EUROMOD WORKING PAPER SERIES

EM 07/21

The Short-term Distributional Impact of COVID-19 in Malawi

Chimwemwe Magalasi

November 2021

The Short-term Distributional Impact of COVID-19 in Malawi

Chimwemwe Magalasi [a,b]

[a] ISER, University of Essex

[b] Reserve Bank of Malawi

Abstract

This study analyses the short-term distributional effects of COVID-19 on household incomes in Malawi. Growth is expected to fall due to the pandemic. The Malawi annual gross domestic product growth rate for 2020 has been revised downwards from 5.5% to 1.9%. According to the government of Malawi, unemployment in Malawi is expected to increase in 2020 compared to 2019 as companies begin to lay-off employees due to both demand and supply shocks. Our study investigates the impact of changes in employment due to the COVID-19 crisis on inequality and poverty using the recently developed tax-benefit microsimulation model for Malawi, MAMOD. In assessing the impact of the job losses, three employment shock scenarios are considered. Our study leverages on the novel High Frequency Phone Survey for COVID-19 that was implemented from June 2020 and the recently released Integrated Household Survey which was collected just before the COVID-19 crisis. We find that the poverty measured by headcount and poverty gap increases because of the COVID-19 outbreak. The pandemic has also worsened inequality as the Gini Coefficient rose. We further find that the corrective measures implemented the Emergency Cash Transfer, were able to subdue the impact of the crisis especially at the bottom of the income distribution.

JEL: D31, E24, H24

Keywords: **COVID-19, income distribution, poverty, fiscal policy, Malawi**

Corresponding author:

Chimwemwe Magalasi

chimwemwe.magalasi@essex.ac.uk

1. Introduction

The COVID-19 pandemic has created enormous health and economic challenges in both developed and developing countries. The African continent is expected to bear the largest health, social and economic cost due to ill-equipped health system, very limited fiscal space to curb the spread of the virus and large sections of the population already living below the poverty line (Sumner et al., 2020). This makes Africa an interesting case study to evaluate the socioeconomic impact of the COVID-19 pandemic.

According to the IMF (2020b) growth in Africa could slow down to -1.6% due to COVID-19 crisis, the lowest level in record. The IMF view is supported by the African Development Bank(AfDB) who estimated gross domestic product (GDP) to have contracted by 2.1% in 2020 (AfDB, 2021). This has the potential to push 29 million people into extreme poverty (ECA, 2020). The more systemic shock of COVID-19 is expected to increase vulnerable employment considerably, with the International Labour Organization (ILO) anticipating 19 million job losses in Africa as workers face full or partial workplace closures.[1] The job losses will raise poverty levels and exacerbate existing income inequalities.

The impact of the crisis is however expected to vary across countries based on socioeconomic structure of the country and government responses to mitigate the negative effects of the pandemic. Even within countries the impact will vary among different groups, industry of employment and geographical location (World Bank, 2020). The heterogeneity in socioeconomic structures of countries emphasises the need to interrogate country specific context. This is supported by Ferreira et al. (2021) who posits that richer countries have been able to offset the losses of poor households than poor countries requiring an investigation into distributional consequences within countries. This research therefore aims to contribute to the literature on the impact of the COVID-19 pandemic on poverty and inequality using Malawian context as the case study.

Malawi has not been spared from the economic downturn due to the COVID-19 pandemic. As of November 2020, there were 6,021 confirmed cases of COVID-19 and 287 deaths. To curb the spread of the pandemic, on April 4, 2020 the government implemented a partial lockdown of the country including closing the borders. The High Court barred the government from implementing a full lockdown due to lack of social protection measures to help the poor. The partial lockdown measures included suspension of all international flights to Malawi except those

[1] International Labour Organization, "COVID-19 causes devastating losses in working hours and employment", 7 April 2020. Available at www.ilo.org/global/about-the-ilo/newsroom/news/WCMS_740893/lang--en/index.htm

carrying essential health & other supplies and returning Malawian citizens or residents until September. A two-week mandatory self-quarantine for people arriving from areas highly affected by coronavirus disease was put in place. Schools were closed with phased reopening from September. Other partial lockdown measures included rotation of work shifts in public sector, closure of all land borders, except three and suspension of large gathering. These developments including news regarding the COVID-19 virus have culminated into risk averse and social distancing behaviour by individuals. Lack of internal trade combined with spill overs from the global slowdown, border closures, and economic disruption in neighbouring countries has slowed domestic economic activity. As a result, the government of Malawi revised downwards the real GDP growth estimate for 2020 from the 5.5% estimated in February 2020 to 1.9% (GOM, 2020b).

Following the above developments, we investigate the short-term impact of the COVID-19 pandemic on poverty and inequality and the extent to which tax-benefit policies were able to lessen the impact of the pandemic. The motivation stems from providing evidence along these objectives to inform policy makers and stimulate discussions in the distributional impact of the pandemic. We focus on the short-term effects as this period might be the hardest hit by the pandemic. The International Monetary Fund (IMF) reported that the economic impact of the pandemic had deepened between June and August due to the acceleration of cases during the month of June (IMF, 2020a). According to the government of Malawi (GoM) there were more signs of potential impact of COVID-19 on labour markets during the months of May/June as 56% of respondents in the High Frequency phone survey on COVID-19 stopped working in May/June potentially on issues related to COVID-19 compared to 12% in July and August, and 26% in September (GOM and Word Bank, 2021). Thus, economy is expected to be hit the hardest in the short-term coupled with the fact the government started phase easing of the partial lockdown measures during the month of September.

Our analysis will involve comparing labour market outcomes before and during the crisis. In the face of difficulty in identifying employment losses due to COVID-19 only we considered three scenarios of employment losses for our employment shock. The first scenario considers total loss in employment, second scenario focussed on loss in employment excluding those that are potentially unrelated to COVID-19 and the final scenario analysed loss in employment potentially due to COVID-19. Unlike studies on other countries, Malawi has the advantage of having up-to-date data. For our analysis we use the data from the novel High Frequency Phone Survey on COVID-19 (HFPS COVID-19), the 2019/2020 Fifth Integrated Household Survey (IHS5) and the 2019/2020 Integrated Household Panel Survey (IHPS-2019) to assess the impact of the

pandemic on poverty and inequality. Estimates of the effects of the crisis on job losses derived from the HFPS COVID-19 and IHPS-2019 are used to construct a dataset reflecting the situation during the pandemic, by adjusting the IHS5 data. We use the recently developed tax-benefit microsimulation model for Malawi, MAMOD to derive the distributional impacts of the pandemic. The main welfare variable for our analysis is disposable income[2]. Specifically, we employ the decomposition method proposed by Bargain and Callan (2010) and extended by Paulus and Tasseva (2020) to disentangle the effects of the policies from other effects such as COVID-19 related shocks. Our analysis show that disposable income drops resulting in an increase in poverty and inequality. The policies implemented by the government to mitigate the impact of the crisis were able to partially offset the increases in poverty and inequality arising from the COVID-19 related shocks, for those at the bottom of the income distribution. We also found that income taxes and social insurance contribution acting as automatic stabilisers were able to compensate income losses experienced by households at the top of the distribution. We also find that indirect taxes exacerbate the situation as both inequality and poverty levels are higher when post-fiscal income is used as our welfare variables.

Our work extends the growing literature on the distributional impact of the COVID-19 pandemic by focussing on a Sub-Saharan African (SSA) country that did not implement a full lockdown. Most recent studies analysing the role of tax-benefit systems in mitigating the distributional impact of the COVID-19 pandemic have focused on high-income countries Beirne et al. (2020), Figari and Fiorio (2020), O'Donoghue et al. (2020) and Richiardi et al. (2020), Bronka et al. (2020), Brewer and Tasseva (2020)). Jara et al. (2021) analyse the role of tax-benefit systems during the COVID-19 pandemic in Ecuador, a middle-income country. Very few studies, such as Chitiga-Mabugu et al. (2020), Baulch et al. (2020), Issahaku and Abu (2020), Seck (2020), Nafula et al. (2020) and Yimer et al. (2020) have looked at the distributional effects of the COVID-19 in SAA. However, unlike these studies on SAA, our analysis also looks at role of the tax-benefit system in SSA during the COVID-19 crisis. Malawi did not implement full lockdown measures like most countries, as such, our analysis will represent an interesting benchmark to compare results from countries that have implemented stay-at-home orders.

[2] Disposable income is defined as gross market income less direct taxes plus benefits. We did a similar analysis using a different income concept. To account for impact of indirect taxes we also calculated distribution using post-fiscal income. We define post-fiscal income as disposable income less indirect taxes (value added taxes in our case). At the moment we do not include subsidies in our definition of post-fiscal income. The results based on post-fiscal income are presented in tables A5 and A6 in the appendix.

The rest of the paper is organised as follows. Section 2 presents review of research on the distributional effects of COVID-19. Section 3 presents a brief discussion of social protection, tax system and government policy response to the COVID-19 pandemic, while Section 4 discusses the data and the empirical model employed in the paper. Section 5 presents and discusses our findings. In section 6, we discuss the policy implications of our key results and conclude with directions for next step of our study.

2. Related literature on the Distributional Effects of COVID-19 Pandemic

Our paper adds to a growing number of studies that have aimed at understanding the distributional consequences of the COVID-19 pandemic such as Beirne et al. (2020), Figari and Fiorio (2020), O'Donoghue et al. (2020), Bronka et al. (2020) and Brewer and Tasseva (2020). These studies investigated the impact of the pandemic and government policy responses in several European countries (Ireland, Italy and United Kingdom) using microsimulation techniques. The studies found that household's disposable income will decrease resulting in widening inequality and higher poverty levels. Income losses will be large for higher income earners. Government policy responses will play a vital role in containing some of the income losses, especially for those at the bottom of the distribution. Thus, the impact on income inequality is smaller because of policies implemented by the respective governments.

Evidence of the distributional consequences of the pandemic in developing country is scare. The few studies on developing countries include Jara et al. (2021) who investigated the distributional effects of COVID-19 in Ecuador and the role of tax-benefit policies in mitigating the immediate impact of the economic shocks. Their results showed a dramatic increase in income poverty and inequality in June 2020, compared to December 2019. Studies that have looked at the distribution effects on of the COVID-19 in SSA include Chitiga-Mabugu et al. (2020). Their study uses a CGE model to assess the impact of the COVID-19 pandemic and immediate containment policy responses on the South African economy, with a particular focus on the immediate impact on production, poverty, and inequality. Their results show that the pandemic moves the income distribution curve such that more households fall under the poverty line while at the same time, inequality declines. The latter result is driven by the disproportionate decline in incomes of richer households while the poorest of the poor are cushioned by government social grants that are kept intact during the pandemic. Baulch et al. (2020) employed a Social Accounting Matrix (SAM) multiplier model to assess the short-term impact of COVID-19 on the Malawian economy. They estimated the gross domestic product (GDP) to decline by around 11.6% during

April/May and between 4% and 5.2% over the 2020 calendar year. This leads to around 1.1 million people, the majority in rural areas, temporarily falling into poverty, although it is urban households who suffer the largest income losses.

Studies on the distributional consequences of the pandemic in African countries that used microsimulation techniques include Yimer et al. (2020), Nafula et al. (2020), Issahaku and Abu (2020) and Seck (2020). These studies estimated the loss of income due to lockdown and the changes in poverty and inequality brought about by the changes in income losses. In addition, the studies also analysed the effects of government intervention adopted to offset the negative consequences of the pandemic. They all found that poverty increased significantly, and that the pandemic had also worsened inequality. Government policies were found to be effective in reducing poverty. These studies however used household surveys from 2015/2016 requiring heavy assumption on labour and income developments for their baseline periods. These analyses also involved the use of household expenditure consumption as welfare indicator for the analysis. Unlike these studies our analysis uses data which was collected just before the pandemic and during the COVID-19 crisis. The main welfare variable for our study is disposable income. We will also assess the role of the tax benefit system in mitigating the impact of the shock caused by the crisis. Our approach is similar to Lastunen et al. (2021) who analysed the distributional effects of the COVID-19 pandemic and related tax-benefit measures in 2020 in a cross-country comparative perspective for five African countries: Ghana, Mozambique, Tanzania, Uganda, and Zambia. Unlike our study which focusses on the immediate impact of the crisis and uses up-to-date data for the baseline scenario they compared the situation before the crisis with the latter nine months of 2020 and due to lack of up-to-date date they reweighted data from surveys carried years before the pandemic to create their baseline datasets. Their findings showed modest increases in poverty and inequality.

Our aim is to contribute to this expanding literature aimed to understanding the distributional effects of COVID-19 pandemic by focussing on a developing country where over 80% of the employed population is employed in the informal sector and did not implement a full lockdown. Where those employed in the informal sector are expected to be affected the most as these households depend on people to people contact.

3. Social Protection in Malawi and Malawi Policy Response to COVID-19

This section provided details of the current social protection and tax system in Malawi. We start with discussing the benefits followed by the tax system. Finally, we will describe the new

measures implemented by government to offset the negative welfare consequence of the coronavirus pandemic.

3.1 Social Protection

The government of Malawi has been implementing different social protection programmes targeting the poor and vulnerable groups. The main social protection programmes in Malawi are the Malawi Social Action Fund Public Works Programmes (MASAF PWP), social cash transfers, Affordable Input Programme and school feeding programme. The main objectives of these programmes is to reduce poverty but also aim at promoting other human capital outcomes such as education, good health and gender equality (Chirwa, 2010).

The MASAF PWP is a safety net for poor households. It uses a cash transfer strategy through labour-intensive public works that create employment. The main activities under the MASAF PWP include rehabilitation and construction of economic infrastructure such as access roads, rainwater harvesting structures, afforestation, and environmental assets. The MASAF PWP covers all the 28 districts in Malawi and has been in operation since the mid-1990s. The MASAF PWP is implemented in food insecure areas targeting vulnerable and disadvantaged groups.

The social cash transfer (SCT) is a proxy means tested benefit provided to families who are ultra-poor, and labour constrained. The main objectives of the SCT are to reduce poverty, hunger and starvation among labour constrained and ultra-poor households and to increase school enrolment and attendance among children of beneficiary households. The SCT is being implemented in all 28 districts in Malawi. The benefit amount varies based on household size and the number of school-age children present in the household. The benefit amounts in Malawian Kwacha (K) are 2,600 ($4), 3,300 ($5), 4,400 ($6) and 5,600 ($8) for households of size 1 to 4 or more, respectively. A bonus to incentivize school enrolment is provided to each primary-school age child of K800 ($1) and secondary-school age child of K 1,500($2) per month.

Affordable Input Program (AIP) replaced the Farm Input Subsidy Program (FISP)[3] in 2020. According to GOM (2020a) the AIP is expected to reach 4.2 million farm families who will be provided with cheap farm inputs. Each farming household will purchase two 50 kg bags of fertilizer at a price of K4,495.00 ($6) per bag. The market price of a 50kg bag of fertiliser in K22,000 ($30).

[3] FISP was the largest social protection programme in Malawi in terms of number of beneficiaries and the budget. The FISP was first implemented in the 2005/06 agricultural season following a poor-harvest season and a high maize import bill in 2004/05 agricultural season. Under FISP smallholder farmer had access to cheap fertilizers to increase agricultural productivity and food security.

This measure is intended to provide additional support for rural households due to high incidence of poverty in rural areas and to ensure future food security in rural areas where the likelihood of climate shocks is very high.

The School Feeding Program is a benefit that provides onsite feeding in selected primary schools throughout the year. In addition, the programme provides take-home rations between January and April for girls and orphaned boys in grades 5 to 8 conditional on attending 80% of the school days[4]. The school feeding programmes use geographic targeting based on vulnerability to food insecurity, the enrolment and drop-out rates and the gender disparity in school enrolment.

3.2 Tax System

The taxation policies have different objectives to achieve including: increasing Government revenue generation; improving levels of investment and exports; and improving efficiency and fairness (Chafuwa et al., 2017). Like most countries in the world, Malawi depends heavily on taxes to generate resources for the provision of public services demanded by her citizenry. The average tax to GDP ratio in 2019 was 17.9% with most of revenues coming from personal income tax (26% of total tax collections).

Personal Income tax is levied on the earnings of individuals. The personal income tax is also charged on sole ownership of a business, in which case there is no clear distinction between the company and owner. In Malawi, a person becomes a taxpayer upon birth. A minor child is, therefore, a taxpayer in his or her own right. A minor child is a child who is under 21 years of age and is unmarried. Under section 73 of the Taxation Act income accrued to the minor child should be included in the return of the parent. As of June 2020, personal income tax had four bands with the following rates 0%; 15%; 30% and 35%.

Like many other developing countries, Malawi has had challenges in taxing income from agricultural and informal sectors. To tax these sectors government introduced the turnover tax in the 2013/14 budget to cater for small taxpayers with a turnover of K6 million. The turnover tax is levied at 2% of the turnover. The following incomes are exempt from turnover (i) rental, management or professional or training fees (ii) incomes of incorporated companies (iii) any income wish is subject to final withholding tax

Malawi made pension scheme mandatory for all defined employers in June 2011 after an Act of Parliament. All employers in Malawi are required to ensure that all their employees become

[4] Malawi operates on an 8-4-4 education system. Primary school is eight years from grade 1 to grade 8. Children enter primary school at age 6. Secondary school is four years and university bachelor's degree is four years.

a member of the National Pension Scheme. According to Section 12(1) of the Pension Act, the employer and employee are required to contribute 10% and 5% of their salaries, respectively, towards the pension fund. Employees earning less than K10,000.00 may be exempted from complying with the provisions of the Pension Act. Exempted are also seasonal workers, tenants, expatriates in possession of a temporary employment permit, members of parliament in their capacity as such and domestic workers.[5]

3.3 Government Response to the Pandemic

Governments around the world have sought to limit the spread of the virus and mitigate the negative health and economic outcomes of the disease through various policy measures. Some of the measures that the government of Malawi has put in place include expansion of social protection, fiscal and monetary measures, as well as steps to support the financial sector and expansion of mobile money services.

To compensate the earning loss incurred by the self-employed, the government implemented an Emergency Cash transfer Programme. The Emergency Cash Transfer Programme of about $50 million (0.6% of GDP) was implemented to support small businesses in major urban areas (GOM, 2020b). The intervention targets peri-urban areas covering approximately 172,337 households, each receiving a monthly sum of K35,000.00. The Emergency Cash Transfer is the only new government policy response to COVID-19 that we can simulate. Below we highlight other government responses, however due to their design we were unable to simulate them.

The government's response plan also included US$20 million (0.25% of GDP) in spending on health care and targeted social assistance programs; this includes hiring 2000 additional health care workers. In addition, tax waivers will be granted on imports of essential goods to manage and contain the pandemic (GOM, 2020b).

According to RBM (2020) statement, government has put in place measures to drive economic activities during the crisis. The domestic currency Liquidity Reserve Requirement (LRR) has been reduced by 125 basis points to 3.75% (aligned with the foreign currency LRR) and the Lombard Rate has been reduced by 50 basis points to 0.2 percentage points above the policy rate. An Emergency Liquidity Assistance (ELA) framework has been introduced to support banks in the

[5] The main indirect taxes in Malawi are the Value added tax (VAT) and the excise duty. VAT is tax levied on the value of goods sold or services provided. VAT was first introduced into the Malawi tax system in 1971 as Surtax. In 2005, Surtax was renamed to Value Added Tax (VAT) following the passing of VAT Act 2005. As of June 2020 the VAT rate was 16.5%.

Excise Tax is an indirect tax charged on certain specified locally manufactured and imported goods. The excise tax is collected on mainly cigarettes/tobacco, alcohol, motor cars and goods for pleasure.

event of worsening liquidity conditions and to provide support to banks on a case-by-case basis. To support small and medium enterprises (SMEs), commercial banks and micro-finance institutions will be, on a case-by-case basis, restructuring SME loans and providing a three-month moratorium on their debt service. Fees on mobile money transactions have been temporarily waived to encourage cashless transactions.

4. Methods and data

4.1 Data

For our analysis we use three data sources, the Integrated Household Survey (IHS), the Integrated Household Panel Survey (IHPS) and the High Frequency Phone Survey on COVID-19 (HFPS COVID-19). The association between these data sources is that the IHPS is a sub sample of the IHS and the HFPS COVID-19 is sub sample of the IHPS.

The IHS is a multi-topic survey implemented by National Statistics Office of Malawi (NSO) every 3 years. The IHS is used by the government to assess poverty, income and expenditure outcomes in Malawi. The latest data available is the fifth Integrated Household Survey (IHS5) which was conducted between April 2019 and March 2020. The survey contains detailed information on incomes and labour market participation of over 11,434 households and 50,476 individuals. This data will be used in our analysis as the baseline to capture labour market outcomes before the COVID-19 crisis. The IHS is the main data source for the Malawi Tax-Benefit microsimulation model (MAMOD).

The second data source used in our study is the Integrated Household Panel Survey 2019/2020 (IHPS-2019). The IHPS-2019 was conducted face to face prior to the COVID-19 crisis and alongside the IHS5. The IHPS is a follow-up survey to the same households interviewed in Integrated Household Survey (IHS). A sub-sample of IHS sample of 3,178 households was selected with the intention to track and resurvey. The sample was selected to be nationally representative. The IHPS contains all the information as contained in the IHS. The main objective of the Integrated Household Panel Surveys is to provide and update information trends in poverty, socioeconomic and agricultural characteristics over time through a longitudinal survey.

Data for the period during the COVID-19 crisis is derived from the High-Frequency Phone Survey on COVID-19 (HFPS COVID-19). The HFPS COVID-19 is a phone survey conducted by the NSO and the World Bank to track the socioeconomic impacts of the pandemic monthly for a period of 12 months. The survey aimed to re-contact the entire sample of households that had been interviewed during the Integrated Household Panel Survey (IHPS) 2019/2020 round and that

had a phone number for at least one household member. Thus, we can match individuals in the IHPS-2019 and HFPS COVID-19 and determine changes to their labour market outcomes between 2019 and June 2020, which form the basis to adjust our main data source for MAMOD. 1,729 households were successfully interviewed for the HFPS COVID-19. The HFPS COVID-19 weights were calculated to counteract selection bias associated with not being able to call IHPS households without phone numbers, and to mitigate against non-response bias associated with not being able to interview all target IHPS households with phone numbers (NSO and World Bank, 2020).

The HFPS COVID-19 contains information on status in employment, type of industry, source of income, information on whether the income increased, decreased or has remained the same since March 2019. The survey also collects detailed information regarding issues related to COVID-19, such as knowledge regarding the spread, behaviour and social distancing measures, access to basic items such as sanitisers and soap, health and financial facilities, and shocks experienced by the families. The main drawback of the survey is that it does not collect information on the actual earnings of individuals; however, it has information on whether individual had positive earnings before and during the crisis and information on those who experienced a reduction in earnings during the crisis. For our COVID-19 scenario we will adjust labour market in the IHS5 to reflect the situation reported in the HFPS COVID-19.

4.2 MAMOD

For our analysis we use the recently developed tax-benefit microsimulation model for Malawi (MAMOD). The development of MAMOD followed the methodology developed in the framework of the SOUTHMOD project, which has constructed tax-benefit microsimulation models for developing countries based on household survey data. The work involved harmonising household survey data from Malawi to ensure comparability with other countries in the SOUTHMOD project, and for implementing tax-benefit policy rules in the EUROMOD software.[6] The model simulates employee social insurance contributions (SICs), personal income tax, turnover tax, social cash transfer and indirect taxes. Benefits which are not simulated are taken directly from the data.[7] At the moment MAMOD covers policy years 2005, 2011, 2017 and 2019 for tax-benefit simulations. As alluded to above, government is implementing several measures to mitigate the impact of the

[6] EUROMOD is an advance tax-benefit microsimulation model for the European Union (Sutherland and Figari, 2013).

[7] Benefits which were not simulated but included are: MASAF-Public Work Programme; Non-MASAF Public Work Programme; Input for Works Programme; Scholarships/Bursaries for Secondary/Tertiary Education.

COVID-19 pandemic on the population. For our study, we have only simulated the emergency cash transfer. The model results have been validated against external statistics.

The underlying microdata for MAMOD is sourced from the nationally representative Integrated Household Surveys (IHS) conducted by the National Statistics Office (NSO). The IHS includes detailed information on among other things, demographic characteristics of households, education, health, employment, housing condition, asset ownership, household expenditure and income. Our analysis thus involves adjusting the IHS5 labour market and earnings information to match the outcomes reported in the HFPS COVID-19 and these becomes our COVID scenario.

4.3 Estimating the Distributional Impact of the COVID-19 Pandemic

To estimates of the effect of the crisis on unemployment we constructed input datasets reflecting the situation before and during the pandemic. The pre-COVID-19 crisis scenario (baseline) is based on the IHS5 data, which was collected between April 2019 and March 2020. The COVID scenario is derived by adjusting the IHS5 data to match the labour market situation of individuals in June 2020 based on the HFPS COVID-19 data. For the COVID scenario we consider three scenarios of the employment shock due to the difficulty of identifying employment losses that are only due to COVID-19 pandemic. The employment shock scenarios are based on supporting materials for HFPS COVID-19 data provided by the National Statistics offices of Malawi (NSO). In the first scenario (Scenario 1) we simulate the effect of total loss in employment during the COVID-19 period, in the second scenario (Scenario 2) we focussed on loss in employment excluding those that are potentially unrelated to COVID-19 and the final scenario (Scenario 3) we analysed loss in employment potentially due to COVID-19. These employment shock scenarios are based on data provided by the NSO office of Malawi on work stoppage by industry and reason for the job loss (see Table A4 in the appendix). No adjustments are made to earnings at the moment, because there is no quarterly information of change in GDP that we could use to assess how much earnings had fallen per industry for those who remained in employment but experienced a reduction in wages in June 2020.[8]

The difference between the pre-COVID scenario and each of the COVID scenarios gives us the impact of the crisis. Additionally, we constructed counterfactual scenarios which apply 2019 tax-benefit policies to the 2020 (COVID) data. We use these datasets and apply a decomposition method to assess the impact of the policy measures and other COVID-19 related effects.

[8] Wright et al. (2021) provides details on projecting income of sectors using quarterly economic growth.

To generate the COVID scenarios, we used the IHPS-2019 and HFPS COVID-19 data information to adjust the IHS5 data. More precisely, we first matched individuals who were employed in the IHPS-2019 data with the HFPS COVID-19 data. For these individuals, we had information about their employment status before the crisis and during the crisis. Based on the sample of individuals employed in the IHPS in 2019, we estimated a probit model of the probability of becoming unemployed in 2020. The dependent variable for our probit model is 1 if the individual was employed in 2019 and out of work in June 2020, zero otherwise. The employment status of the individuals is assumed to be a function of age; age squared; level of education (none, primary, secondary, tertiary); gender; marital status; and industry of occupation. From the probit (see Table A1 in the appendix) we find that females have a higher probability of becoming unemployed. The probability of becoming unemployed decreases for individuals who have some form of education. Married couples were found to be more likely to lose their jobs, which could be partly because of having to two earners in the household. We find that there is higher probability of becoming unemployed in the agriculture sector compared to most of the other sectors. The obtained coefficients from this probit model plus a random component are used to predict the probability of becoming unemployed in the IHS5 or pre-COVID data (baseline) (Li and O'Donoghue, 2014). Based on the predicted probability in the pre-COVID-19 data we select individuals with the highest probability of becoming unemployed and set their earnings to zero and we keep the rest as earners. In selecting individuals with the highest probability of becoming unemployed we matched the proportion of job losses per industry provided by the NSO for the three employment shock scenarios[9]. The adjustment is done in terms of employment losses only. At the moment, no adjustment is made to earnings of those who remain in work. In summary, from our pre-COVID data we create a COVID scenario data that reflects the employment characteristics of the HFPS COVID-19 data. From this dataset we then create a counterfactual scenario dataset which does not include the emergency cash transfer which the government implemented to the small-scale enterprises to mitigate the impact the COVID-19 pandemic.

The counterfactual scenarios are used to assess the role of the tax benefit policy. This is of vital interest to policy makers in developing countries because social protection and COVID-19 measures are assumed to have limited impact. Assessing the role of tax-benefit policies involves decomposing the observed changes between the pre-COVID scenario and COVID-scenario to isolate the contribution of policies and other effects. For this purpose we follow the

[9] This data is provided as additional documentation the HFPS on COVID-19 and its available at: https://microdata.worldbank.org/index.php/catalog/3766/related-materials

decomposition method proposed by Bargain and Callan (2010) and its extension by Paulus and Tasseva (2020). We follow the application of the method as in the analysis of the UK's response to COVID-19 and its impact on household income by Brewer and Tasseva (2020) and in the paper quantifying the distributional effects of COVID-19 and the role of tax-benefit policies in mitigating the immediate impact of economic shocks in Ecuador by Jara et al. (2021).

Following Brewer and Tasseva (2020) we define y as the pre-COVID crisis gross market income, $t(y)$ is income taxes and Social Insurance contribution (SIC) as a function of gross income; $b(t, y)$ are benefits which are function of gross market income and incomes taxes. The pre-COVID disposable income for the households B can be written as:

$$B = y - t(y) + b(t, y) \quad (1)$$

The gross market income after the COVID-19 crisis is defined as y_i' where i represents our employment shock scenarios 1, 2 and 3. These incomes consider the effects of the shock such as higher unemployment levels after taking into account the three scenarios. Income taxes and SIC after the crisis are defined as $t(y_i')$; benefits during the crisis include the emergency case transfer to small enterprises and are defined as $b''(t, y_i')$ which are function of gross market income after the crisis and incomes taxes. The disposable income for the households during the crisis D can then be written as:

$$D = y_i' - t(y_i') + b''(t, y_i') \quad (2)$$

The impact of the crisis can then be derived by taking the difference between 1 and 2.

$$D - B$$
$$y_i' - t(y_i') + b''(t, y_i') - (y - t(y) + b(t, y)) \quad (3)$$

We then create a counterfactual scenario C, which does not include the emergency cash transfer but has employment levels during the crisis. This will enable us to isolate the impact associated with COVID-related policy changes from other effects not linked to policy such as effects of the crisis.

$$C = y_i' - t(y_i') + b(t, y_i') \quad (4)$$

To isolate the contribution of the policy changes and other changes we add and subtract C to 3.

$$D - C \quad + \quad C - B \tag{5}$$

$$\begin{aligned} &(y_i' - t(y_i') + b''(t, y_i') - (y_i' - t(y_i') + b(t, y_i')) \quad \text{(policy effects)} \\ &+ (\, y_i' - t(y_i') + b(t, y_i') \;\; - (\, y - t(y) + b(t, y)) \quad \text{(other effects)} \end{aligned}$$

Now let I be a functional of income such as poverty measured by the headcount and poverty gap, or inequality measured by the Gini coefficient or Theil Index. If I is additively decomposable by income source we can disentangle other effects further into effects of earning changes, income tax and social insurance contribution and automatic stabilisers due to benefits (Paulus and Tasseva, 2020).

$$\begin{aligned} &I[y_i' - t(y_i') + b''(t, y_i')] - I[(y_i' - t(y_i') + b(t, y_i'))] \quad \text{(policy effects)} \\ &+[y_i'] - I[(y'] \quad \text{(employment changes)} \\ &+ \;\; I[t(y)] - I[\big(t(y_i')\big)] \quad \text{(tax and SIC as automatic stabiliser)} \\ &+ \;\; I[b(t, y_i')] - I[b(t, y))] \quad \text{(benefits as automatic stabiliser)} \end{aligned}$$

In summary, our analysis will be comparing between the pre-COVID scenario and the COVID scenario with COVID-related policies and this will give us the total impact of the pandemic. To get the impact of the COVID-19 measures we will compare the COVID scenario with COVID-related policies and the COVID scenario without COVID-related policies. In the face of difficulty in identifying those who lost their jobs due to the pandemic we have considered three scenarios for the employment shock during the COVID period. The employment shock scenarios are based on supporting materials for HFPS COVID-19 data provided by the National Statistics offices of Malawi (NSO). The NSO data has information on total employment loss (scenario 1), employment loss potentially unrelated to COVID-19 (the compliment of this gives us employment loss excluding those that are unrelated to COVID 19: scenario 2) and employment loss potentially due to the pandemic (scenario 3).

5. Results

We now present results of our investigation of the impact of the COVID-19 crisis on household's income distribution and the Malawi government response to the crisis. The results are based on

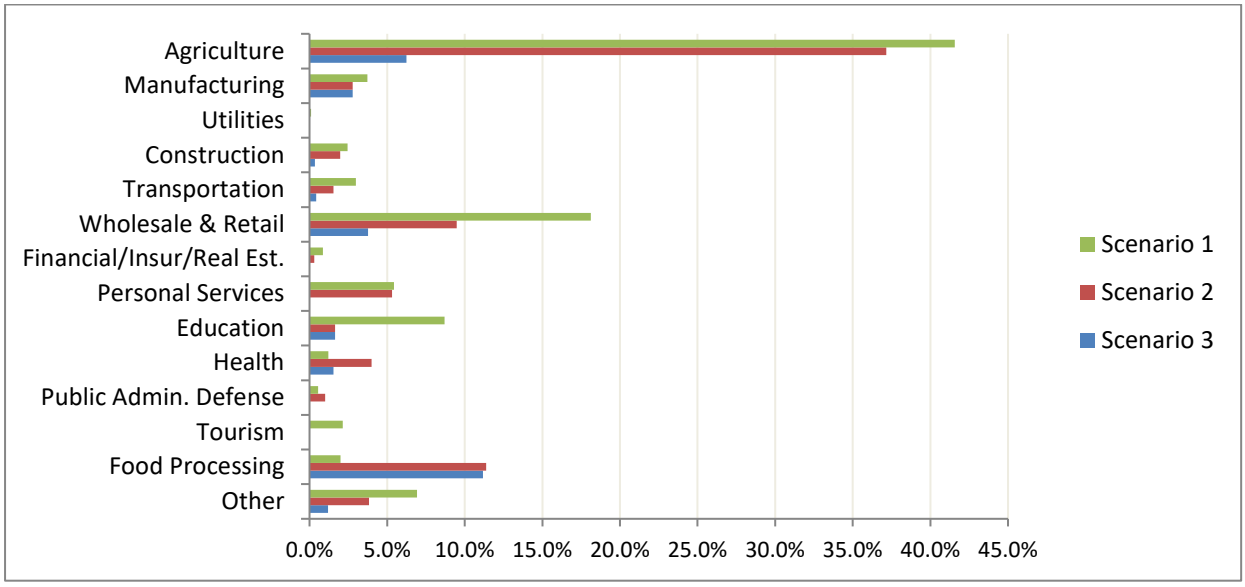
the comparison between the pre-Crisis scenario (baseline) and each of the three COVID scenarios. We first provide details of the effect of the crisis on job losses per industries following our simulations of the three employment shock scenarios. Then we assess the effects of the crisis on household disposable income decomposing it into changes arising from a drop in earnings, automatic stabilisers and the benefit introduced by government to mitigate the impact of the crisis. Finally, we analyse the impact of the crisis on poverty and inequality.

5.1 Characteristics of those impacted

Figure 1 shows the differential impact of the pandemic on job losses by sector of employment for the three scenarios considered. As mentioned above, the three scenarios were based on work stoppage data provided by the National Statistics office of Malawi as supplementary information to the HFPS COVID-19 (see table A4 in the appendix). As expected, the impact of the pandemic will be unequal as it has affected industries differently. The most severely hit sector under scenarios 1 and 2 is the agriculture sector as the bulk of the labour force is in the agriculture sector. 90% of the households in the HFPS COVID-19 sample reported to be engaged in agriculture just before the pandemic (NSO and World Bank, 2020). Under the scenario 1 workers that lost their jobs in the agriculture sector represent 41.6% of total job losses compared to 37.2% under scenario 2 and 6.2% under scenario 3. Although Malawi did not impose a full lockdown measure, the agriculture sector, which is the main exporting sector, was affected by border closures and the overall risk averse social distancing practices. Social distancing is expected to impact agricultural actives including the sale of agricultural produce in rural areas. Due to border closures the few commercial farmers cannot get their crops on to the international market resulting in laying-off workers. The agriculture sector employs mostly on an informal basis, in that the employees do not have contracts and are without benefits such as: no paid leave; no contribution to social security; no payment for leave days not taken; no paid sick leave; no medical benefit and no tax deduction from salary. The huge informality in the agriculture sector makes jobs in the sector very sensitive to shocks. The second most severely affected sector is the wholesale and retail sector with 18.6%, 9.5% and 3.8% of total job losses under scenario 1, 2 and 3, respectively. Like the agriculture sector most of the workers in this sector are informal and self-employed who depend on people to people contact. As highlighted above, as news of the virus spread individuals began to practice social distancing to protect themselves such as not going to the market and not travelling in general. These affected small enterprises prompting government to provide cash transfer to cushion them from these negative effects of the pandemic. Other sectors that

experienced large employment losses are manufacturing, education and professional, scientific and technical activities. Another sector which will be severely hit is the food processing sector. Food processing is the hardest hit sector under our scenario 3. This sector is linked to both the agriculture and the manufacturing sector thus it is heavily affected by the reduced demand in the economy due to the factors highlighted above. The rest of the job losses per industry are highlighted in figure 1 and these layoffs have affected the household incomes.

Figure 1: Employment loses per sector in 2020



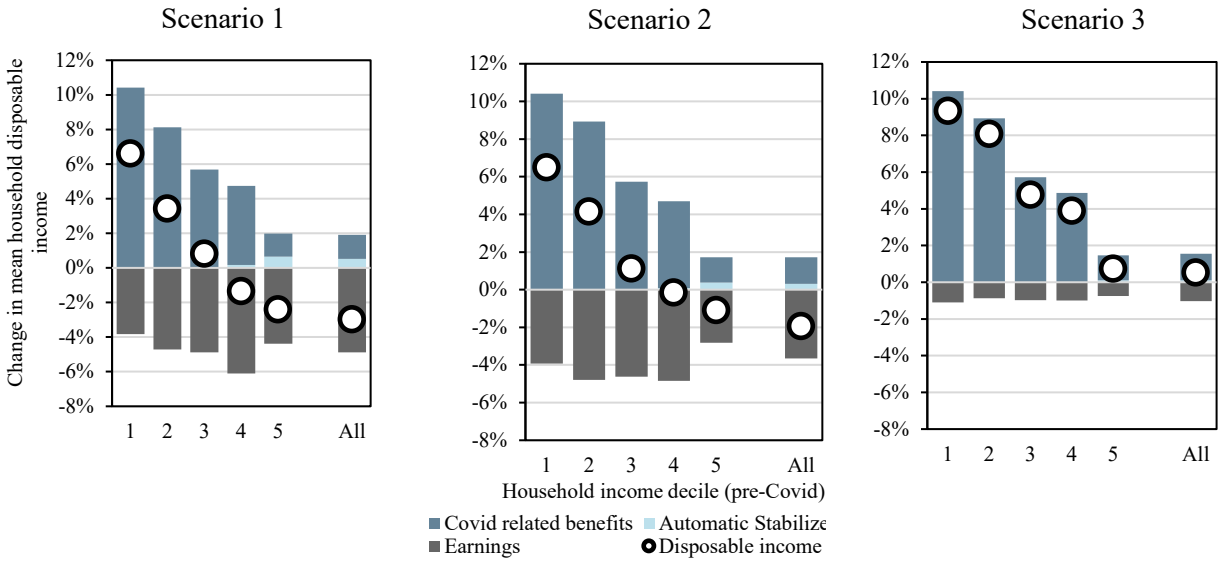
Source: Own calculate based on simulations from MAMOD

5.2 Effects on Household Income

The pandemic and the subsequent job losses have affected family incomes across the distribution. Figure 2 presents the mean change in per capita household disposable income between the pre-crisis scenario and the COVID scenarios for each quintile group and for the whole population following the employment shock and government policies. The total effect of the pandemic is a decrease of 3.0% and 1.9% in average disposable income for the whole population, with a largest effect for the last quintile under scenarios 1 and 2, respectively. Average disposable income increases slightly by 0.5% under scenario 3 which assumes lower job losses. The increase in average disposable incomes under scenario 3 is due to emergency cash transfer which was able to offset drop in earnings, especially for those at the lower end of the distribution. Using scenario 1, our results show a big positive impact for the first quintile in relative terms (about 6.0%) but in absolute terms the impact is only about K800 (US$1). In contrast, the largest quintile has a small

negative impact in relative terms (about 2%) but in absolute terms it's minus K16,060 (US$22) resulting in the overall impact being a decrease in average disposable income. The overall drop in disposable income in all three scenarios is driven by losses in earnings due to job losses. Across the income distribution, all quintile groups experience a decrease in earnings, with earnings losses slightly larger in the middle 3 quintiles than the top quintile, while the lowest quintile experienced the smallest drop in earnings except under scenario 3. Lustig et al. (2020) also found that greatest decrease in the middle of the income distribution in their study of the distributional consequences of COVID-19-induced lockdown policies in Argentina, Brazil, Colombia and Mexico. Overall, earnings account for a 4.9%, 1.9% and 0.5% of the reduction in disposable income under scenarios 1, 2 and 3 respectively. The new benefit was able to mitigate the impact of the shock across all income quintile with those at the bottom of the distribution getting compensated the most. The COVID-19 related policy contributed 1.4% to the overall increase in disposable income while automatic stabilisers contributed 0.5%. The main piece of legislation implemented to respond to the job losses was the Emergency Cash Transfer. The government provided an amount of K35,000 (US$48) per month to the eligible households. The benefit was able to absorb a higher proportion of income losses for the bottom quintiles accounting for an increase income of 10.4% and 8.1% for the quintile 1 and 2 compared to 1.3% for the highest quintile.

Figure 2: Change in mean disposable income by quintile

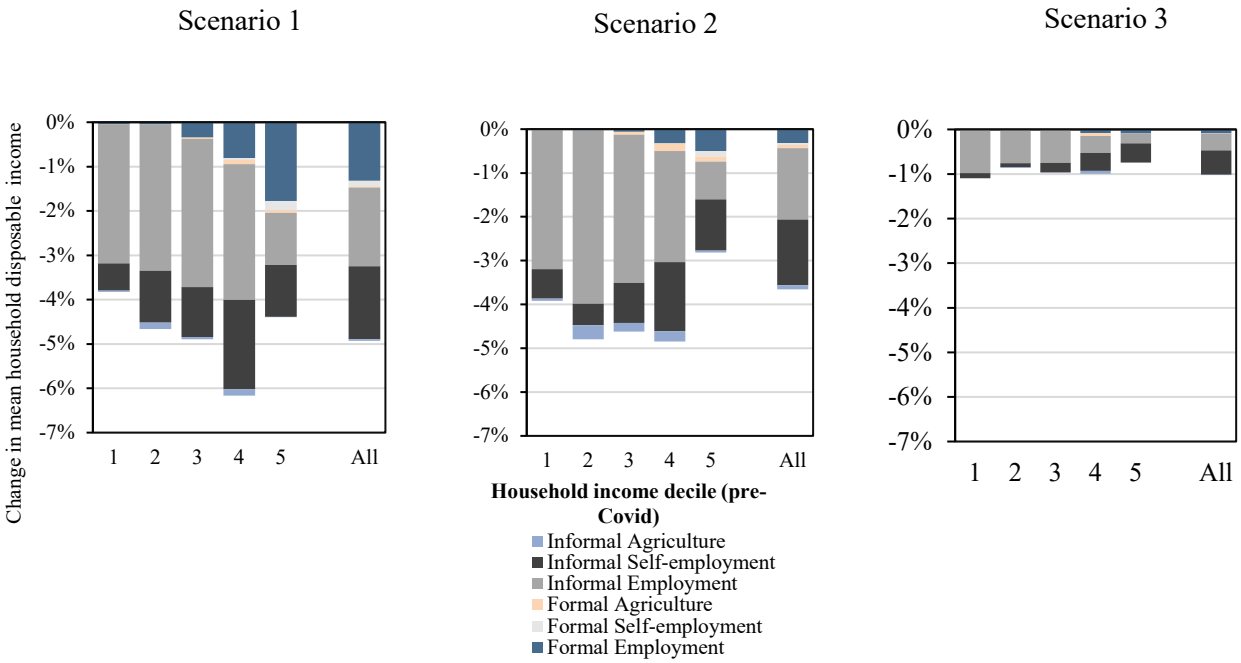


Source: Own calculations using MAMOD

Looking at the effect of different income sources on the drop in earnings, we find that employment income contributed the most to the decrease in household disposable income.

Overall, average employment income contributed 3.1% under scenario 1, 1.9% under scenario 2 and 0.5% under scenario 3 to the decrease in household disposable income, with the middle-income earners contributing the most, followed by the top quintile and the bottom quintile contributing the least. Following employment incomes, earnings from self-employment accounted for 1.7%, 1.5% and 0.5% drop in household disposable income under scenarios 1 to 3, respectively. We further assess the impact of losses in earnings from these sources distinguishing between formal and informal employment. As Figure 3 shows, we find that the drop in earnings of those in informal employment contributed the most to the decrease in household disposable income, followed by informal self-employment and formal employment. The impact of these sources varies across the distribution. Losses in informal employment earnings are larger and uniformly distributed between quintiles 1 to 4 while losses in informal self-employment are largest in quintile 4 followed by and uniformly distributed between quintiles 2, 3 and 5. Overall losses in the informal sector account mostly for the drop in disposable income in quintiles 1 to 4 while those from the formal sector were more prevalent at the top of the income distribution. Over 80% of the labour force in Malawi is engaged in the informal sector.

Figure 3: Change in mean disposable income due to employment losses of formal and informal sectors

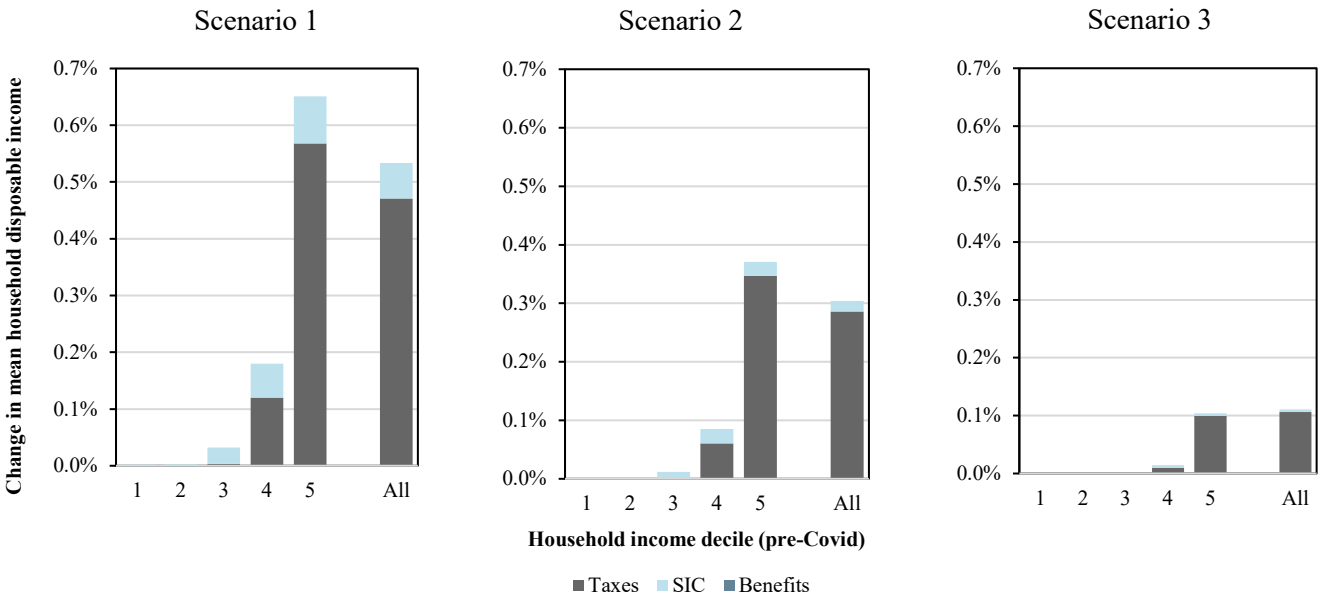


Source: Own calculations using MAMOD

Earnings from the agriculture sector (formal and informal) contributed only 0.07% to the decrease in household disposable income, with most of the effect arising from the bottom 3 quintiles of the earnings in informal agriculture. As highlighted above the employment in the agriculture sector is largely on informal basis and it is characterised with low wages.

Figure 4 presents the effect of automatic stabilisers. The largest impact on changes in disposable income due to automatic changes in tax-benefit instruments is from taxes followed by social insurance contributions. The significant impact of taxes and social insurance contributions is larger at the top of the distribution reflecting the progressive nature of the system in Malawi. A reduction in personal income tax will contribute 0.5% gain in income while a reduction in social insurance contribution accounts for 0.1% increase in household disposable income under scenario 1. The outcomes are same under the other scenarios the only difference is in the magnitudes. The impact of taxes is larger than that of social insurance contributions because social insurance contributions only started in 2011 and some employers have been found not to be strictly adhering to the requirement of the scheme. Government employees were also initially exempted from the scheme. Benefits were found not to have any impact as automatic stabilisers partly because benefits in Malawi are proxy means tested. Jara et al. (2021) found similar results for Ecuador where benefits are proxy means tested.

Figure 4: Change in mean disposable income due to automatic stabilisation



Source: Own calculations using MAMOD

5.3 Effects on Poverty and Inequality

The major consequence of these job losses and subsequent incomes losses is a rise in poverty and inequality as shown in Table 1. For our poverty analysis we use the national poverty line of US$19 per month and the extreme poverty line of US$11 per month. The national poverty line measurers the failure of a household to attain a minimum acceptable consumption level of food and other basic needs while the extreme poverty line measures the failure of household to meet a minimum acceptable level of food consumption. The Gini coefficient and Theil index are used to measure the impact on inequality.

Comparison of household disposable income per adult person with national poverty line of US$19 reveal that the poverty headcount rose by 0.60 percentage points under scenario 1 and 0.26 percentage points under scenario 2 due to the pandemic from the baseline rate of 83.6% in 2019. The poverty rate decreases by 0.41 percent under scenario 3 which has the least amount of job losses. The poverty levels have increased for most of the households engaged in the informal sector which is the main source of livelihood for most Malawians. The policies implemented have not been adequate to maintain the pre-crisis level of poverty. Similarly, the COVID-19 crisis contributed to 1.93 percentage points, 1.31 percentage points and 0.03 percentages points increases in poverty when poverty gap is used across the three scenarios. The poverty gap is a measure of poverty that enables governments to estimate the amount of required resources to bring the poor to the poverty line. This means that it will now be more costly to eliminate poverty because of the pandemic. The pandemic will put pressure on government which was already struggling to deal with high level of poverty before the pandemic. As highlighted above government policies were able to mitigate against some of the effects of the pandemic hence government policies aimed at reducing poverty need to be scaled up.

At the extreme poverty line, the results are quite similar although changes in poverty levels for both headcount and poverty gap measures are slightly higher than above. This indicates that the pandemic has resulted in larger share of extremely poor. As table 2 shows the policies implemented by government were also able to offset a lower amount of the pandemic induced increase in poverty when the extreme poverty line is used compared to the national poverty line. This could partly be due to the fact the emergency cash transfer that government had implemented targeted small-scale enterprises in urban areas while most of the ultra-poor reside in the rural areas.

Looking at the change in income inequality we show in Table 1 that the pandemic has made Malawi a more unequal society. Income inequality as measured by the Gini coefficient

increased by 0.9 percentage points under scenario1, 0.72 percentage points under scenario 2 and 0.02 percentage points under scenario 1 from the baseline rate of 68.9%. Since the pandemic has affected incomes across all distribution and government measures have boosted incomes of those at the bottom of the distribution the gap is not expected to widen significantly. We however hasten to point out that any increase in inequality is worrisome for a country which is one of the most unequal countries in the world.

Table 1: Total Change in Poverty and Inequality

		Total Change		
	Pre-Crisis	**Scenario1**	**Senario2**	**Scenario3**
Poverty				
National Poverty Line				
Headcount (%)	80.7	0.60***	0.26**	-0.41***
		(0.001)	(0.0013)	(0.0008)
Poverty gap (%)	53.2	1.92***	1.49***	0.08
		(0.0013)	(0.0011)	(0.0007)
Extreme Poverty Line				
Headcount (%)	66.8	1.93***	1.31***	0.03
		(0.0019)	(0.0017)	(0.0009)
Poverty gap (%)	39.9	2.41***	2.01***	0.29***
		(0.0014)	(0.0013)	(0.0007)
Inequality				
Gini Coefficient (%)	68.9	0.9***	0.72***	0.02
		(0.0009)	(0.0009)	(0.0006)
Theil Index	7	0.16***	0.0	-0.25***
		(0.0454)	(0.0363)	(0.0542)

Notes: The 2019 national poverty lines of US$19 per month and US$11 per month for extreme poverty are used in the calculations. Significance levels indicated as * p < 0:1, ** p < 0:05, *** p < 0:01 and Standard errors at a confidence level of 95% are shown in parenthesis.
Source: Own calculations using MAMOD.

Table 2 shows the total change in poverty/inequality decomposed into the contribution of policies implemented and other effects. Our analysis shows that emergency cash transfer that government provided to the small-scale enterprises had the effect of offsetting the increase in poverty during the crisis, otherwise without the policy measure poverty would have been higher. 'Other effects' which comprise of all factors not related to policy, such as the pandemic, were responsible for the increase in poverty. Thus, the mitigating measures were not adequate to offset all the negative effects of the shocks on poverty but contributed to lessening the impact.

Similarly, we find that 'other effects' contributed to the increase in inequality while policy implemented to mitigate the impact of the shock contributed to the decrease in inequality, entailing that without government intervention inequality could have been higher.

Table 2: Decomposing Change in Poverty and Inequality

	Scenario 1			Scenario2			Scenario 3		
	Total Change	**Policy Effects**	**Other Effects**	**Total Change**	**Policy Effects**	**Other Effects**	**Total Change**	**Policy Effects**	**Other Effects**
Poverty									
National Poverty Line									
Headcount (%)	0.60***	-0.57**	1.17***	0.26**	-0.59**	0.85***	-0.41***	-0.60**	0.19***
	(0.0014)	(0.0005)	(0.0012)	(0.0013)	(0.0006)	(0.0012)	(0.0008)	(0.0006)	(0.0005)
Poverty gap (%)	1.92***	-0.31**	2.22***	1.49***	-0.32**	1.81***	0.08	-0.32	0.40***
	(0.0013)	(0.0003)	(0.0012)	(0.0011)	(0.0003)	(0.0011)	(0.0007)	(0.0003)	(0.0006)
Extreme Poverty Line									
Headcount (%)	1.93***	-0.39**	2.32***	1.31***	-0.41***	1.72***	0.03	0.40***	0.43**
	(0.0019)	(0.0004)	(0.0019)	(0.0017)	(0.0004)	(0.0016)	(0.0009)	(0.0004)	(0.0008)
Poverty gap (%)	2.41***	0.19***	2.5***	2.01***	-0.2***	2.21***	0.29***	-0.19***	0.48***
	(0.0014)	(0.0002)	(0.0014)	(0.0012)	(0.0002)	(0.0012)	(0.0007)	(0.0002)	(0.0006)
Inequality									
Gini Coefficient (%)	0.9***	-0.14**	1.04***	0.72***	-0.15***	0.88***	0.02	-0.15***	0.17***
	(0.0009)	(0.0005)	(0.0007)	(0.0009)	(0.0005)	(0.0007)	(0.0006)	(0.0005)	(0.0003)
Theil Index	0.16***	-0.35	0.51***	0	-0.35***	0.35***	-0.25***	-0.34***	0.08***
	(0.0454)	(0.0707)	(0.0919)	(0.0363)	(0.0703)	(0.0705)	(0.0542)	(0.0674)	(0.0226)

Notes: Significance levels indicated as * p < 0:1, ** p < 0:05, *** p < 0:01 and Standard errors at a confidence level of 95% are shown in parenthesis.
Source: Own calculations using MAMOD.

5.4 Effects of Indirect Taxation

In addition to our main welfare variable of disposable income, we undertake the same analysis using post-fiscal income. As highlighted in Lustig (2018), using different concepts of income can to measure inequality and poverty can lead to different results. Furthermore, indirect taxation and subsidies play a key role in the fiscal system of low-income countries. In our study we define post-fiscal income (consumable income) as disposable income as defined above less value-added taxes (VAT). Subsidies are not yet included in our analysis. Tables A4 and A5 in the appendix provides results based on post-fiscal income. The general outcome is similar to the analysis using disposable income as both poverty and inequality increase due to the pandemic. We also find that

the additional policy the government has put in place to cushion the impact of the crisis was able to offset some of the increase in poverty and inequality. The main difference between the analyses using disposable and post-fiscal income is that poverty and inequality levels are higher when post-fiscal income is used. The higher levels of poverty and inequality entail that value added taxes are indeed regressive and create "fiscal impoverishment"[10].

6. Conclusions

The COVID-19 pandemic has resulted in profound economic impacts in many countries around the world. This paper provides some of the first evidence on the distributional impacts and government responses to mitigate the welfare consequences of the pandemic on households and individuals in Sub-Saharan Africa. To do so we considered three different scenarios to analyse the short-term impact of COVID-19 pandemic and mitigating measures implemented in Malawi using pre-COVID-19 face-to-face household surveys and from the novel phone surveys implemented during the pandemic. We found that the 15.1% of the people who were employed in 2019 lost their jobs in 2020. This resulted in a decrease of 3.0% in disposable income under our worst-case scenario.

The employment losses and the subsequent decrease in disposable income have made some sections of the Malawi population poorer and have widened income inequalities. Poverty as measured by the headcount ratio rose under our three scenarios. Similarly, the poverty gap rose due to the pandemic. Inequality as measured by the Gini coefficient and the Theil index increased. The increase in both inequality and poverty was on account of 'other effect' or factors not related to government policy i.e., COVID-19 related.

Our analysis provided evidence that government policies, such as emergency cash transfer, had very small impact on offsetting the increases in poverty and inequality. These results highlight that the existing social safety nets are inadequate if we want to restore poverty back to pre-crisis level. Our results are similar to other studies on developing countries i.e. Jara et al. (2021) and Issahaku and Abu (2020); who found that the policy implemented in Ecuador and Ghana, respectively did not manage to completely offset the negative effects of the pandemic, in terms of poverty and inequality. Although the effect on poverty and inequality is small, we do observe that the emergency cash transfer provided strong cushioning effect for low-income households. Mean disposable income increases at the bottom of the distribution despite the economic shock

[10] The situation to which a tax-benefit system causes some individuals to become poor or poor people are made poorer is referred to as fiscal impoverishment by Higgins and Lustig (2016).

due to the government policy. The policy makers in Malawi thus need to work towards improving the coverage, effectiveness and coherence of the social protection system as our findings show that policies were able to offset some of the negative impacts of the pandemic.

In terms of the impact of the automatic stabiliser we found that income tax had the most impact in compensating for the drop in disposable income. Due to the progressivity of the tax system the effect was most at the upper end of the distribution. Social insurance contributions marginally contributed to gains in incomes however the impact was limited due to under development of the national contributory pension scheme in Malawi. The overall contribution of the automatic stabilisers to an increase in disposable income was less the 1% reflecting the high informal employment in the country. Benefits were found not to act as automatic stabilisers partly because benefits in Malawi are proxy means tested.

Similarly, though not identical, the studies that have been undertaken for other countries have resulted in findings like ours above. Studies by Beirne et al. (2020) for Ireland, Figari and Fiorio (2020) for Italy Brewer and Tasseva (2020) UK, and Jara et al. (2021) Ecuador found that the major consequences of the pandemics was a drop in disposable household income with the most profound effect at the top of the distribution. The studies for Ireland and Italy also found in line with our findings that those at the bottom of the distribution were actually better off during the crisis as their incomes were higher than before the crisis due to the benefits. Compared to these studies for the developed world we found that the decrease in disposable income of individuals was mainly due to job losses in the informal sector. Our results are also in line with studies from other African countries such as Issahaku and Abu (2020) for Ghana, Seck (2020) for Senegal Nafula et al. (2020) for Kenya, Yimer et al. (2020) for Ethiopia and Lastunen et al. (2021) for Ghana, Mozambique, Tanzania, Uganda, and Zambia. These studies found that poverty and inequality increased due to the pandemic. Similarly, they found that the government measures though had small impact on poverty and inequality were able to mitigate some of the welfare consequences of the pandemic and recommended for increasing resources for the social cash transfer programmes. Compared to other studies we however found that the increases in poverty in Malawi were lower. We envisage that these could be due to the fact that Malawi did not implement a full lockdown.

In our study we found that poverty and inequality levels are higher when distributional measures are calculated using post-fiscal income compared to disposable income. Reduction in the VAT rate could therefore cushion households against the adverse socioeconomic effects of

the pandemic. Since VAT is major source of revenue of the government this policy change can therefore be implemented cautiously and be reviewed as the economic activities improve.

Finally, our study only looks at the change in the welfare of people on account of employment losses and do not consider that some people have experienced a drop in earnings. We expect that including those who remained employed but experienced a reduction in earnings could result in a larger effect of the pandemic on the household incomes. Thus, future work should focus on analysing the impact of the pandemic at both the 'extensive' and 'intensive' margins. Future studies should also look at the effects on specific groups who are more vulnerable to labour market shocks.

References

African Union. 2020. Impact of the Coronavirus Covid-19 on the African Economy.

AFDB 2021. African Economic Outlook- From Debt Resolution to Growth: The Road Ahead for Africa. *In:* BANK, A. D. (ed.). African Development Bank.

BARGAIN, O. & CALLAN, T. 2010. Analysing the effects of tax-benefit reforms on income distribution: a decomposition approach. *The Journal of Economic Inequality,* 8**,** 1-21.

BAULCH, B., BOTHA, R. & PAUW, K. 2020. *The short-term impacts of COVID-19 on the Malawian economy, 2020–2021: A SAM multiplier modeling analysis*, Intl Food Policy Res Inst.

BEIRNE, K., DOORLEY, K., REGAN, M., ROANTREE, B. & TUDA, D. 2020. The potential costs and distributional effect of Covid-19 related unemployment in Ireland. *Budget Perspectives,* 2021.

BREWER, M. & TASSEVA, I. 2020. Did the UK policy response to Covid-19 protect household incomes? *Available at SSRN 3628464*.

BRONKA, P., COLLADO, D. & RICHIARDI, M. 2020. The Covid-19 Crisis Response Helps the Poor: the Distributional and Budgetary Consequences of the UK lock-down. EUROMOD at the Institute for Social and Economic Research.

CHAFUWA, C., KENANI, J. & KAUNDA, S. 2017. Tax Policy and Administration Evolution and Revenue Performance in Malawi.

CHIRWA, E. W. 2010. Exploring the Scope of Social Protection as an Instrument for Achieving the MDGs in Malawi. *In:* AFRICA, U. N. E. C. F. (ed.).

CHITIGA-MABUGU, M., HENSELER, M., MABUGU, R. & MAISONNAVE, H. 2020. Economic and Distributional Impact of COVID-19: Evidence from Macro-Micro Modelling of the South African Economy. *South African Journal of Economics*.

ECA 2020. COVID-19 in Africa: Protecting Lives and Economies. *In:* UNITED NATIONS, E. C. F. A. (ed.).

FERREIRA, F. H., STERCK, O., MAHLER, D. & DECERF, B. 2021. Death and Destitution: The global distribution of welfare losses from the COVID-19 pandemic.

FIGARI, F. & FIORIO, C. V. 2020. Welfare resilience in the immediate aftermath of the covid-19 outbreak in italy. EUROMOD at the Institute for Social and Economic Research.

GOM 2020a. 2020-2021 Budet Statement.

GOM 2020b. Assessment of Impact of COVID-19 on the Economy. *In:* DEVELOPMENT, D. O. E. P. A. (ed.).

GOM & WORD BANK 2021. Malawi COVID-19 Impact Monitoring Report High Frequency Phone Survey For Period May to September 2020. *In:* NSO (ed.).

HIGGINS, S. & LUSTIG, N. 2016. Can a poverty-reducing and progressive tax and transfer system hurt the poor? *Journal of Development Economics,* 122**,** 63-75.

IMF 2020a. Malawi, IMF Country Report No. 20/288. *In:* DEPARTMENT, A. (ed.). Washington D.C.: International Monetary Fund.

IMF 2020b. REGIONAL ECONOMIC OUTLOOK: SUB-SAHARA AFRICA. *In:* FUND, I. M. (ed.).

ISSAHAKU, H. & ABU, B. M. 2020. COVID-19 in Ghana: Consequences for Poverty, and Fiscal Implications.

JARA, H. X., MONTESDEOCA, L. & TASSEVA, I. 2021. The role of automatic stabilizers and emergency tax-benefit policies during the COVID-19 pandemic in Ecuador. World Institute for Development Economic Research (UNU-WIDER).

LASTUNEN, J., RATTENHUBER, P., ADU-ABABIO, K., GASIOR, K., JARA, H. X., JOUSTE, M., MCLENNAN, D., NICHELATTI, E., OLIVEIRA, R. C. & PIRTTILÄ, J. 2021. The mitigating role of tax and benefit rescue packages for poverty and inequality in Africa amid the COVID-19 pandemic. World Institute for Development Economic Research (UNU-WIDER).

LI, J. & O'DONOGHUE, C. 2014. Evaluating binary alignment methods in microsimulation models. *Journal of Artificial Societies and Social Simulation,* 17**,** 15.

LUSTIG, N. 2018. *Commitment to equity handbook: Estimating the impact of fiscal policy on inequality and poverty,* Washington, DC, Brookings Institution Press and CEQ Institute.

LUSTIG, N., PABON, V. M., SANZ, F. & YOUNGER, S. D. 2020. The impact of COVID-19 lockdowns and expanded social assistance on inequality, poverty and mobility in Argentina, Brazil, Colombia and Mexico. Tulane University, Department of Economics.

NAFULA, N., KYALO, D., MUNGA, B. & NGUGI, R. 2020. Poverty and Distributional Effects of COVID-19 on Households in Kenya.

NSO & WORLD BANK 2020. Malawi High-Frequency Phone Survey on COVID-19 (HFPS COVID-19) Baseline.

O'DONOGHUE, C., SOLOGNON, D. M., KYZYMA, I. & MCHALE, J. 2020. Modelling the Distributional Impact of the COVID-19 Crisis.

PAULUS, A. & TASSEVA, I. V. 2020. Europe Through the Crisis: Discretionary Policy Changes and Automatic Stabilizers. *Oxford Bulletin of Economics and Statistics,* 82**,** 864-888.

RBM 2020. Statement of the Monetary Policy Committee. *In:* MALAWI, R. B. O. (ed.). Lilongwe.

RICHIARDI, M., BRONKA, P. & COLLADO, D. 2020. The Economic Consequences of COVID-19 lock-down in the UK. An Input-Output Analysis Using Consensus Scenarios.

SECK, A. 2020. Poverty Consequences of COVID-19 Epidemic-Induced Lockdowns in Senegal: Extent and Implications from a Household Survey.

SUMNER, A., HOY, C. & ORTIZ-JUAREZ, E. 2020. *Estimates of the Impact of COVID-19 on Global Poverty*, United Nations University World Institute for Development Economics Research.

SUTHERLAND, H. & FIGARI, F. 2013. EUROMOD: the European Union tax-benefit microsimulation model. *International Journal of Microsimulation,* 6**,** 4-26.

WORLD BANK 2020. Poverty and distributional impacts of COVID-19: Potential channels of impact and mitigating policies. *In:* BANK, W. (ed.).

WRIGHT, G., NOBLE, M., BARNES, H., MOECHTAR, A., MCLENNAN, D., YUSSUF, A. A., GASIOR, K. & MUYANTO, R. 2021. Estimating the Distributional Impacts of the COVID-19 Pandemic and the Remedial Tax and Benefit Policies on Poverty in Indonesial. *CeMPA Working Paper Series 02/21*.

YIMER, F., ALEMAYEHU, M. & TAFFESSE, S. 2020. The Short-run Impact of the COVID-19 Crisis on Poverty in Ethiopia.

Appendix

Table A1: Probit estimation of the probability of becoming unemployed in 2020

VARIABLES	Coefficient	Std. error
Female	0.379***	(0.0787)
Age	-0.0688***	(0.0141)
Age sq.	0.000705***	(0.000155)
Primary Education	-0.0849	(0.115)
Secondary Education	-0.159*	(0.0892)
Diploma/Tertiary/University	-0.0134	(0.136)
Married	0.165*	(0.0845)
Self-employment	-0.0742	(0.101)
Informal	0.207	(0.424)
Rural	-0.107	(0.0842)
Mining, Manufacturing and Utilities	-0.281*	(0.154)
Construction	0.0739	(0.266)
Transportation	-0.162	(0.188)
Wholesale and Retail trade	-0.167	(0.130)
Financial/Insurance/Real Est,	0.194	(0.385)
Personal Service	-0.132	(0.135)
Education	0.286*	(0.172)
Health	-0.148	(0.273)
Public Admin. And Defence	0.118	(0.501)
Hotel and Restaurants	-0.0989	(0.245)
Other	0.265	(0.173)
Constant	0.803	(0.530)
Observations	1,406	

Notes: The dependent variable is 1 if the individual is employed in 2019 and 0 if the individual is not employed in 2020. The model is estimated on the sample of all those employed in 2020. The standard errors are shown in parenthesis. Significance level indicated as * $p < 0.1$, ** $p < 0.05$, *** $p < 0.001$

Source: Own calculation with High Frequency Phone Survey on COVID-19 and Integrated Household Panel Survey 2019/2020 data.

Table A2: Decrease in Earnings per Sector in 2020

	Reduction in Wages
Agriculture	80.0
Mining, Manufacturing and Utilities	77.3
Construction	67.2
Transportation and Communication	76.5
Wholesale and Retail Trade	83.0
Financial/Insurance/Real Estate	81.8
Personal Services	75.6
Education	52.4
Health	41.2
Public Administration and Defence	36.4
Hotel and Restaurant	50.0
Other	72.3

Note: Percent of that experienced a decrease in earnings in each industry, i.e., 80 % of those employed in agriculture sector reported to have experienced a reduction in wages in June 2020.
Source: Own Calculations based on IHPS and HFPS COVID-19

Table A3: Change in GDP Growth per Industry for 2020

	Change in GDP
Agriculture	-4.0
Mining, Manufacturing and Utilities	-2.7
Construction	-1.9
Transportation and Communication	-2.6
Wholesale and Retail Trade	-4.2
Financial/Insurance/Real Estate	-2.8
Personal Services	-1.7
Education	-2.8
Health	-3.4
Public Administration and Defence	0.0
Hotel and Restaurant	-14.0
Other	-1.8

Source: Reserve Bank of Malawi

Table A4: Work Stoppage by Industry

	Percentage of respondents that stopped working	Related to coronavirus & counter measures	
		Potentially related	Potentially unrelated
Agriculture	45.6	13.7	18.5
Mining	0.4	88.2	11.8
Manufacturing	3.0	93.4	6.6
Professional/Scientific/Technical Activities	2.9	46.0	18.3
Utilities			
Construction	5.5	6.3	63.7
Transportation	1.5	28.5	0.0
Buying and selling	11.7	32.1	19.2
Financial/Insurance/Real Estate Services	0.3	0.0	0.0
Personal Services	6.8	0.0	21.9
Education	2.1	79.0	21.0
Health	4.0	38.8	0.0
Public Administration	1.0	0.0	0.0
Tourism			
Food Processing	11.4	98.1	0.0
Other	3.8	31.2	0.0

Potentially related – Business / office closed due to coronavirus legal restrictions; Ill / quarantined; Need to care for ill relative; Not able to go to farm due to movement restrictions; laid off while business continues; Furlough; Not able to farm due to lack of inputs;

Potentially unrelated – Business / office closed for another reason; Vacation; Seasonal worker; Retired; Not farming season; Other

Source: National Statistics office of Malawi. This data is provided as additional documentation for the HFPS on COVID-19 and its available at: https://microdata.worldbank.org/index.php/catalog/3766/related-materials

Table A5: Total Change in Poverty and Inequality Based of Post-Fiscal Income

	Pre-Crisis	Total Change		
		Scenario1	Senario2	Scenario3
Poverty				
National Poverty Line				
Headcount (%)	82.1	0.47***	0.18	-0.43***
		(0.0014)	(0.0012)	(0.0008)
Poverty gap (%)	55.7	2.0|***	1.53***	0.07
		(0.0014)	(0.0012)	(0.0007)
Extreme Poverty Line				
Headcount (%)	68.7	0.07	1.13***	-0.03
		(0.0023)	(0.0016)	(0.0009)
Poverty gap (%)	42.6	-0.60***	2.13***	0.3***
		(0.0017)	(0.0014)	(0.0008)
Inequality				
Gini Coefficient (%)	69.3	0.77***	0.60***	-0.04
		(0.0008)	(0.0008)	(0.0006)
Theil Index	7.2	0.1**	-0.05	-0.29***
		(0.0409)	(0.0394)	(0.0604)

Notes: The 2019 national poverty lines of US$19 per month for poverty and US$11 per month for extreme poverty are used in the calculations. Significance levels indicated as * p < 0:1, ** p < 0:05, *** p < 0:01 and Standard errors at a confidence level of 95% are shown in parenthesis.

Source: Own calculations using MAMOD.

Table A6: Decomposing Change in Poverty and Inequality Based on Post-Fiscal Income

	Scenario 1			Scenario2			Scenario 3		
	Total Change	**Policy Effects**	**Other Effects**	**Total Change**	**Policy Effects**	**Other Effects**	**Total Change**	**Policy Effects**	**Other Effects**
Poverty									
National Poverty Line									
Headcount (%)	0.47***	-0.59***	1.1***	0.18	-0.61***	0.79***	-0.43***	-0.62***	0.2***
	(0.0014)	(0.0006)	(0.0012)	(0.0012)	(0.0006)	(0.0011)	(0.0008)	(0.0006)	(0.0020)
Poverty gap (%)	2.0***	-0.33***	2.34***	1.53***	-0.35***	1.88***	0.07	-0.35***	0.41***
	(0.0014)	(0.0003)	(0.0013)	(0.0012)	(0.0035)	(0.0012)	(0.0007)	(0.0003)	(0.0006)
Extreme Poverty Line									
Headcount (%)	0.07	-2.06***	2.14***	1.13***	-0.43***	1.55***	0.03	-0.42***	0.4***
	(0.0023)	(0.0016)	(0.0017)	(0.0016)	(0.0005)	(0.0015)	(0.0009)	(0.0005)	(0.0040)
Poverty gap (%)	-0.6***	-3.43****	2.83***	2.13***	-0.23***	2.36***	0.3***	-0.22***	0.52***
	(0.0017)	(0.0008)	(0.0016)	(0.0014)	(0.0003)	(0.0014)	(0.0008)	(0.0003)	(0.0007)
Inequality									
Gini Coefficient (%)	0.77***	-0.17***	0.94***	0.6***	-0.19***	0.79***	0.04	-0.18***	0.14***
	(0.0080)	(0.0005)	0.0008	(0.0008)	(0.0005)	(0.0060)	(0.0006)	(0.0005)	(0.0003)
Theil Index	0.1**	-0.38***	0.48***	-0.05	-0.38***	0.33***	0.29***	-0.36***	0.08***
	(0.0409)	(0.0765)	(0.0814)	(0.0394)	(0.0762)	(0.0683)	(0.0604)	(0.0733)	(0.0226)

Notes: Significance levels indicated as * p < 0:1, ** p < 0:05, *** p < 0:01 and Standard errors at a confidence level of 95% are shown in parenthesis.

Source: Own calculations using MAMOD.