estimate from sectoral GDP numbers and what is revealed by the World Bank Phone Survey Data that have been published in the meantime (World Bank 2021a).

¹⁴ Also see table 1 in Sumner et al. (2020) for a comparison of the differences between the forecasting approaches used in these studies. The studies use microdata from PovCalNet, estimating changes to poverty for select countries using GDP growth forecasts, and are sensitive to a range of assumptions, such as the pass-through rate of the GDP contraction to household income/consumption. The studies fully abstract from the workings of the tax-benefit system on incomes and ultimately welfare measures, the main interest of our study.

5 Conclusions

The COVID-19 pandemic presented an unparalleled challenge to developing nations, notably those within SSA. Characterized by underdeveloped social safety nets and fragile healthcare systems, countries in SSA were uniquely susceptible to the direct and indirect effects of the virus. Furthermore, the constrained fiscal space of their governments emerged as a major barrier to deploying effective policy interventions, to address both the immediate health concerns and the economic repercussions of the crisis.

Our research evaluates the economic consequences of the pandemic and the cushioning effects of related tax-benefit policies on income, poverty, and inequality in Ghana, Mozambique, Rwanda, Tanzania, Uganda, and Zambia. Our primary contribution involves delineating how the crisis affected individual-level earnings and assessing the role that tax-benefit policies played in moderating disposable income losses. We also decompose the distinct contributions of automatic stabilizers and discretionary policies enacted in response to the crisis.

Our results point to a modest increase in income inequality and poverty across the countries studied. The mitigating effect of automatic stabilizers on income losses proved weak. COVID-19-related interventions also demonstrated limited efficacy, with notable exceptions in Zambia and, to a lesser degree, Mozambique. In these countries, emergency cash transfers softened the loss in disposable income in the bottom income quartiles. Conversely, poor households in Ethiopia and Ghana experienced a reduction in disposable income due to the suspension of national school feeding programmes. This exacerbated poverty despite other policy interventions.

Several factors helped to shape these outcomes. First, agriculture acted as a buffer against income losses, especially among the poorest households. A considerable share of households at the bottom of the income distribution engage in agricultural activities, a sector that was less affected than many others by the restrictions imposed during lockdowns. On the other hand, transitioning out of poverty via service sector employment was increasingly challenging in 2020. Hotels and restaurants were particularly affected by the pandemic in all countries studied.

Second, with substantial informality and a lack of means-testing components in social protection benefits, automatic stabilizers were constrained in delivering prompt relief. Without a significant expansion of the formal sector, the emphasis on discretionary policies will remain important during future crises, notwithstanding limitations such as their delayed reaction to sudden shocks.

Third, the social protection floors in place prior to the pandemic proved insufficient in supporting vulnerable households throughout the crisis. We have abstracted here from the discussion on how additional social protection policies could be initiated in the medium to long run given the severely constrained fiscal space in these countries. See Furceri et al. (2021) on how fiscal policies and long-run inequality outcomes have related in past crises.

Finally, our analysis focuses on 2020, which was marked by comparatively lower caseloads and numbers of reported deaths compared with the subsequent years in all seven SSA countries (Figures A1 and A2). However the larger recorded health impacts in 2021 and 2022 did not correlate with more severe economic impacts. Nearly all countries studied witnessed a rebound from the downturn of 2020 (Figure C1), aided by the easing of lockdown measures and mobility restrictions (Figure B1).

In 2020, economic growth in Rwanda, Zambia, Mozambique, Ghana, and Tanzania was either stagnant or negative, but 2021 brought a significant rebound for each country. The shift was particularly prominent in Rwanda, which surged from a large contraction in 2020 to double-digit

growth in 2021. By 2022, the momentum of the recovery was largely sustained, with all seven nations maintaining positive growth rates, albeit at varying magnitudes. Ethiopia witnessed a gradual decline in the growth rate over the 2020–22 period, reflecting the economic ramifications of the Tigray conflict and the war in Ukraine. Along with commodity price surges and supply chain disruptions, both conflicts also affected Uganda, contributing to a sluggish recovery in 2021–22.¹⁵

The overarching theme for the majority of the countries was still one of resilience. While 2020 was marked by economic disruptions due to the pandemic, the subsequent years brought about a steady recovery. This study, focusing on the onset of the crisis in 2020, is therefore likely to have captured the most severe impacts of the pandemic on these economies and their populations.

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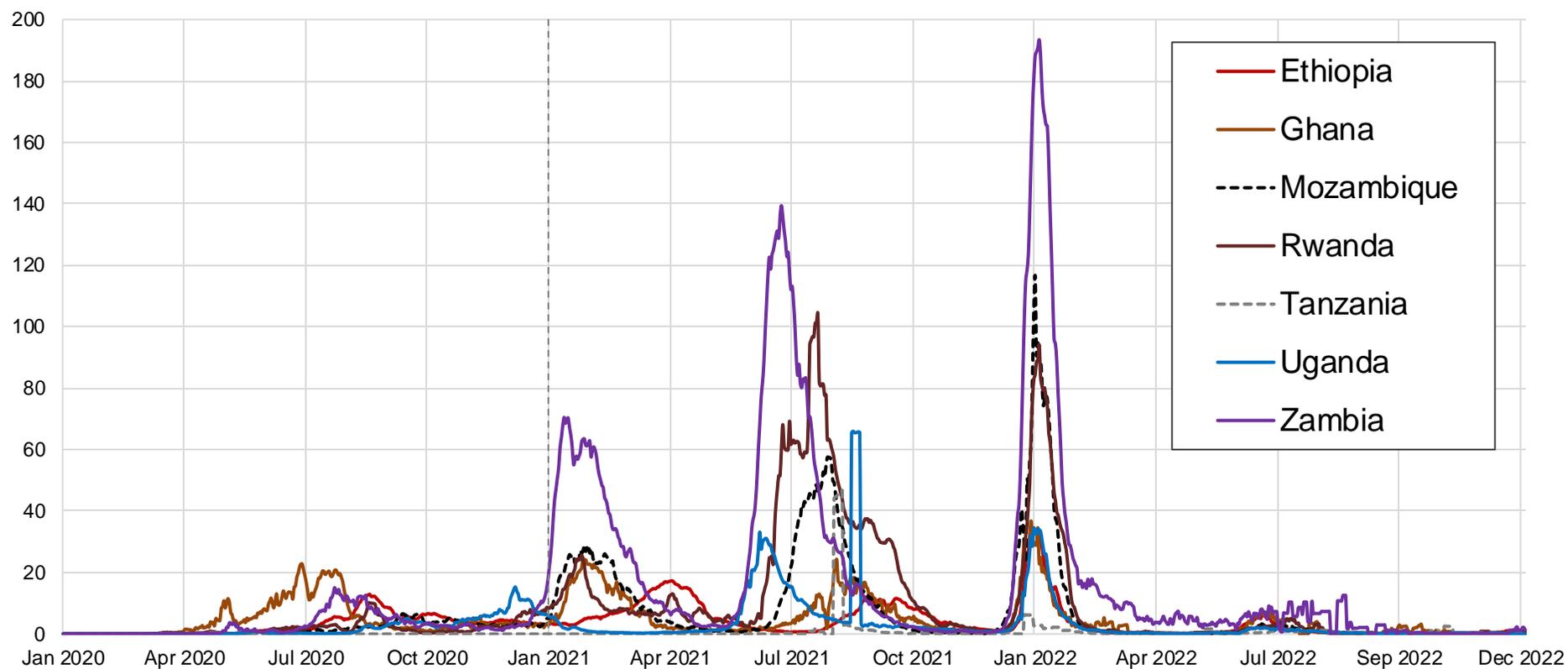
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Appendix A: COVID-19 cases and deaths across countries analysed

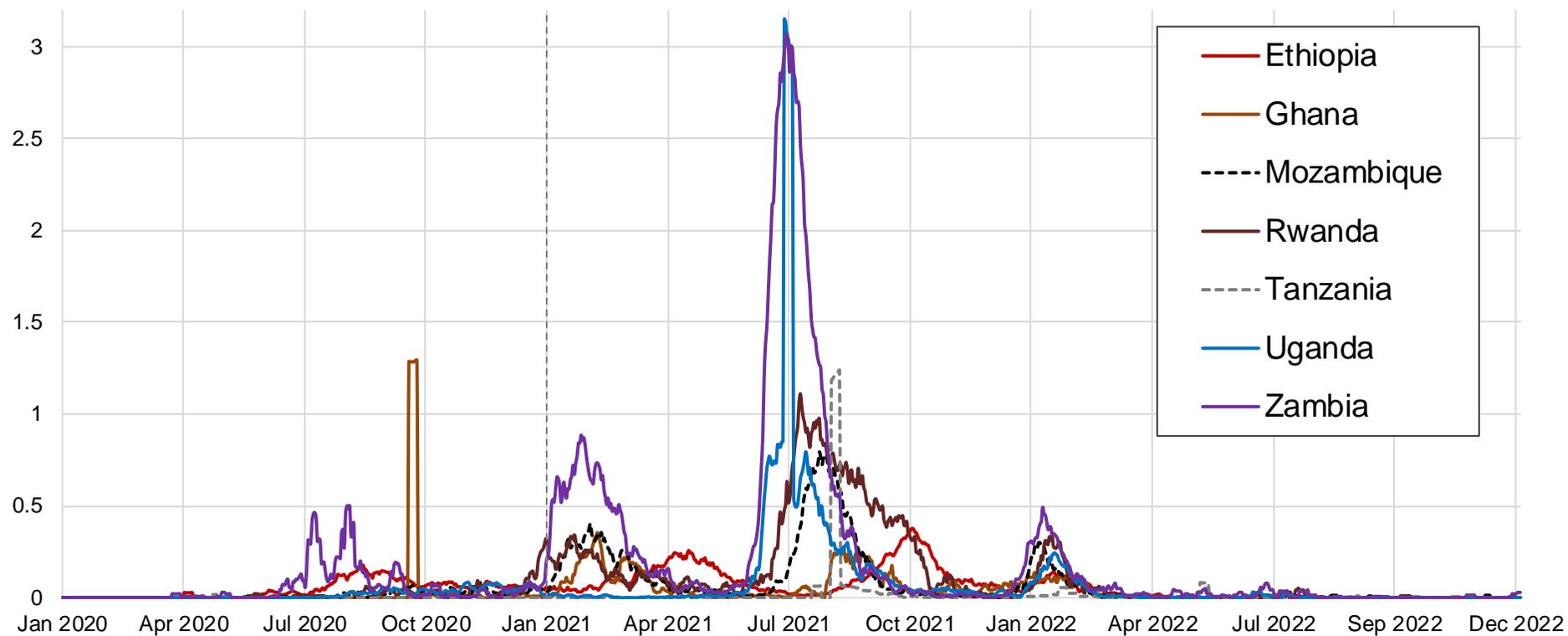
Figure A1: Daily new confirmed cases per million people, 2020–22



Note: the dotted line designates the end of the study period (2020).

Source: authors' illustration based on data from WHO (2023), updated 25 July 2023.

Figure A2: Daily new confirmed deaths per million people, 2020–22

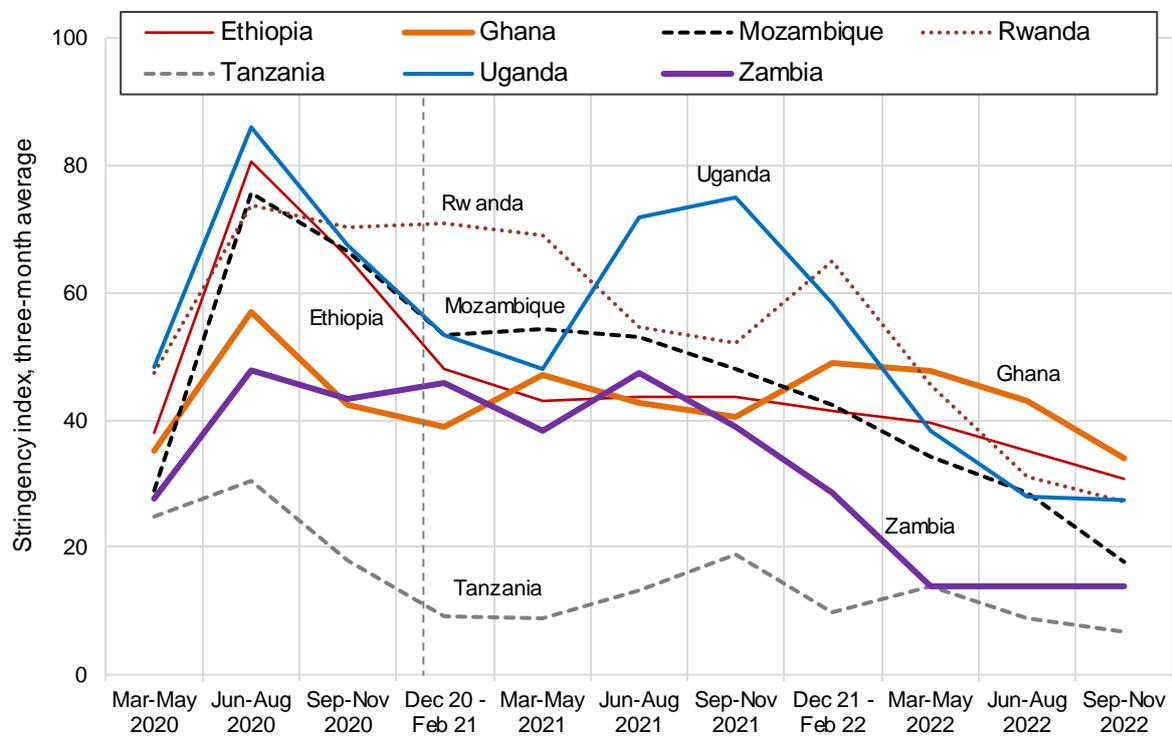


Note: the dotted line designates the end of the study period (2020).

Source: authors' illustration based on data from WHO (2023), updated 25 July 2023.

Appendix B: Lockdown measures across countries according to the Oxford Stringency Index 2020

Figure B1: Oxford Government Stringency Index (three-month average) for Ethiopia, Ghana, Mozambique, Rwanda, Tanzania, Uganda, and Zambia, March 2020 – November 2022

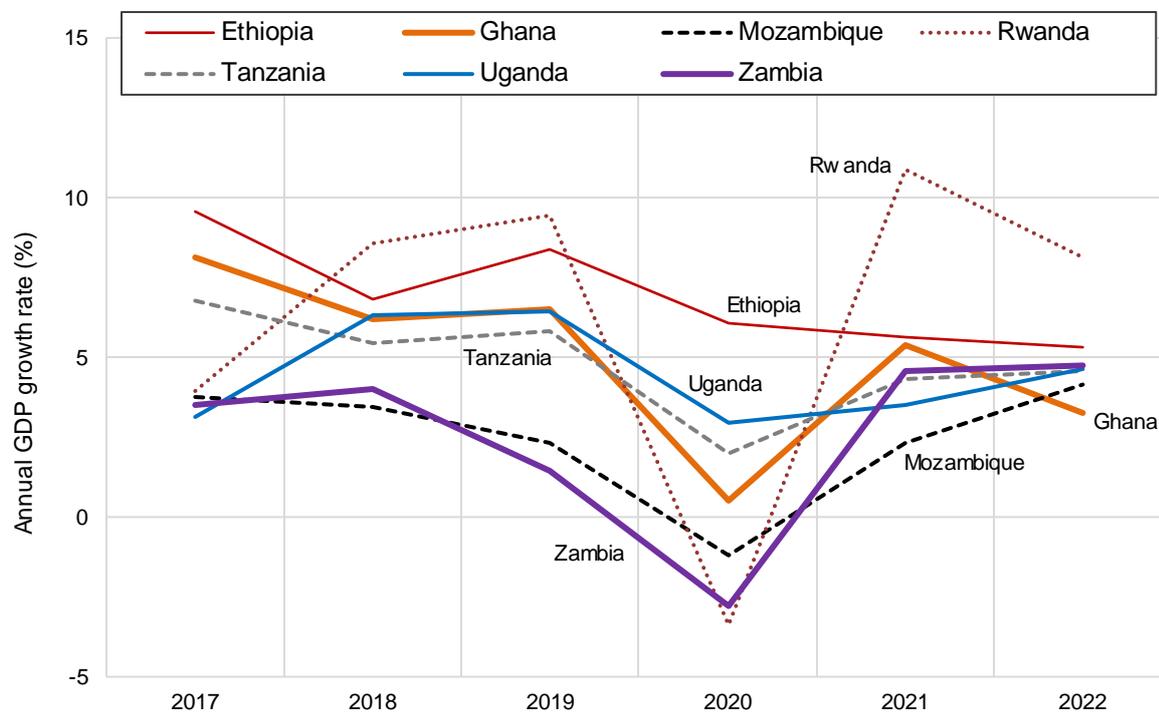


Note: the dotted line designates the end of the study period (2020).

Source: authors' illustration based on data from Hale et al. (2021), updated 25 July 2023.

Appendix C: GDP growth

Figure C1: real GDP growth per year for Ethiopia, Ghana, Mozambique, Rwanda, Tanzania, Uganda, and Zambia, 2017–22

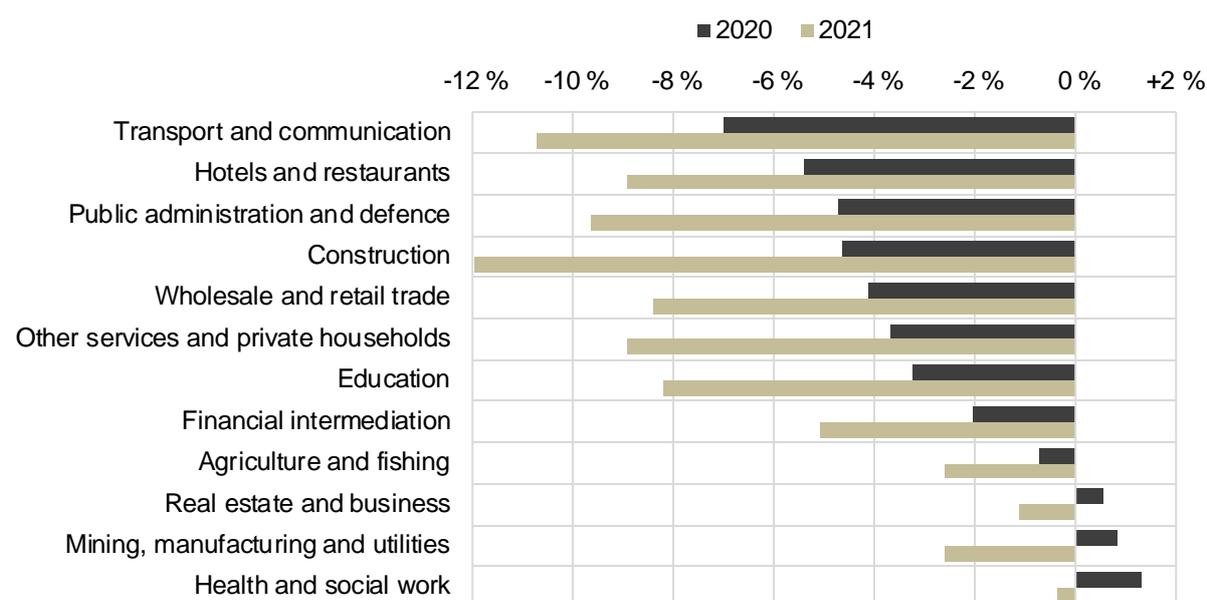


Source: authors' illustration based on World Bank (2023b), updated 15 September 2023.

Appendix D: Estimated GDP shocks at the industry level

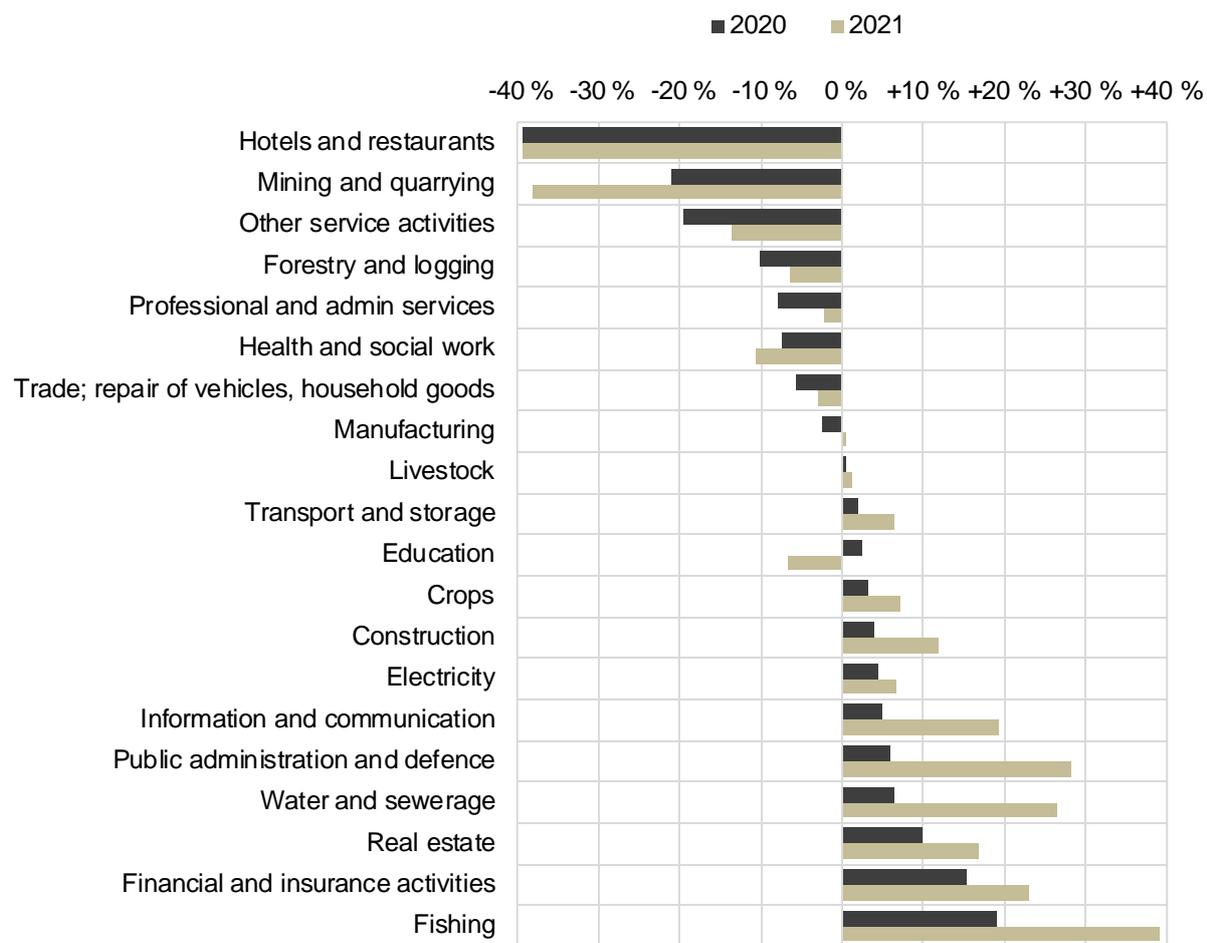
Industry-level GDP shocks are presented in Figures D1–D7. We derive these shocks by estimating the deviation of 2020 GDP from its counterfactual value, which is derived based on pre-pandemic growth trends. First, we use annual or quarterly industry-level GDP data from each country under consideration, annualizing the figures where necessary. Second, we compute the economic shock in 2020 as the deviation of 2020 GDP for each industry from a counterfactual value derived based on the 2017–19 linear trend, accounting for inflation. See Table 1 in the main text for the relevant data sources and the technical note by Oliveira et al. (2021) for more information.

Figure D1: Industry-level GDP shocks in 2020 and 2021, Ethiopia



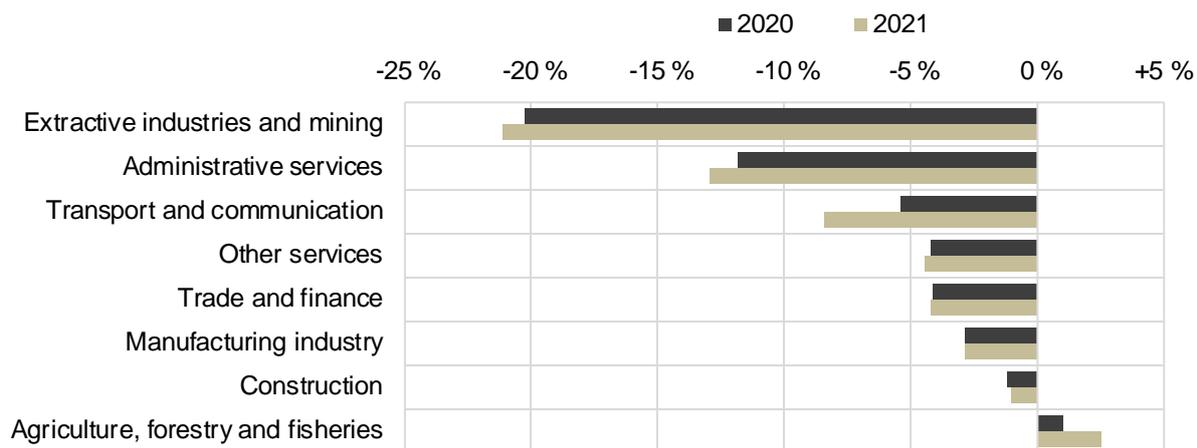
Source: authors' illustration based on national GDP data provided privately by the Planning and Development Commission, Ethiopia (2022), unofficial tax data, and the overall real growth rate of GDP from 2020/21 to 2021/22 based on estimates by the National Macro Economic Council (Ethiopian Monitor 2022).

Figure D2: Industry-level GDP shocks in 2020 and 2021, Ghana



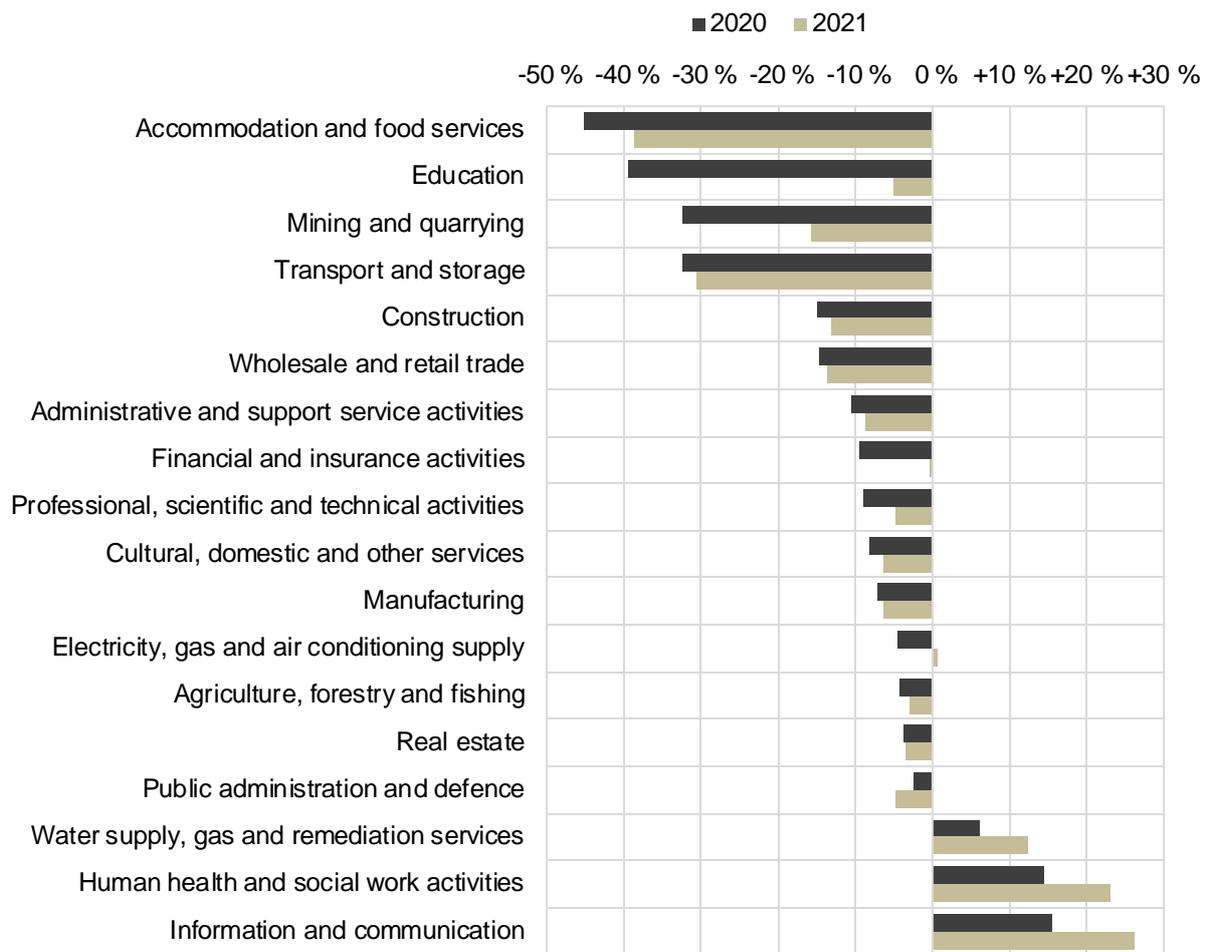
Source: authors' illustration based on data from Ghana Statistical Service (2022).

Figure D3: Industry-level GDP shocks in 2020 and 2021, Mozambique



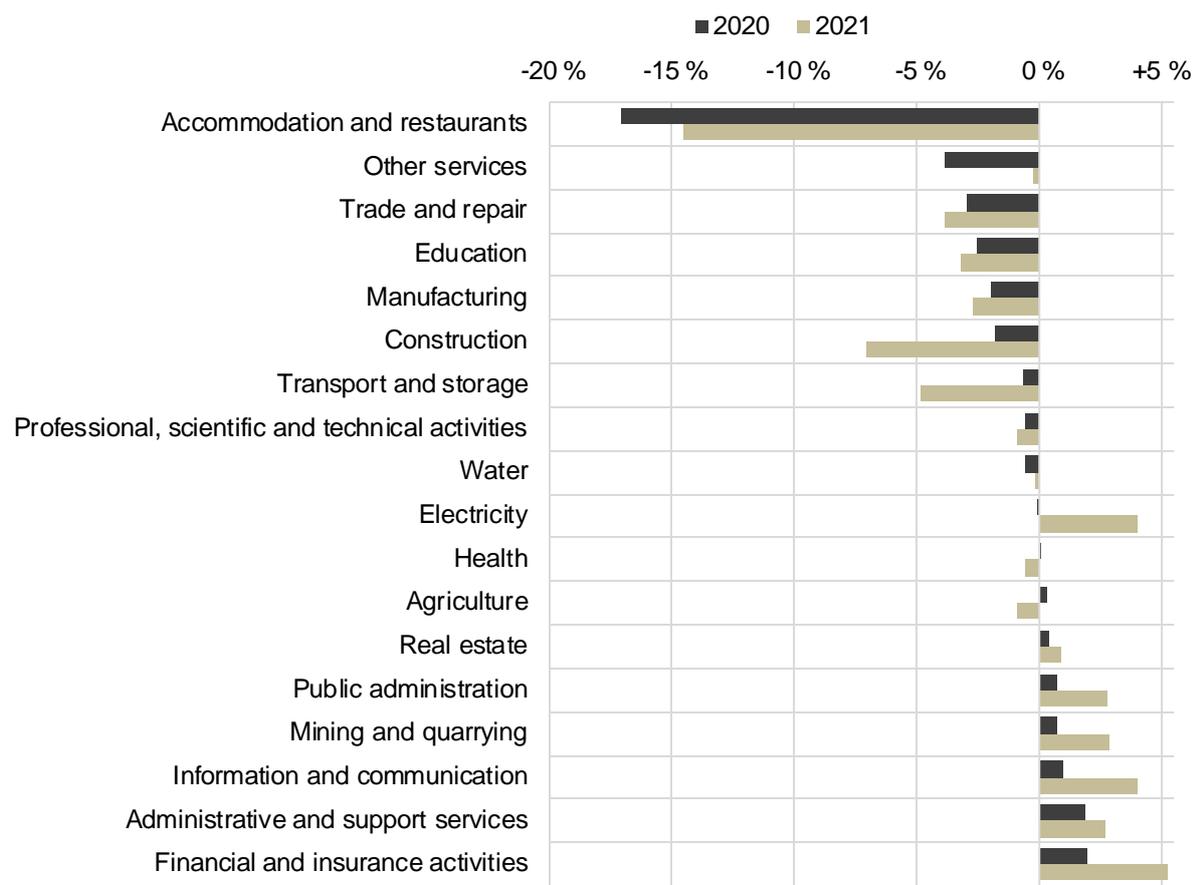
Source: authors' illustration based on data from Instituto Nacional de Estatística (2022).

Figure D4: Industry-level GDP shocks in 2020 and 2021, Rwanda



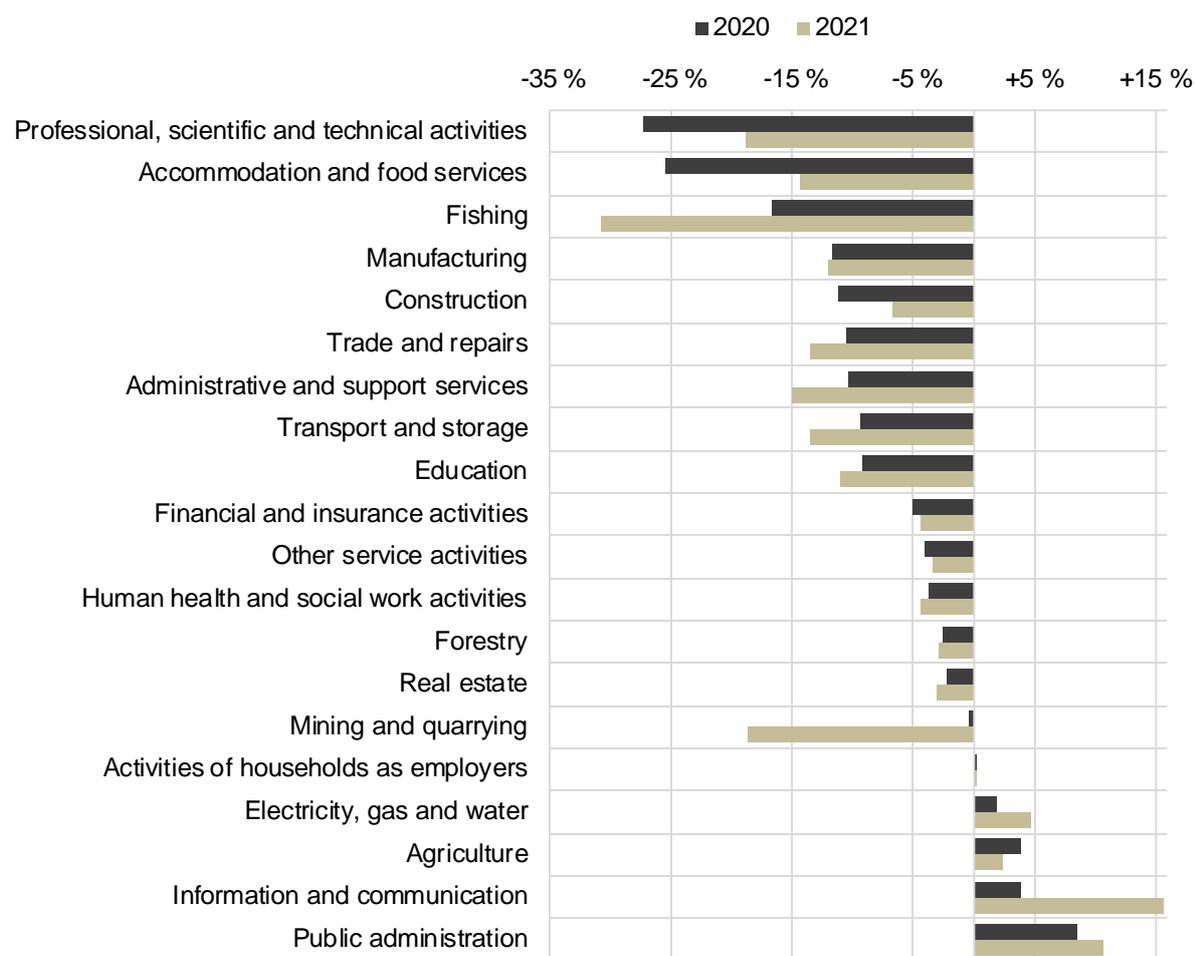
Source: authors' illustration based on data from the National Accounts (NISR 2022).

Figure D5: Industry-level GDP shocks in 2020 and 2021, Tanzania



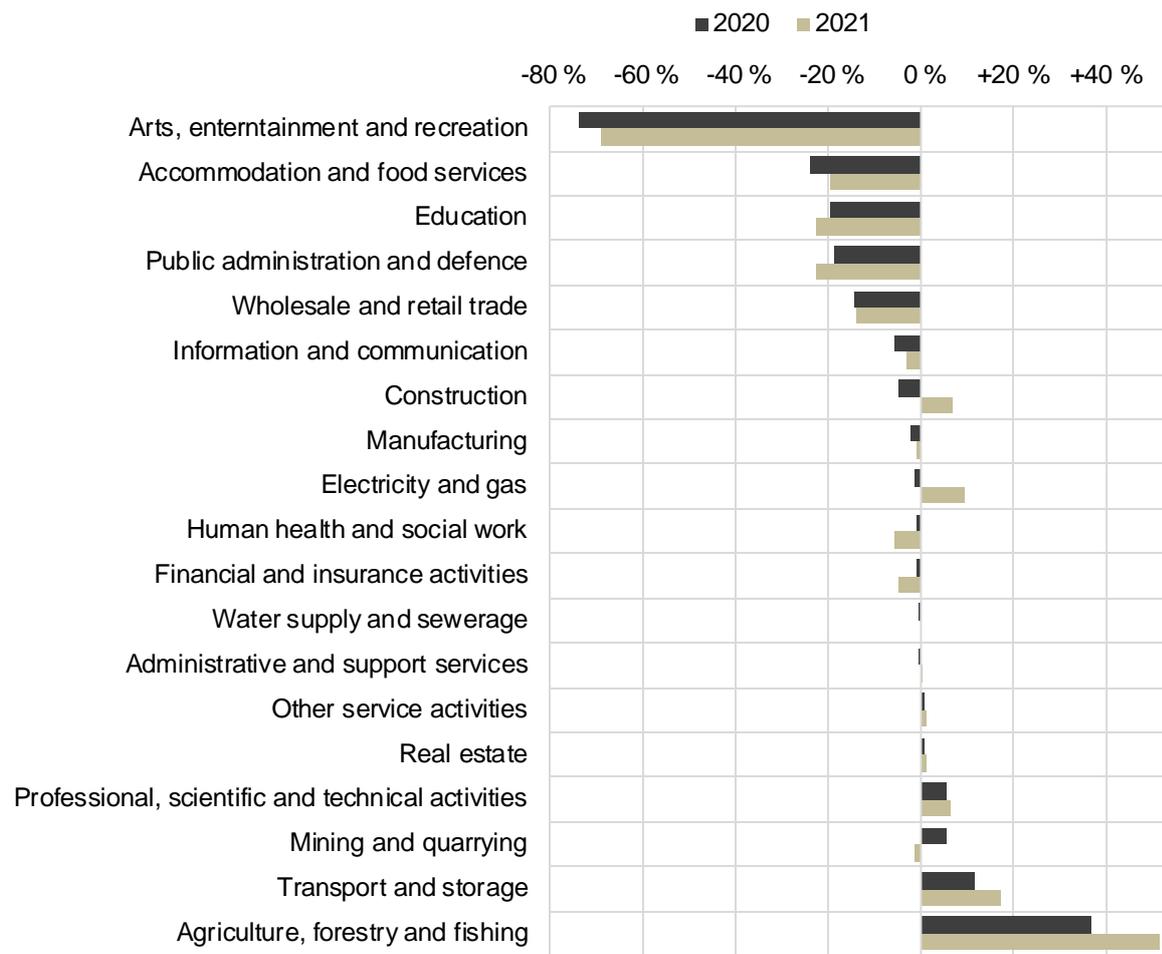
Source: authors' illustration based on data from Bank of Tanzania (2022).

Figure D6: Industry-level GDP shocks in 2020 and 2021, Uganda



Source: authors' illustration based on data from Uganda Bureau of Statistics (2023).

Figure D7: Industry-level GDP shocks in 2020 and 2021, Zambia



Source: authors' illustration based on data from Zambia Statistics Agency (2019, 2020, 2021, 2022).

Appendix E: Implementation of COVID-19-related tax-benefit policy measures and implementation in simulations

Table E1: Tax-benefit policy measures in Ethiopia

Policy measure	Description	Policy modelled (Y = yes, N = no, P = partially)	Duration of measure	Source
School feeding	Addis Ababa city administration provides breakfast and lunch to students starting from kindergarten up to grade 8 in public schools	Y, scaling the benefit to cover only four months in 2020	September 2020 – time of writing	Delbiso et al. (2021)
School uniforms	Addis Ababa city administration provides school uniforms to students attending public schools (from kindergarten up to grade 12)	Y, although not considered a COVID measure	September 2020 – time of writing	Delbiso et al. (2021)
Tax exemptions on imports of selected items	Imports of personal protective equipment and raw materials essential for COVID-19 prevention and containment became exempted from import tax	N	30 April 2020 – end date N/A	Ministry of Finance, Ethiopia (2020); Office of the Prime Minister, Ethiopia (2020)
Tax deduction on COVID-related charitable donations	The donor could get a deduction if grant was less than 20% of taxable income	N	30 April – 7 July 2020	Ministry of Finance, Ethiopia (2020); Office of the Prime Minister, Ethiopia (2020)
Loss in 2020 becoming a deductible from future tax	Loss incurred in the 2020 fiscal year could be carried forward to next five subsequent fiscal years even if the business had already carried forward two losses	N	30 April – 7 July 2020	Ministry of Finance, Ethiopia (2020); Office of the Prime Minister, Ethiopia (2020)
Other tax reliefs	Pre-2015 accumulated tax debt (principal with interest and penalty) cancelled; Remit interest and penalty on outstanding tax liability between 2016 and 2019; Waiver of a four-month employment tax for workers required to stay home while still receiving salary; Extension of deadline for filing and paying turnover tax and VAT; Pension contribution deferred for private organizations;	N	30 April 2020 30 April 2020 for one year March to June 2020 April to July 2020 30 April 2020 – N/A	Ministry of Finance, Ethiopia (2020); Office of the Prime Minister, Ethiopia (2020)

Fast-tracking value-added tax refunds for
businesses

Table E2: Tax-benefit policy measures in Ghana

Policy measure	Description	Policy modelled (Y = yes, N = no, P = partially)	Duration of measure	Source
Personal income tax waivers for frontline and medical personnel	Individuals whose employer was providing frontline and medical services were exempted from paying personal income tax; policy implemented through employers via pay-as-you-earn (PAYE) system	Y	1 May – Dec 2020	Presidency of the Republic of Ghana (2020b)
Waiver/reduction of utility tariffs	Water costs waived for three months; electricity costs waived fully for the poorest of the poor, 50% waived for all other consumers	Y, calculating costs saved on expenditure for water and electricity but disregarding lifeline consumers of electricity	From 9 April 2020 for three months	Presidency of the Republic of Ghana (2020a)
School feeding for final-year junior and senior high school students	Provision of meals to final-year junior and senior high school students to enable them to complete final exams during pandemic	Y, using monetized value of in-kind benefit	24 Aug – 18 Sept 2020	Presidency of the Republic of Ghana (2020c)
School feeding for second-year senior high school and junior high school students	Provision of meals to continuing junior and senior high school students until end of academic year in December	Y, using monetized value of in-kind benefit	5 Oct – 14 Dec 2020	Presidency of the Republic of Ghana (2020c)
Discontinuation of school feeding component of school capitation grant	In-kind benefit not handed out to students due to closure of schools during lockdown	Y, using monetized value of in-kind benefit	30 March – 31 Dec 2020	This applies automatically as schools benefiting from this grant were closed due to the pandemic
Additional food rations supplied to existing LEAP beneficiaries	Food rations supplied specifically to vulnerable households already receiving LEAP transfers	Y, using monetized value of in-kind benefit, assuming LEAP beneficiaries perfectly targeted to poorest households	For 21 days to lockdown areas and LEAP households	Presidency of the Republic of Ghana (2020a)
Support to lockdown areas and essential workers	Distribution of food in lockdown areas and provision of medical supplies to essential workers	N	From 9 April 2020 for three months to lockdown areas and essential workers	Presidency of the Republic of Ghana (2020a)
Business support to formal and informal micro, small and medium-sized enterprises (MSMEs; Coronavirus Alleviation Programme Business Support Scheme (CAP BuSS))	Emergency programme supporting MSMEs and start-ups, funded mainly by Mastercard Foundation and National Board for Small Scale Industries (NBSSI); part of greater CAP initiative	N, information on eligibility not sufficient	1–30 June 2020 (application period ended in June)	Mastercard Foundation (2020)

COVID-19 Alleviation and Revitalization of Enterprises Support (CARES)—stabilization component	Firm support, building on/including existing initiatives; not limited to MSMEs: all firms facing challenges due to COVID given support; part of greater CAP initiative	N, currently sufficient information is not available for modelling eligibility	July to Dec 2020	Republic of Ghana (2020)
Reliefs by the Ghana Revenue Authority	<ol style="list-style-type: none"> 1. Extension of due dates for filling of taxes from four to six months after end of the basis year 2. Grant of remission of penalties on principal debts to taxpayers who redeem their outstanding debts due to Ghana Revenue Authority (GRA) up to 30 June 2020 3. Waiver of VAT on donations of equipment and goods for fighting COVID-19 4. Waiver of taxes on selected third-tier pension withdrawals 5. Permitting of deduction of contributions and donations towards COVID-19 as allowable expense for tax purposes 	N, data do not provide sufficient information to model the measures	30 March to 31 Dec 2020	Ministry of Finance, Ghana (2020)
New tax policies	<ol style="list-style-type: none"> 1. COVID-19 Health Recovery Levy Act 2021, Act 1068: special 1% levy imposed on 'VAT-able' goods and services to support implementation of COVID-19 response policies; 2. Penalty and Interest Waiver Act 2021, Act 1065: waiver on penalties and interest payments on accumulated tax arrears up to December 2020, applicable to agents able to file tax returns and arrange for payment of outstanding by end of December 2021; 3. Income Tax (Amendment) Act 2021, Act 1066: 30% rebate for payment of quarterly tax instalment for selected sectors and suspension of payment for specific self-employed persons and owners of commercial vehicles; 4. Energy Sector Levies (Amendment) Act 2021, Act 1064: imposition of GHP20/litre on petrol and diesel and GHP18/kg of liquified petroleum gas (LPG) for payment of energy sector bills; additional GHP10/litre on petrol and diesel to serve as sanitation and pollution levy; 5. Financial Sector Recovery Levy Act 2021 (Act 1067): banks to pay 5% of profit before tax as levy 	N, data do not provide sufficient information to model the measures; 2021 policy measures not considered in this study	1 May – Dec 2021	Ghana Revenue Authority (2021)
			1 April – Dec 2021	
				Applicable from 2nd quarter of 2021 to 4th quarter of 2021
				May – Dec 2021
				End June – end Dec 2021

Table E3: Tax-benefit policy measures in Mozambique

Policy measure	Description	Policy modelled (Y = yes, N = no, P = partially)	Duration of measure	Source
Additional BSSP payments	Three additional payments equal to monthly transfers the household already received in the BSSP programme	Y	Aug – Dec 2020	De Lima Veira et al. (2020)
VAT exemption for sugar, cooking oil, and soap	These products had already been exempted from VAT for the past five years to 31 December 2019; the exemption was set up again at the end of May	Y	June – 31 Dec 2020	Lei 5/2020, Assembly of the Republic, 29 May 2020 (see Boletim da Republica 2020b)
Suspension of negotiations for minimum wage adjustments across sectors	Minimum wage adjustments were suspended for all industries for 2020	N	13 April – 31 Dec 2020	Club of Mozambique (2020).
Subsidy of 30% of salaries for civil servants in health and defence sectors	This policy sets up a 'risk subsidy' of 30% for personnel of the national health service and related institutions; the subsidy was intended for personnel working in exceptional conditions or situations of high endemic or epidemic incidence, and for those potentially exposed to radioactive and toxic substances; purpose was to minimize physical and psychological stress caused by constant exposure to biological risk of infectious diseases such as HIV, pulmonary tuberculosis, hepatitis, musculoskeletal disorders, and cancerous diseases	N	N/A	Decreto 46/2020, Council of Ministers, 24 June 2020 (see Boletim da Republica 2020c)
Reduction of utility tariffs for lifeline consumers	50% reduction for those in the social tariff group and 10% reduction for those in other groups, with the exception of customers in the domestic category, whose tariff remained unchanged; tariffs for the industrial sector deferred for the period (this covers fixed-rate payments on electricity by companies in industry, commerce, agriculture, services, hospitality, catering, education, and sports and cultural facilities, which are included in	P – the model simulates a 50% reduction in tariff for households (all treated as being on the 'social tariff') for the period June – end Dec 2020 using 0–125 kw/hr@1.07Mt per kw; the deferred payments for the industrial sector are not simulated	1 June – 31 December 2020	EDM (2020)

	the general tariff); and large 'low- and medium-voltage' consumers with installed power up to 200 kVA, whose turnover registered a reduction above 30% due to the pandemic; cost of measure estimated at around US\$15 million				
Total exemption from customs duties and miscellaneous taxes on import of medicines and reagents, as well as all COVID-19 prevention material and ventilators	COVID-19 prevention material and ventilators as included in a list previously approved by the Tax Authority until December 2020	N		May– Dec 2020	Decreto 23/2020, Council of Ministers, 27 April 2020 (see Boletim da Republica 2020a)
Programa do Subsídio Social Básico (PSSB)	Beneficiaries received a larger payment for one month (at point in July/Aug/Sep 2020); in the augmented payment month, the beneficiary received 3x the normal monthly payment, i.e. 15 payments in the calendar year of 2020 instead of 12	Y		For one month July–September 2020	UNICEF (2021)
Exemption of fees for drinking water up to 5 m ³	Water supply to customers' facilities was not interrupted during the state of emergency, and the collection of water bills was suspended from customers who consumed up to 5 m ³ , the respective bill could be paid after the end of state of emergency without fines; the collection of water bills was stopped for all fixed and/or mobile public fountains	N, the underpinning dataset does not allow for determining whether households obtain water from a public or private supplier		17 April 2020 until the state of emergency was terminated	Circular n3/FIPAG/DG/900/2020, by the Ministry of Public Works and Water Resources, 17 April 2020 (see Coordinadora de ONGD Navarra 2020)
No requirement to work for Programa Accao Social Produtiva payments	An obligation to work was removed for health reasons	N		N/A	N/A
Programa de Apoio Social Directo (PASD) and Post Emergency—Direct Social Support Program (PASD-PE)	PASD was no longer simulated in MOZMOD as the programme is being phased out; dDirect post-emergency transfers (PASD-PE 'COVID') were introduced to support low-income families not covered by the BSSP; since most of the beneficiaries received the benefit only in 2021, and due to lack of up-to-date data about this programme, we do not simulate it for 2020	N – payments started only at the very end of 2020		N/A	De Lima Veira et al. (2020)

Table E4: Tax-benefit policy measures in Rwanda

Policy measure	Description	Policy modelled (Y = yes, N = no, P = partially)	Duration of measures	Source
Employment income tax waivers targeting private schools, hotel, and tourism sectors	Exemption for private school teachers and tourism and hotel employees earning less than RWF150,000 per month	N	N/A	IMF (2022)
Redirecting salary of civil servants	Salaries of top civil servants were redirected to welfare programmes for a month	N	April 2020	IMF (2022)
VAT exemption on locally produced masks	Expenditure on domestically produced masks became VAT exempted to lower prices and motivate individuals to buy local products	N	N/A	IMF (2022)
Other tax reliefs measures	Suspension of down-payments on outstanding tax for amicable settlement; Relaxing of enforcement for tax arrears collection; Extension of deadline for filing and paying corporate income tax and VAT; Accelerating VAT refunds, especially for small businesses; 30-day maturity period for the public health insurance scheme premium removed;	N	March – May 2020	IMF (2022)
				IMF (2022)
Food provision	Providing food support for poor households and individuals infected by the virus and under home treatment	N		Mascagni and Lees (2023)
				IMF (2022)

Table E5: Tax-benefit policy measures in Tanzania

Policy measure	Description	Policy modelled (Y = yes, N = no, P = partially)	Duration of measure	Source
Charity support from institutions to the special committee chaired by the prime minister		N	N/A	Tanzania Bureau of Statistics (2020)
Informal support to hospitals and orphanage centres	Included in-kind support, e.g for sanitizers, handwash facilities, and masks.	N	N/A	NA
Conditionalities waived for PSSN II cash transfers	Conditionality was waived for August and October 2020 bi-monthly payments	N, as full compliance with conditionality was assumed in base model	Aug and Oct 2020	Gentilini et al. (2021)
Expansion of social security schemes	Government announced an expansion of social security schemes by US\$32.1 million to meet the increase in withdrawal of benefits for newly unemployed due to COVID-19	N, no further information available on who benefited		Gentilini et al. (2021)
Customs duty: 100% allowable deduction for contributions made to the AIDS Trust Fund and to the government for fighting the pandemic	Applied only for those institutions that contributed to the AIDS Trust Fund and to the government; intended to encourage contributions to support the fight against the disease	N	From 1 July 2020, effective until government announced the end of the pandemic	Deloitte (2020); Ministry of Finance and Planning, Tanzania (2020)
Customs duty: changes in Common External Tariff (CET) and amendments to the EAC (East African Community) Customs Management Act (EAC-CMA), 2004	Duty remission on raw materials used by domestic manufacturers of items directly used in prevention, treatment, and management of COVID-19; duty rate of 0% for one year; aimed at stimulating the economy to safeguard livelihoods, jobs, businesses, and industrial recovery	N	1 July 2020 – start of financial year 2020/21	Deloitte (2020); Ministry of Finance and Planning, Tanzania (2020)
Duty remission on raw materials used by domestic manufacturers of items directly used in prevention, treatment, and management of COVID-19 pandemic	Exempted items included under the fifth schedule of the EAC Customs Management Act, 2004 were supplies for diagnosis, prevention, treatment, and management of epidemics, pandemics, and health hazards as recommended by the competent authority in the health ministry	N	1 July 2020 – start of financial year 2020/21	Deloitte (2020); Ministry of Finance and Planning, Tanzania (2020)
Increases in excise duty rates for non-petroleum products	Government minister proposed not to amend the specific duty rates upwards for all non-petroleum products on the back of suppressed inflation and the government's desire to incentivize industrial development and increase its contribution to GDP; measures involved all business and manufacturing units engaged in non-petroleum products	N	From 17 April 2020 until state of emergency terminated	Deloitte (2020); Ministry of Finance and Planning, Tanzania (2020)

Table E6: Tax-benefit policy measures in Uganda

Policy measure	Description	Policy modelled (Y = yes, N = no, P = partially)	Duration of measure	Source
Deferment of payment tax liability	Income taxpayers liable to pay tax on or after 1 April and before 30 June 2020: - For taxpayers in the business of education, tourism, manufacturing, horticulture, or floriculture; - Employers liable to withhold PAYE on or after 1 April and before 30 June 2020; - No interest or penalty on outstanding amount of tax during the same period	N	From 31 Dec 2020	BDO (2020); KPMG (2020)
Waiver of interest and penalty on unpaid principal tax	A taxpayer who made any voluntary disclosure during March and April 2020 and paid the principal tax would have their penalty and interest remitted in accordance with the law	N	Any penalty outstanding as at 30 June 2020	BDO (2020); KPMG (2020)
VAT exemption for specified medical supplies	Exemption from VAT of supplies of specified medical goods used in the prevention of the spread and the treatment of COVID-19 pandemic	N	N/A	BDO (2020); KPMG (2020)
Excise duty exemptions on spirits for manufacturing sanitizers	Exemption from VAT of supplies of raw materials and inputs for the manufacture of COVID-19-related items	N	N/A	BDO (2020); KPMG (2020)
Tax Procedure Code Act amendment	The Bill proposed to defer tax payment dates to 30 September 2020 for a taxpayer involved in a tourism, manufacturing, horticulture, or floriculture business with a turnover of less than UGX500 million; or one liable to a tax chargeable on employment income	N	N/A	BDO (2020); KPMG (2020)
Supply of accommodation in tourist lodges and hotels inside a radius of 50 km from the boundaries of Kampala		N	1 July – 30 June 2021	N/A

Table E7: Tax-benefit policy measures in Zambia

Policy measure	Description	Policy modelled (Y = yes, N = no, P = partially)	Duration of measure	Source
Emergency Cash Transfer	Emergency social cash transfer to households already receiving Social Cash Transfer ('vertical expansion') and expansion of the cash transfer to vulnerable households working in informal sector ('horizontal expansion'); benefit amounted to ZMW400 per household per month for six months; programme covered 22 districts	P; only 'vertical expansion' modelled	From 28 July 2020 (covered six months and possible phase approach, exact timeline not known)	MCDSS (2021)
Discontinuation of the Home-Grown School Feeding Programme	Programme paused due to closure of schools during lockdown	Y, scaling the benefit to cover only six months in 2020	17 March to 14–28 September 2020	Information obtained directly from ZIPAR
Suspension of custom duties and VAT on additional medical supplies used in fight against COVID-19	To expedite provision of medical devices needed to support fight against COVID-19, government extended the list of medical supplies not subject to import duty and VAT for an initial six months; the complete list comprised 38 individual items including testing equipment, protective garments, thermometers, disinfectants, sterilization products, and other medical equipment such as ventilators and patient monitoring devices	N; no information on item 'medical supplies' in MicroZAMOD	From April 2020	Statement by the Zambian Minister of Finance on further measures aimed at mitigating the impact of the coronavirus on the Zambian economy (see EY 2020)
Waiver of tax penalties and interest	To assist businesses to manage their cash flows during the pandemic, when they were faced with reduced revenue; the government decided to waive tax penalties and interest on outstanding tax liabilities from the impact of COVID-19	N – no tax penalties and interest modelled in MicroZAMOD tax system	From April 2020	Statement by the Zambian Minister of Finance on further measures aimed at mitigating the impact of the coronavirus on the Zambian economy, 27 March 2020 (see EY 2020)