Three Essays on the Impact of Public Policy on Inequality and Poverty in Malawi

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by

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Declarations

No part of this thesis has been submitted for another degree.

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All the works in this thesis are mine.

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Summary

Since independence, governments in most developing countries have implemented various public policies aimed at reducing poverty and inequality. Yet, despite the public policy interventions poverty remains widespread and pervasive and inequality has widened. In this thesis, microsimulation techniques are employed to examine public policies and the extent to which they have failed to achieve the objective of reducing poverty and inequality in Malawi.

This thesis contains three interlinked studies covering different topics on the impact of public policy on inequality and poverty in Malawi. Chapter 1 assesses the effect of potential reforms to social assistance aimed at reducing poverty. The results show that the current tax-benefit system decreases income inequality but increases poverty because of income tax and the limited role of social benefits. We find that the current budget allocated to social benefits does not allow for reducing poverty significantly even under a different targeting approach. We further find that reducing extreme poverty by half would represent a large increase in social spending and a significant increase in taxes.

Chapter 2 investigates the effects of informality and unemployment changes on the income distribution in Malawi between 2004 and 2016. Increases in informal jobs and unemployment levels have the effect of increasing inequality. Changes in informal jobs explained the reduction in poverty levels while the rise in unemployment had the effect of increasing poverty. Our results suggest that transitioning from informal to formal employment and job creation policies should be a main objective of policymakers.

Chapter 3 investigates the impact of changes in employment due to the COVID-19 crisis on inequality and poverty. We find that poverty and inequality increased because of the COVID-19 outbreak. 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.

Contents

List of Figures

List of Table

"*As a country we have waged war against different diseases and we have won in some cases,……But we have miserably failed to fight poverty."*

- Patricia Kaliati

- Minister of Gender, Community Development and Social welfare, Malawi

- October 2021

"Can we say in a simple and direct way how the government operations bite?"

- Peter J. Lambert

Introduction

Despite the commitment by governments, through the Millennium development Goals, to reduce extreme poverty by half, and despite decades of research by academics, poverty remains widespread and pervasive in developing countries, especially in Sub-Saharan Africa (SSA). Yet, one of the main responsibilities of governments is to protect households from poverty. Similarly, the IMF (2014) posits that fiscal policy is a primary tool for governments to affect the income redistribution. The ability for a country to redistribute income depends on the size and composition of its budget and how it finances government spending (Lustig, 2016). Yet, inequality has been on the rise in both developed and developing countries. According to the recent World Bank figures, Sub-Saharan Africa is the second most unequal region in the world (Chancel et al., 2021). This outturn is however mixed within regions, while some countries have managed to reduce the indigence levels others have not. The divergent outturn has been attributed to public policy implemented in different countries (IMF, 2014).

Indeed, public policy is widely recognised as the main instrument for enhancing growth, redistributing income and reducing poverty. It is a mechanism available to governments through which revenues collected in the form of taxes are manipulated through government spending to achieve these goals. The appropriate mix of instruments depends on administrative capacity as well as political consideration (IMF, 2014). Analysing the impact of public policy on inequality and poverty at the country level can therefore provide evidence into why some counties have failed to address these major problems affecting the developing world.[1]

[1] Public policy can impact many things, however, in our analysis we have just focused on inequality and poverty.

At the global level, Sub-Saharan African (SSA) countries have lagged those from other regions in terms of poverty and inequality reduction. According to the World Bank, global poverty has been declining since 1990, while developments in inequality are worrisome except for Europe (World Bank, 2017, World Bank, 2018, Chancel et al., 2021). This partly indicates that policies implemented have managed to achieve their intended purposes. However, while most regions in the world have managed to register significant declines in poverty rates, SSA has been lagging. In 1990, 34% of the world population lived in extreme poverty, and the extreme poverty rate declined to 10% in 2013, whereas in SSA 54% of the people lived in extreme poverty in 1990 compared 41% in 2013 (World Bank, 2017). According to the World Bank, at the global level, Goal 1 of the Millennium Development Goals was achieved five years ahead of time.[2] However, the poverty milestone was not achieved in most of African and South Asian countries. In terms of inequality, the recent World Bank figures shows that the regions where the bottom 50% of the population shares of national income is the smallest are Sub-Saharan Africa, Latin America, Middle East and North Africa (MENA), and South and Southeast Asia, where the bottom 50% captures between 9-12% of national income (Chancel et al., 2021). Sub-Saharan Africa is the second world's most unequal region where the bottom 50% earn 31% less than the top 10% compared to Europe the most equal region with the bottom 50% earning 9% less than the top 10% (Chancel et al., 2021).

Despite this overwhelming evidence of widespread poverty and high levels of inequality, not many studies have been done to understand the impact of public policy on poverty and inequality in Sub-Saharan Africa. This gap in literature has been partly addressed by recent initiatives and studies by the SOUTHMOD project and Commitment to Equity

[2] Goal 1 of the Millennium Development Goals was: Eradicating of extreme poverty by half by 2015. Thus, most of the world achieved the goal in 2010.

(CEQ) who have examined the impact of tax and benefit systems on poverty and inequality in SSA (Decoster et al., 2019, Lustig, 2018).[3] These studies have provided some insights into why public policy in some countries have failed to tackle poverty and inequality. The results have been mixed, while most findings show that tax-benefit systems have been able to reduce inequality, the case has not been the same in terms of poverty, some tax-benefit systems have been able to reduce poverty while other countries' tax-benefit systems have failed to reduce poverty (Lustig, 2017, Gasior et al., 2021). The differences in outturns points to the fact that while developing countries are seen as homogeneous entity there is some variation in the implementation of public policy that needs to be explored.

Moreover, while the study of the impact of public policy in SSA has attracted some attention, no such studies have been undertaken so far for Malawi either by CEQ or under the SOUTHMOD project. The country is amongst the poorest in the world with a per capita GDP of US$440 and it was ranked 170 out of 188 countries on the 2016 UNDP Human Development Index (UNDP, 2016, RBM, 2020). Since independence in 1964, the government has implemented several tax measures and social programmes aimed at reducing poverty and narrowing inequality. These strategies include: the Poverty Alleviation Program (1994); the Malawi Poverty Reduction Strategy (2002-2005); the Malawi Growth and Development Strategy I (MGDSI) (2006-2011) and the Malawi Growth and Development Strategy II (2011-2016). Yet, poverty and inequality are widespread hence our motivation to explore why these fiscal objectives have not been achieved. Our aim is to interrogate the tax-benefit policies and

[3] Under the SOUTHMOD project studies have been done on the following Sub-Saharan African countries: Ethiopia, Ghana, Mozambique, Tanzania, Uganda, Zambia South Africa and Namibia (see https://www.wider.unu.edu/project/southmod-%E2%80%93-simulating-tax-and-benefit-policies-development, accessed on 30 March 2022).

CEQ Studies on Sub-Saharan Africa: South Africa, Lesotho, Botswana, Namibia, Zambia, Tanzania, Uganda, Kenya Ethiopia, Niger Ghana, Cote d' Ivoire, Burkina Faso, Mali, Guinea, Cameroon, Nigeria, Benin, Togo (see https://commitmentoequity.org/, accessed on 30 March 2022).

their impact on poverty and inequality using new data and applying the best practice techniques. To analyse the consequences of fiscal policies we have developed a tax-benefit microsimulation model for Malawi (MAMOD) following the SOUTHMOD methodology in the EUROMOD software (Decoster et al. ,2019, Sutherland and Figari, 2013). While tax-benefit microsimulation models have been widely used in developed countries, this is still not the case for many SSA countries. O'Donoghue (2014) maintains that research in this area has mainly been undertaken on developed countries thus advancements should focus on new countries which will allow for more cross-country comparative research. This view is also supported by the IMF who posits that much less evidence exists on the overall distributional incidence of fiscal policy in developing economies except for Latin countries (IMF, 2014). Furthermore, policies in developing countries are different to policies in developed countries, i.e., developing countries rely on proxy means-testing for targeting beneficiary while most developed countries use means-testing; developing countries rely on consumption-based taxes developed countries rely on income-based taxes. This thesis therefore contributes to the literature by providing an empirical assessment of the impact of public policy implementation and why it has failed to address the challenges of widespread poverty and widening income inequality in developing countries.

This thesis consists of three interlinked essays focussing on various topics associated to taxation and social benefit system and their impact on inequality and poverty. All three chapters use household data for Malawi which is publicly available online. As mentioned above, in order to undertake our analysis in all three chapters we developed a tax-benefit microsimulation model for Malawi (MAMOD). MAMOD is a static model, in a sense that tax-benefit simulations abstract from behavioural reactions of individuals. Unlike most studies for Sub Saharan African (SSA) which have mostly used consumption as welfare

indicator, we aim to derive poverty and inequality measures using, in addition to consumption, income from household survey.

The use of income data in developing countries continues to be a contentious issue. The argument in favour of using consumption in developing countries, especially for Sub-Saharan African Countries, is premised mainly on the reliability of the data in the household data. Consumption is said to be more reliable than income due to underreporting in the income data. However, consumption data is also prone to measurement error just like income data (Deaton, 2019). Our choice if using income data stems from the fact the use of income data allows for accurate simulation of tax policies and their impact on living standards of individuals leading to the understanding of the impact of public policy on poverty and inequality (Bargain et al 2021). In terms of measurement error, De Magalhães and Santaeulàlia-Llopis (2018), in their analysis of consumption, income and wealth behaviour in Malawi, Uganda and Tanzania, found that underreporting of income did not appear to be a major issue. They also found that Malawi has the largest and arguably the highest quality data. They indicated that the Integrated Household Survey for Malawi has been improved with the incorporation of comprehensive agriculture questionnaire, which is the main sector in Malawi, to reduce underreporting. Hence the use of income data in our study, nevertheless, researchers need to be aware that both consumption and income have strengths and weakness.

The development of the MAMOD, the tax-benefit model for Malawi, and its use for public policy analysis in a Sub-Saharan African country is one of the main contributions of this thesis. Our aim is to highlight the advantages of tax-benefit microsimulation models for policy evaluation in SSA while adding to the literature on taxation and social benefits using income in developing countries. Analysis of fiscal policy has always lagged its sister, monetary policy, in most of African countries. This is partly due to availability of data, lack of tools and political will. However, anecdotal evidence points to the conclusion that the

problems in SAA are due to public policy administration. Yet, limited research has been done to provide evidence and quantify that indeed it is mostly due to fiscal policy. Thus, we want to illustrate and contribute to the methodology available for evaluating and improving policy in developing countries, with the overall objective of providing insights on how to improve the welfare of households.

The first chapter studies potential reforms aimed at reducing extreme poverty by half. We start by analysing the current tax-benefit system and examine its impact on poverty and inequality. Data from the 2016/2017 Malawi Integrated Household Survey (IHS4) and the recently developed tax-benefit microsimulation model for Malawi are used to elucidate fiscal incidence. The obtained results indicate that the current tax-benefit system in Malawi decreases income inequality by 4.3 percentage points but increases poverty because of income tax and the limited role of social benefits. We then explore various counterfactual reforms targeted at reducing extreme poverty. First, we relocate the budget of all benefits in Malawi to increase coverage and benefit amounts of the social cash transfer, which targets households in vulnerable conditions. We find that even under income means-tested targeting (instead of proxy means-testing), social benefits in Malawi would reduce extreme poverty only marginally due to the limited budget allocated to social spending. Second, we looked at the cost of reducing extreme poverty by half. We show that reducing extreme poverty by half would represent an increase in social spending from the current 0.3% of gross domestic product (GDP) to 18.6% of GDP. We show that financing the increase in social spending under a budget neutral setting will require a significant increase in taxes. These findings add to literature on how tax-benefit policy can help reduce or stabilise poverty and inequality which is less abundant for countries with a sizable informal sector. In addition, they illustrate anti-poverty strategies for Malawi and provide a better understanding on why poverty and

inequality has not responded to some policy interventions in developing countries. Our study further confirms the limitedness of social protections spending in developing countries.

The objective of the second chapter is to look at changes in the demographic composition of the country as one way to understand changes in inequality and poverty. Malawi is an interesting case study because the share of informal jobs rose by 12.6 percentage points while the unemployment rate rose by 11.5 percentages points between 2004 and 2016. During the two periods, the percentage of the working age population has increased by 20.4 percentage points, while the increase in the population of the children was 10.1 percentage points and that of the elderly (above 64) rose by 34.5 percentage points. Pressure on productive population in Malawi is very high as we find a dependency ratio at 103.1 in 2011 and 96.6 in 2016. Given the observed changes, we used decomposition techniques to assess the effect of informality changes, unemployment changes, as well as policy changes on inequality and poverty between 2004 and 2016. The method involves performing counter-factual simulations to assess what inequality would be in 2016 in the absence of these changes. We followed the decomposition methods proposed by Bargain and Callan (2010) and Bourguignon et al. (2008) to isolate the contribution of informality and unemployment on inequality and poverty developments. The obtained results indicate that the increases in informality and unemployment contributed to the increase in inequality, while policies implemented had the effect of decreasing inequality. The increase in the number of informal jobs however, had the effect of reducing poverty. In contrast, the rise in unemployed persons resulted in more people falling below the poverty line. These findings suggest that informal employment is an option individuals take to escape poverty. However, informal employment does not decrease inequality because informal jobs are low paid jobs. Therefore, job creation and in particular the creation of formal jobs should be considered as an important government goal.

The last chapter investigates the short-run distributional effects of the COVID-19 pandemic in Malawi. What started as a sanitary crisis is expected to have devastating socioeconomic effects. Due to the pandemic and subsequent lockdowns economic growth has slowed down pushing people into extreme poverty. The response to the crisis has varied across countries, while some have implemented full lockdowns, others implemented partial lockdown, and others did not implement any lockdowns at all. The response from governments in terms of taxation and social benefit measures to mitigate the impact of the pandemic have also been different. Based on this, we investigate the impact of the pandemic on employment and the effect of government responses on households' welfare using MAMOD. Our study uses household data which was collected during the crisis and household data which was collected just before the crisis to study changes in household income. This is one of the few studies on Africa which has used disposable income as the main welfare variable in the analysis and has looked at the role of the tax-benefit system. Due to the difficulty in identifying employment losses due only to COVID-19, we considered three scenarios of employment losses. The three scenarios are based on information from the survey collected during the pandemic: (i) all employment losses are attributed to COVID-19; (ii) employment losses potentially unrelated to COVID-19 are not considered; and (iii) only employment losses reported as COVID-19 related are considered. Our results show that in the first scenario disposable income decreased by 3.0% due to the COVID-19 crisis. In our second and third scenarios, disposable income decreased by 1.9% and increased by 0.5%, respectively. The increase in the last scenario was due to the mitigating measures implemented by the government which were able to offset the decrease in earnings. The headcount poverty rate (83.6% before the pandemic) increased by 0.45 percentage points in the first scenario and 0.13 percentage points in the second scenario and decreased by 0.35 percentage points in our last scenario. We also find that the pandemic has worsened inequality

as the Gini Coefficient rose by 0.85 percentage points, 0.75 percentage points and 0.05 percentage points, in the first, second and third scenarios, respectively. We further find that the Emergency Cash Transfer implemented by the government was able to subdue the impact of the crisis. In terms of the impact of the automatic stabilisers, we found that income tax had the most impact in compensating for the drop in disposable income. The impact was, however, small due to high informal employment in the country. Benefits were not found to act as automatic stabilisers partly because benefits in Malawi are proxy means-tested.

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Chapter 1

Assessing Potential Reforms to Social Assistance to Reduce Poverty in Malawi

1.1 Introduction

"More than 50% of the population live below the World Bank International Poverty Line of $1.90 a day" is statement which has now become associated with most of the countries in Sub-Saharan Africa (SSA). A question is usually asked: Why is Africa poor? According to theory, poverty can be a reflection of market failure which requires government intervention through redistributive taxation in cash and in kind (Sanchez-Martinez and Davis, 2014). An analysis of tax and spending decisions of government can therefore provide some evidence on why poverty and inequality are pervasive in Africa. While there is a vast literature on fiscal incidence for most of the developed countries, the case is not the same for SSA countries.

According to the World Bank, global poverty has been declining since 1990, while inequality has increased in developed countries and remained stable in developing countries (World Bank, 2017, World Bank, 2018). However, while most of the regions in the world have managed to register significant declines in poverty rates, SSA has been lagging. In 1990, 34% of the world population lived in extreme poverty, and the extreme poverty rate declined to 10% in 2013, whereas in SSA 54% of the people lived in extreme poverty in 1990 compared 41% in 2013 (World Bank, 2017). Why has the decline in the poverty rate been slower in SSA compared to the rest of the world?

The evolution of poverty within SSA is also divergent, while some countries such as Uganda, and Rwanda have managed to significantly reduce poverty rates others such as Malawi and Madagascar have recorded marginal decreases in poverty rates and inequality has widened (World Bank 2017). The divergent outturn on poverty and inequality within SSA could be as a result of domestic policies and institutions (IMF, 2014). Examining tax-benefit systems can therefore provide insights as to why some fiscal policies are more redistributive than others. As highlighted by Duclos and Tabi (1996), taxes could be progressive but have no impact on narrowing inequality. Similarly, taxes can be regressive but still be equalising

if transfers are sufficient to offset the taxes (Lustig, 2018). A tax system can be progressive and equalising but again increase poverty if taxes paid by the poor are higher than the transfers they receive (Jellema et al., 2016). Therefore, to understand the divergent outcomes in SSA it is imperative that the impact of individual fiscal policies and programmes is well understood, and this has not been the case for many African countries.

The present study aims to add to this literature by examining the distributional impact of taxes and social spending on households in Malawi. Malawi is an interesting case study because it stands out in its immediate region as lagging in terms of reducing poverty. The country is amongst the poorest in the world, and it is ranked 170 out of 188 countries on the 2016 UNDP Human Development Index (UNDP, 2016). These developments have occurred despite poverty eradication being the main objective of fiscal policy in Malawi since independence in 1964 (Mussa, 2017).

Our objective is therefore to assess reforms aimed at reducing poverty and their underlying cost and financing with a view of providing insights into why the government has failed to fight poverty and help policymakers during planning stages. The study will make use of the newly developed tax-benefit microsimulation model for Malawi (MAMOD), developed in the EUROMOD platform (Sutherland and Figari, 2013). MAMOD is a static microsimulation model, entailing that household behavioural responses are not accounted for in the measures of tax-benefit impact on poverty and inequality. The use of the microsimulation model allows the aggregate and distribution effect of government policies to be studied. A key factor in distributional analysis is the choice of income equivalisation used. Equivalence scales are used to account for the fact that household needs depend on household size and demographic composition (Aaberge and Melby, 1998). Income is also adjusted in order to make welfare comparison between individuals and not between necessary households. Some studies use a per capita definition, whereas the other studies use more

complicated adult equivalence scale where economies of scale and adult equivalent adjustments are made (Buhmann et al., 1988). In this study, just like the official Malawi statistics, we use household per capita income, thus we do not adjust for economies of scale or adult equivalent within the household. Thus, for each income concept we divide the total income of the household by the number of the members of the household.

Our results show the current tax-benefit system in Malawi reduces income inequality by 4.3 percentage points. With regards to poverty, we find that the current taxes and benefits do not reduce poverty. They marginally increase poverty by 1.1 percentage points. Similarly, social safety nets do not play a significant role in the incomes of households. Our results are consistent with studies from other African countries (Jellema et al., 2016, Lustig, 2017, Bargain et al., 2021, Gasior et al., 2021). We further look at counterfactual scenarios aimed at reducing poverty based on reforms to Malawi's social cash transfer programme. We reallocate the budget for other benefits to the social cash transfers which targets the vulnerable. We find that increasing benefit amount and increasing coverage does not reduce extreme poverty. Subsequently we quantified the loss in extreme poverty reduction due to targeting mechanism (proxy means-testing vs income means-testing) and find that the loss was negligible. As the abovementioned reforms do not yield any positive results, we subsequently look at how costly it would be to reduce extreme poverty by half and find that it would be extremely costly to reduce poverty. Revenues would have to increase by 134.9% under proxy means-testing approach and by 121.8% when income means-testing methodology is used in order to cover the cost of expanding benefit coverage and reduce extreme poverty by half.

The study contributes to the literature on household inequality and poverty measures based on both consumption and income by simulating alternative policy reforms targeting reducing extreme poverty, which is not abundant for developing countries, especially African

countries. The findings add to the discourse on the anti-poverty strategies for Malawi and provide a better understanding of why poverty and inequality have not responded to some policy interventions in developing countries. The use of tax-benefit microsimulation based on a common methodology enables us to compare our results with other countries in the region.

The structure of the paper is as follows: Section 1.2 discusses the theoretical as well as empirical published literature. Section 1.3 lays out the tax-benefit microsimulation model. In Section 1.4, we present and discuss the results, while Section 1.5 summarises the study and provides recommendations for future work.

1.2 Literature review

Most studies on Malawi have used consumption expenditure to measure household welfare, i.e., Mukherjee and Benson (2003), Mussa (2011, 2013, 2014 and 2017) and Pauw et al. (2016). Measuring income in Malawi like in most developing countries in Sub-Sahara Africa (SSA) is considered problematic. This is due to the fact the informal sector is large, and the economies are mostly agriculturally based, hence households do not have regular incomes. Households in SSAs do not keep accounts of their revenues and expenditures making assessing income difficult at any point in time. There is also a high chance that individuals might intentionally under-report earnings from informal activities (Beegle, 2004). Due to the essential measurement issues, income is usually deemed not to be a suitable standard to assess poverty in these countries. Instead, household welfare assessment has been based on total household consumption and expenditure (GOM and World Bank, 2007)

Using consumption, Mukherjee and Benson (2003), exploiting the 1997/98 Integrated Household Survey (IHS), investigated determinants of poverty in Malawi and found that higher levels of education for women and relocation of labour away from agriculture into

services and trade were effective in reducing poverty. Mussa (2013) analysed the 2004/05 IHS and found that the poverty headcount gap and severity indices are higher in rural areas than in urban areas. Pauw et al. (2016) instead of relying on the official national poverty line, constructed regional poverty lines to take into account variations in consumption preference. Using this methodology, they found that poverty had declined more than the official estimates were indicating. Specifically, whereas the official poverty estimates based on the 2010/11 IHS suggested that national poverty had decreased by only 1.7 percentage points between 2004/05 and 2010/11, they found that poverty had dropped by 8.4 percentage points during that period. These studies, however, have only focussed on understanding the levels of poverty and inequality disregarding government interventions. No study to our knowledge has looked at the impact of taxes and transfers combined on inequality and poverty in Malawi.

With the availability of data, a few studies have examined government interventions and their impact on inequality and poverty in SSA. The Commitment to Equity Institute (CEQ) initiative is among the first efforts to comprehensively assess the tax/benefit system in developing countries (Lustig, 2017). Using comparative fiscal incidence analysis, they examine the impact of fiscal policy on inequality and poverty in twenty-nine low-and-middle-income countries. They found that for low-income countries in Africa, Ethiopia, Tanzania, Ghana, and Uganda fiscal policy reduced inequality but that was not the case for poverty (Lustig, 2017). Their results showed that the extreme poverty headcount ratio was higher after taxes and transfers than before. This entailed that the poor were net payers into the fiscal system and are impoverished by the fiscal policy. It should however be highlighted that in assessing fiscal incidence in African countries, the CEQ make a strong assumption of using consumption as a proxy of disposable income and then calculate backwards to market income, and forwards to derive final income (Jellema et al., 2016). Our approach however differs from

CEQs as we take market income information directly from the data and simulate the policy instrument to obtain disposable income.

More recently, the effect of tax-benefit policies on income inequality and poverty in developing countries has been studied by means of tax-benefit microsimulation models under the SOUTHMOD project.[4] Gasior et al. (2021) examine the redistributive effect of the tax-benefit system in five African countries using microsimulation. The study by Gasior et al. (2021) is the first to study poverty and inequality measured in terms of both consumption and income for several African countries. They find that the tax-benefit systems of Uganda, South Africa, and Zambia can reduce income inequality while those for Ghana and Mozambique have marginal impact on inequality. In terms of poverty, only the tax-benefit system of South Africa was poverty reducing. Alarmingly, they found that the tax-benefit systems of the remaining four countries in the study had no poverty lowering properties. They concluded that the tax-benefit systems of these countries, except for South Africa, were ineffective because the government interventions only affected a small minority of each country's population (Gasior et al., 2021).

An advantage of tax-benefit microsimulation models built using a common approach is the ease to undertake cross country comparison including assessing the effects of counterfactual scenarios which involve swapping policies between countries. For instance, would implementation of the South African tax-benefit system in the other countries be equalising? Bargain et al. (2021) used newly developed tax-benefit microsimulation models for Ghana, Zambia, Mozambique, Tanzania Ethiopia and South Africa to assess the

4 SOUTHMOD is a major research project in which tax-benefit Microsimulation models for selected developing countries in Africa (Ethiopia, Ghana, Mozambique, Tanzania, Zambia) and elsewhere (Ecuador and Viet Nam) were built in addition to those that already existed for South Africa and Namibia. SOUTHMOD is collaboration between UNU-WIDER, the EUROMOD team at the Institute for Social and Economic Research (ISER) at the University of Essex and the Southern African Social Policy Research Insights (SASPRI).

distributional effects of the tax-benefit systems by applying tax-benefit rules of the most (least) redistributive country to the population of all the other states. They found that under the counterfactual scenarios where the South African tax-benefit system is applied to the other countries, the Gini coefficient would decrease in the range from 3.3 points in Ghana to 19.3 points in Ethiopia. Income poverty would be reduced by 2.2 points in Mozambique and by up to 17.8 points in Tanzania. These effects are due to the relatively more generous social benefits in force in South Africa and in the case of inequality only, due to a small contribution of the South African tax progressivity. Alternative simulations that consist of exporting one of the least redistributive systems (Mozambique) show consistent results: it would increase the Gini and the poverty rate in South Africa by a margin equivalent to the redistributive property of this country pointing to the weakness of Mozambican social benefits compared to those in South Africa.

Our study aims to add to this literature by assessing the impact of government interventions on poverty and inequality on another SSA country. To our knowledge there has not been any study that have evaluated the tax-benefit system of Malawi. Our study further explores the budgetary implications of reducing extreme poverty by half by simulating alternative fiscal reforms.

1.3 Methods and data

1.3.1 Integrated Household Survey

The Integrated Household Survey 2016/17 (IHS4) was the data set selected for use as input data for tax-benefit microsimulations in Malawi. The IHS is one of the primary instruments implemented by the Government of Malawi through the National Statistical Office (NSO) to monitor and evaluate the changing conditions of Malawian households. According to NSO (2017b), the IHS4 is designed to be nationally representative. The IHS4 is the fourth cross-

sectional survey in the IHS series.[5] Among other crucial indicators, the information in the IHS includes detailed information on employment and self-employment income from primary and secondary jobs, agricultural incomes, informal employment (ganyu[6]) income, rental income, investment income, pension income, demographic characteristics, health, education, labour force participation, credit and loan, household enterprises, consumption and asset ownership. The reference period for income from employment (primary, second jobs, ganyu) is the last 12 months. Respondents are asked about the last payment for wages/salary paid for the job in the last 12 months and for what period do each of the salary payment cover (daily, weekly or monthly). Income from self-employment refers to income in the last month of operation in the past 12 months. The reference period for other incomes, such as those from rental, pension and investment is during the last 12 months. In terms of consumption, expenditure is collected/reported in different reference periods (past 7 days, 1 month, 3 months and 12 months).

In the IHS, a household is defined as either a person living alone or a group of people, either related or unrelated, who live together as a single unit in the sense that they have common housekeeping arrangements (that is, share or are supported by a joint budget). A household head is a person who makes economic decisions in the household. The head of the house is person regarded by the household members as the head of the house. The head of the house is usually the main income earner and the main decision maker, however the household are given the discretion to decide as to who is their head (NSO, 2017a).

The IHS4 sampling frame was based on the listing information and cartography from the 2008 Malawi Population and Housing Census (PHC). A stratified two-stage sample design

5 The IHS has been conducted every five years since 1997.

6 Informal off-farm labour.

was used for the IHS4. At the first stage, the primary sampling units (PSUs), which were the census enumeration areas (EAs) defined for the 2008 PHC, were selected. Following the selection of the IHS4 sample EAs, a listing of households was conducted in each sample EA to provide the sampling frame for the second stage selection of households. A random, systematic sampling was used to select 16 primary households and 5 replacement households from the household listing for each sample EA. While the original sample design provided a total household sample size of 12,480 (780 EAs with 16 households sampled per EA), data from 33 interviews that had been conducted was lost through technical difficulties with the data collection platform, representing 0.26% of the sample. This resulted in the final sample of 12,447 households (53,885 individuals) which was able to provide district-level representativeness and a reasonable level of precision for key socioeconomic and agricultural indicators (NSO, 2017b).

1.3.2 MAMOD

Our analysis uses MAMOD, the newly developed tax-benefit microsimulation model for Malawi. MAMOD is a static model, meaning that behavioural response to policy changes are not taken into account. 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 (Decoster et al., 2019). 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.[7] The development of the microsimulation model for Malawi took as reference the case studies of neighbouring countries: Ghana,

7 EUROMOD is an advanced tax benefit microsimulation model for the European Union (Sutherland and Figari, 2013).

Mozambique, Tanzania and Zambia, for which models have already been developed (Adu-Ababio et al., 2017, Castelo et al., 2017, Leyaro et al., 2017, Nakamba-Kabaso et al., 2017). Particular attention was paid to the income data needed for the simulations as this was the first time the income data has been used for fiscal incidence analysis.

We made some adjustments to the original data for the construction of the input data set for MAMOD. 99 individuals classified as domestic workers were dropped from the original sample resulting with 53,786 individuals for our analysis. This is because of the ambiguity of which household they belonged to. No households were dropped, and no adjustment was made to the weights following the dropping of the 99 individuals.

The main clean up in the data was regarding the kinship variable. The first adjustment undertaken was for household heads which were wrongly coded. This affected 40 households in the data. This adjustment also involved changing the mother and father identifiers and partner variables.[8]

Another challenge in adapting Malawi data for EUROMOD was due to the structure of family in Malawi. The primary problem was regarding a polygamous marriage arrangement. EUROMOD is not designed to recognise individuals with multiple partners. This has implications in the application of means-tests in European countries which are based on the income of the individual and their spouse (Wilkinson, 2009). In the data 17 males were found to have more than one partner.

MAMOD aims to simulate the main taxes and benefits components of household disposable income in Malawi. A complete simulation was possible for personal income tax,

8 Thirteen cases where father was wrongly coded were also adjusted. Consequently, we also had to make adjustments to the mother identifier variable. In one case we had to modify the father identifier variable only.

One individual had a wrong gender and one individual had age missing. These were imputed based on information from the relationship with respect to the head of the household.

turnover tax and Value Added Tax (VAT). Employee contributions to the national pension scheme were also possible to simulate. In terms of benefits, the current version only simulated the Social Cash Transfers (Mtukula Pakhomo) from Government and Development Partners. Not all policy instruments from the tax-benefit system in Malawi were simulated because the information was not available such as documented rules regarding targeting and selection of beneficiaries. Instruments which were not simulated were taken directly from the data.[9] Currently work is continuing with the simulation of excise duties. In the following section we provide details of simulated policies.

1.3.2.1 Social Cash Transfers

The social cash transfer (SCT) is a proxy means-tested benefit provided to families who are ultra-poor and labour constrained. Its main objectives are to reduce poverty and hunger, and to increase school enrolment. Ultra-poor are those that: have one meal per day; survive from begging; are undernourished; do not possess valuable assets; and do not receive support from others. For social support programming the government of Malawi uses proxy means-test (PMT) to determine potential eligibility of individuals/households. The PMT uses a set of proxies which explain welfare of household. Each proxy is given a weight. A household score is then calculated to determine its rank, and those that fall below a cut-off point are considered ultra-poor (Kachaka, 2012, Kachaka, 2020) . Labour constrained households are defined by their ratio of members that are 'not fit to work' to those 'fit to work'. 'Unfit' means being outside of economically active ages (below 18 or above 64 years), having a chronic illness or disability or being otherwise unable to work. A household is considered labour constrained if

9 Instruments 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.

it has no members that are 'fit to work' or if the ratio of 'unfit' to 'fit' is bigger than three (Handa et al., 2014).

The benefit amount varies based on household size and the number of school-age children present in the household. In 2016/17 the benefit amounts were Malawian Kwacha (MK) 2,600 ($12.6 PPP), 3,300 ($16.0 PPP), 4,400 ($21.4 PPP) and 5,600 ($27.2 PPP) 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 MK 800 ($3.9 PPP) and secondary school-age child of MK 1,500($7.3 PPP) per month.[10]

The government of Malawi through Ministry of Gender, Disability and Social Welfare reported that social cash transfer programme (SCT)was implemented in 18 out of 28 districts in the country in 2016 due to problems with the Unified Registry. The coverage of all the districts was done in early 2018. For our study we only simulated in the 18 districts where the SCT was implemented.

1.3.2.2 Employee Social Insurance Contribution

All employers in Malawi are required to ensure that all their employees become 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 MK10,000.00 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.

10 The figures in brackets are the equivalent amounts in international dollars using the Purchasing Power Parity (PPP) conversion factor provided by the World Bank.

1.3.2.3 Personal Income Tax

Personal income tax is levied on the earnings of individuals. The arrangement described below also applies for the sole ownership of a business, in which case there is no clear distinction between the company and owner.

In terms of married couples, the taxation act in sections 12 and 73 provides that the husband in his own right is a taxpayer and the wife in her own right is a taxpayer. The tax liability of the husband includes his earned income. The tax liability of the wife comprises her earned income. Earned income for the wife is derived from: (i) a business in which the husband is not the employee or partner; and (ii) any emoluments earned from a job in which the husband is not the employer or partner or a director. The law also allows married couples to choose to file a joint return.[11] In such circumstances tax on the couple's earned incomes is computed as though it was the sole income of the couple.

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 person 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.

The 2016/16 personal income tax has three bands. Table 1.1 below presents the tax schedule.

11 We do not simulate joint taxation in MAMOD.

Table 1.1 Personal Income tax rates

	Annual	Monthly	Rate
First	240,000	20,000	0%
Next	60,000	5,000	15%
Excess over	300,000	25,000	30%

Notes: Annual and monthly incomes are in national currency, the Malawi kwacha (MK).
These figures are for 2016/17 fiscal year.
Source: Ministry of Finance

1.3.2.4 Turnover tax

The turnover tax was introduced in the 2011/12 budget to cater for small taxpayers with a turnover of MWK10 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; and (ii) Incomes of incorporated companies.

1.3.2.5 Value Added Tax (VAT)

This is tax levied on the value of goods sold or services provided. Value added tax is a tax on the amount by which the value of an article has been increased at each stage of its production or distribution or on the service provided. The buyer or provider of a service pays the tax to the seller or service provider and they in turn passes on to the final user. The standard rated goods and services are at taxable at the standard rate of 16.5%. VAT is charged at 0% for zero rated supplies and other goods and services that are exempted.

1.3.3 Validation

A key element of microsimulation modelling is comparing the results from the model to an external source. Table 1.2 below compares the simulation results from the 2016 system in MAMOD with actual results obtained from the Ministry of Finance and Economic Planning (MoF) and Ministry of Gender, Children, Disability and Social Welfare (MoFDSW).

Considering the simulation of taxes, we find that the simulated values of both personal income tax, turnover tax and VAT overestimate tax revenue compared to official statistics. The overestimation of taxes could be related to tax evasion which we do not account for in our model. The mismatch between simulated and official statistics is particularly large for turnover tax because those liable can choose whether to register for the turnover tax or choose to be assessed under the normal income system. In our model we have assumed that only 4% of those liable choose to register the turnover tax. We randomly selected 4% based on Campos et al. (2018) who found that found that only 4% of the informal businesses in Malawi were willing to register for turnover tax with the Malawi Revenue Authority (MRA). It was not possible to obtain any external statistics to enable validation of number of taxpayers. In terms of employee social insurance contribution, we find that MAMOD overestimates the number of beneficiaries. In our model we simulate all individuals affiliated to the social security however not all companies contribute.

Table 1.2: Validation of simulated taxes and benefits

Policy	Number of beneficiaries/ taxpayers			Aggregate expenditure / revenue (in millions)		Tax
	MAMOD	Official	Ratio	MAMOD	Official	Ratio
Employee SICs	571,514	304,256.00	1.88	65,952.0	62,500.0	1.06
Personal Income Tax	1,032,728			466,680.0	263,355.0	1.77
Turnover Tax	1,346			73.9	12.8	5.78
VAT	3,789,411			125,400.0	108,063.0	1.16
Social Cash Transfer	173,879	176,436.00	0.99	12,720.0	12,278.5	1.04

Source: MoF, MoGCDSW and Own calculation based on simulations from MAMOD

For the social cash transfer, we calibrated the number of recipients because of large discrepancies between the official statistics and the simulated figures. The main challenge was that in our simulation we assumed full take-up of the benefit. Similar calibration has

been done for the Mozambican tax benefit microsimulation model (MOZMOD) where the simulation of the Basic Social Support Programme resulted in much larger number of recipients than those in receipt (Gasior et al., 2021). The random selection is done using a special function in the EUROMOD software which enable random take-up adjustment while respecting the eligibility criteria of the benefit.

1.3.4 Inequality and Poverty Measures

We assess the poverty reducing effect of each policy interventions based on the Foster, Greer and Thorbecke (1984) class of poverty measures. The general formula of the Foster, Greer and Thorbecke (FGT) class of indices is

$$FGT_{\alpha} = \frac{1}{N}\sum_{i=1}^{q}\left(\frac{z - y_i}{z}\right)^{\alpha} \quad (1.1)$$

where z is the poverty threshold, y_i is the income of the individual, q is the number of the poor (those with incomes below z) and N is the number of individuals in the population. FGT_0 ($\alpha = 0$) is the headcount ratio or the poverty rate which measure the proportion of the population with income below the extreme poverty line. However, the headcount index does not capture how close or far the poor are from the poverty line and the distribution of income among the poor, these are addressed by two other measures. FGT_1 ($\alpha = 1$) is the poverty gap index which measures the extent to which the individuals fall below the poverty line, expressed as a percentage of the poverty line. It captures the overall magnitude of poverty in a given population. FGT_2 ($\alpha = 2$) is the poverty severity index, also known as the poverty gap squared, it accounts for the inequality among the poor. Under the severity of poverty measure,

the poverty of the poor are weighted by poverty gaps in assessing the aggregate poverty, with more weight given to the poorest among the poor.

To measure inequality, the Gini coefficient is used (for more details on the Gini coefficient see Haughton and Khandker (2009)). A Gini coefficient is a standard measure of the amount of inequality and is based on the mathematical measure of the Lorenz curve. The Gini coefficient is derived from the Lorenz curve which ranks individuals from the poorest to the richest and shows the cumulative proportion of the population on the x-axis and the cumulative proportion of income (or consumption expenditure) on the y-axis. The coefficients are normalized to range from zero (perfect equality) to one (perfect inequality). Some researchers multiply this by 100, in that case the coefficients run from zero in perfect equality, to 100, where the richest person in the society has all the income. Formally, let x_i be a point on the x-axis, and y_i be a point on the y-axis, then:

$$Gini = 1 - \sum_{i=1}^{N} (x_i - x_{i-1})(y_i - y_{i-1}) \qquad (1.2)$$

1.4 The Effect of Tax-Benefit Policies on Income, Inequality and Poverty

Section 1.4 presents the main findings from our simulations. We begin by examining the relative size of different components of household disposable income. Then, we study inequality using various parts of income. We also look at inequality figures arising from consumption. Next, we turn to poverty results. We present results of poverty for incomes and consumption and analyse poverty by population subgroups.

1.4.1 Relative size of income components

Malawi is a low-income country with a large rural population mostly involved in casual labour. The wealthiest quintile holds the largest share of income; it possesses 87.2% of the

disposable income and 90.4% of total original income. These figures point to a shortfall of the social protection system in redistributing incomes. This is also evident in table 1.3 below which presents means of income by quintile in the national currency, the Malawi kwacha (MK).

Table 1.3: Means of income and income components by income quintiles

	Original income	Earnings	Self-Emp.	Agri.	Other market incomes	Benefits, total	SCT	Edu. Ben.
1st	4,620.00	2,525.10	405.8	933.1	755.9	266.6	12.1	9.5
2nd	18,699.90	10,858.20	2,422.80	3,459.90	1,959.00	2,103.70	1,365.00	64.4
3rd	39,671.00	22,456.20	7,256.30	6,934.30	3,024.20	2,909.00	1,998.60	31.2
4th	85,717.60	50,846.10	17,152.20	11,747.10	5,972.20	2,445.70	1,214.60	77.1
5th	751,852.00	452,368.70	228,062.30	31,742.10	39,678.90	2,712.90	346.4	1,003.70

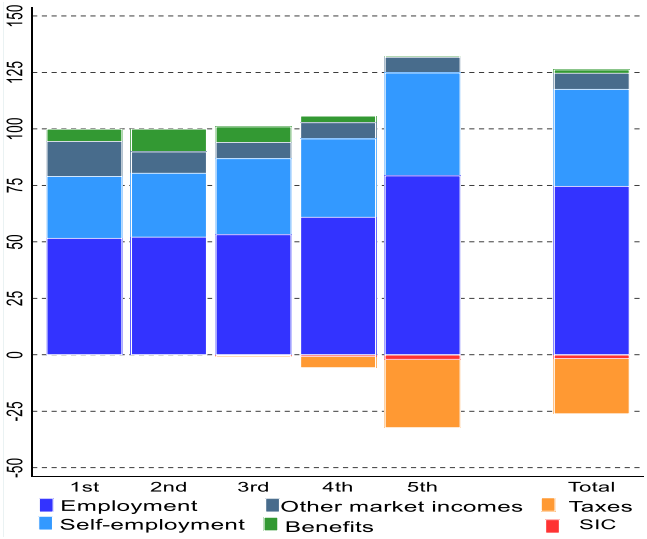
	Direct taxes	SIC	Disp. income	VAT	Post-fiscal income
1st	0	0	4,886.60	-4,063.60	823
2nd	-2.7	-4.3	20,796.50	-3,198.90	17,597.50
3rd	-293.4	-129.6	42,157.00	-4,107.20	38,049.80
4th	-4,082.10	-737.3	83,344.00	-6,958.30	76,385.70
5th	-172,113.40	-12,166.60	570,284.90	-26,024.60	544,260.30

Source: Own calculation using MAMOD

Figure 1.1 shows that in terms of income sources as a share of disposable income, self-employment income (which includes agriculture income) plays a vital role for all income groups in Malawi in particular the poorest quintile. Employment income is the primary source of income for the wealthiest quintile. Other market incomes, which include investments, rental income etc., are an important source of income across all income groups in Malawi. Social benefits, however, play a minimal role in Malawi. We, moreover, observe from table 1.3 above that the richest quintile also benefits from social benefits in Malawi, specifically the social cash transfer and the education benefit. Taxes and social insurance contributions are more concentrated in the highest quintile. However, we find that direct taxes are paid from

the second quintile. The direct taxes paid by the poor quintile are due to turnover tax which is levied on gross sales of business without considering expenses incurred by the enterprises. Similar result was also highlighted in Gasior et al. (2021) in their study of five African countries, pointing that these taxes are levied on enterprises which have made net losses during the month.

Figure 1.1: Sources of Income by quintiles of per capita disposable income in 2016



Notes: Each bar refers to a different population quantile. These are calculated are calculated by ranking households into five equal parts according to their disposable income
Source: Own calculation using MAMOD.

1.4.2 Inequality

Inequality studies on Malawi like most African countries are based on consumption data. Using MAMOD, we can assess inequality in terms of both income and consumption, as shown in Table 1.4. Our results show that income inequality is high in Malawi with a Gini coefficient from disposable income of 76.0%. To assess the redistributive effect of fiscal policy one looks at the difference between the Gini coefficient from market income (original income) and the Gini coefficient from disposable income. Fiscal policy is equalising if the redistributive effect is positive and unequalising if the redistributive effect is negative. Comparison of Gini

coefficients for original income and disposable income indicates that the tax-benefit system of Malawi reduces inequality by 4.3 percentage points. In their paper, Gasior et al. (2021) found similar results for Ghana (0.1 percentage points), Mozambique (0.8 percentage points), South Africa (7.6 percentage points), Uganda (1.6 percentage points) and Zambia (3.4 percentage points). South Africa was found to have a tax benefit system which reduced inequality the most. Lustig (2017) also found South Africa to be a country that redistributes the most in their study of twenty-five developing countries.

Table 1.4 also presents the Gini coefficient for other concepts of income. These are used to assess the contribution of each tax-benefit components to income redistribution. The effect of the component is derived from the difference between inequality for disposable income with and without the benefit or the tax. Our results show that the instrument that contributes the most to inequality reduction is income tax. Meanwhile, benefits have only a marginal effect as the Gini coefficient moves from 76.0% to 76.4% once they have been removed.

When consumption is used, inequality is lower, with a Gini coefficient of 45.9%. The result could indicate that Malawi is an agricultural economy and income is often very lumpy. Farming households receive a large amount of cash income in May and June after the harvest and receive very little the rest of the year. Consumption expenditure, however, continues throughout the year. The variability of income during the year might not be adequately captured in the survey.

Table 1.4: Gini Coefficients based on different measures of income

Original income	80.3
Disposable income	76.0
Dispy. income - pensions	76.0
Dispy. income - all benefits	76.4
Dispy. income + tax	79.7
Dispy. income + SIC	76.2
Post-fiscal income	76.2
Consumption based	45.9

Source: Own calculation Using MAMOD

1.4.3 Poverty

To assess poverty, the headcount indicator of the Foster-Greer-Thorbecke family of poverty measures is used (Foster et al., 1984). We use the national extreme poverty line. As table 1.5 shows, the monthly value of extreme poverty line is MWK7,105 which is equivalent to international $34.5 PPP per month. The impact of taxes and benefits can be inferred by comparing original income and disposable income. Our results show that application of the tax-benefit system leads to higher poverty levels in Malawi. This is illustrated in table 1.6 as poverty increases from 74.3% according to original income to 75.4% in terms of disposable income. This worrisome development is not unique to Malawi, Gasior et al. (2021) and Lustig (2017) also arrive at the same conclusions for African countries except for South Africa.

Table 1.5: Overview Poverty lines in National Currency

$1.9/day	11,915
$3.2/day	20,068
$5.5/day	34,491
National poverty line	11,453
Extreme poverty line	7,105

Note: Monthly value in national currency

Source: Own calculation using MAMOD

In terms of the contribution of each component of the tax-benefit system to the reduction of the poverty we find that benefits reduced poverty the most. As highlighted above this obtained by the difference between poverty for disposable income with and without the tax/benefit component. Meanwhile direct taxes are found to increase poverty.

Indirect taxes are found to increase poverty even more, as post-fiscal income jumps to 77.5%. In summary our findings show that taxes, both direct and indirect, were largely responsible for the increase in poverty while benefits had very little effect of decreasing poverty.

Table 1.6: Extreme Poverty Rates Using Different Incomes Concepts

Original Income	74.3
Disposable income	75.4
Dispy. income – pensions	75.4
Dispy. income - all benefits	75.9
Dispy. income + tax	74.0
Dispy. income + SIC	75.1
Post-fiscal income	77.5
Consumption based	20.1

Source: Own calculation using MAMO

To understand the relative wellbeing conditions of different subgroups of the population we looked at poverty rates by different subgroups based on household disposable income, as presented in table 1.7. The aim is to understand which groups are most affected by poverty in order to determine what kind of benefits or fiscal intervention could be targeted to remedy their situation. In terms of gender, we find that a higher poverty rate of 76.2% for women compared to men at 74.5%. Poverty rates increase as we move from households with fewer members to large households. Results based on consumption follow similar pattern (see table 1.7). Thus, policy interventions aimed at reducing poverty could target women headed household or households with high number of young children.

Table 1.7: Poverty Rates for Different Sub-population groups based on Consumption and Disposable income

	Consumption	Disposable income
Women	20.1	76.2
Men	20.0	74.5
Aged 0-9	24.5	79.2
Aged 10-19	22.2	78.9
Aged 20-29	13.3	65.4
Aged 30-39	19.2	70.1
Aged 40-49	18.2	72.5
Aged 50-59	16.5	72.2
Aged 60-69	12.0	79.2
Aged 70+	13.1	84.7
Children(0-14)	24.3	79.7
Adults(15+)	16.7	71.8
... Young adults (15-17)	21.1	78.6
... Middle-age (18-59)	16.3	69.6
... Old-age (60+)	13.3	83.7
1 person hh	0.8	47.5
2 person hh	4.8	61.5
3-4 person hh	12.4	70.2
5-6 person hh	21.1	77.4
7+ person hh	34.1	84.4
0 child/young adult	3.4	53.3
1 child/young adult	7.2	63.9
2 children/young adults	14.2	70.9
3-4 children/young adults	22.3	79.7
5-6 children/young adults	41.4	89.4
7+ children/young adults	40.6	95.1

Source: Own calculation using MAMOD

1.5 Reforming Cash Transfers to Reduce Extreme Poverty in Malawi

From the analysis above we found that the extreme poverty is high in Malawi. In table 1.3 above we also observed leakages to the rich arising from both the cash transfer programme and the education benefit. The question is therefore what kind of policy interventions government can implement to reduce poverty? Using the recently developed Malawi tax and

benefit microsimulation model for Malawi (MAMOD) we analyse several counterfactual scenarios aimed at alleviating extreme poverty.

The social cash transfer (SCT) is the main benefit in Malawi which makes it a good candidate for reforms aimed at reducing poverty. The SCT has the objective to reduce poverty and hunger among ultra-poor and labour constrained households. The ultra-poor eligibility condition is implemented through a proxy means-test (PMT). Ultra-poverty is characterised as a household who: has on average only one meal per day; and/or survives from begging; and/or is undernourished; and/or does not possess any valuable assets; and/or does not receive any monetary help, food or gifts from others. These variables go into the derivation of the PMT score for a household (Kachaka, 2012).

PMT is a targeting method which is widely used in developing countries. In general, PMT is targeting method where by a survey based measure of well-being (consumption/income) is regressed on household covariates (such as demographic characteristics and home attributes) to estimate a proxy for well-being and this proxy is in turn used determine the list of beneficiaries based on their PMT scores (Gazeaud, 2020). In the case of Malawi, instead of using income/expenditure a ranking formula is used to rank household economic status based on their assets possession and other household characteristics (Kachaka, 2012). Various assets owned by household are aggregated into one variable to proxy household well-being. They include demographic characteristics (such as size of household or composition), human capital characteristics (such as education of household head), housing characteristics (such as type of roof or floor), durable goods (such as bicycle, bed, sofa or televisions) and productive assets (such as land). Correlations are run to find the proxies that most correlate with welfare.

While individual proxies may be weakly correlated with welfare, multiple proxies show stronger correlations (Kachaka, 2012). Thus, the PMT in Malawi uses a set of 26 proxies

that best explain welfare. Each proxy is given a weight based on its estimated impact on household expenditure. A score is calculated for each household and households are ranked according to the PMT score. Households that score below the cut-off point are eligible for the social protection program (Kachaka, 2020).

The challenge with PMT is that it is more like an informed guess of the households wellbeing based on the household characteristics, i.e. all things being equal a family living in a brick-walled house is likely richer than a family living in a house made of clay. Since the type of wall is used as a proxy income can result in PMT being not well correlated with income measures as there could be great variability in incomes, even between families living in houses made of clay. For the case of Malawi, which uses 26 proxies, it will be a case then that the imperfect correlation between the multiple proxies and household income. Another challenge why proxy means testing might not be well correlated to income measures relates to crises and shocks faced by households. A household that experience a loss in earnings due to shock like COVID 19 pandemic but do not suffer a related change in the household characteristics and assets used as proxies will be considered PMT rich while in reality they are income poor. These individuals will thus be income poor but PMT non-poor.

1.5.1 Increasing Benefit Amount and Coverage

Using the PMT approach we assess whether the Social Cash Transfer programme can be reformed to reduce poverty and prevent leakages (errors of inclusion) to the rich? We study the effect of two reforms aimed at improving the living standards of individuals living below the extreme poverty line. The interventions assume that government is budget constrained hence budget for benefits remains constant. In the first reform, we allocate an equivalent amount of total budget for education benefits to increase the benefit amount of the Social Cash Transfer beneficiaries. In other words, the education benefit is abolished and the money

saved from it is used to increase the benefit amount for the Social Cash Transfer. The education benefit was chosen because of the leakages to the rich. In the second reform we allocate an equivalent amount of the total budget for the education benefits to increase coverage of the Social Cash Transfer beneficiaries (increasing the eligibility threshold). The education benefit is again abolished.

Table 1.8 below provides poverty outcomes that our interventions are supposed to improve. Using the poverty measures mentioned in section 1.3.4 we find that changes are inconsequential between the baseline and our reforms scenarios entailing that the policy simulations do not move households from below the extreme poverty threshold.

Table 1.8: Effect of reform scenarios on extreme poverty based on disposable income

	Baseline	Reform 1 (Increased Benefit Amount)	Reform 2 (Increased Benefit Coverage)
FGT_0	75.4	75.3	75.3
FGT_1	48.8	48.6	48.5
FGT_2	36.9	36.7	36.6

Source: Own calculation using MAMOD

Thus, our simulation did not yield the intended results. We found that changes in extreme poverty between our baseline and reforms were indistinguishable, and from Table 1.9 below we still observe leakages (errors of inclusion) to the rich in the social cash transfer programme. We posit that the complex targeting mechanism where several poverty proxies are used in the Social Cash Transfer makes it difficult to target the extremely poor in the country. Our view is supported by several other studies which have come to a similar conclusion. According to a study of the social cash transfer, Matita and Chirwa (2014) found that a high proportion of beneficiary households do not fulfil the criteria prior to being selected into the programme. Similarly, Miller et al. (2011) found that some recipients were not

eligible according to the criteria, indicating a high inclusion error. They attribute the high inclusion error to lack of clarity of the targeting concepts and the use of poor proxies, favouritism and the influence of village level politics.

Table 1.9: Means of income and income components by quintile

	Baseline			Reform 1 (Increasing benefit amount)			Reform 2 (Increasing coverage)		
	SCT	Disp. income	Post-fiscal income	SCT	Disp. income	Post-fiscal income	SCT	Disp. income	Post-fiscal income
1st	12.1	4886.6	823.0	16.8	4881.9	818.2	1409.1	6274.1	2210.5
2nd	1365.0	20796.5	17597.5	1862.8	21229.9	18030.9	1865.6	21232.7	18033.7
3rd	1998.6	42157.0	38049.8	2995.7	43122.9	39015.8	2371.7	42498.9	38391.7
4th	1214.6	83344.0	76385.7	1776.2	83834.3	76876.0	1548.4	83606.4	76648.2
5th	346.4	570284.9	544260.3	560.0	569738.3	543713.7	493.0	569671.2	543646.6

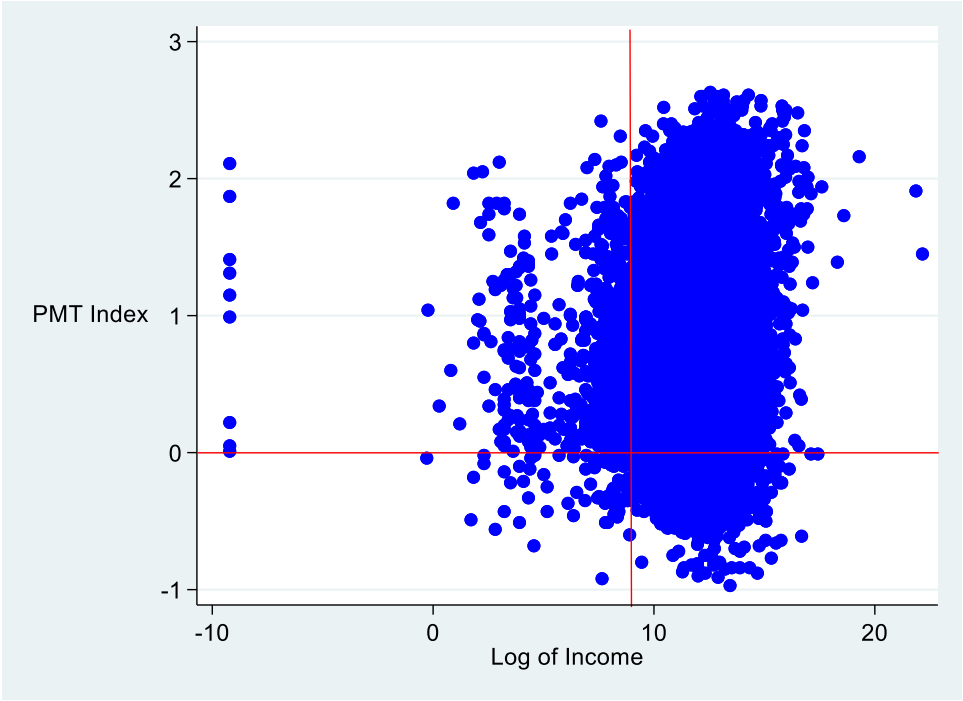
Note: Quintiles fixed as those in the baseline
Source: own calculation using MAMOD

1.5.2 Changing Targeting Approach

Following the results above, in this section we look at a scenario where PMT is replaced with income means-testing for targeting eligible beneficiaries for the social cash transfer, in order to quantify the loss in extreme poverty reduction due to problem of targeting. In implementing a social cash transfer programme, the main concern is always whether the intended beneficiary is receiving the benefit. Proper targeting is crucial to ensuring that the objective of the intervention is achieved given the budget available. Poor design and implementation of social safety nets can lead to two errors. These are inclusion and exclusion errors, where those that are not eligible get the benefit (inclusion) and where those that should be enrolled miss out (exclusion). A targeting approach should therefore ensure that these errors are minimised (Devereux et al., 2015).

We examine the inclusion and exclusion errors in figure 1.2 where we plot log of income and the PMT index and compare against the extreme poverty line. It demonstrates that there may be households with similar income but with different scores i.e., households that are poor by income but are not poor according to the PMT index. These households are excluded from the programme and are shown in the top left quadrant. While those that are income rich but PMT poor are included and reflected in the bottom right quadrant.

Figure 1.2. Inclusion and Exclusion Errors



Notes: The horizontal line is the threshold for PMT and the vertical is threshold for income means testing.
Source: Own calculation using MAMOD

Similarly, table 1.10 shows that households rated poor according to the PMT index quintile 1 and 2 of the index, 35.7% are income poor. The correlation between the PMT index and income is weakly positive at 0.032.

Table 1.10: PMT Index vs Income

		Income					Total
		Q1	Q2	Q3	Q4	Q5	
PMT Index	Q1	15.4	20.4	20.6	22.1	21.5	100
	Q2	20.3	18.1	19	22	20.7	100
	Q3	22.2	19.9	21.4	18.3	18.2	100
	Q4	22.6	22.2	18.7	18.6	17.9	100
	Q5	20	20	20	20	20	100
Total		100.5	100.5	99.6	101	98.3	

Source: Own calculation.

In order to assess the extent to which proxy means-testing mitigates the reduction of extreme poverty, we test the effect of replacing proxy means-testing with income means-test for the Social Cash Transfer. It is worth noting that the aim of this counterfactual is to quantify the loss in extreme poverty reduction due to problems in targeting, rather than proposing the use of income means-testing due to the difficulties of measuring income correctly in developing countries. We assess the effects of using income means-testing in our baseline scenario, as well as in the counterfactual scenarios of increasing the benefit amount (reform 3) and coverage (reform 4). Table 1.11 below provides the results of our new approach to targeting.

Table 1.11: Effect of income means-testing social benefits on extreme poverty

	Baseline (MT)	Reform 3	Reform 4
FGT_0	75.5	75.5	75.2
FGT_1	48.7	48.4	48.4
FGT_2	36.6	36.3	36.2

Notes: Reform 3 is the increase in benefit amount. Reform 4 is increase in coverage. In all the reforms targeting is income means-tested and we keep the budget constant.
Source: Own calculation using MAMOD

The effectiveness of our simulations in reducing poverty was subdued despite changing the targeting approach to an income means-test without adjusting expenditure on benefits. The results are similar to those obtained above under the PMT setting. As shown in table 1.11 poverty headcount remains at 75.5% when proxy means-test is replaced by means-test. However, unlike in table 1.9 above, table 1.12, which is based on income means-testing, shows no leakage in SCT to the richest quintile.

Table 1.12: Mean of incomes and income components by quintile (income means-testing)

	Baseline (Means-Tested)			Reform 3 (Increasing benefit amount)			Reform 4 (Increasing coverage)		
	Benefits	Disp. income	Post-fiscal income	Benefits	Disp. income	Post-fiscal income	Benefits	Disp. income	Post-fiscal income
1st	1,812.4	6,687.0	2,623.3	2,712.7	7,577.8	3,514.1	4,044.2	8,909.2	4,845.6
2nd	1,934.8	21,366.3	18,167.4	2,720.7	22,087.7	18,888.8	2,528.2	21,895.2	18,696.3
3rd	1,642.2	41,800.5	37,693.4	2,628.6	42,755.8	38,648.6	1,901.0	42,028.2	37,921.1
4th	509.2	82,644.4	75,686.2	923.4	82,981.5	76,023.3	625.4	82,683.4	75,725.2
5th	0.0	570,181.9	544,157.4	0.0	569,178.3	543,153.7	0.0	569,178.3	543,153.7

Notes: Quintiles fixed as those in the baseline scenario.
Source: Own calculation using MAMOD.

1.5.3. The cost of reducing extreme poverty by half

All the scenarios above resulted in a minimal reduction in extreme poverty in Malawi. This is most likely due to the fact that the budget allocated to the Social Cash Transfer was kept fixed and does not allow lifting a significant number of people above the poverty line. The aim of this section is therefore to evaluate how costly it would be to achieve a large reduction in extreme poverty; say, to reduce extreme poverty by half.[12] In order to achieve this, we look

12 We consider reducing extreme poverty by half in this study based on Sustainable Development Goals (SDGs) number 1. The objective of Goal 1 of the Sustainable Development Goals is to "End Poverty in all its forms everywhere." Its associated targets aim, among others, to eradicate extreme poverty for all people, reduce it at least by half by 2030 (UN, 2016).

at two other reforms which assumed no binding budget constraint. The reforms involved increasing benefit amounts for the social cash transfer programme. The reforms were done using both the proxy means-test and income means-tested approaches. Table 1.13 present results of our counterfactual scenario of evaluating the cost of reducing extreme poverty by a half. It presents the aggregate amounts required if the proxy means-test (PMT) or the income means-test approaches are used and compare with the actual current level expenditure. We find that government expenditure on Social Cash Transfer will have to increase from its current levels of 0.3% of gross domestic product (GDP) to 18.6% of GDP under PMT approach and to 16.8% of GDP using income means-tested targeting. The amounts required are enormous highlighting the challenge government has of reducing poverty in Africa and providing evidence that the coverage of the current social protection programmes is very low. Looking at the difference in aggregate expenditure between PMT and means-test approaches we find that 1.8% of GDP additional resources will be required under the PMT targeting mechanism.

Table 1.13: Cost of Reducing Extreme Poverty by Half

	Baseline	PMT	Income Means-Tested
Beneficiaries	176,436	1,788,834	1,659,392
Aggregate Expenditure (mn')	12,278.48	810,720	733,920
Extreme Poverty Rate (%)	75.4	37.7	37.7

Source: Own calculation using MAMOD

1.5.4. Financing the Cost of Reducing Extreme Poverty by half

Given the little effect that reforms of social benefits have in Malawi under a fixed spending budget, and after exploring how costly it will be to reduce extreme poverty significantly the natural option is to analyse the financing side of this type of reforms that is budgetary neutral. What would be the effect of financing such reforms through VAT or personal income tax?

Increasing VAT may not be desirable on equity grounds, as VAT is known to be regressive, however, increasing VAT may be desirable on equity grounds if the VAT is financing a benefit that targets poor households (Inchauste and Lustig, 2017). We analyse a scenario of an increase in taxes whereby the additional revenues are used to finance an increase in coverage of the social cash transfer. We find that reducing poverty by half would require substantial addition expenditure on benefits and in a budget neutral setting taxes have to rise significantly. The additional pressure on government is arising from the fact that we are not taxing the benefit. The additional revenue for financing the increase in coverage comes from increasing the VAT rate from the current 16.5% to 20.0%. The increase in the VAT rate was not sufficient to cover the cost of the increase in social cash transfer we therefore added two tax brackets to the personal income tax schedule of 80% for income between MWK500,001 and MWK700,000 and another 80% for those earning above MWK700,000.

Table 1.14: Comparison of Current tax schedule with counterfactual tax schedule

2016/17 Tax Schedule			Counterfactual tax schedule		
	Annual	Rate		Annual	Rate
From	0 - 240,000	0%	From	0 - 240,000	0%
Between	240,001 - 300,000	15%	Between	240,001 - 300,000	15%
Above	300,001	30%	Between	300,001 - 500,000	35%
			Between	500,001 - 700,000	80%
			Above	700,001	80%

Source: Ministry of Finance and own derivation

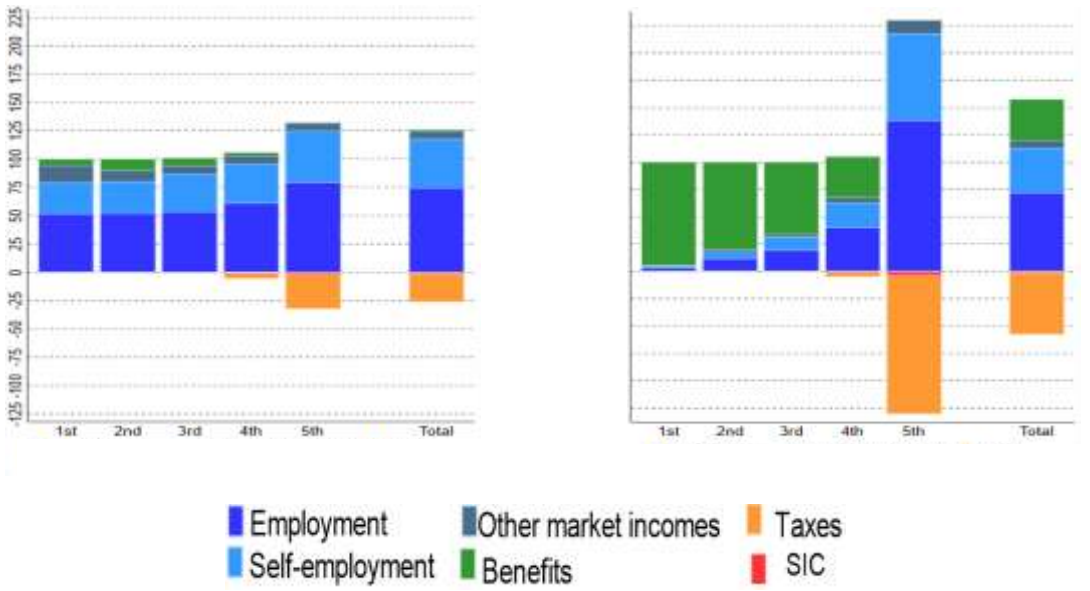
These measures were sufficient to finance the expansion in coverage of social cash transfer in order to reduce poverty by half. Thus, in Malawi a very large tax reforms would be needed to finance the social cash transfer resulting in a huge tax burden on individuals. Revenue would have to increase by 134.9 % under PMT targeting and 121.8% under means-test for government to improve household's income and reduce poverty by half. Figure 1.3 below

shows the increase in direct taxes by comparing our baseline line scenario (figure 1.1) and the counterfactual scenario of financing the increase in coverage of the cash transfer using the income means-testing approach. The quintiles are in both graphs are fixed based on the baseline scenario. As highlighted above, the figure shows a significant increase in taxes by the richest quintile which is mainly financing the transfers to the poorest quintile. The graph is mainly an illustration of the cost involved in reducing poverty by half. Such a huge increase in taxes might cause higher income people to work less hard and by also providing such large transfers might encourage poor individuals to work less hard. Thus, individuals reaction would need to be considered before one can make policy recommendations based on a such a huge increase in taxes and transfers, which our current static model does not take into account.

Figure 1.3. Sources of Income by quintiles of per capita disposable income

Baseline Scenario (Same as Figure 1.1 above)

Counterfactual Scenario of Financing Coverage Expansion of the Social Cash Transfer



Notes: The left plot show sources of income per capital disposable income for the baseline scenario, same as figure 1.1. The right plot shows source of disposable income for the counterfactual scenario of financing the reforms aimed at reducing poverty by half using income means testing. Taxes are direct taxes. Each bar refers to a different population quantile. These are calculated are calculated by ranking households into five equal parts according to their disposable income. The quintiles are fixed based on the baseline scenario.
Source: Own calculations based on MAMOD.

1.6 Conclusions

Fiscal policy is an essential instrument which the government can influence to fight inequality and poverty. The International Monetary Fund posits that a large proportion of the differences in average disposable income inequalities could be explained by differences in fiscal policies, especially in the levels and composition of taxes and spending (IMF, 2014). Given the high levels of poverty and inequality in developing countries, it is legitimate to assess whether fiscal policy is effective in achieving these goals. Malawi has high levels of poverty and

inequality despite the reduction of these being the primary goal of government. We, therefore, examined the impact of fiscal policy on inequality and poverty in Malawi.

The primary objective of the paper was to assess the effect of potential reforms to social assistance aimed at reducing poverty in Malawi. This task was carried out using the recently developed tax-benefit microsimulation model for Malawi. Microsimulation models are powerful tools to assess the overall distribution effects of fiscal policy action. The underlying data for our model was the 2016/2017 Integrated Household Survey (IHS4). The IHS4 was disseminated on November 22, 2017, by the National Statistics Office as such there are not many previous studies using the data set. Furthermore, this is the first time that income data is being comprehensively used, as such the model will continue being improved and updated and the results presented above represent the best available at the time of writing.

Our results showed that the current tax-benefit system in Malawi reduces income inequality, this is noted by a decrease in inequality when Gini coefficient based on disposable income and original income are compared. With regards to poverty, we find that the current taxes and benefits do not reduce poverty, they increase poverty. Similarly, social safety nets do not play a major role in the incomes of individuals and households. We also found that women, young-age, old-age people and household with more members had higher poverty rates.

Given the above, we assessed whether the social cash transfer programme could be used to reduce poverty given a fixed budget. We found that increasing the benefit amount and coverage of the social cash transfer using resource saved from an abolished education benefit did not have a significant impact on poverty. Similarly, changing the targeting approach to a means-tested system did not yield significant improvement in the poverty rate due to the limited budget allocated to social benefits. Finally, we found that achieving a large reduction in extreme poverty would be extremely costly. Reducing extreme poverty by half would

require an increase of the budget allocated to social spending from the current levels of 0.3% of GDP to 18.6% of GDP. From this, around 1.8 % of GDP would represent transfers to households who are not necessarily income poor, but due to the inefficient proxy means-test targeting of the social cash transfer programme. Our main findings were, however, that whether PMT or income means testing is used, reducing extreme poverty by half entailed a significant increase in taxes paid by high income individuals and large transfers to poor households. This could however lead to behavioural changes which will need to be taken into account before recommending policy changes. As mentioned below the current study does not consider individuals reactions to policy changes.

Given the goal of the tax-benefit system in Malawi is to narrow inequality and reduce poverty the above analysis provides essential evidence on the efficacy of fiscal policy in Malawi. The Government of Malawi could consider reviewing the allocation to the social safety net. Cash transfers should target women headed households and the elderly. However, improving targeting only is not the silver bullet for reducing poverty. Government redistribution policy should also focus on increasing the tax base.

While some authors argue that developing countries should not focus on redistribution because it is not feasible but should focus more on development, our findings show that redistribution can make a difference. Our view is that government should focus on both. This view is supported by Bourguignon and Verdier (2000) who found that progressive redistribution policies financed through some (possibly progressive) tax the proceeds of which would be devoted to the accumulation of assets among the poor should contribute to an acceleration of both growth and poverty reduction. Similarly, Fiszbein and Schady (2009) who reviewed cash transfers programmes in developing countries found that cash transfers were generally successful in reducing poverty and encourage parents to invest in health and education of their children. Other studies that have found cash transfers to have positive

impacts on households' wellbeing include: Hagen-Zanker and Himmelstine (2016), However as we have shown and also in line with finding by Lustig (2017), the success in fiscal redistribution is driven primarily by redistributive efforts (share of social spending to GDP) and the extent to which transfers are targeted to the poor and direct taxes are targeted to the rich.

Future work is to extend this analysis to include excise taxes to assess its impact on inequality and poverty levels. The current study focused on interventions that targeted the whole population affected. Thus, further study could focus on variation in population subgroups, including gender, age and size of household and assess impact of intervention target at these population subgroups. We also aim to interrogate why we obtain different results between consumption and income. Future work will also include exploring various equivalence scales. Overall further study will thus focus on why the tax-benefit system seems to be ineffective, and we will aim to assess as to what would be the effective policies for reducing inequalities and poverty. Finally, simulations in our study are static, and the long-term effects of these reforms are beyond the scope of this study but can be significant.

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Chapter 2

The Effects of Informality and Unemployment Changes on Income Inequality and Poverty in Malawi

2.1 Introduction

A significant number of households in Africa, as well as other developing countries, engage in informal jobs as a coping mechanism against poverty. The rise in informal jobs is a result of fewer formal jobs being created, making informality the only alternative to unemployment. The overall informal economy is estimated to contribute approximately 55% of the gross domestic product (GDP) in Sub-Saharan Africa (SSA) and 80% of its labour force, including in agriculture (ECA, 2018). Concerns have, therefore, been raised on the effects of informality on welfare and income inequality. According to literature, effects of informality on a country can be both negative and positive, which makes it difficult to generalise the overall impact of changes in informality on inequality and poverty (Dell'Anno, 2016). This challenge is exacerbated by the fact the most countries use of different definitions of informality (Rodríguez and Jara, 2019, Gilbert, 2017). It is therefore essential to appreciate the contextual nature of the effect of informality on poverty and inequality at the country level, to understand and possibly predict the public policy required.

We aim to contribute to this debate by exploring and quantifying the effects of an increase in informal jobs and unemployed persons on income inequality and poverty using Malawi as a case study between 2004 and 2016. We chose Malawi because the country has some of the highest levels of inequality and poverty in the world (World Bank, 2016). The World Bank (2018) report further elucidates that, 69.9% of the Malawi population lived below the international poverty line of US$1.90/day per capita in 2016. Whiteside (2000) found that Malawi has one the most skewed income distributions in the world. The economy of Malawi is based on agriculture, and with no unemployment insurance, most Malawians cannot afford not to participate in the labour force. The country has a high level of unemployment due to the insufficient number of jobs created in the formal economy resulting in a rapid growth in the size of the informal economy. The informal sector is characterised by low earnings and

by low levels of education. People with high education have high earnings compared to those with low education. Individuals with higher education earn around 100% more than those with secondary education and about 133% more that those with primary education (UCW, 2018). On average, males have higher earnings than females, and people in urban areas have higher incomes than those in rural areas (NSO, 2014).

We chose the period between 2004 and 2016 for our analysis because of availability of data and due to demographic and macroeconomic developments that occurred during the period. For our analysis we use the 2004/05 Integrated Household Survey and the 2016/17 Integrated Household Survey which are publicly available online. As highlighted below the informal jobs and unemployment levels recorded dramatic increases during this period. The share of informal jobs rose by 12.6 percentage points while the unemployment rate rose by 11.5 percentages points between 2004 and 2016. In addition, the population increased from 12.3 million in 2004 to 16.8 million in 2016 (RBM, 2010, RBM,2018). The macro-economic performance was also divergent during this period as the economy recorded above average growth rates between 2004 and 2010 and very low growth rates between 2010 and 2016. Gross domestic product (GDP) rose to a record high of 9.7% in 2008 from 3.3% in 2005 due to good weather and introduction of farm input subsidy programme which provided subsidised fertilizer and subsidized maize (corn) to poor households (RBM, 2010). The period between 2010 and 2016 however saw a slowdown in economic activities as the country experienced foreign exchange problems because of low export earnings and cuts in external aid as several donors reduced their financial support to Malawi following the non-successful implementation of International Monetary Fund-supported programme and governance concerns. The shortage of foreign reserves impacted the manufacturing, construction and retail trade sectors which rely on imports, consequently GDP growth decelerated to 2.7% by 2016 (RBM, 2018).

Against this backdrop, the primary aim of this research is to investigate the effects of an increase in the number of informal workers and unemployed people on income inequality and poverty with the view of providing a direction of policy. The available published literature is divided in terms of impacts, suggesting that developments are based on the dynamics of each specific country. In support of this view, Saunders (2002), posits that the impacts are contingent on the welfare system and other structural factors, including the overall inequality profile. Therefore, country specific studies are important to guide authorities to implement proper domestic policies that can achieve their growth objectives. To achieve our objective, we use the recently developed tax-benefit microsimulation model for Malawi (MAMOD). We follow the decomposition methods proposed by Bargain and Callan (2010) and Bourguignon et al. (2008) to isolate the contribution of informality and unemployment changes on inequality and poverty. For our purpose and due to data availability, we define informality as individuals employed in informal jobs popularly known as *ganyu* in Malawi and surrounding countries. We elaborate on this definition in section 2.4.1.

Our results show that the increase in informal jobs between 2004 and 2016 contributed to a decrease in poverty however they led to an increase in inequality. We also find that the increase in unemployment levels contributed to the widening of inequality. Meanwhile tax-benefit policy developments between 2004 and 2016 had the effect of reducing inequality. We further analysed the impact of specific tax-benefit instruments. We found that income taxes had the largest effect in reducing inequality. The results obtained can help policymakers better understand the links between informality and inequality/poverty and help design appropriate polices. Specifically, our results suggest that policy should focus on creation of formal jobs. This will give an opportunity for informal workers to transition to them and hence increase the tax base and make redistributive policies more effective.

The paper is organised as follows. The next section covers the review of related literature. Section 2.3 presents the status of informality in Malawi. Section 2.4 introduces the methods and the data that we use for our analysis. Section 2.5 reports the main findings of the empirical analysis, and section 2.6 briefly concludes. Supplementary results and methodological details are provided in the Appendix.

2.2 Literature review

While there is no consensus in literature on the impact of informality on inequality and poverty, most studies have concluded that high informality is associated with high inequality and higher levels of poverty (Özgür et al., 2021). The opposing views stem from the argument, on one hand, that the presence of informality improves the income distribution by creating employment for the low skilled workers thus providing income for the poor. On the other hand, that high informality creates a challenge for implementation of public policy as it reduces the resources available for income redistribution (Dell'Anno, 2016, Rosser Jr et al., 2000, Dell'Anno, 2016). According to Cassim et al. (2016), high levels of informal jobs in a number of emerging markets have contributed to failure to convert high rates of growth into reduction in poverty and inequality. Thus, for the growth to be inclusive, the transition from formal to informal employment needs to occupy the policy agenda in Africa (Kiaga and Leung, 2020). Dell'Anno (2016) further notes that inequality can lead to greater informality. Increasing inequality decreases human capital accumulation due to imperfect capital markets and high fertility rates resulting in a decrease in gross domestic product and an increase in informality. Similarly high informality has been associated with hight levels of poverty because most jobs in the informal sector are low paying and without any social benefits (Bonnet et al., 2019, Meagher, 2013, Özgür et al., 2021, World Bank, 2019). However, as

pointed out above, the debate on the effects of informality on poverty and inequality remain inconclusive.

Just like informality, there is also continued debate in literature on the effects of unemployment on poverty and inequality which has created a challenge for policymakers. However, most studies have also concluded that high levels of unemployment are associated with an increase in poverty and inequality. The early empirical work on the relation between poverty and unemployment include Sen (1973) who noted that poverty, inequality and unemployment are interconnected. Saunders (2002) looking at Australian data, found that the risk of poverty was reduced when there was at least one full time employed adult in the household. A few studies that have been done on Africa, such as Kingdon and Knight (2004) for South Africa and Aiyedogbon and Ohwofasa (2012) for Nigeria also came to a similar conclusion, that unemployment is linked to widespread poverty and inequality.

This paper contributes to the existing literature on the effects of informality and unemployment on inequality and poverty which remain scarce for Sub-Saharan African. Our case study is Malawi. Malawi has high levels of inequality and poverty and during the period of our study we observed an alarming increase in informality and unemployment. While several studies have been done, mostly on other regions of the world, the continuing changes in the world and because Africa still lags in reducing poverty and inequality necessitates exploring the impacts of these issues to provide solution to guide policy. Thus, our study will contribute to this literature by quantifying the effects of informality and unemployment using microsimulation techniques and providing evidence for a Sub-Saharan African country.

2.3 Informality and Unemployment in Malawi

In this section, we present a preliminary characterisation of the Malawi labour market between 2004 and 2016 with particular focus on informal jobs and unemployment. Malawi is one of

the poorest countries in the world with per capita GDP of US$440 (RBM, 2020). As mentioned above, Malawi has one of the most skewed distributions of income, entailing that poverty is widespread. Most of the population live in rural areas and depend on agriculture for their livelihood. The informal sector, as defined by the Nationals Statistics Office in the 2013 Malawi Labour force Survey, absorbed 89% of the labour force in 2013 (NSO, 2014).[13] The 2013 Malawi Labour Force Survey further indicates that women are more likely to be employed in informal employment than males. There are marked differences in involvement in informal employment between rural and urban areas. In rural areas, the percentage of workers in informal employment is 91% compared to 69% in urban areas (NSO, 2014). Most of the people engage in informal employment known as *ganyu* (Dimowa et al., 2010).

Ganyu labour is informal employment widely practised in Malawi and in some nearby countries. These are casual jobs that are not declared as such they are not subject to income taxation, social protection and or employment benefits. A few studies have been done to understand why individuals engage in *ganyu*. Whiteside (2000) and Ellis et al. (2009) found that *ganyu* is the most important coping strategy for most poor households to meet their consumption needs. However, their emphasis was on the rural population, *ganyu* is also practised in the urban areas, although the participation is higher in the rural areas. Orr et al. (2009) and Cole and Hoon (2013) found that the supply of *ganyu* may not even be a result of a binding consumption constraint but may instead signify greater access to income-generating opportunities. Sitienei et al. (2016) found that less educated males were more likely to engage in ganyu labour and they further found that supply of ganyu labour increased with household size. Supply of ganyu is therefore a very important source of income for many households.

Many households engage in informal employment because unemployment levels are high. According to the 2013 Malawi Labour Force Survey, unemployment among

[13] See the next section for the definitions.

economically active population in Malawi, based on the International Labour Organisation (ILO) broad definition, was at 21% (NSO, 2014). Most of the unemployed are females at 26% compared to males at 14%. The 2013 Labour Force Survey also found that there are little differences in unemployment rates by level of education except for those with tertiary education.

2.4 Methods and data

2.4.1 Definition of informality

In this section, we present the definition of informality in literature, in Malawi and for our study. As alluded to above, the major concerns for a study of this kind is in terms of the definition for describing informality. The three internationally agreed definitions of informality are the *enterprise, the productive and the legalistic definitions* (Henley et al., 2009, Hussmanns, 2004). Under the *enterprise definition*, informality is identified based on the characteristics of the production unit in which the activities took place. The focus is on the type of enterprise and the number of workers in the enterprise. These are private unincorporated enterprises owned by individuals or households where no separate accounts are available that would allow separation between the accounts of the enterprise from other activities of the owner(s). The size of workers is below a certain threshold which is determined according to national circumstances. The second referred to as the *productive definition* combines the enterprise characteristics with the type of job characteristics. It defines informality as comprising self-employment in informal enterprises and wage employment in informal jobs. Informal jobs refer to those that are not subject to national labour legislation, income taxation, social protection or entitlement to certain employment benefits (Hussmanns, 2004). The third, known as the *legalistic, contract-based* or *social protection* definition expands on the first two and it defines informality in terms of the legal status of employment,

rather than firm or job characteristics. In practice, this definition is translated into several measurement criteria such as having a signed contract, belonging to a union, entitlement to benefits such as health insurance or pension, working at the public sector, or paying taxes and this is the definition used by the International Labour Organisation and official statistics in Malawi.

In order to enhance international comparability the International Labour Organisation (ILO) proposed that informal employment should be defined as: own-account workers (without hired workers) operating in informal enterprises; employers (with hired workers) operating an informal enterprise; all contributing family workers, irrespective of whether they work in formal or informal sector enterprises; the job should not be in law or in practice, subject to national labour legislation, income taxation, social protection or entitlement to employment benefits (ILO, 2018). The ILO further highlights that these are jobs that are not declared, casual jobs or jobs of short duration, jobs with hours or wages below specified threshold.

In line with the ILO definition, the government of Malawi define informal employment as percentage of employed population age 15 to 64 years where the relationship between the employer and employee is not subject to national labour economy, income taxation or any social protection or employment benefits. Workers in informal employment include: own account workers and employers employed in their own enterprises; members of informal producers' cooperatives; and contributing family workers irrespective of whether they work for formal or informal enterprises (NSO, 2014). The official definition is thus in line with the *legalistic definition* and in line with the ILO proposal.

However, information for defining informality using the *legalistic definition* was not available in the 2004 data. Based on the information available in the data, we define informality as those individuals aged between 15 and 64 years engaged in informal

employment known as *ganyu* labour. With *ganyu* labour the worker does not pay social security contributions, it has no benefits such as paid or sick leave, no written contract and is not subject to income taxation. Our definition is in line with the *productive definition.* For robustness check, we further undertake an analysis using an alternative definition of informality. In the alternative definition we define informality as own-account workers and family contributing workers aged 15-64 years.

The data for *ganyu* are taken directly from the Integrated Household Survey. In the survey, individuals are asked to report whether they were engaged in *ganyu* in the last seven days. The survey further collects data on the earnings from *ganyu*.

2.4.2 Definition of Unemployment

Next, we turn to the definition of unemployment. The International Labour Organisation (ILO) provides two definitions, strict and broad, for the unemployed person. According to the strict definition a person is unemployed if during the reference period they were without work, were available for work and they are seeking work. The broad definition states that the unemployed individual is without work during the reference period and available for work. For our study, just like the official statistics, we follow the broad definition, specifically we define unemployed persons as those persons aged 15-64 years who during reference period were without work and were available for work. The IHS collects information on the employment status of individuals.

2.4.3 Data

Our analysis focuses on the period 2004 - 2016. The data is drawn from the Malawi Integrated Household Surveys for 2004/2005 (IHS2) and 2016/2017 (IHS4). The IHSs are cross-sectional data and are designed to be nationally representative. The IHS2 contains 11,280

households while the IHS4 contains 12,447 households. The surveys are conducted by the National Statistics of Malawi (NSO). The surveys contain extensive information on employment and self-employment income from primary and secondary jobs, self-consumption, agricultural incomes, informal employment income, rental income, demographic characteristics, health, education, labour force participation, credit and loan, household enterprises, consumption and asset ownership. Being a household survey, the survey also contains other information on the family structure.

2.4.4 MAMOD

For our analysis and to derive disposable income for the individuals and their households we make use MAMOD, the newly developed tax-benefit microsimulation model for Malawi. MAMOD is static microsimulation model in the sense that simulations abstract from behavioural reaction of individuals. The use of microsimulations techniques in the study however highlights the power of tool. While having major contributions in redistributive policy analysis we show that it can also be applied to other important areas related to public policy. Spielauer (2011) posits that microsimulation is a powerful tool that has already demonstrated its strength in a broad variety of applications of all degrees of complexity, including simple models for which other modelling approaches exist—but those other approaches cannot compete in flexibility with the microsimulation approach. They also added that for most socioeconomic challenges, microsimulation is the only available study tool (Spielauer, 2011). Thus, a key advantage of including the tax-based benefit system via microsimulation in the analysis is that it is a flexible environment that can be expanded to answer various research questions.

MAMOD computes benefits, direct taxes, indirect taxes, social insurance contributions for the actual and counterfactual scenarios for all households in the IHS. 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 (Decoster et al., 2019). 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.[14] The development of the microsimulation model for Malawi took as reference the case studies of neighbouring countries Mozambique, Tanzania and Zambia, for which models have already been, developed (Castelo et al., 2017, Leyaro et al., 2017, Nakamba-Kabaso et al., 2017).

MAMOD aims to simulate the main taxes and benefits components of household disposable income in Malawi. The model allows simulating personal income tax, turnover tax, value-added tax and employee's contributions to the national pension scheme. In terms of benefits, the current version of the model only simulates the Social Cash Transfers from Government (Mtukula Pakhomo). Other policy instruments from the tax-benefit system in Malawi were not simulated because the information was not available, such as documented rules regarding targeting and selection of beneficiaries. Instruments which were not simulated were taken directly from the data.[15]

In terms of policy developments during the period under investigation, the government increased the benefit amount for the social cash transfer while the tax regime became less progressive. The government increased the coverage for the social cash transfer from 1 district

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

15 Instruments 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.

in 2005 to 18 districts in 2016. At the same time, the benefit amounts households were receiving increased. Changes regarding the social cash transfer are summarised in table 2.1.

Table 2.1: Benefits Amount for the Social Cash Transfer

	2005	2016
1 Member household	600	2,600
1 Member household	1,000	3,300
1 Member household	1,400	4,400
1 Member household	1,800	5,600
Incentive for each Prim. school going child	200	800
Incentive for each Sec. school going child	400	1500

Source: Ministry of Gender, Children, Disability and Social Welfare

On the tax side, changes included the adjustments of income tax brackets and the introduction of a turnover tax for small business in 2011. The major tax reforms that occurred during the period was a reduction of tax brackets to 3 from 4, thereby removing the highest income tax rate (see table 2.2 below). A turnover tax was introduced in 2011 which targeted small business with a turnover not exceeding than MK10 million (US$61 thousand). Most of these small businesses are deemed not to have been paying taxes before the introduction of the turnover taxes. The value-added tax (VAT) rate was reduced from 17.5% in 2004 to 16.5% in 2016.

Table 2.2 Income tax

2004		**2016**	
Rates		Rates	
0%	0 - 36,000	0%	0 - 240,000
10%	36,001 - 54,000		
		15%	240,001 – 300,000
20%	54,000 - 72,000		
		30%	300,001 +
39%	72,001 - 1,200,000		
40%	1,200,001 +		

Source: Authors own elaboration based on the 2004/2005 and 2016/2017 budget statements.

2.4.5 Decomposition

The aim of our study is to analyse the effects of the change in informal employment, unemployment levels and policies between 2004 and 2016 on income inequality and poverty. To achieve our objective, we use the recently developed tax-benefit microsimulation model for Malawi to simulate distributions of disposable income and to construct counterfactual situations which show what the income distribution would have looked like in 2016 if either tax-benefit policies or population characteristics and market incomes (the informal jobs and unemployment levels) had remained unchanged from 2004. We employ decomposition methods as suggested by Bargain and Callan (2010), Bargain (2012) and Bourguignon et al. (2008) to isolate the pure effects of the rise in informal jobs and unemployment rate on inequality and poverty. The decomposition analysis involves isolating tax-benefit policy effects from informality effects, unemployment effect and other effects (or population characteristics and market incomes). The other effects are population characteristics and market incomes which are not linked to informal jobs and unemployment. Thus, we have six simulated distributions of disposable income for our study, as highlighted in table 2.3 below.

We now describe how the simulated distributions of disposable income were constructed. Following the approach by Bargain and Callan (2010) and Bargain (2012) we define *y* as a matrix which describes the population contained in the data, such as gross income, socio-economic and demographic characteristics of the households excluding information on informal jobs and unemployment. We denote *l* as the informality status (whether the person is formal or informal) and u as the unemployment status (whether the person is unemployed or not). The structure of the tax-benefit system is denoted d, and policy parameters with monetary values are denoted p, such as benefit amounts or threshold level of tax brackets etc. The function for transforming gross income and household incomes into disposable income

while taking into account the structure of the tax-benefit system is $d(p, y, l, u)$. We define I as our variable of interest, such as inequality or poverty as measured, for instance, by the Gini coefficient or poverty headcount. The subscripts/superscripts 0 and 1 represent the start period and the end period, respectively. Thus, the total change in the welfare index between periods 0 and period 1 is characterised as:

$$\Delta I = I[d_1(p^1, y^1, l^1, u^1)] - I[d_0(p^0, y^0, l^0, u^0)] \quad (2.1)$$

The change in (2.1) can be decomposed to into the contribution arising from policy changes (tax benefit policy effect), the impact of changes in labour informality (informality effect), changes due to unemployment developments (unemployment effects), the contributions of changes in population characteristics and market incomes (other effects), and the effect of income growth capturing the effect of uprating incomes in year 0 to nominal levels of year 1. This involves adding counterfactual distributions between the observed distributions in (2.1). In the counterfactual scenarios, tax benefit policies of 2004 are applied to gross market incomes of 2016. In order to make these comparable we adjust income levels of 2004 by an uprating factor α = the income growth rate between 2016 and 2004. More formally, the decomposition can be written as:

$$\begin{aligned}
\Delta I = {} & I[d_1(p^1, y^1, l^1, u^1)] - I[d_0(\alpha^1 p^0, y^1, l^1, u^1)] && \text{(Policy effects)} \quad (2.2)\\
+ {} & I[d_0(\alpha^1 p^0, y^1, l^1, u^1)] - I[d_0(\alpha^1 p^0, y^1, l^0, u^1)] && \text{(Informality effects)}\\
+ {} & I[d_0(\alpha^1 p^0, y^1, l^0, u^1)] - I[d_0(\alpha^1 p^0, y^1, l^0, u^0)] && \text{(Unemployment effects)}\\
+ {} & I[d_0(\alpha^1 p^0, y^1, l^0, u^0)] - I[d_0(\alpha^1 p^0, \alpha^1 y^0, l^0, u^0)] && \text{(Other effects)}\\
+ {} & I[d_0(\alpha^1 p^0, \alpha^1 y^0, l^0, \alpha^1)] - I[d_0(p^0, y^0, l^0, u^0)] && \text{(Income growth)}
\end{aligned}$$

The first term measures the policy effects between 2004 and 2016 conditional on data from 2016. The second captures the impact of changes in informality between 2004 and 2016.

The third term captures the contribution of unemployment changes. The fourth term captures all other effects related to demographic and labour market changes which are not linked to informality and unemployment. The fifth term measures the effect of uprating initial incomes to end year nominal levels. This term however does not affect the decomposition because if the function $d(p, y, l, u)$ is linearly homogenous in p, y , l and u as simultaneous change in nominal levels of both incomes and parameters does not affect the relative location of household distribution of disposable incomes hence the term drops out of the decomposition (Bargain, 2012).

To construct the counterfactual of having the same proportion of informal workers in 2016 as in 2004 (the second term in 2.2 above) we employed reweighting method as proposed by Bourguignon et al. (2008). Unlike other decompositions that work on means alone, reweighting works on the entire distribution, thus we construct a counterfactual density that would have prevailed in 2016 if the characteristics of the informal workers and unemployed persons remained as in 2004 (Dinardo et al., 1996).[16] Bourguignon et al. (2008) posit that working with the entire distribution as obtained using the reweighting method is useful when trying to understand differences across household incomes.

The reweighting was done in Stata using the Stata command reweight2 which uses an algorithm defined in Gomulka (1992).[17] The method uses a minimum distance function to minimise the difference between base year weights and end year weights. Specifically, the weights in the end year (2016) are adjusted, so that share of people in informal jobs and the unemployment rate corresponds to the proportion in the base year (2004). In addition to the amount of those with informal jobs and unemployed, we controlled for age, household composition and sex. Thus, we construct a counterfactual scenario where the population of

[16] Table 2.C1 in the appendix shows that the characteristics of the old and new unemployed are the same.
17 The reweight2 command was developed by Browne (2012).

2016 has the same share of informal jobs as in 2004 $[d_0\,(\alpha^1 p^0, y^1\,, l^0, u^1)]$. The second counterfactual distribution constructed using reweighting has the same proportions of informal jobs and unemployment rate in 2016 as in 2004 $[d_0\,(\alpha^1 p^0, y^1\,, l^0, u^0)]$. Table 2.3 below summarises the simulated disposable incomes that we constructed for our analysis.[18]

Table 2.3: Summary of Scenarios

Scenario	Data			Tax-Benefit Policies			Notation
	Year	Uprated	Uprated to year	Year	Uprated	Uprated to year	
1	2004	No	-	2004	No	-	$d_0(p^0, y^0, l^0, u^0)$
2	2004	Yes	2016	2004	Yes	2016	$d_0(\alpha^1 p^0, \alpha^1 y^0, l^0, u^0)$
3	2016	No	-	2004	Yes	2016	$d_0(\alpha^1 p^0, y^1, l^1, u^0)$
4	2016	No	-	2004	Yes	2016	$d_0(\alpha^1 p^0, y^1, l^0, u^1)$
5	2016	No	-	2004	Yes	2016	$d_0(\alpha^1 p^0, y^1, l^0, u^0)$
6	2016	No	-	2016	N0	-	$d_1(p^1, y^1, l^1, u^1)$

Notes: Table does not follow the order of simulated distributions in equation 2.2.

Source: Authors own elaboration

The decomposition is path-dependant, meaning the change in the welfare indicator can be decomposed by conditioning the population characteristics and market incomes on either end or start period policies (Tasseva, 2019). Our method above has conditioned the data on start period policies. We present in appendix 2.F the methodology and results when conditioning it on end period policies.

2.5 Results

Section 2.5 presents the main findings of our decomposition analysis. We begin by highlighting the main characteristics of the Malawi economy and how they have changed

[18] Table 2.3 does not follow the order of simulated distributions in equation 2.2. The order in which the simulated distributions are taken into account, as in equation 2.2, is very important.

between 2004 and 2016. We then document changes in inequality and poverty based on our simulated disposable incomes from MAMOD. We examine the results from the decomposition, analysing how much of the change in inequality and poverty is attributed to changes in tax-benefit policies and other effects, in particular informal jobs and changes in the unemployment rate. We finally look at the marginal effects of the tax-benefit system.

2.5.1 Population changes in Malawi between 2004 and 2016

We first discuss how the size and age composition of the population in Malawi has changed between 2004 and 2016 based on MAMOD (see figure 2.A1 and table 2.A1). We find that the population of Malawi grew from 12.7 million in 2004 to 16.3 million in 2016, representing an increase of 28.3%. The observed rise in the total population was accompanied by an increase in the number of persons of working age, i.e., 15 to 64 years old (from 6.8 million in 2004 to 9 million in 2016) as well as an increase in children younger than 15 (from 5.8 million to 7.3 million). Overall, figure 2.A1 shows that the population is wider at the younger age groups than at the older age groups. 44.8% of the population is below the age of 15, indicating that Malawi has a young population structure. Fertility declined as the percentage of children aged 0 to 4 years was much lower in 2016. In terms of gender, table 2.A1 shows that 49.2% were males, and 50.8% were females in 2004. The proportion of women rose to 52% in 2016 while that of men decreased to 48.0%.

Next, we discuss population characteristics pertaining to residence, labour, education and health (see table 2.A2). Most of the Malawi population lives in rural areas. About 87.7% of people lived in rural areas while 12.3% lived in urban areas in 2004. By 2016 the share of those living in urban areas rose to 19.0%. Most of the Malawian population (about 70%) have not completed any kind of formal education. Little progress has however been made in terms of completing primary and secondary. In 2004, only 9.8% of the population had completed

primary education, and the figure rose to 11.3% in 2016. The percent of the population who completed secondary education was 7.6% in 2004 and increased to 9.7% in 2016. 8.9% of the population had completed education above secondary in 2016 up from 4.2% in 2004. Looking at health, table 2.A2 shows that the mortality rate declined between 2004 and 2016 as 13.5% of the household in 2004 reported death in the family during the preceding 2 years compared to 5.5% who reported death in the family in 2016.

These population trends are significantly affecting the structure of the Malawian labour market. The rising amount of active population means the Malawian labour force is high thereby raising a growing concern about the capacity of the Malawian economy to create enough jobs to match the labour supply. Table 2.4 below shows that the labour force participation rate in Malawi is around 87%. The male participation has remained approximately 88% between 2004 and 2016, while the female participation was lower in 2016 at 85.3% compared to 87.7% in 2004.

Table 2.4: Summary of Labour Market Changes

	2004	2016
Informal Employment	29.7	42.3
Unemployment Rate	5.1	16.6
Male	4.1	12.6
Female	6.2	20.3
Labour Force Participation Rate	87.8	86.5
Male	87.9	87.7
Female	87.7	85.3
Dependency Ratio	99.6	96.9

Source: Authors own calculation using MAMOD

Using MAMOD, we find that 29.7% of the active population was involved in *ganyu* labour in 2004 and this rose to 42.3% in 2016. In terms of gender, we observe that unlike other studies on informality in developing countries (Kan and Tansel, 2014, Cassim et al., 2016) we find that share of males engaged in informality was higher between the two periods.

In 2004 the ratio between men and women involved in *ganyu* was 57.4% for males to 42% for women. The gap however marginally narrowed in 2016 as the share of men involved *in ganyu* was 52.7% and for women was 47.3%.

When *ganyu* is disaggregated by age, we observe that it's mostly the young and the middle-aged workers that are suppliers of the *ganyu* labour compared to the elderly workers. Informality rate is the highest for the 20-24 age-group followed by the 15-19 age groups and declines progressively as age increases. The rate increased slightly for elderly workers in 2016 compared to 2004. The overall distribution is, however, the same between the two periods meaning that the young and the middle-aged are the main suppliers of informal jobs.

Informality in Malawi like in most countries is strongly associated with education levels. 85.3% of the individuals involved in *ganyu* in 2004 did not have any kind of education and the rate decreased slightly to 78.1% in 2016. The share falls progressively as educational attainment increases. This evidence is consistent with the fundamental premise that informality is mostly a low-skill phenomenon (Acar & Tansel, 2014).

Turning to unemployment, we find that the unemployment rate rose from 5.1% in 2004 to 16.6% in 2016. Our results are in line with official figures. According to the government of Malawi reports the unemployment rate in Malawi was 7.8 % (NSO, 2005) in 2004 and rose to 18.5% in 2018 (NSO, 2018). Most of the unemployed people reside in rural areas, they are young and have less education than their counterparts who are employed.

2.5.2 The evolution of inequality and Poverty in Malawi

Following the demographic development, we now look at the evolution of inequality and poverty. The results presented in the following sections are based on the concept of disposable income. Disposable income is defined as market income minus income taxes and Social Insurance Contributions (SIC) plus cash benefits. As a robustness check, results based on

post-fiscal income, that is disposable income less indirect taxes, are shown in figures 2.D1 and 2.D2 in the appendix. Additionally, we present results of based on an alternative definition of informality in figures 2.E1 and 2.E2 in the appendix. We find that the results are consistent with those focussing on disposable income

Table 2.5 shows different measures of inequality based on simulated equivalised household disposable income from MAMOD.[19] We looked at three measures; the Gini coefficient, the Atkinson Index with aversion parameters equal to 0.5 and 1. Inequality increased between 2004 and 2016 according to the measures used. Inequality measured by the Gini coefficient rose from 73.4% to 76.1%.

From 2004 to 2016, Malawi's poverty headcount of disposable income (FGT0) dropped from 89.8% to 75.4% (Table 2.5). The trends are similar when the poverty gap (FGT1) and poverty severity also known as squared poverty gap (FGT2) are used to measure poverty. Poverty levels as measured by the poverty gap declined from 70.2% in 2004 to 48.8% in 2016. The poverty gap is interpreted as the amount of money required to get those below the poverty line out of poverty. The poverty severity measure also declined significantly from 59.7% in 2004 to 36.9% in 2016. Our results are in line with other studies in the literature which found the same dynamics in poverty incidence. Unlike our study, these other studies measured poverty by comparing a household's annual consumption per capita with the national poverty lines (UCW, 2018, World-Bank, 2016).

[19] Household per income equivalent scale is used.

Table 2.5: Inequality and Poverty

	Inequality			*Poverty*		
	Gini	Atkinson (0.5)	Atkinson (1)	FGT0	FGT1	FGT2
Observed 2004	73.4	47.4	71.7	89.5	70.2	59.7
Observed 2016	76.1	53.4	73.6	75.4	48.8	36.9
Change 2004-2016	2.7	6.0	1.9	-14.1	-21.4	-22.8

Source: Authors own calculation using MAMOD

2.5.3 Decomposition Results

Figure 2.1 provides the results of decomposing total changes in inequality into the contribution of tax-benefit policies, informality, unemployment and other effects,[20] We find that changes in the share of the active population employed in the informal sector contributed to increase inequality by 5.2%. As pointed by Dell'Anno (2016), high levels of inequality are associated with high levels of informal jobs. The high levels of informal jobs entail low tax revenue for government, weakened redistributive policy and subsequently high inequality. Government policy should therefore create a conducive environment for transitioning from informal to formal jobs. As Rosser Jr et al. (2000) notes, this, in turn, involves having a fair rather than an arbitrary tax system. Formalisation policy should also ensure an easy transitioning process. The challenge in Malawi is related to burdensome transaction costs of registering a business, if these were reduced could help with the formalisation (Campos et al., 2018). Formalisation would increase the tax base engendering effective redistributive polices. On the other hand, one may question why the high levels of informality are not reducing

20 Results based on post fiscal income can be found in appendix 2.D.

Results based alternative definition of informality are in appendix 2.E.

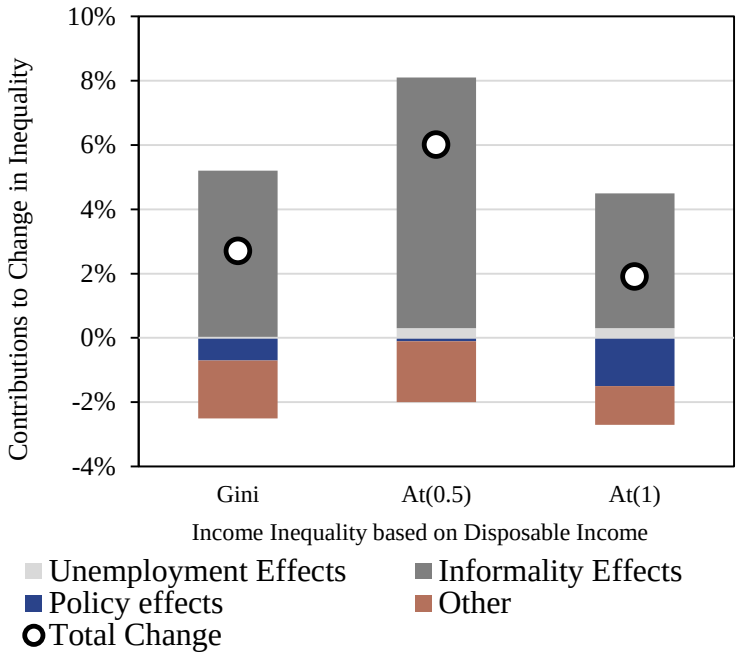
Results for decomposition when conditioning is on end period policies are in appendix 2.F.

inequality since they are a source of income for the unemployed? This is not the case in Malawi because the wages in the informal sector are very low, commensurate with the low levels of education of those in the sector. As pointed out by UCW (2018), individuals with higher education earn 133% more than those with primary education.

Turning to unemployment, our results also show that the increase in the unemployment rate had the effect of increasing inequality. As figure 2.1 shows, this was especially the case when the Atkinson's measures of inequality with aversion parameters equal to 0.5 and 1 are used. Our results are similar to Tregenna (2011) who found that increases in unemployment rate account for 77% of increased in earnings inequality in South Africa. This is also supported by Chibba and Luiz (2011), they found that labour market issues, in particular unemployment, are responsible for driving most of the inequality. They found that wage income contributed about 67% of inequality and was mostly driven by households with no income. Addressing this labour market problem will assist in dealing with inequality.

We further find that the policies implemented between 2004 and 2016 and other changes in population characteristics and market income had the effect of reducing inequality (see figure 2.1). Policies implemented counteracted the increase inequality by 0.7% when Gini Coefficient is used as a measure of inequality. If the policies were not implemented, inequality would have increased by 3.4%. We obtain similar policy effects when we use other measures of inequality. Other effects were found to have a reducing effect on inequality. If it was not for the changes in other population characteristics and market incomes, inequality would have been lower by 1.8%. Future work will thus involve decomposing other effects further to determine the main contributors to the changes in inequality.

Figure 2.1: Decomposing Inequality Changes

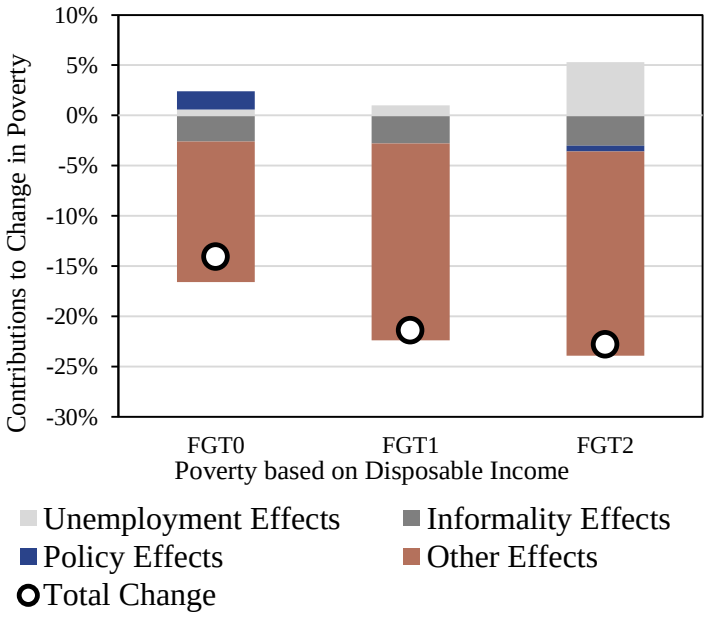


Source: Authors own calculation using MAMOD

We now turn to decomposing changes in extreme poverty. As figure 2.2 indicates, changes to other population characteristics and market incomes were the main contributor to lower poverty levels in 2016. As mentioned above, extensions of these research will include decomposing other effects further. Changes in informal jobs contributed 2.6% to the decrease in poverty as measured by the headcount index. The effect is similar when the poverty gap and poverty severity (also known as squared poverty gap) are used. While incomes are low for those in informal jobs, the earnings from such jobs managed to keep a few households above the extreme poverty line, thereby contributing to reducing extreme poverty, especially for those that were unemployed before working in the informal sector. However, as some studies suggests, the high levels of informality are associated with low productivity and output growth which results in more informality and higher levels of poverty (Özgür et al., 2021). Thus, while the increase in informal jobs contributed to the decreases in poverty most of the empirical evidence suggest that high informality can be an economic trap in developing

contraries (World Bank, 2019). The indigence levels could have been lower if it was not for the contribution from changes in unemployment rate. The rise in unemployment rate had the effect of increasing poverty (see figure 2.2). Our results are consistent with the study on South Africa by Kingdon and Knight (2004) who found that a remarkable increase in unemployment rate, and the associated fall earnings, raised the number of households who fell into poverty. Thus, job creation policies should be a major concern of government to alleviate poverty. Policy changes had the effect of increasing poverty, especially when the headcount and poverty gap measures are used. These results are consistent with our findings in chapter 1 where we found that the tax-benefit system of Malawi increases poverty.

Figure 2.2: Decomposing Poverty Changes



Source: Authors own calculation using MAMOD

2.5.4 Marginal Contributions of tax-benefit policies

In table 2.6 we present the effects of specific tax-benefit instruments on income inequality based on each of the scenarios. This table is an extension of table 2.3 above. In deriving the marginal contribution of each instrument, we take the difference between inequality of

disposable income and inequality of income before benefit is added or before income taxes and social insurance have been deducted (Bargain et al. 2017, Lambert, 2001). In all the scenarios, our results show that income tax has the largest effect of reducing inequality. Income taxes reduce inequality the most (3.6 points) in the 2016 baseline scenario. Surprisingly, social assistance benefits had the effect of increasing inequality as reflected by a positive sign of their marginal contributions in most of the scenarios. However, we find that social benefits contributed 1.5 points to the reduction in inequality in the 2016 baseline scenario. As previously mentioned, social assistance benefits in the 2016 baseline scenario were characterised by a higher benefit amount and a wider coverage, compared to the 2004 baseline scenario.

Table 2.6: Effects of Tax-Benefit Instruments on Inequality

Scenario	Notation	Marginal Contributions		
		Benefits	Income Tax	SIC
1	$d_0(p^0, y^0, l^0, u^0)$	0.7	-2.9	0.0
2	$d_0(\alpha^1 p^0, \alpha^1 y^0, l^0, u^0)$	0.7	-2.9	0.0
3	$d_0(\alpha^1 p^0, y^1, l^1, u^1)$	-0.1	-3.4	0.0
4	$d_0(\alpha^1 p^0, y^1, l^0, u^1)$	0.2	-2.8	0.0
5	$d_0(\alpha^1 p^0, y^1, l^0, u^0)$	0.2	-2.8	0.0
6	$d_1(p^1, y^1, l^1, u^1)$	-1.5	-3.6	-0.3

Source: Authors own calculation using MAMOD

Turning to poverty, we find in table 2.7 that social assistance benefits contributed to a decrease in poverty. The effect for social assistance benefits was, however, very small. The marginal contributions of benefits to the reduction in poverty was higher for the 2016 baseline compared with the 2004 baseline scenario. Direct taxes had the effect of increasing poverty. The effect was also very small, while some scenarios show no impact at all. Our findings are in line with Bargain et al. (2017) who found social assistance contributed to the decline in

poverty in Ecuador and Columbia, while income taxes tended to increase absolute poverty in both countries

Table 2.7: Effects of Tax-Benefit Instruments on Poverty

Scenario	Notation	Marginal Contributions		
		Benefits	Income Tax	SIC
1	$d_0(p^0, y^0, l^0, u^0)$	-0.2	0.5	0.0
2	$d_0(\alpha^1 p^0, \alpha^1 y^0, l^0, u^0)$	-0.2	0.5	0.0
3	$d_0(\alpha^1 p^0, y^1, l^1, u^1)$	-0.7	0.0	0.0
4	$d_0(\alpha^1 p^0, y^1, l^0, u^1)$	-0.6	0.0	0.0
5	$d_0(\alpha^1 p^0, y^1, l^0, u^0)$	-0.6	0.0	0.0
6	$d_1(p^1, y^1, l^1, u^1)$	-0.5	1.4	0.3

Source: Authors own calculation using MAMOD

2.6 Conclusion

Using data from the second and the fourth integrated household surveys, this chapter has analysed the effects of an increase in the share of informal labour and unemployment on the distribution of income over time. The amount of people with informal jobs in Malawi rose by 12.6 percentage points while unemployment rate rose by 11.5 percentage points between 2004 and 2016. Using a decomposition approach, we assessed the contribution of changes in informality, unemployment, policies and other effects on welfare indicators. We constructed counterfactual scenarios of what the income distribution would be in 2016 if the proportion of individual employed in the informal jobs and unemployment levels was equal to that observed in 2004. We find that increase in informal employment and unemployment levels contributed to the increase in inequality in Malawi while policies had the opposite effect on inequality. Looking at marginal contribution of the tax-benefit instruments we found the income taxes had the effect of reducing inequality while social benefits reduced poverty levels.

The expansionary effects of higher *ganyu* workers on inequality are a major concern to policymakers in their efforts to narrow inequality. Income taxes were found to reduce inequality entailing that the government should aim to make the taxes more progressive to achieve its objective of narrowing inequality. However, this requires an increase in that tax base, thus government policy should also be geared towards job creation and providing incentives to transition from informal jobs to formal. A measured approach will however be required, as highlighted by (Dell'Anno, 2016), badly designed informality reducing policies may increase inequality.

In terms of poverty, we find that the increase in informality contributed to lower poverty levels while the rise in unemployment had an expansionary effect. Though lower, the income earned from informal jobs helped other households to push some households above the extreme poverty line. Thus, in the absence of government creating enough formal jobs for low skilled individuals, informal jobs are a source of income for many who otherwise would have been destitute. However, we argue that formalisation of the informal sector engenders effective redistribution polices, hence our recommendation that policy should focus on formal jobs creation. Benefits were also found to decrease poverty levels. Expanding social protection programs in Malawi will help government in achieving its poverty reduction goals.

Further research will involve decomposing the other effects further to determine the major contributor to the changes in poverty. Understanding better the transition from this kind of informality to formality will also assist in understanding the effects of informality on inequality/poverty and also deal with concerns raised that badly designed policies of reducing informality can lead to an increase in inequality. Thus, further research can utilise panel data to analyse the extent of transitions into and out of *ganyu* and formal employment.

Some caveats need to be noted. Our study looks at the changes over a long period of time which can be impacted by subtle changes in survey questions by collecting agency. Our

study also only looks at the effects not the causal relation. Lastly, our analysis is a static in that we do not consider future effects that come from the changes today. However, the analysis provides the policymaker with key evidence of morning-after effects of the changes in informality and unemployment on poverty and inequality.

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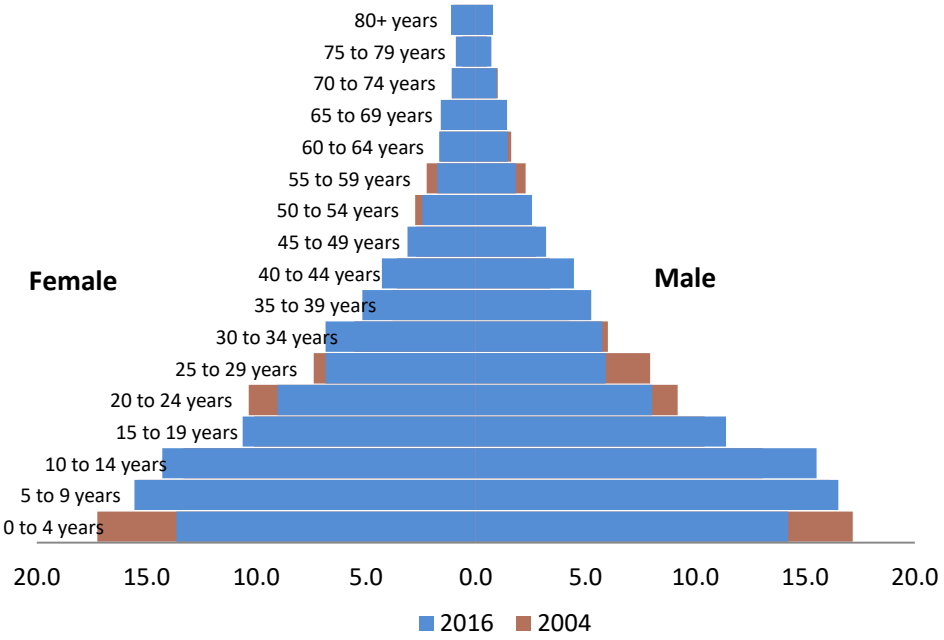
Appendix

2A: Demographic Developments

Figure 2.A1: Population Pyramid 2004 and 2016: Percent of Total Population



Source: Authors own calculation using MAMOD

Table 2.A1: Overview of the Population Characteristics

	2004	**2016**
Women	50.8	52.0
Men	49.2	48.0
Average age	21.3	22.3
Aged 0-9	33.0	29.9
Aged 10-19	23.5	25.9
Aged 20-29	17.4	15.0
Aged 30-39	9.8	11.5
Aged 40-49	6.2	7.5
Aged 50-59	4.8	4.3
Aged 60-69	2.8	3.1
Aged 70+	2.5	2.8
Children(0-2)	10.7	8.3
Children(3-5)	9.8	8.7
Children(6-14)	25.7	27.8

Source: Authors own calculation using MAMOD

Table 2.A2: Characteristics of the Malawi Population

	2004	2016
Place of Residence		
Rural	87.7	81.0
Urban	12.3	19.0
Highest Level of Education Completed		
None	78.4	70.0
Primary	9.8	11.3
Secondary and above	11.8	18.7
Health		
HH's. reported death	13.6	5.5

Source: Authors own calculation using MAMOD

2.B Education System in Malawi

Malawi operates on an 8-4-4 system. Primary school is for 8 years. Children start primary at age 6. At the end of primary school those who qualify are award Primary School Leaving Certificate (PSLC). Most pupils start secondary education at the age of 14. Secondary education is for 4 years, after the first two-year students write the Malawi Junior Certificate of Education (JCE). Two years further on following successful completion students are awarded the Malawi School Certification of Education (MSCE). Those with good grades on MSCE are chosen to the University and are awarded a University Diploma, Degree at the end of 4 years. Due to limited places at universities, those who are not selected to the universities pursue vocational training or other training and obtain on non-university diploma.

2.C Characteristics of the old and new unemployed

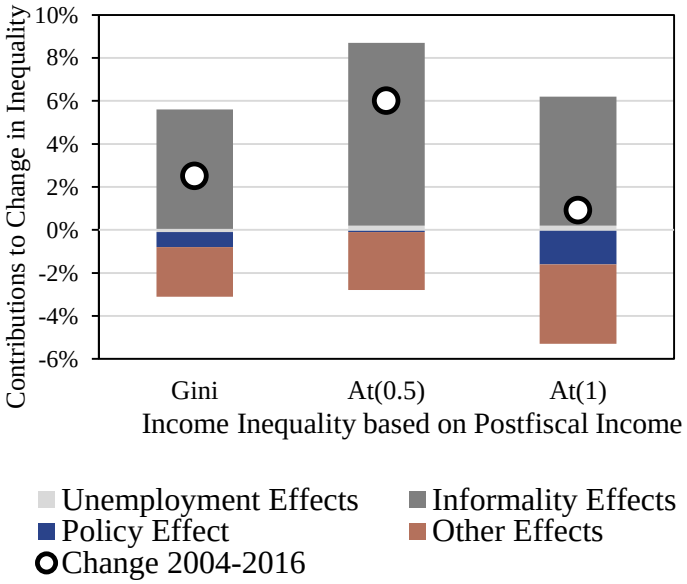
Table 2.C1: Characteristics of the old and new unemployed

	OLD	NEW
Age		
Average age	30.2	30.3
Gender		
Female	63.7	62.8
Male	36.3	37.2
Highest Level of Education Completed		
None	79.5	78.8
Primary	9.9	9.6
lower secondary	7.4	7.9
Upper secondary	2.9	3.2
Post secondary diploma	0.2	0.2
Tertiary, University degree, Masters, PhD	0.1	0.1

Source: Authors own calculation using MAMOD

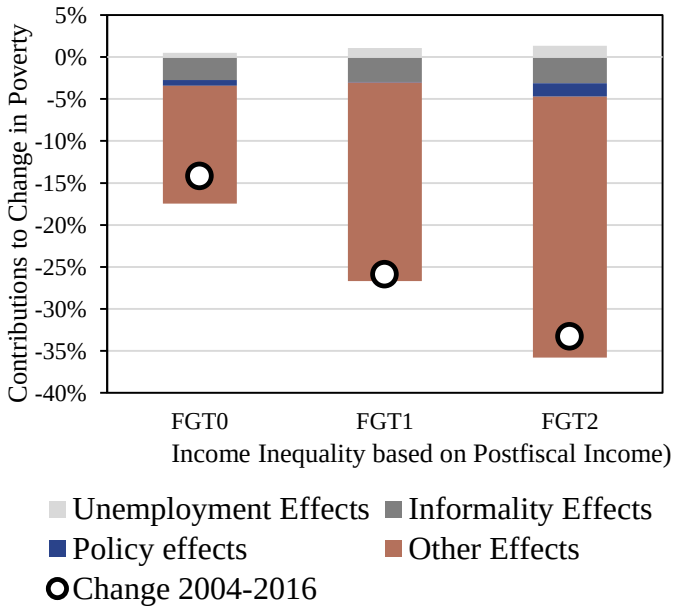
2.D. Post-fiscal Income Analysis

Figure 2.D1: Decomposing Inequality Changes



Source: Authors own calculation using MAMOD

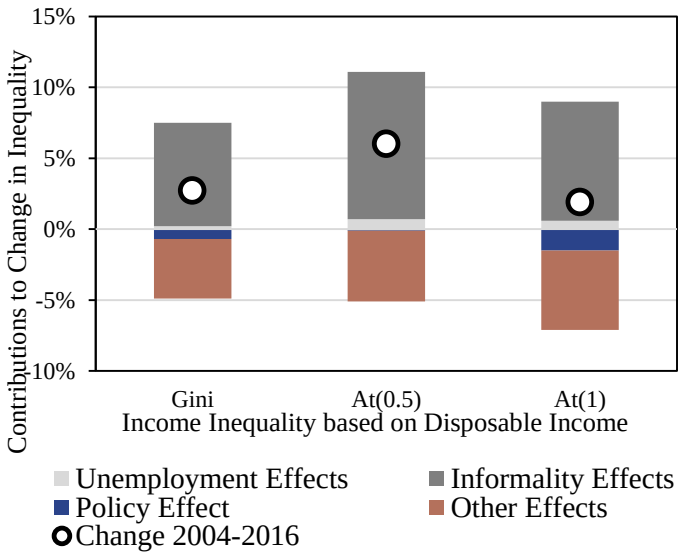
Figure 2.D2: Decomposing Poverty Changes



Source: Authors own calculation using MAMOD

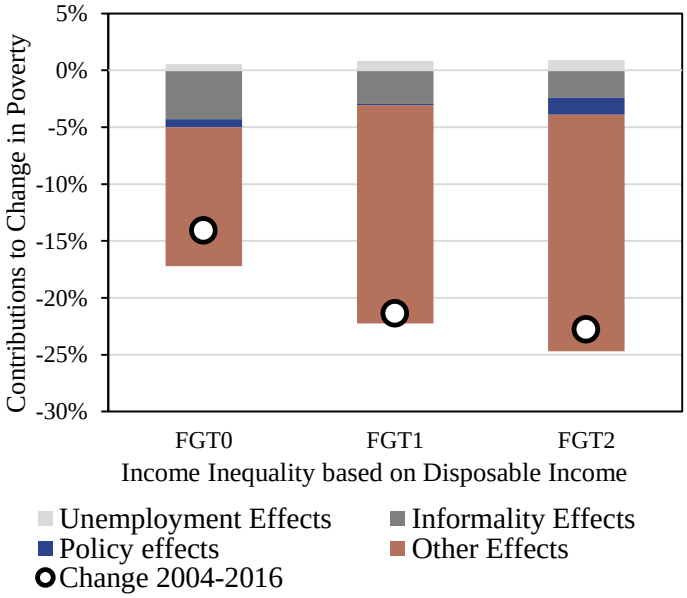
2.E. Analysis based on alternative definition of informality

Figure 2.E1: Decomposing Inequality Changes



Notes: Informality define as own-account workers and contributing family workers. Using this definition, informality rose from 25% in 2004 to 29% in 2016.
Source: Own calculations using MAMOD

Figure 2.E2: Decomposing Poverty Changes



Notes: Informality define as own-account workers and contributing family workers. Using this definition, informality rose from 25% in 2004 to 29% in 2016.
Source: Own calculations using MAMOD

2.F Decomposition II

Results of the decomposition on the effects of informality changes on poverty and inequality maybe path dependent. We, therefore, assess the effects of changes on income and informality when we condition the data on end period policies. As can be seen from Tables 2.A1, 2.A2 and 2.A3 that are results are consistent with earlier decomposition in section 3.4. Changes in informal jobs lead to high inequality and lower poverty levels. We also find that policy implemented had the effect of decreasing poverty while changes in population characteristics and market incomes led to increase in inequality. In terms of the effect of tax-benefits instruments, we find that when benefits of 2016 are applied to data of 2004 has the effect of reducing inequality. Overall benefits contribute to a decrease in poverty as was the case in the earlier decomposition

$$\Delta I = I[d_1(p^1, y^1, l^1, u^1)] - I[d_1(p^1, \alpha^1 y^0, l^1, u^1)] \quad \text{(Other effect)}$$

$$+ I[d_1(p^1, \alpha^1 y^0, l^1, u^1)] - I[d_1(p^1, \alpha^1 y^0, l^0, u^1)] \quad \text{(Informality effect)}$$

$$+ I[d_1(p^1, \alpha^1 y^0, l^0, u^1)] - I[d_1(p^1, \alpha^1 y^0, l^0, u^0)] \quad \text{(Unemployment effect)}$$

$$+ I[d_1(\alpha^1 p^0, y^1, l^0, u^0)] - I[d_0(\alpha^1 p^0, \alpha^1 y^0, \alpha^1 l^0, \alpha^1 u^0)] \quad \text{(Policy effects)}$$

$$+ I[d_0(\alpha^1 p^0, \alpha^1 y^0, \alpha^1 l^0, \alpha^1 u^0)] - I[d_0(p^0, y^0, l^0, u^0)] \quad \text{(Income growth).}$$

Table 2.F1: Decomposition of Inequality and Poverty Changes (Decomposition II)

	Inequality			*Poverty*		
	Gini	Atkinson (0.5)	Atkinson (1)	FGT0	FGT1	FGT2
Change 2004-2016	2.7	6.0	1.9	-14.1	-21.4	-22.8
Policy effects	-0.8	-0.8	-2.5	1.3	0.7	-0.1
Informality effects	1.5	2.3	1.5	7.2	11.9	12.7
Unemployment effects	3.1	4.0	3.0	-8.0	-12.5	-13.4
Other effects	-1.1	0.5	-0.1	-14.7	-21.5	-22.0

Source: Authors own calculation using MAMOD

Table 2.F2: Effect of tax-benefit Instruments on Inequality (Decomposition II)

Scenario	Notation	Marginal Contributions		
		Benefits	Income Tax	SIC
1	$d_0(p^0, y^0, l^0, u^0)$	0.7	-2.9	0.0
2	$d_0(\alpha^1 p^0, \alpha^1 y^0, l^0, u^0)$	0.7	-2.9	0.0
3	$d_1(p^1, \alpha^1 y^0, l^0, u^0)$	-0.1	-2.7	0.0
4	$d_1(p^1, \alpha^1 y^0, l^o, u^1)$	-3.8	-2.1	0.0
5	$d_1(p^1, \alpha^1 y^0, l^1, u^1)$	-3.0	-3.3	0.0
6	$d_1(p^1, y^1, l^1, u^1)$	-0.5	-3.6	-0.3

Source: Authors own calculation using MAMOD

Table 2.F3: Effects of tax-benefit Instruments on Poverty (Decomposition II)

Scenario	Notation	Marginal Contributions		
		Benefits	Income Tax	SIC
1	$d_0(p^0, y^0, l^0, u^0)$	-0.2	0.5	0.0
2	$d_0(\alpha^1 p^0, \alpha^1 y^0, l^0, u^0)$	-0.2	0.5	0.0
3	$d_1(p^1, \alpha^1 y^0, l^0, u^0)$	-0.2	1.9	0.0
4	$d_1(p^1, \alpha^1 y^0, l^o, u^1)$	-0.2	1.8	0.0
5	$d_1(p^1, \alpha^1 y^0, l^1, u^1)$	-0.2	1.8	0.0
6	$d_1(p^1, y^1, l^1, u^1)$	-0.5	1.4	0.3

Source: Authors own calculation using MAMOD

Chapter 3

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

3.1 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.[21] 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

21 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

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 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 scenarios are based on responses to a question in the survey. In the first scenario all reported job losses are attributed to COVID-19, second scenario exclude job losses reported to be potentially unrelated to COVID-19 and the final scenario analysed job loss that were reported to be 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). Estimates of the effects of the crisis on job losses derived from the HFPS COVID-19 and IHPS-2019. The IHPS-19 was collected just before the pandemic while the HFPS COVID-19 was collected during the pandemic and they both use the same sample. We therefore observe individuals employment status before and after the crisis from these two data sets. This information is then used to construct a dataset for our microsimulation model which reflects the situation during the

pandemic, by adjusting the IHS5 data.[22] 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.[23] 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 shows 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, such as: 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

[22] The IHS is the main data source for the Malawi Tax -benefit microsimulation model.

[23] 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 3.A5 and 3.A6 in the appendix.

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.

The rest of the paper is organised as follows. Section 3.2 presents review of research on the distributional effects of COVID-19. Section 3.3 presents a brief discussion of social protection, tax system and government policy response to the COVID-19 pandemic, while Section 3.4 discusses the data and the empirical model employed in the paper. Section 3.5 presents and discusses our findings. In section 3.6, we discuss the policy implications of our key results and conclude with directions for next step of our study.

3.2 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.

3.3 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.

3.3.1 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 are 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 (MK) 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)[24] 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). 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[25]. 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.

3.3.2 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.

[24] 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.

[25] 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.

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 2011/12 budget to cater for small taxpayers with a turnover of K10 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 and (ii) incomes of incorporated companies.

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 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.[26]

26 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

3.3.3 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 also known as the COVID-19 Urban Cash Initiative (CUCI), of about $50 million (0.6% of GDP) was implemented to support small businesses in major urban areas (GOM, 2020b). The intervention targeted peri-urban areas covering approximately 172,337 households, each receiving a monthly sum of K35,000.00 (US$40), matching the countries minimum wage, for a total of three months.[27] The intervention targeted the urban poor in four cities, Lilongwe, Blantyre, Zomba and Mzuzu. The Emergency Cash Transfer used geographic and socioeconomic indicators to register 35% of the population in the four key cities. Geographic eligibility was determined by poverty hotspots, and household eligibility was based on financial indicators and structural factors. Specifically, the Emergency Cash Transfers targets those who primarily derive their livelihoods from the informal sector, especially those who depend on piecework, petty trading or those who may have been laid off

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.

[27] See https://www.africanews.com/2020/04/29/malawi-launches-40-cash-transfer-to-cushion-the-poor/ Assessed on 12/07/2022.

from work (Paul 2021). 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 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.

3.4 Methods and data

3.4.1 Data

For our analysis we use three data sources, the Fifth Integrated Household Survey (IHS5), the Integrated Household Panel Survey (IHPS-2019) 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 first data source, the IHS5, is the main data source for the Malawi tax-benefit microsimulation model

(MAMOD), and it has 11,434 households, this data source gives us before the COVID-19 scenario. The IHS5 is a cross-sectional survey. The second data source used is the IHPS-2019 which was collected alongside the IHS5 and this is a longitudinal survey. In 2011, a sub-sample of IHS sample of 3,178 households was selected with the intention to track and resurvey. The IHPS-2019 has exactly same information as the IHS5 the only difference is number of households. The IHPS-2019 is therefore also our before COVID scenario with just fewer households. The information for our COVID scenario is derived from our third data source HFPS COVID-19, which was conducted from June 2020. The survey aimed to contact all individuals who were interviewed during the IHPS-2019 (our second data source). Thus we are able to see changes in individuals status (i.e. employment status) between our second data source (IHPS-2019) and our third data source (HFPS COVID-19). However, the (IHPS-2019) and (HFPS COVID-19) are not the main data source of the Malawi tax-benefit microsimulation (MAMOD), we therefore use the observed changes between our second data source and our third data source to adjust our first data source (IHS5) and create our COVID-19 scenario based on IHS5. We expand on how this was done in section 3.4.3. Below we however describe the three data sources in detail.

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 2019/2020 (IHPS-2019) 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 (IHS5) 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 2020. 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 scenarios we will adjust labour market in the IHS5 to reflect the situation reported in the HFPS COVID-19.

3.4.2 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 (Decoster et al., 2019). 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.[28] 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.[29] At the moment MAMOD covers policy years 2004, 2010, 2016 and 2019 for tax-benefit simulations. As alluded to above,

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

29 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.

government is implementing several measures to mitigate the impact of the COVID-19 pandemic on the population. For our study, we have only simulated the Emergency Cash Transfer which also known as the COVID-19 Urban Cash Initiative (CUCI). 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 scenarios.

3.4.3 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 responses to a question the survey and the subsequent supporting materials for HFPS COVID-19 data provided by the National Statistics offices of Malawi (NSO). In the survey, respondents were asked to provide reasons for losing their jobs. Based on the responses we have three scenarios. In the first scenario (Scenario 1) we attribute total loss in employment to the COVID-19 pandemic, 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 reported to be 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 3.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.[30]

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.

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 3.A1 in the appendix) we find that females have a

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

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 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[31]. 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 decomposition method proposed by Bargain and Callan (2010) and its extension

31 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

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:

$$B = y - t(y) + b(t, y) \tag{3.1}$$

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:

$$D = y_i' - t(y_i') + b''(t, y_i') \tag{3.2}$$

The impact of the crisis can then be derived by taking the difference between 3.1 and 3.2.

$$D - B$$

$$y_i' - t(y_i') + b''(t, y_i') - (y - t(y) + b(t, y)) \quad (3.3)$$

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.

$$C = y_i' - t(y_i') + b(t, y_i') \quad (3.4)$$

To isolate the contribution of the policy changes and other changes we add and subtract C to 3.3

$$D - C \quad + \quad C - B \quad (3.5)$$

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

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).

$I[y_i' - t(y_i') + b''(t, y_i')] - I[(y_i' - t(y_i') + b(t, y_i'))]$ (policy effects)

$+[y_i'] - I[(y]$ (employment changes)

$+ \;\; I[t(y)] - I[\big(t(y_i')\big)]$ (tax and SIC as automatic stabiliser)

$+ \;\; I[b(t, y_i')] - I[b(t, y))]$ (benefits as automatic stabiliser)

In summary, our analysis will be comparing between the pre-COVID scenario and the COVID scenarios 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 scenarios 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). Based on the NSO data, we attribute all job losses to COVDID-19 (scenario 1), we excluded employment loss reported to be potentially unrelated to COVID-19 (scenario 2) and employment loss reported to be due to the pandemic (scenario 3).

3.5 Results

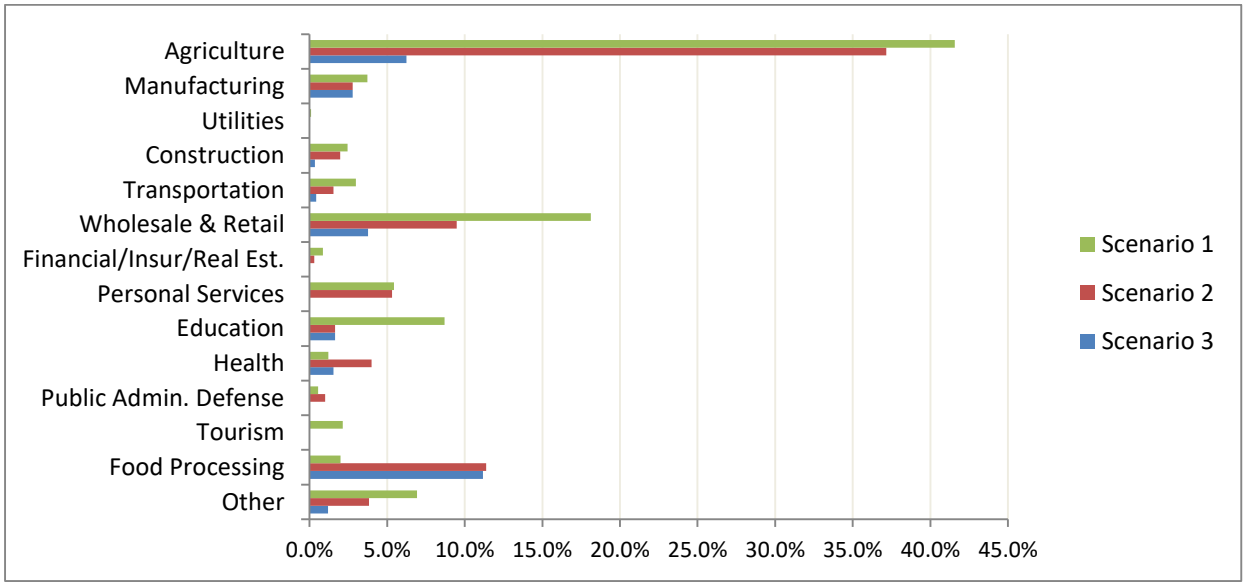
We now present results of our investigation of the impact of the COVID-19 crisis on household's income distribution and the Malawi government response to the crisis. The results are based on the comparison between the pre-Crisis scenario (baseline) and each of the three COVID scenarios. We first provide 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.

3.5.1 Characteristics of those impacted

Figure 3.1 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 3.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 3.1 and these layoffs have affected the household incomes.

Figure 3.1: Employment loses per sector in 2020



Source: Own calculate based on simulations from MAMOD

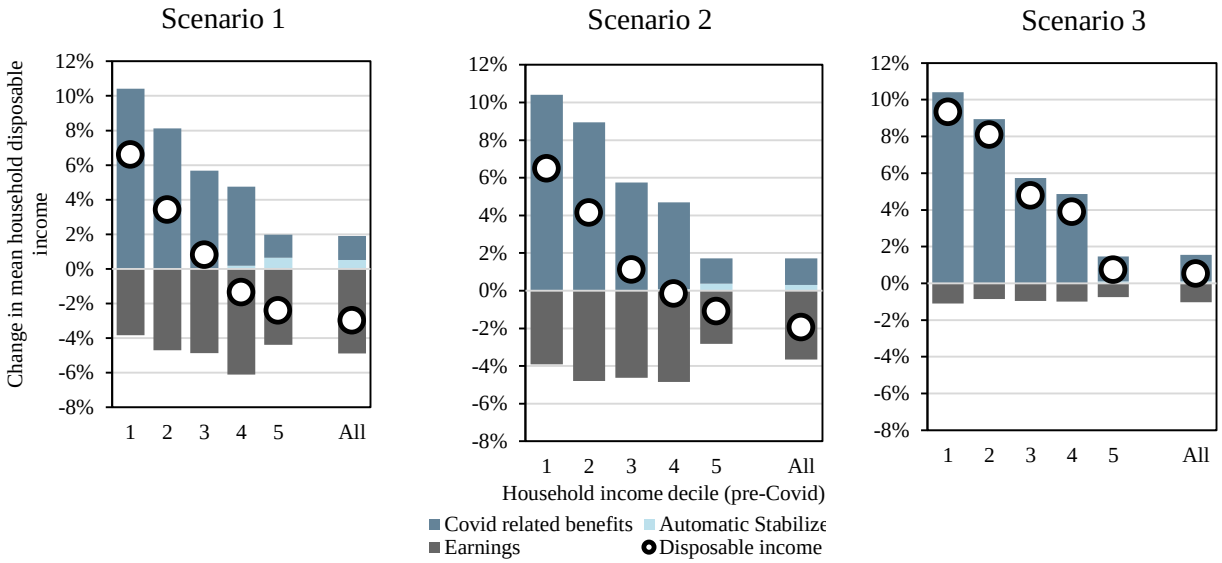
3.5.2 Effects on Household Income

The pandemic and the subsequent job losses have affected family incomes across the distribution. Figure 3.2 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 also known as the COVID-19 Urban Cash Initiative (CUCI). The government provided an amount of K35,000 (US$40) 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 3.2: Change in mean disposable income by quintile

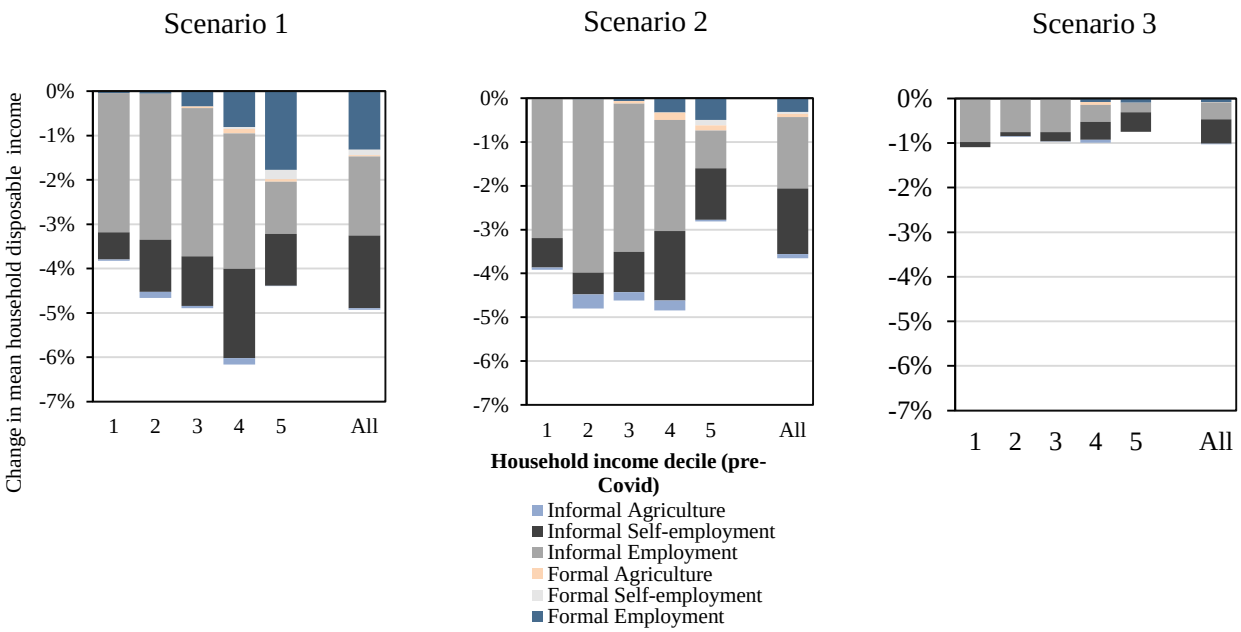


Source: Own calculations using MAMOD

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 3.3 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 3.3: Change in mean disposable income due to employment losses of formal and informal sectors

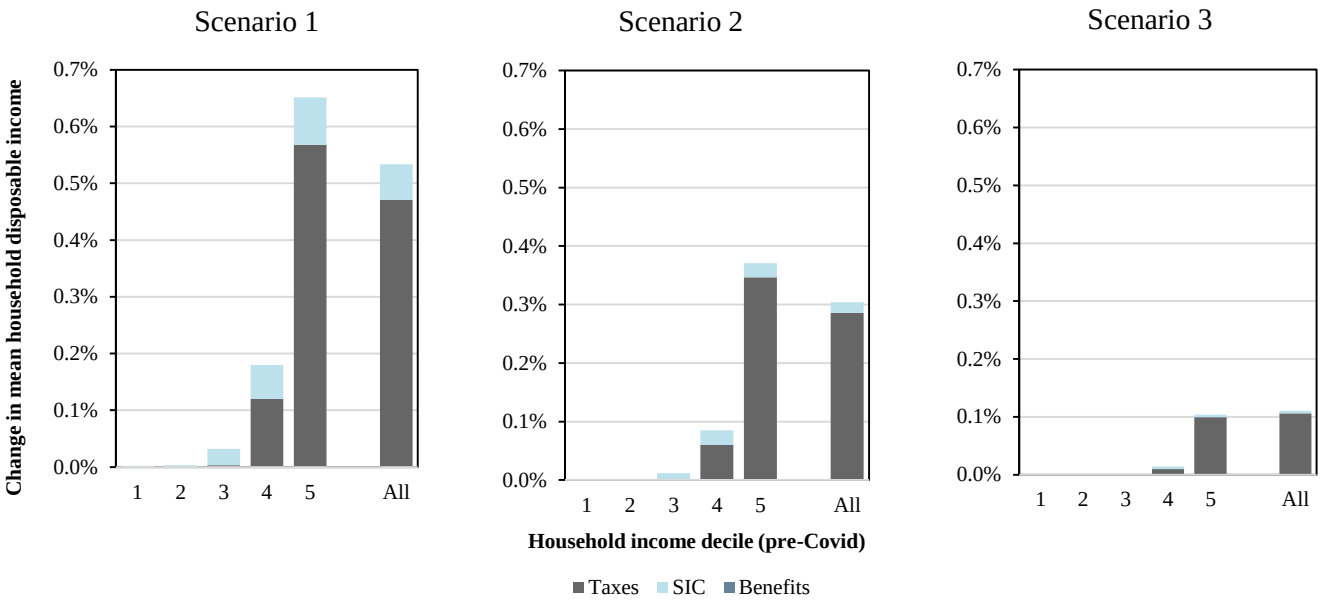


Source: Own calculations using MAMOD

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 3.4 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 3.4: Change in mean disposable income due to automatic stabilisation



Source: Own calculations using MAMOD

3.5.3 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 3.1. 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 percentage points 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 a larger share of extremely poor. As table 3.2 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 3.1 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 3.1: 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 3.2 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 3.2: 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.

3.5.4 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 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 3.A4 and 3.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."[32]

3.6 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 employment loss 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

[32] 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).

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 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. Specifically, the Emergence Cash Transfer which targeted household in urban areas performed better than the regular Social Cash Transfer. The main difference between the two programmes is the benefit amount that the beneficiary received. Under the Emergency Cash transfer eligible households were receiving K35,000 ($40) which

is same is the minimum wage, compared to average transfers of K9,000 (US$10) in the regular Social Cash Transfer.[33] However, we argue that such a huge increase in benefits amount would lead to behavioural changes if the programme was not for a short period. Thus, to make policy recommendation based on this large cash transfer would require to expand our study to look at not just first order effects but also second order effects. The current model allows for the short term effects but future work will require expanding to a behavioural model which looks at second order effects.

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

[33] See: https://mtukula.com/content?view=18&pageName=Cash%20Transfers

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.

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Appendix

Table 3.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 3.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 3.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 3.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 3.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 3.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.

Conclusion

This thesis has investigated three topics on the impact of public policy on inequality and poverty in Malawi. High levels of poverty and inequality have remained a problem for most Sub-Saharan African countries. As we have shown in this thesis, to solve these problems, governments need proper tools to explore ways to implement taxation and benefit policies which will have the potential of increasing welfare of the poor households. We have highlighted the advantages of tax-benefit microsimulation models in providing evidence to guide policymakers in developing countries. The three chapters of the thesis have illustrated how microsimulation modelling techniques can be used to expand research on public policy in developing countries which remains scarce. In all three chapters we used the tax-benefit microsimulation that we built for Malawi (MAMOD) and carried out numerous simulations to investigate various developments and the role of the tax-benefit system in dealing with poverty and inequality. Chapter 1 investigated potential reforms to reduce poverty in Malawi and the cost to the budget of reducing extreme poverty by half. Chapter 2 investigated the effects of informality and unemployment changes on income distribution in Malawi between 2004 and 2016. Chapter 3 explored the short-term distributional impact of COVID-19 in Malawi. Below we summarise the main finding of each chapter and discuss policy implications. We conclude this section discussing possible extensions.

Chapter 1 shows that the current tax-benefit system for Malawi decreases income inequality by 4.3 percentage points but increases poverty due to the effect of income tax and the limited role of social benefits. After exploring various counterfactual reforms targeted at reducing extreme poverty, we find that whether proxy means-testing or income means testing is used for targeting the beneficiaries of social benefits, poverty only decreases marginally due to the limited budget allocated to social spending. We also provide evidence that reducing

extreme poverty by half would represent an increase in social spending from the current 0.3% of gross domestic product (GDP) to 18.6% of GDP. The results show that improving targeting will not reduce poverty or inequality, policymakers need to consider the budget allocated to social budgets. However, as we have shown, while the taxes are progressive transfers to the poor are not large enough to have an impact on poverty. In order to reduce poverty by half, the financing of the increase in social benefits would require significant increases in taxes.

Chapter 2 illustrates the effects of changes in informal jobs, unemployment levels and policies between 2004 and 2016 had on inequality and poverty. We used decomposition methods to isolate the impacts of these variables. The results show that an increase in informal jobs and an increase in unemployment had the effect of increasing inequality. Informal jobs were found to decrease poverty while the rise in unemployment levels had the effect of increasing poverty. Policies implemented during the period had the effect of reducing inequality and poverty. The findings implies that formalisation and job creation policies should be the main concern of government. This will increase the tax base for government engendering effective redistributive policies.

Chapter 3 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 Integrated Household Survey which was collected just before the COVID-19 crisis. These were used to construct our before COVID-19 and during COVID-19 scenarios. We find that the poverty measured by headcount, poverty gap and poverty severity increase because of the COVID-19 outbreak. The pandemic has also worsened inequality as the Gini Coefficient rose. We further find that the Emergency Cash Transfer was able to subdue the impact of the crisis especially at the

bottom of the income distribution. The finds suggest, as it is the case in the other two chapters that social safety nets are key in the fight against poverty and inequality in Sub-Saharan Africa. However, our results quantify that the current budgets for social safety nets are not enough to put a dent in the fight against poverty.

All the three chapters concluded with extensions that the tool allows to undertake. In summary, the analysis in this thesis uses static microsimulation model, meaning that individuals reaction to policy changes are not taken into account. Future work will be to expand to a behavioural model which would look at the second order effects of the increases in taxes and benefits highlighted in our study. While we managed to derive our variable of interest using consumption and income data, in the future, we aim to also use administrative data to study poverty and inequality. The exercise could help determining why we get different results when consumption and income data are used. This will further help improving the quality of income data from household surveys. The tool also allows to analyse variations in population subgroups which did not get much attention in this thesis as we mainly focussed on interventions that targeted the whole population effects. The study could be extended to focus on the impact of policies on population subgroups based on gender, age and size of households as well as spatial impact of policy changes.

Finally, an important contribution of this thesis has been to make available tools to policymakers for the evaluation and improvement of public policies in developing countries. In this endeavour, the Ministry of Finance for Malawi has agreed to use MAMOD for its fiscal policy analysis. It will also be responsible for hosting and maintaining MAMOD with support from Southern Africa Social Policy Research (SASPRI).