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Malawi

Multipliers of Social Protection

Product 3 - Drafting the country case studies

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Product 3
Country Case Study – Malawi

1. Introduction

Malawi's economy has been heavily impacted by the COVID-19 pandemic. GDP growth was 0.8% for 2020, compared with earlier projections of 4.8. The COVID-19 crisis increased poverty, particularly in urban areas, where the services and industry sectors have been hit hard. Until March-2022, an estimated 4.4% of the total population was fully vaccinated against COVID-19.[1] Despite the reopening of the economy after almost two years of containment measures, GDP growth fell to 0.8% in 2022 from 2.2% in 2021. The pandemic also disproportionally affected human capital investment in poor households, reducing future intergenerational income mobility.

Before the pandemic hit, the national poverty rate had increased slightly from 50.7% in 2010 to 51.5% in 2016, but extreme national poverty decreased from 24.5% in 2010/11 to 20.1 percent in 2016/17. The share of the population covered by at least one social protection benefit in Malawi is 21.3%, which is higher than the average 13.7% of the population in Sub-Saharian Africa but much lower than 46.9% of the World population. When excluding universal health, the coverage is much lower: 19.6% of vulnerable persons are covered by social assistance but only 3.3% of the labour force are covered by a pension scheme and 6.9% of workers are covered in case of work injury, for instance. Total expenditures on social protection excluding health are 1.6% of GDP in Malawi relative to 3.8% in Africa and 12.9% in the World.

The limited coverage of the active population under social assistance schemes in Malawi and other African economies hinders the potential positive effects of these schemes on economic development and productivity as has been extensively documented in the region both at household level and in the local economy (Davis et al., 2016). Additionally, schemes provide very low benefits, which are insufficient to guarantee minimum income support. Progress with implementation and coverage expansion has been limited, partly because programmes

[1] https://www.afro.who.int/countries/malawi/news/malawi-marks-one-year-covid-19-vaccination-828-080-people-receive-full-dose.

are embedded in interventions targeted to poor or ultra-poor households. Coverage of non-contributory social protection for the "working poor" is delegated to public works programmes, empowerment schemes and input subsidy schemes, as well as other livelihood and support interventions. The cost efficiency of public works interventions has in some cases been questioned. In the absence of social security benefit in case of unemployment, workers covered by the labour law may be entitled to a severance payment, usually on the basis of a minimum length of service and/or the reason for the termination of the employment relation, sometimes depending on professional categories, size of enterprise or other criteria.[2]

The 2012 National Social Support Policy provided a wide-ranging framework for the development of the social protection system in the country. The Malawi National Social Support Programme I and II (MNSSPI and MNSSPII) operationalized this policy. Since the inception of the first MNSSP, in 2018, investment in non-contributory social protection has increased significantly. The Social Cash Transfer programme, piloted in 2006, has seen a large extension of coverage. However, it remains the only social assistance programme that covers all districts. There have been concerted efforts to harmonize the different programmes, but the system remains fragmented and siloed, supported and implemented by different NGOs and international organizations (the funding to SSP has been dominated by donors). Social security remains limited to pensions for the small formal sector, although an occupational injury scheme should be launched in 2021, marking an important step for contributory programmes in Malawi. The MNSSPII focuses on three thematic pillars: Consumption Support (provision of consumption support through timely predictable and adequate cash/aid or in-kind transfers to poor and vulnerable people through their life cycles); Resilient Livelihoods (promoting resilient livelihoods through tailored packages based on individual households and community needs, providing graduation pathways and inter - programme linkages by facilitating access to and utilization of services beyond MNSSP); Shock-Sensitive Social Protection (development of shock responsive social protection system that meets needs and prepares for and responds to unpredictable shocks in cooperation with humanitarian sectors and supports recovery and return and return to regular programmes).[3]

[2] For the worker compensation scheme, it also exists an employer liability.

[3] The Malawi Social Support Policy (MSSP) and Malawi National Social Support Programme (MNSSP) set the country's strategy on social protection. The key priority areas in the National Social Support Programme also include pillar 4 (linkages for a coherent and effective social protection system) and pillar 5 (cross cutting strategic actions for systems strengthening).

2. Recent empirical literature on fiscal multipliers

Since the global crisis that erupted in 2008, there has been a considerable increase in the empirical literature on fiscal multipliers. In country-specific empirical studies, following Blanchard and Perotti (2002), the strategy of using linear VAR models (autoregressive vectors) to estimate the impact of an exogenous shock in public expenditures or government revenues on the level of economic activity has been the most common approach. When disaggregating different government expenditures, this literature usually finds that public investment has a higher and more persistent multiplier effect on aggregate output than government consumption. However, only a few studies have focused on estimating the impacts of different social expenditures on economic growth. Blanchard and Perotti (2002) and Perotti (2004) treat transfers as a component that should be subtracted from total revenue, which is a strategy followed by several authors (Peres 2006, Giordano et al. 2007, Peres and Ellery 2009, Burriel et al. 2010, Tenhofen et al. 2010, Castro and Fernandez 2011, Lozano and Rodriguez 2011, Jemec et al. 2013, Borg 2014, Skrbic and Simovic 2015, Mendonça et al. 2016, Alves 2017, Grudtner and Aragon 2017, Restrepo 2020, among others). However, such an empirical strategy has been criticized in the recent literature both for not taking into consideration government expenditures and revenues in a disaggregated way and for seldom focusing on social spending (Baum and Koester 2011, Gáldon 2013, Pereira and Wemans 2013, Gechert et al. 2018). Pereira and Wemans (2013: 10), for instance, make a case for going beyond aggregate government expenditures and revenues, given the likelihood that their components have heterogeneous multipliers:

> 'Initial studies applying the structural VAR methodology to fiscal policy adopted a very aggregate definition of budgetary variables, considering only taxes net of transfers, on the one hand, and public expenditure (fundamentally consumption and public investment), on the other. These definitions were used in a great deal of the subsequent work in this field. It is, however, plausible that the various headings that make up these aggregates have distinctive influences on economic activity.'

In their turn, Gechert et al. (2018) claim that social expenditures have not received enough attention despite the existence of numerous studies on fiscal multipliers. According to the authors, this fact represents a relative paradox in the face of the growing importance of social expenditures:

> ‘In recent years there has been a tremendous surge in the literature on the size of fiscal multipliers. While many papers have focused on the effects of federal and local public procurement, employment and investment spending, and tax shocks, the impact of changes in social security contributions and benefits has received only limited attention. This seems surprising given the fact that social security systems have grown substantially in OECD countries after the Second World War and account for about half of the overall budget in countries like Germany.’ (Gechert et al. 2018: 2)

While the implementation of the American Recovery and Reinvestment Act (ARRA) in the United States in the aftermath of the 2008 crisis has been partially justified in terms of more significant multiplier effects of income transfers by the Council of Economic Advisers (2009), only a few empirical studies have estimated the impact of this type of expenditure on aggregate output. Moreover, the set of these studies that adopt the conventional VAR approach of Blanchard and Perotti (2002) finds mixed results, as reported in Table 1 below.

Some of them find significant multiplier effects for social expenditures – impact multipliers close to one (Gáldon 2013, Adams and Wong 2018, Gechert et al. 2018) –, but, in some cases, the results suggest that the multiplier is non-persistent – the accumulated multiplier is close to zero (Adams and Wong 2018).[4] In other cases, the impact multiplier for social transfers is close to one, and the effect remains above zero in accumulated terms (Pereira and Wemans 2013). In contrast, some studies have found a negative - although non-significant – accumulated effect (Claus et al. 2006, Bruckner and Tuladhar 2010).

Various studies estimate positive but very low multipliers for social transfers. These studies usually estimate higher multipliers associated with government consumption, cuts of direct taxes, and, especially, public investment (Pereira and Wemans 2013, Silva et al. 2013, Huseyin and Ayse 2017, Sarangi and Bonin 2017, Bova and Klyviene 2019). In other cases, the multiplier for social transfers is large in absolute terms, but different types of expenditure feature a similar or higher multiplier effect on aggregate output (Fatás and Mihov 2001, Pereira and Sagalés 2009, Pereira and Wemans 2013).

[4] The authors find lower multipliers in the long run (accumulated) and attribute the lower output responses to rising inflation and interest rates, proposing a kind of crowding-out effect.

Romer and Romer (2016), using a 'narrative method' based on episodes of fiscal expansion in different countries, find that permanent increases in social expenditures exert significant and substantial impacts on consumption. However, tax reductions seem to have the highest and most persistent multiplier effect, which could be explained, in the authors' view, by a more significant positive response of interest rates to an expansion in social expenditures. Similarly, Alesina et al. (2017) report results for a panel of OECD countries showing that fiscal consolidations based on higher taxes are more costly in terms of output than those that resort to spending cuts, whether from government consumption spending or transfers. Meanwhile, Gechert et al. (2018) employ a similar methodology for social spending in Germany and find a higher and more persistent multiplier effect for social expenditures than for decreases in the social contributions that finance them.[5] In general, according to Batini et al. (2014: 4), studies resorting to the 'narrative approach' tend to 'find larger tax multipliers than conventional VAR models do.'

Besides, some empirical studies have used panel techniques to estimate multipliers for a group of countries or states and regions within the same country via VAR or one-equation methods (Beetsma and Giuliodori 2011, Furceri and Zdzienicka 2012, Ilzetski et al. 2013, Reeves et al. 2013, Silva et al. 2013, Valencia 2015, Carrière-Swallow et al. 2018, Deleidi et al. 2019, Izquierdo et al. 2019, Konstantinou and Partheniou 2019). For social expenditures, Furceri and Zdzienicka (2012) find a positive accumulated multiplier (but smaller than one) for a group of OECD countries, emphasizing the central role of health expenditures and unemployment benefits as the components with more substantial impacts on output. Moreover, Reeves et al. (2013) estimate a positive social protection multiplier for a group of European countries[6], which reaches 3 in the baseline scenario. In their estimates, health expenditures present an even higher multiplier (near 4.9).

Table 1 presents a summary of the empirical literature on the multiplier effects of different types of expenditures – from aggregate government spending to several decompositions of it

[5] The authors offer the following possible explanation: 'Given that benefits are likely pro-poor while contributions are paid by middle- and upper-income classes, it seems plausible that benefit shocks have a stronger aggregate demand effect. Moreover, some benefits are in-kind and will have a direct GDP effect.' (Gechert et al. 2018: 19).

[6] In this article, the authors apply a panel model instead of the traditional VAR: 'Vector autoregressive models have been applied to quarterly data for small numbers of countries, but for annual data with larger numbers of countries fixed effects models are more consistent.' (Reeves et al. 2013)

– in many countries (or panel of countries), different periods and using several alternative empirical approaches or econometric techniques.

Table 1 – Multiplier effects of different types of expenditures in the econometric literature for different countries and time periods

Study	Countries	Period	Type of Expenditure	Methodology	Multiplier Results
Adams and Wong (2018)	New Zealand	1990-2017	Transfers (social assistance and superannuation)	SVAR	1.53 (impact) and 0.76 (cumulative one year)
Auerbach and Gorodnichenko (2014)	Japan	1960-2012	Government spending	Direct projections (based on Auerbach and Gorodnichenko [2013])	1.74 (peak) and 2.3 (cumulative)
Auerbach and Gorodnichenko (2014)	Japan	1985-2012	Government spending	Direct projections (based on Auerbach and Gorodnichenko [2013])	0.5 (peak) and 0.44 (cumulative)
Bayoumi (2001)	Japan	1981-1998	Government spending	VAR	0.65 (short-term multiplier)
Bova and Klyviene (2019)	Portugal	1995-2017	Transfers (old age, unemployment, and disabilities transfers)	SVAR	-0.27 (impact) and 0.1 (cumulative)
Bruckner and Tuladhar (2010)	Japan	1990-2000	Local government expenditure on social assistance	One-equation methods	-0.25 (impact)
Dufrénot et al, 2016)	United States	1960-2012	Transfers (social security)	Non-linear methods (MS/TVTP)	It reaches 1.68 (in terms of consumption) and -0.02 (investment); recession
Fatas and Mihov (2001)	United States	1960-1996	Social security, other transfers, and subsidies	VAR (Choleski decomposition)	Do not estimate multipliers, but captures a positive and significative impact of transfers on GDP after eight quarters
Furceri and Zdzienicka (2012)	OECD	1980-2005	Social expenditure (old age, incapacity-related, unemployment benefits, and other expenditures)	One-equation method	Short-term multipliers: 0.6 (total expenditure), 0.9 (health), and 2.1 (unemployment benefits)

Gáldon (2013)	United States	1948-2012	Social security, unemployment benefits, and other	Non-linear methods (TVPSV-VAR)	>1 (impact and long run). Near 1.5-2 (long run) at the end of 2008/2009 crisis. Reaches almost 3 (long-run) at the end of 1950s and beginning of the 1960s
Gechert and Rannenberg (2014)	Meta-analysis (98 studies)	+1800 observations	Transfers	Meta-regression analysis	Between 2 and 3 (cumulative/recession)
Gechert et al (2018)	Germany	1974-2013	Social security	SVAR with narrative-identified shocks	0.5-1.5 (impact)
Hollmayr and Kuckuck (2018)	Germany	1993-2017	Social expenditures (pensions and unemployment)	SVAR	2 (impact), between 0.3 and 3.8 (after 5 years)
Huseyin and Ayse (2017)	Turkey	2002-2016	Transfers	SVAR	0.02-0.23 (impact)
Kanazawa (2018)	Japan	1980-2014	Public investment	Local projection (IV method)	4.95 (peak; 17th period, quarterly data)
Konstantinou and Partheniou (2019)	OECD and non-OECD countries	1991-2015	Social expenditures	Non-linear one-equation methods	0.8 (OECD countries) and 0.076 (non-OECD); cumulative in two years; recession
Kuttner and Posen (2002)	Japan	1976-1999	Government spending	SVAR	1.06 (four-year cumulative multiplier)
Mahaphan (2013)	Thailand	1988-2009	Public investment and government consumption	VECM	0.6 (peak, 2nd period) for public investment, 0.09 (peak, 1st period) for government consumption
Miyamoto, Nguyen, and Sergevev (2017)	Japan	1980-2014	Government spending	Local projection method (based on Jordà [2005])	1.48 (impact; when the nominal interest rate is near the zero-lower bound) and 0.71 (impact; otherwise)
Orair et al (2016)	Brazil	2002-2016	Social expenditure (pensions,	Non-linear VAR	1.51 (peak) and 8 (cumulative

			social programmes, and unemployment benefits)	(STVAR)	in four years); recession
Park and Lee (2019)	South Korea	2000-2018	Government spending	VAR	1.09 (impact) and 1.68 (six-period, quarterly data, cumulative)
Pereira and Sagalés (2009)	Portugal	1980-2005	Public transfers	VAR	1.88 (impact) and 1.81 (cumulative)
Pereira and Wemans (2013)	Portugal	1995-2011	Social transfers in cash	SVAR	Near 1 (peak) and 0.6 (cumulative, one year)
Reeves et al (2013)	European Union	1995-2010	Social expenditure	One-equation method	3 for social protection, near 4.9 for health
Resende (2019)	Brazil	1997-2018	Social expenditure (pensions, social programmes, and unemployment benefits)	VAR	0.72 (impact) and 4.3 (cumulative, two years)
Romer and Romer (2016)	United States	1952-1991	Social security benefits	Narrative VAR	Significant and great response of consumption (mainly in the impact) – but tax revenues had a higher effect in the analysed period
Sanches and Carvalho (2019)	Brazil	1997-2018	Social expenditure (pensions, social programmes, and unemployment benefits)	SVAR	0.75 (impact), 1.2 (peak), and near 3 (cumulative, two years)
Sarangi and Bonin (2017)	Egypt	1990-2015	Social expenditure	SVAR	0.04 (impact) and 0.17 (peak)
Silva et al (2013)	Euro Area	1998-2008	Transfers – social expenditures in cash/in kind – plus subsidies and other expenditures	VAR	-0.118 (impact) and 0.82 (cumulative, ten quarters); recession
Tang, Liu, and Cheung (2013)	Thailand	1993-2019	Government spending	SVAR	-0.37 (impact)

The literature that estimates multipliers for social benefits in Malawi is relatively small and no time series econometric study could be found. Using microdata for an emergency cash-transfer programme in rural Malawi (the Dowa Emergency Cash Transfer (DECT) programme carried out during the 2006/7 agricultural season), Davies and Davey (2008) estimate multipliers between 2.02 and 2.45 depending on initial assumptions. Covarrubias, David and Winters (2012) use a local economy-wide impact evaluation methodology (LEWIE model) to assess the impact of the Government of Malawi's (GoM's) Social Cash Transfer (SCT) Programme (an unconditional cash transfer programme targeted to ultra-poor, labor constrained households). The parameters in the LEWIE model are estimated econometrically and results suggest a total income multiplier of 1.25 in nominal terms with a confidence interval of 1.22 to 1.28, within the project area. Based on a difference-in-differences (DD) model using data from cash transfer programmes from Ghana, Malawi and Zimbabwe in 2008, 2009 and 2011, respectively, Handa, Otchere and Sirma (2021) find that Malawi's Social Cash Transfer Programme (SCTP) has an implied multiplier of 2.94 (relative to 1.2 in the programme implemented in Ghana and 1.21 in the one implemented in Zimbabwe).

3. Methodology

As mentioned in the previous section, most attempts to estimate multiplier effects of different types of government expenditures based on macroeconomic data use a structural VAR (or SVAR) approach. The SVAR became well known in the literature of fiscal multipliers through Blanchard and Perotti (2002). They argue that the VAR methodology is appropriate for analyzing the effects of fiscal policy due to *lags* in decision-making and implementation of government spending decisions. With high-frequency data (monthly or quarterly), they argue that the temporal coincidence of unexpected shocks in output and fiscal policy reaction to these shocks can plausibly be ruled out. In other words, output does not affect public spending contemporaneously because policymakers take longer than a quarter – and much longer than a month – to notice the output shock, decide the next steps in fiscal policy, and present them to the legislature.

The purpose of the identification strategy is to isolate the exogenous shocks, recovering their structural shape, so that the impact of a variable can be measured – in technical terms, to obtain a non-recursive orthogonalization of the error terms. First, the VAR is estimated in

reduced form. The vector of endogenous variables is three-dimensional, including time series of expenditures, revenues, and output. It is a VAR model, as proposed by Sims (1980), where each variable is explained by lags of itself and the other variables of the model, capturing dynamic relationships. However, the shocks of the reduced form do not have economic significance (Castro and Hernandez de Cos 2008). According to Perotti (2007), shocks of the reduced form (or 'surprise' movements) can be seen as linear combinations of three components: a) the automatic response of government spending and revenue to changes in output; b) the discretionary response due to changes in endogenous variables (Perotti gives the example of tax changes in response to a recession); c) random discretionary shocks, that is, structural shocks, which are uncorrelated and unobservable – the ones that need to be recovered. Formally:

$$u_t^g = \alpha_{gy} u_t^y + \beta_{gt} e_t^t + e_t^g \quad (1)$$

$$u_t^t = \alpha_{ty} u_t^y + \beta_{tg} e_t^g + e_t^t \quad (2)$$

$$u_t^y = \gamma_{yt} u_t^t + \gamma_{yg} u_t^g + e_t^y \quad (3)$$

The unexpected movements in the expenditure, revenue, and output variables are, respectively, denoted by u_t^g, u_t^t, and u_t^y. These 'surprise' movements are the residuals in the reduced form, as it is the part of the data that the VAR does not explain. Also, e_t^g, e_t^t, and e_t^y are the structural shocks that are not correlated with each other by assumption and reflect the part of the surprise movements that is exogenous: it does not depend on policies and 'normal' economic evolution (Coudret 2013). The coefficients α_{ij} reflect the response of variable i to variable j – the components (a) and (b) listed above are captured by the coefficients α. While β_{ij} measures the contemporaneous response of variable i to a structural shock in variable j – that is, component (c) (Perotti 2007).

As discussed by Vdovychenko (2018), coefficients α_{gy}, α_{ty}, γ_{yt}, and γ_{yg} cannot be estimated without bias due to the instantaneous mutual relationship between output, expenditures, and revenues. Two steps are necessary to solve this. First, considering the identification hypothesis discussed above, component (b) is removed, and coefficients α are made to reflect only the first component – the response of the automatic stabilizer. As Perotti (2007: 176)

argues: 'it typically takes longer than a quarter for discretionary fiscal policy to respond to, say, an output shock.' Following Perotti (2007), the second step is to use external information to the model to estimate the coefficients α_{gy} and α_{ty}.

Coefficient α_{gy} reflects the contemporary elasticity of expenditure to output, and α_{ty} is the contemporary elasticity of revenues to output. These coefficients measure both the discretionary and the automatic responses of fiscal variables to unexpected changes in economic activity (Jemec et al. 2013). Due to the identification hypothesis, the discretionary response of fiscal variables to output is disregarded so that these elasticities reflect only the automatic stabilizer. Consequently, the following elasticity is used:

$$\alpha_{gy} = 0 \tag{4}$$

The elasticity of revenue to output, in its turn, was estimated based on the 'IMF method,' as in Andreis (2014) and Maciel (2006), which is a regression using dummy variables for periods, outliers, and a trend control.

Since u_t^t and u_t^g are correlated, from these separate estimations of the exogenous elasticities, the cyclically adjusted residuals, $u_t^{g,ca}$ and $u_t^{t,ca}$, are obtained – which are the shocks without the effects of the cycle to eliminate the automatic stabilizer. Thus, component (a) is removed, guaranteeing exogeneity:

$$u_t^{g,ca} = u_t^g - \alpha_{gy} u_t^y = \beta_{gt} e_t^t + e_t^g \tag{5}$$

$$u_t^{t,ca} = u_t^t - \alpha_{ty} u_t^y = \beta_{tg} e_t^g + e_t^t \tag{6}$$

The structural shocks, e_t^g and e_t^t, can be obtained from the assumption of the ordering of the variables. Blanchard and Perotti (2002) claim that there is no reason to choose $\beta_{gt} = 0$ or $\beta_{tg} = 0$ *a priori*. Regarding shocks in spending and revenue, there is no theoretical or empirical basis to decide which variable will react first. As the correlation between adjusted residuals is small, Perotti (2007) points out that the order does not change the result. $\beta_{gt} = 0$ was then assumed, and the regression of the adjusted revenue residuals on the residuals of the

structural form of expenditures was estimated by ordinary least squares (OLS) to obtain β_{tg} in equation (6) (Burriel et al. 2010). [7] The purpose of this regression is to obtain the estimates of e_t^g and e_t^t. These shocks are 'isolated' from the influence of output because the automatic response component has been removed. It, therefore, becomes possible to make the shocks exogenous by removing the (a) and (b) components mentioned above.

From equation (5), it is possible to recover e_t^g, using it to estimate equation (6) by OLS (Burriel et al. 2010). We then obtain instrumental variables, the structural shocks e_t^t and e_t^g in equation 3, since the regressors (residuals of the reduced form) are correlated with the error term (structural shock). Those structural shocks of expenditure and revenue are used as instruments since the correlation between them and the structural shock of output, e_t^y, is low. The last step is estimating the impulse-response functions using the estimated coefficients.

The basic model is estimated using the vector of endogenous variables, in real terms: the logarithms of social expenditures, total primary revenue, and output.[8] Dynamic effects of public spending can also be analyzed using a three-dimensional SVAR by replacing total social expenditures with its different components and the aggregate GDP by household consumption and private investment (Burriel et al. 2010, Çebi 2015).

The key goal of this report is to estimate the multipliers of social protection expenditures. As framed by Spilimbergo et al. (2009), there are four types of multipliers: a) the impact multiplier, for the analysis of a short-run period, $\frac{\Delta Y(t)}{\Delta G(t)}$; b) the horizon multiplier, for calculating the multiplier for a specific period, $\frac{\Delta Y(t+n)}{\Delta G(t)}$; c) the peak multiplier, which represents the highest value in the period under analysis, $max\frac{\Delta Y(t+n)}{\Delta G(t)}$; d) the accumulated multiplier, which adds the total effect over a more extended period, $\frac{\sum_{i=1}^{n}\Delta Y(t+i)}{\sum_{i=1}^{n}\Delta G(t+i)}$.

[7] Models were also estimated assuming $\beta_{tg} = 0$, that is, that decisions relating to revenue occur before those relating to expenditure. This procedure indicated the robustness of the results to different specifications, with minor variation in impulse response functions, as is usual in the literature.

[8] The variables used in this work are not stationary. Therefore, their first difference was used (they are integrated of order 1), including the control variables, as suggested by different tests (Dickey-Fuller, Phillips and Perron, KPSS). Thus, the exercises are performed in terms of growth rate. We used the cumulative impulse-response function to obtain the responses in terms of levels. The number of lags is chosen based on the information criteria and the autocorrelation LM test (Matteo et al. 2018). When several information methods are used together, the literature recommends choosing that lag most methods point to as more appropriate (Lopes et al. 2012). Tests for autocorrelation (LM) and heteroscedasticity (White) pointed to the absence of these problems in most models. All models showed stability. The results of the tests are provided in the appendix.

The importance of calculating the impact multiplier is that it provides an assessment of fiscal policy in terms of the immediate output response to a shock in the fiscal variable – when the government aims to deal with a crisis, for example. Accumulated (or cumulative) multipliers, in turn, are important to verify the impact of a random discretionary shock since the economy requires a certain amount of time to absorb the initial shock (Ilzetzki et al. 2013). The accumulated multiplier is equal to the ratio between the accumulated response of output and the accumulated response of the fiscal variable subject to the shock. It measures the cumulative change in economic activity after a cumulative change in the government spending over a given time horizon (Burriel et al. 2010, Tenhofen et al. 2010, Lozano and Rodriguez 2011, Borg 2014, Restrepo, 2020). Cumulative multipliers are also called integral multipliers, and they may offer a better depiction of the dynamic interaction 'when the effects of fiscal policy build over time.' (Restrepo 2020, see also Spilimbergo et al. 2009).

To calculate multipliers, we need to divide the elasticity of the response by the average share of social expenditures in output (or its components). As the variables are in logarithmic form, impulse-response functions provide the elasticity of output (Y) to the fiscal variable (X):

$$\xi_{Y,X} = \frac{\frac{\Delta Y}{Y}}{\frac{\Delta X}{X}} = \frac{\Delta Y}{Y}\frac{X}{\Delta X} = \frac{\Delta Y}{\Delta X}\frac{X}{Y} \quad (7)$$

According to Pires (2014), since $\frac{\Delta Y}{\Delta X}$ is the definition of the multiplier, which reflects a change in output given an increase of one unit in the fiscal variable, we have that:

$$\frac{\Delta Y}{\Delta X} = \frac{\xi_{Y,X}}{\frac{X}{Y}} \quad (8)$$

To estimate the cumulative multiplier, we justify the number of periods based on Garcia et al. (2013: 11): 'The long-run multiplier is defined as the cumulative multiplier when $\rightarrow \infty$, but in practice is used the number of periods needed for the multiplier to stabilize at its long-run value.' When the impact of social expenditures on GDP is more persistent, the cumulative multiplier is calculated for a more extended period.

In summary, for this report, the multiplier effects of social protection expenditures were estimated for Malawi through this three-dimensional structural linear VAR. Based on the

estimations, cumulative impulse response functions were generated to obtain the dynamic impact of social protection expenditures on the level of real GDP. Then these functions were used to get the elasticities of GDP in response to a shock in social spending and, finally, the multipliers.

4. Data

We compiled a quarterly series for expenditures in social benefits in Malawi, using "total government expenditure on social protection", annual. In order to transform annual series into quarterly data, we used total government expenditures available at quarterly frequency as an indicator in the "Denton-Chollete" temporal disaggregation method (available in the R Package "tempdisagg"). Revenue data were also obtained at quarterly frequency.

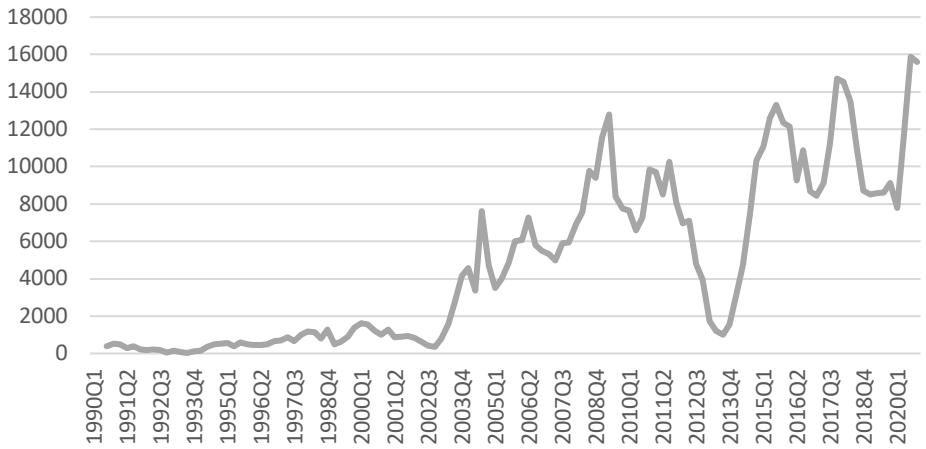
For GDP, the obtained series was available at annual frequency. In order to transform the annual GDP series into quarterly data, we used quarterly GDP for Uganda as an indicator, another African country with a similar trend, available in Tahir et al (2018)[9] from 1990 to 2016. For 2017-2020 we obtained a quarterly GDP series from Uganda Bureau of Statistics. Malawi´s GDP was transformed to quarterly frequency using both series – Malawi's and Uganda's GDP - in dollar (2010 prices). We extracted Malawi's series in dollar from World Bank Open Data[10]. The method used was also Denton-Chollete. After this procedure, the quarterly GDP series for Malawi was converted to local currency (Malawian Kwacha) so as to carry out the estimations using other series in domestic currency (2010 prices).

The CPI index, as well as the exchange rate, was obtained from the IMF. All series were seasonally adjusted using the X13 Arima Method, available in Eviews. Figure 1 shows the social protection series at quarterly frequency.

[9] TAHIR, M.; AHMED, J.; AHMED, W. Robust quarterization of GDP and determination of business cycle dates for IGC partner countries. Reference number: I-37400-PAK-1. International Growth Centre, 2018.

[10] The year 2020 is not available in this series. Then, we used an estimation for Malawi's GDP in 2020 from IMF and World Bank (e.g. https://www.worldbank.org/en/country/malawi/overview).

Figure 1 - Social Protection Series (in millions of local currency, 2010 prices, seasonally adjusted)



5. Estimation results

Based on the Structural VAR approach followed in Blanchard and Perotti (2002), all the structural VARs were estimated using the three-dimensional vectors of the following variables in logarithmic form: expenditures on social protection, tax revenues and GDP. The first difference of each variable was used to avoid spurious relationships as all series are integrated of first order according to stationary tests (ADF, PP, and KPSS). We chose the specification that appeared to be better in terms of significance and robustness (free of heteroscedasticity, autocorrelation, and non-stability problems, according to LM and White tests).

We tested two control variables, at quarterly frequency: an index of effective exchange rate (in first difference) obtained from the IMF, as well as a real interest rate, obtained from Malawi's Central Bank (policy rate).

We also tested time different dummies variables: dum13 and dum14 are included to control for the year of 2013 and 2014, respectively (sharp fall in the social protection series, as we can see in Figure 1); and dum1994 for the 1994 year (when real GDP decreased). We also tested a 2020 dummy, but it was not significant.

We obtain three different multipliers from each VAR, where Y is GDP and G, expenditure:

- Impact - instantaneous effect: $\frac{\Delta Y(t)}{\Delta G(t)}$.
- Peak - represents the highest value in the period under analysis: $max\ [\frac{\Delta Y(t+n)}{\Delta G(t)}]$.
- Accumulated - measures the total effect of higher expenditures over time (n periods): $\frac{\sum_{i=1}^{n} \Delta Y(t+i)}{\sum_{i=1}^{n} \Delta G(t+i)}$.

The impact, peak, and accumulated multipliers were obtained. Both the impulse response function and the corresponding multipliers are presented in the following subsections. Diagnostic tests and estimated coefficients are reported in the appendix.

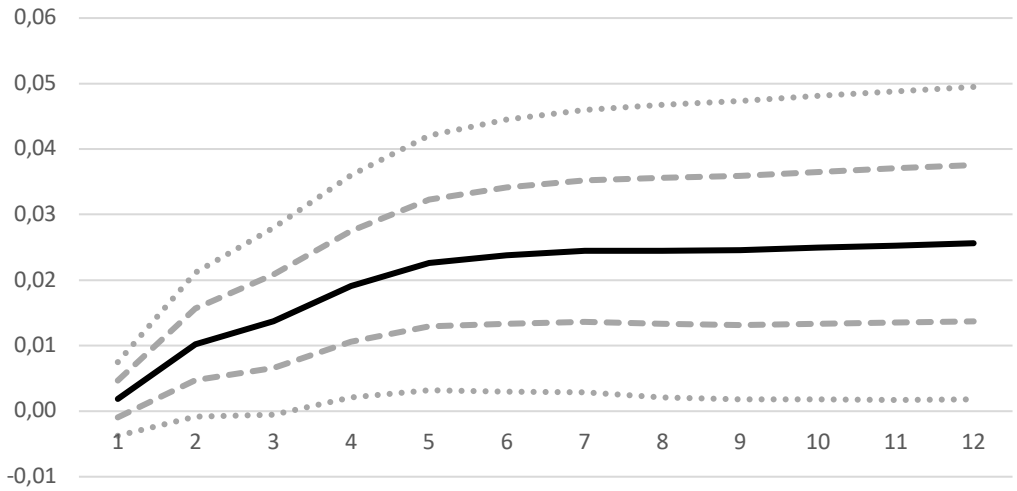
5.1 *Effects of social protection expenditure on output*

The model was estimated using real social protection and revenue series (deflated by the CPI) and real GDP (deflated by the GDP deflator) for the period 1990 (third quarter)-2020 (last quarter).

We included four lags and the following dummies: dum94, dum13, dum14, which improved the estimations and were found to be statistically significant. Although the real interest rate (in first difference) did not show significance, it was able to eliminate the autocorrelation problem in our results. We also included the real exchange rate index (in first difference) as it was found to be statistically significant in the social protection equation. The LM test did not detect autocorrelation. The exercise is stable and free of heteroscedasticity, according to White test with cross terms.

Figure 2 shows the accumulated response of GDP to a shock in Social Protection Expenditures. Dotted lines represent a confidence interval of 95% (two standard deviations). Dashed lines show a confidence interval of 68% (one standard deviation). As we can see, the exercise shows a positive effect of social expenditures on GDP at 95% significance in most periods. Estimated multipliers, despite being small in the first quarter after the shock, are above one after some time (which are considered relevant multipliers).

Figure 2 - Accumulated response of GDP to a shock in Social Protection Expenditure



Dotted lines represent a confidence interval of 95% (two standard deviations). Dashed lines show a confidence interval of 68% (one standard deviation). Accumulated response of GDP was divided by the accumulated shock in revenue.

After a moderate immediate impact on output, the expansionary effect of increased social expenditures is raised for a couple of quarters and stabilizes subsequently. The multiplier reaches its peak value at the end of the first year after the shock, that is, in the fourth quarter. As shown in Table 2, the estimated size of the impact (instantaneous) multiplier is 0.1, meaning that, for each additional Malawian kwacha of social expenditure,[11] real GDP becomes 0.1 Malawian kwacha larger. The estimated size of the peak multiplier is 1.79, attained in the fourth quarter. Finally, the accumulated multiplier after three years (twelve quarters) is 1.7: each additional Malawian kwacha spent in social benefits has a persistent expansionary impact of 1.7 Malawian kwacha on GDP. This behavior is suggestive that the cumulative effects of increases in Social Benefits Expenditures on Malawi's level of economic activity are not only quite substantial in the short- run but also in the medium-run. The accumulated multiplier may be even larger for periods longer than twelve quarters, as the impulse-response functions grows towards the end of the period.

Table 2: Social protection expenditure multipliers for each model

Category of expenditure	Impact Multiplier	Peak Multiplier	Accumulated Multiplier (over

[11] Expenditure on social protection is the sum of government expenditure on the following: i) pension and gratuities; ii) government contribution to the pension scheme; iii) social cash transfer; iv) Farm input subsidy; v) maize purchases (market intervention subsidy); vi) university students' loans.

		(quarter)	ten quarters)
Total expenditure on social protection	0.1	1.79 (fourth quarter)	1.7

These results have several implications. First, as argued before, they point toward a crucial dimension of the interdependence of the SDGs, as expansion of social protection expenditure not only contributes to guaranteeing the human right of social security for all but also is instrumental to sustaining processes of inclusive growth. The persistent positive multiplier of social protection expenditure indicates that growth and redistribution can be combined by resorting to increases in this specific component of government expenditure. This would also be enhanced by development of other sectors, integration, and creation of policy linkages among them.

6. Concluding remarks

The current report presented estimates of fiscal multipliers for Malawi, resorting to the SVAR approach pioneered by Blanchard and Perotti (2002). Using data on social protection expenditure, ranging from 1990 to 2020, it estimated the fiscal multipliers of the expenditure on this component. A positive and persistent impact of shocks social protection spending on GDP was found: over twelve quarters, the accumulated multiplier is statistically significant and larger than one and a half. This result means that each additional Malawian kwacha spent on social protection leads to an increase in real GDP, three years after the shock, of 1.7 Malawian kwacha.

The present empirical investigation contributes to the existing research in some dimensions. First, it takes forward the extant effort to estimate fiscal multipliers in a more disaggregate way, the importance of which has been maintained by Pereira and Wemans (2013). Also, it helps filling the gap in this empirical literature regarding social protection expenditures – which, as Gechert et al. (2018) argued, represent a substantial share of government spending in several countries but has seldom been investigated by the literature on fiscal multipliers. The findings here reported confirm the need to study fiscal multipliers in a disaggregate way to provide a more precise estimate of the consequences of different policy options. In

addition, these findings also highlight the expansionary potential of social protection expenditure, as they indicate that its accumulated multiplier is positive and persistent.

A second dimension of the contribution of the research done for this report is emphasising the interdependence of several SDGs. Improving social protection systems are an end in itself and play a crucial part in ending poverty and reducing inequality. In the specific case of Malawi, the scope for such an improvement is vast, but this interdependence of the SDGs can be taken further, including through policy linkages (i.e., harmonization). Such an improvement in social protection should not be thought of as a policy disconnected from the more general development strategy of the country and the prospects of sustaining inclusive growth. In fact, the multipliers estimated for the present report suggest that building more robust social protection systems also has a potential to unleash a virtuous economic dynamic, in which higher expenditure in social protection leads to higher incomes, employment, and tax revenues. Besides, a growth process sustained by improvements in the social protection system has a higher likelihood of distributing its fruits more evenly than one that disregards the importance of social protection.

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APPENDIX

**** 1% / *** 5% (two standard-deviation bands) / **10% / *30% (one standard- deviation bands)

Model VAR

(0) In the Table refers to the SVAR's contemporaneous response of GDP to social benefits and to revenues (if negative, the impact is positive due to matrix algebra).

White test (p-value): 0.1736 (cross terms) / 0 (without cross terms).

LM (p-values):

	Social Protection	Revenue	GDP
Social Protection (0)			-0.003932*
Social Protection (-1)	-0.240210***	0.029280	0.013038**
Social Protection (-2)	-0.044841	0.010394	0.003042
Social Protection (-3)	0.138946**	-0.021281	0.015548***
Social Protection (-4)	-0.160656**	-0.006849	-0.000643
Revenue (0)			0.029062***
Revenue (-1)	0.275053**	-0.587866****	0.016249*
Revenue (-2)	0.517982***	-0.625988****	-0.006161
Revenue (-3)	0.384791**	-0.106668	0.006358
Revenue (-4)	0.124658	-0.292251****	-0.003980
GDP (-1)	-0.606427	0.014231	0.109495*
GDP (-2)	-0.860877	-0.939596*	-0.023856
GDP (-3)	3.001933***	0.246725	-0.103000
GDP (-4)	1.998089*	0.019524	-0.175559**
C	-0.039122	0.056134***	0.011166****
Dum94	0.550378***	-0.162059*	-0.030876**
Dum13	-0.365290**	-0.015357	0.018924*
Dum14	0.581434****	-0.104523*	-0.006031
Interest rate	-0.265455	-0.151106	0.005244
Exchange rate	-0.724692**	-0.071447	-0.008940

0.1342
0.5749
0.1088

0.4441
0.8078
0.0110
0.4045
0.5363

VAR Roots (Modulus)
0.833362
0.833362
0.777846
0.777846
0.735606
0.735606
0.643406
0.643406
0.638367
0.638367
0.477008
0.477008