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ESTIMATES OF FISCAL MULTIPLIERS AND THE IMPACT OF COVID-19 STIMULUS IN THE GAMBIA

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Abstract

Given the importance of fiscal multipliers in evaluating the impact of fiscal policies on the macroeconomy, many researchers have estimated various forms of fiscal multipliers across countries and times. This paper contributes to this body of literature by estimating fiscal multipliers for The Gambia for the first time using an SVAR approach. The results show that fiscal multipliers are small and below unity. In other words, government spending multipliers are as low as 0.04 dalasi at impact before peaking at 0.42 dalasi by the end of five years. Taxes on the other hand are found to have more effect on output than government spending. Specifically, we estimated output tax multiplier of -0.24 dalasi at impact bottoming out at -1.01 dalasi by the end of three years suggesting the use of taxes to finance the fiscal deficit could be costly. Using the estimated spending multiplier, we also showed that government spending relating to Covid-19 activities narrowed the recession from -1.5 percent to -1.13 percent at end 2020. However, while government spending affects real GDP, its trickling down effect is small and policymakers should account for this when considering fiscal interventions.

Keywords: Fiscal Multipliers, Covid-19 Stimulus, SVAR, Fiscal Policy, Budget Deficit, Monetary Policy

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INTRODUCTION

The idea of government intervention in the economy during economic hardship remains appealing today to both economists and politicians as it was during the time it was proposed by Keynes. The narrative often forwarded by experts is that government spending has a multiplier effect on aggregate economic activity thus an increase in government spending of let say one percent will translate to a more than one percent increase in output. Consequently, during a recession or depression, these actions of government have the potentials of saving jobs and businesses and bring back the economy to normalcy. This is what is presented in most undergraduate macroeconomic textbooks – since the Marginal Propensity to Consume is less than one, the ratio (1/1-MPC) which is a measure of the fiscal multiplier is always greater than one. In fact, the debate on fiscal activism regained strong momentum during the 2008 Global Financial Crises igniting vast empirical research into the area.

Appealing as it may be, there remains disagreements on the effectiveness of fiscal stimulus on the economy in general and the quantitative measure of the fiscal multipliers in particular. Owing to this, a large number of studies emerged during the 2008-2009 great recession trying to establish the magnitude of fiscal multipliers. This coincided when the United States and other advanced economies were debating various forms of fiscal interventions. Obtaining a precise quantitative measure of the size of fiscal multipliers was important – guide policymakers on the size and impact of economic relief packages on the economy. For example, Christina Romer, who was part of Obama's economic advisers was quoting multipliers as high as 1.6 during the presentation of the $780 billion economic relief package to Congress (Romer and Bernstein, 2009). While on the other extreme, Barro (2009) suggests multipliers very close to zero during peacetimes. Although significant research has been dedicated into obtaining precise estimates of fiscal multipliers, the results remain inconsistent across countries and methodologies.

Differences in the magnitude of fiscal multipliers rest to a large extent on the methodology employed and the economy understudy. In addition, the choice of one method over the other rest on the kind of data available (quarterly data or annual data) or at worse the availability of reliable data (challenge for low-income countries in particular). As a result, methodologies applied in estimating fiscal multipliers ranges from the narrative approach, the use of structural vector autoregressive (SVAR) models, local projection methods and so on. Owing to this fact, the literature on this subject points to two conclusions: those that suggest multipliers are different during recessions and those that suggest multipliers are higher when monetary policy is accommodative (interest rates are stuck at the zero bound).

Blanchard and Perotti (2002) employed the structural vector autoregressive (SVAR) technique (similar to the one used to study monetary policy by Bernanke and Mihov, 1998) to study fiscal policy. The identification strategy used by the authors for the structural VAR rely on institutional information on tax transfers and the timing of tax collections to identify the response of taxes and spending on economic activity. They find that positive fiscal spending shocks have positive impact on output and positive shock on taxes have negative effect on output. They find fiscal multipliers to be 0.96 and 0.87 for government spending and taxes respectively suggesting that a one dollar increase in government spending will lead to 0.96 cents increase in output while a one dollar increase in taxes will decrease output by 0.87 cents. Ilzetzki et al (2013) uses a similar methodology on a panel of 44 industrial and developing countries to quantify fiscal multipliers and their meaning in the macroeconomy. The results show the impact of government spending depends on the country's characteristics such as level of development, trade openness, exchange rate regime and indebtedness. In other words, the output effect of an increase in government spending is larger in developed countries than developing countries (0.66 and -0.63 respective). Moreover, fiscal multipliers are large in countries with fixed exchange rate regime while zero with countries practicing flexible exchange rate. Similarly, multipliers for open economies are smaller than those of closed economies while multipliers in high indebted countries are negative.

Ramey and Zubairy (2014) use a plethora of techniques such as the narrative approach extending the work of Owyang et al (2013) by using information prior to WW-II to construct a dataset extending to 1889. This dataset they believe contains information rich in episodes of variations in government spending and taxes. The authors also made use of the local projection methodology to show whether multipliers vary between good times and bad times. To add to the growing literature on state-dependence multipliers using state dependent models, they show that earlier results of higher multipliers during recession state suffer from calculation defaults thus could not stand robustness test for generalisation. In fact, using the local projection methods, they find no evidence to suggest that government spending multipliers are higher in high unemployment states and most estimates average around 0.6 to 1. Furthermore, contrary to the notion that fiscal multipliers are higher when interest rates are near the zero-lower bound, they show this is not the case except when WW-II period is excluded in the sample. Other studies that found variability in multipliers between good times and bad times, states dependence and when monetary policy is accommodative can be found in (Jorda, 2005; Auerbach and Gorodnichenko, 2012 and 2013; Chodorow-Reich, 2019).

This debate is extended to countries beyond those found in advanced economies and developing and emerging markets to those in low-income category – Sub-Sahara Africa (SSA)

in particular. Though the initial quest for measuring fiscal multipliers in the region was more of accounting for the impact of fiscal consolidations on output (growth), however, the effect of government spending on the economy is taking centre-stage especially after the 2008 financial crises and recent COVID-19 pandemic. Arizala et al (2017) investigated the impact of fiscal consolidation on growth in 44 SSA countries from 1990 to 2016. They employed the local projections technique to estimate the impulse response function to account for fiscal multipliers. Their results show the size of the multipliers depend on the choice of policy variable. For example, a one percentage point shock on public investment spending has an effect on output by 0.1 percent at impact rising to 0.7 after three years. Estimated consumption spending multipliers have lower impact on output (0.5 at the end of three years) while changes in government revenue does not significantly impact output.

In a similar paper, Kemp (2020) investigated estimates of fiscal multipliers in South Africa employing both the SVAR and SR approaches in conducting the analysis. The SR approach differs from the well-known SVAR method in that it imposes directly on the shape of the structural impulse responses of the variables unlike the linear restrictions on contemporaneous relationships between variables done under SVAR. The results of the study show that budgetary multipliers are generally less than one while tax multipliers are large and distortionary. However, as noted in other studies, the size of fiscal multipliers is sensitive to the choice of method. Similar results on lower multiplier (0.4) were found by Kraay (2014). The literature on fiscal multipliers does not only show inconsistency in the size of multipliers based on different methodologies, but it also points to the fact that fiscal multipliers to a large degree depend on country specific characteristics. Therefore, in as much as we can refer to estimated multipliers from similar countries and regions, to estimate country specific multipliers is laudable and encouraged. Our study capitalizes on this and performs an empirical estimation of fiscal multipliers for The Gambia which by the time of writing this paper, there is no known study on the topic. The other motivation of this exercise is to use the estimated multipliers to evaluate the impact of COVID-19 relief packages initiated by the government of The Gambia and its development partners. We believe this will serve as a milestone achievement in understanding how fiscal policy affect the economy and be able to measure the implied impact of COVID-19 stimulus packages on economic activity. It will also lay a foundation for future research in this area going forward. Against this backdrop, we show that fiscal multipliers are positive, small and below unity except for tax multipliers for some periods. In addition, we disclose that Covid-19 related spending accounted for about 24 percent of the economic rebound therefore narrowed the recession from -1.5 to -1.13 by the end of 2020.

Table 1: Selected Literature on Estimated Fiscal Multipliers

				Mutipliers	
Source	Method	Country	Fiscal Variable	Impact	Cumulative
Ilzetzki et al, 2013	SVAR	Developed Nations	GC	0.39	0.66
		Developing Nations	GC	-0.029	-0.63
R. Santo, 2020	Panel	Ecowas countries	GS		0.82
Blanchard and Perotti 2002	SVAR	United States	GS, DT	0.8	1.1
			GS, ST	0.9	1.3
			T, DT	0.7	1.4
			T,ST	0.7	2.3
Arizala et al, 2017	LPM	Sub-Sahara Africa	GI	0.1	0.7
			GC		0.5
Kemp, 2020	Recursive	South Africa	GS	0.11	0.36
	SVAR		GS	0.11	0.36
	SR		GS	0.32	0.78
	Recursive		T	0.00	-0.35
	SVAR		T	-0.20	-0.65
	SR		T	-0.27	-0.78
Ramey, 2008	VAR & Narrative	United States	Military Spending	1.5	1.5
Ramey, 2014	Linear Model, across state of slackness	United States	GS	0.76	0.84
	Linear Model, across monetary policy regimes	United States	GS	0.76	0.84
Kraay, 2014	OLS	Developing Nations	GS	0.306	
	2SLS		GS	0.375	0.4
	First Stage Regressions		GS	0.531	
Auerbach & Gorodnichenko, 2012**	STVAR, Linear	United States	GS		0.87
	STVAR, during expansion		GS		0.49
	STVAR, during recession		GS		2.12

GC is government consumption, GS is government spending, GI is government investment, T is taxes
SVAR is structural vecto autoregressive, SR is sign restriction and STVAR is smooth transition vector autoregressive
** Estimates using different method of calculating the multipliers gives 0.58, -0.86 and 2.17 for linear, expansion and recession respectively

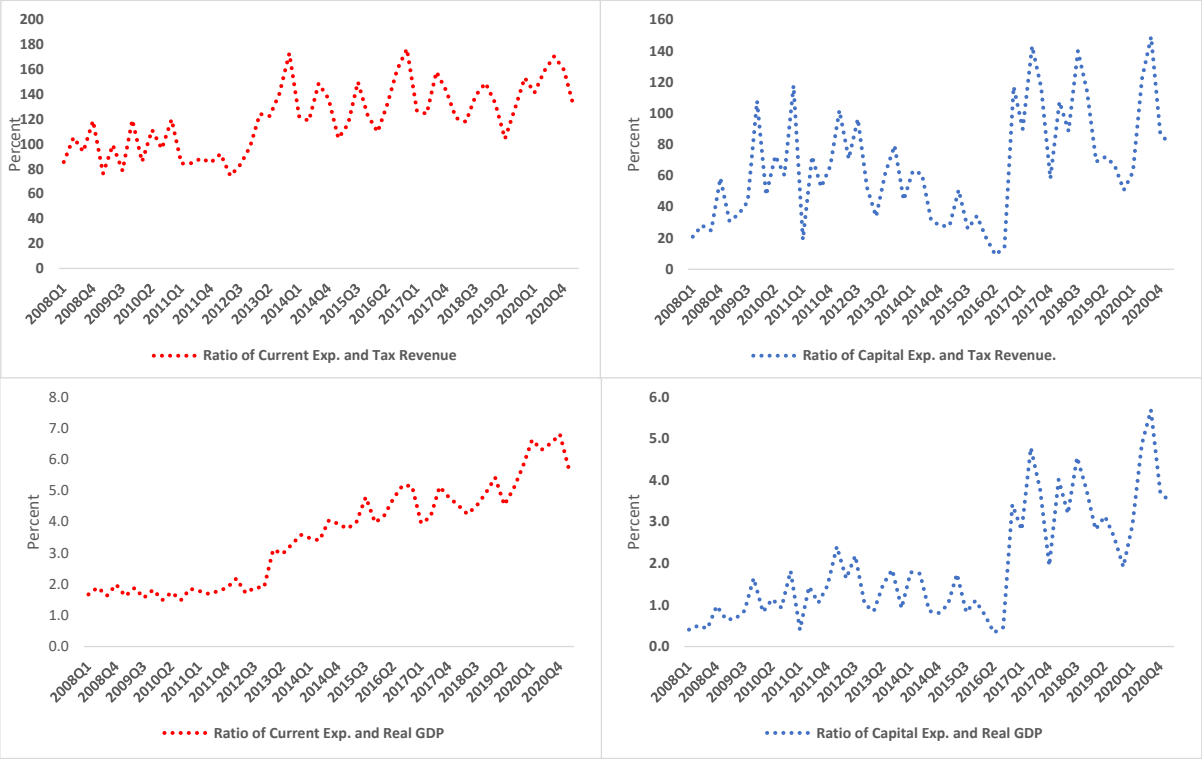
Source: Authors Calculation

Fiscal Multipliers and Government Fiscal Policy Variables

Apart from its social responsibilities – providing critical infrastructure, health and education – the government of The Gambia continue to accommodate a large public sector being probably the largest employer in the economy. This means much of the fiscal budget is spent on recurrent expenditure leaving little for the much-needed investment in social infrastructure. In fact, from 2008 to date, current expenditure as a percent of tax revenue and GDP averaged around 120 percent and 3.5 percent respectively while government capital investment as a percent of tax revenue and GDP remains relatively lower at 66 percent and 1.9 percent respectively.

As shown in Figure 1 below, not only is government capital spending lower than current expenditure but it is more volatile suggesting a non-systematic budgetary allocation towards this crucial sector of the economy.

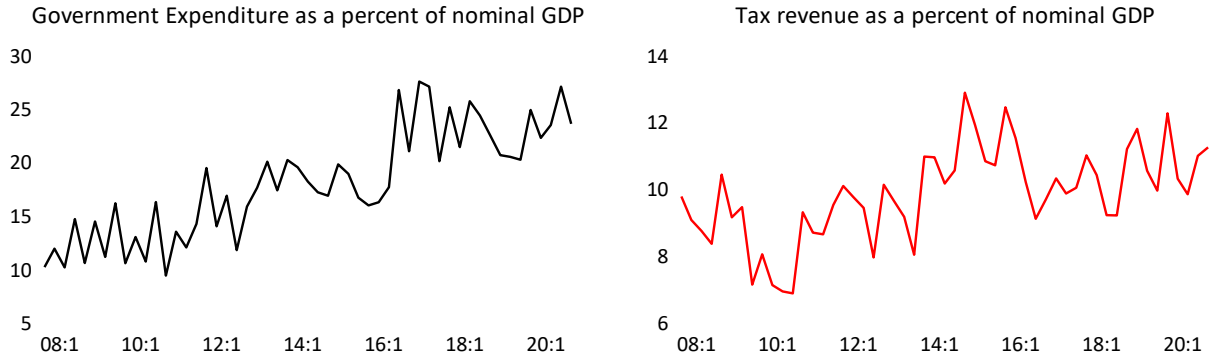
Figure 1: Components of government spending as a ratio of tax revenue and real GDP



Source: Authors Calculations

During this period, though short, there is evidence of variations in both government expenditure and taxes as depicted in Figure 2 below. This is important if we are to see any significant potential effect of fiscal variables on output. In that way, moderate multipliers could be a sign of the effectiveness of government actions on the aggregate economy.

Figure 2: Taxes and government expenditure as a ratio of GDP



Source: Authors Calculations

Fiscal Multipliers

The fiscal multiplier is the ratio of change in output (ΔY) to an exogenous change in the fiscal deficit (ΔG) – could also be used for change in taxes (-ΔT) and government expenditure (ΔGE). Looking at the literature on how fiscal multipliers are calculated, there are numerous ways of computing fiscal multipliers as well as numerous multipliers computed. However, in this study, we limit ourselves to two: the impact multiplier and cumulative multiplier.

Impact multiplier: $\left(\equiv \frac{\Delta Y_t}{\Delta G_t} \right)$,

Cumulative multiplier: For some horizon N $\left(\equiv \frac{\sum_{j=0}^{N} \Delta Y_{t+j}}{\sum_{j=0}^{N} \Delta G_{t+j}} \right)$ or $\left(\equiv \frac{\sum_{j=0}^{N} (1+i)^{-j} \Delta Y_{t+j}}{\sum_{j=0}^{N} (1+i)^{-j} \Delta G_{t+j}} \right)$,

Where, the first is without discounting future changes of output and fiscal deficit (or government spending and taxes) while the second shows discounted present value of the multiplier using the policy rate as the interest rate. It is expected that the cumulative multiplier will be larger than the impact multiplier and except otherwise stated, the two among others are reported in this paper.

RESEARCH METHODOLOGY

Analytical Framework

As noted earlier, there are different methodologies on estimating fiscal multipliers in the literature each with its own shortcomings. Here we are not going to delve into all these methodologies and their differences but follow two that have been used extensively in the literature. These are the Cholesky decomposition or recursive approach and the Blanchard and Perotti (2002) approach.

Following Ramey (2016), suppose the structural relationship between government spending (*g*), tax revenue (*τ*) and Gross Domestic Product (GDP = *y*) is represented by the following system:

$$\begin{aligned} y_t &= \beta_{y\tau}\tau_t + \beta_{yg}g_t + \varepsilon_{yt} \\ g_t &= \beta_{g\tau}\tau_t + \beta_{gy}y_t + \varepsilon_{gt} \\ \tau_t &= \beta_{\tau g}g_t + \beta_{\tau y}y_t + \varepsilon_{\tau t} \end{aligned} \quad (1)$$

Where, ε_s are the structural shocks to the system. Theoretically, it is suggested that estimates of $\beta_{yg} > 0$ and $\beta_{y\tau} < 0$. However, the use of ordinary least squares (OLS) to

estimate system 1 above individually will lead to bias estimates because both τ_t and g_t are correlated with ε_{yt}. The correlation is coming from the fact that $\beta_{gy} < 0$ and $\beta_{\tau y} > 0$. Thus, further assumptions are required in order to be able to identify the structural shocks.

Let assume that we have a vector of three endogenous variables X1, X2 and X3. The dynamic behaviour of the vector of the endogenous variables $X_t = [X_{1t}, X_{2t}, X_{3t}]$ is given by

$$X_t = B(L)X_t + \Omega\varepsilon_t \tag{2}$$

$$B(L) = B_0 + \sum_{k=1}^{p} B_k L^k$$

Where, the elements of B_0 are the same as in β in (1) with $\beta_{jj} = 0$. Equation (2) above can be written in the reduced form as done in standard structural VAR

$$A(L)X_t = \eta_t \tag{3}$$

Where, $A(L) = I - \sum_{k=1}^{p} A_k L^k \ , \ and \ \eta_t = [\eta_{1t}, \eta_{2t}, \eta_{2t}]$ is the reduced form VAR innovations. Now we can link the reduced form innovations to the unobserved structural shocks ε as

$$\eta_t = B_0\eta_t + \Omega\varepsilon_t \tag{4}$$

$$or \ \ \eta_t = H\varepsilon_t \ , \ \ where \ \ H = [1 - B_0]^{-1}\Omega$$

If we assume Ω to be an identity matrix and ε_t to have unit effect, then the system can be written as:

$$\begin{aligned} \eta_{1t} &= \beta_{12}\eta_{2t} + \beta_{13}\eta_{3t} + \varepsilon_{1t} \\ \eta_{2t} &= \beta_{21}\eta_{1t} + \beta_{23}\eta_{3t} + \varepsilon_{2t} \\ \eta_{3t} &= \beta_{31}\eta_{1t} + \beta_{32}\eta_{2t} + \varepsilon_{3t} \end{aligned} \tag{5}$$

The equations in (5) are the dynamic equivalent of those found in equation (1) just that the structural relationship in (5) is written in the reduced form VAR innovations η_t as opposed to writing them using the endogenous variables themselves.

Identification Strategy of Fiscal Shocks

The above presentations points to the fact that the identification of fiscal shocks is not simple and to the point. As a result, and as noted above, different approaches exist and for the sake of space, we follow two approaches: *the Recursive approach and Blanchard-Perotti*

approach.[1] The reason for the choice of these approaches are (a) they apply linear restriction to the parameter coefficients which is motivated by economic theory (b) they have been used extensively in the literature and shown to produce consistent and reliable results. Thus, based on this, we opt to follow these approaches in identifying fiscal shocks in The Gambia and estimate fiscal multipliers therefrom.

Cholesky Decomposition (Recursive)

Under this approach, the identification strategy assumes the policy variable does not respond contemporaneously to other endogenous variables in the system. In the case of our example above, let say X_1 is the policy variable, this means setting $\beta_{12} = \beta_{13} = 0$ in (5). This suggests that X_1 appears first in the ordering of the variables in the system. Alternatively, if we assume the other endogenous variables does not respond contemporaneously to the policy variable, then this is captured by setting $\beta_{21} = \beta_{31} = 0$ in (5). For us to be able to visualize this in the context of this study on The Gambia, we introduce the Structural Vector Autoregressive (SVAR) system and apply the linear restrictions as pointed above. Thus, a reduced form VAR model with P lags is given by:

$$Y_t = \alpha_0 + A(L)Y_{t-1} + \eta_t \tag{6}$$

Where, Y_t is a vector of endogenous variables, α_0 is a constant, $A(L)$ is a polynomial lag operator and η_t is a vector of reduced form innovations. For this paper, the vector of endogenous variables contains government spending (g_t), output (y_t) and tax revenue or taxes for short (τ_t). In matrix form $Y_t = [g_t, y_t, \tau_t]$. We can represent the system in its structural form as:

$$A_0 Y_t = A_0\alpha_0 + A_0 A(L)Y_{t-1} + B\varepsilon_t \tag{7}$$

Where, $B\varepsilon_t = A_0\eta_t$ and A_0 is a matrix of contemporaneous relationship between the variables. Following Blanchard and Perotti (2002) and Perotti (2005), the structural system in (7) can be written in matrix form as given below.

[1] For details of other approaches see Ramey and Shapiro (1998), Romer and Romer (2010), and Ramey (2011b) for the narrative approach; Watson (2008), Stock and Watson (2012), Mertens and Ravn (2013) on the use of external instruments/proxy SVARS; Faust (1998) and Uhlig (2005) for the use of sign restrictions.

$$\begin{pmatrix} 1 & -a_{gy} & -a_{g\tau} \\ -a_{yg} & 1 & -a_{y\tau} \\ -a_{\tau g} & -a_{\tau y} & 1 \end{pmatrix} \begin{bmatrix} \eta_t^{\,g} \\ \eta_t^{\,y} \\ \eta_t^{\,\tau} \end{bmatrix} = \begin{pmatrix} b_{gg} & 0 & b_{g\tau} \\ 0 & b_{yy} & 0 \\ b_{\tau g} & 0 & b_{\tau\tau} \end{pmatrix} \begin{bmatrix} \varepsilon_t^{\,g} \\ \varepsilon_t^{\,y} \\ \varepsilon_t^{\,\tau} \end{bmatrix} \tag{8}$$

From (8), we need additional restrictions on A_0 and B to meet the identification and recover the uncorrelated shocks. To this end, the recursive identification allows us, as noted by Caldara and Kamps (2008), for B to be restricted as a diagonal matrix while A_0 is assumed to be lower triangular with unit diagonal. Keeping in mind that the ordering follows g_t , y_t , τ_t , the relationship between the reduced form innovations η_t and structural shocks ε_t is given as

$$\begin{pmatrix} 1 & 0 & 0 \\ -a_{yg} & 1 & 0 \\ -a_{\tau g} & -a_{\tau y} & 1 \end{pmatrix} \begin{bmatrix} \eta_t^{\,g} \\ \eta_t^{\,y} \\ \eta_t^{\,\tau} \end{bmatrix} = \begin{pmatrix} b_{gg} & 0 & 0 \\ 0 & b_{yy} & 0 \\ 0 & 0 & b_{\tau\tau} \end{pmatrix} \begin{bmatrix} \varepsilon_t^{\,g} \\ \varepsilon_t^{\,y} \\ \varepsilon_t^{\,\tau} \end{bmatrix} \tag{9}$$

Under (9), the recursive identification restrictions are fully achieved. In such case, the ordering of the variables is very important. For example, as we have it in (9), ordering government spending first means it does not respond contemporaneously to shocks from other variables – output and taxes. The economic justification of this is that government spending is always predetermined, and that decision of spending are made before those of taxes and output. Output is ordered second to respond contemporaneously to government spending but not taxes, while taxes are ordered last to suggest that taxes respond to all shocks contemporaneously.

Blanchard-Perotti (BP) Approach

The BP approach nests the Cholesky decomposition as SVAR and uses outside estimates and/or economic theory to constrain the contemporaneous responses of the endogenous variables. In other words, this approach uses recursive decomposition with government spending ordered first i.e., setting $\beta_{12} = \beta_{13} = 0$ in (5) while tax shocks are estimates of the elasticity of tax revenue to GDP to contain β_{23} in (5). In this paper, the output elasticity of tax revenue is obtained by regressing tax revenue on output. We also assume government spending, because of its predetermined nature, does not respond contemporaneously to output and set $a_{gy} = 0$. Similarly, we set $a_{g\tau} = a_{\tau g} = 0$ with the assumption that fiscal variables do not react contemporaneously to shocks of other fiscal

variables and finally $b_{g\tau} = 0$ because spending decision are made before taxes. In summary, these restrictions are presented in matrix notation below.

$$\begin{pmatrix} 1 & 0 & 0 \\ -a_{yg} & 1 & -a_{y\tau} \\ 0 & -a_{\tau y} & 1 \end{pmatrix} \begin{bmatrix} \eta_t^{\,g} \\ \eta_t^{\,y} \\ \eta_t^{\,\tau} \end{bmatrix} = \begin{pmatrix} b_{gg} & 0 & 0 \\ 0 & b_{yy} & 0 \\ b_{\tau g} & 0 & b_{\tau\tau} \end{pmatrix} \begin{bmatrix} \varepsilon_t^{\,g} \\ \varepsilon_t^{\,y} \\ \varepsilon_t^{\,\tau} \end{bmatrix} \tag{10}$$

Therefore, the empirical results in this study are based on (9) and (10) and the respective fiscal multipliers are calculated therefrom. Using both the Recursive and BP approaches will also allow us to compare results given that estimates of this sort are methodologically sensitive.

Data

Based on data availability, this study employs quarterly data on real government spending, real GDP and real tax revenue from 2008Q1 – 2021Q1. It is important to note that real GDP was on annual frequency therefore we use the Denton method of interpolation to break the series into quarterly frequencies. The consumer price index (CPI) was used to deflate all variables except real GDP. All variables are expressed in natural logarithm and are seasonally adjusted. We source the data from the Central Bank of The Gambia data warehouse https://gambia.datawarehousepro.com/.

COVID-19 Stimulus Spending

For the fact that the secondary objective of this study is to evaluate the implied impact of COVID-19 spending on the economy, it is important to highlight the nature of the fiscal policy response to the pandemic since the beginning. This is done with the view of obtaining the size as well as the timing of the fiscal stimulus carried out during this period. Knowing the size of the stimulus package will allow us, using the estimated fiscal multipliers, to evaluate the implied impact of the fiscal stimulus on economic activity. Similarly, the timing is crucial as it signals at what point we are expecting to see the impact of the fiscal stimulus on the economy. As noted earlier, we assume government spending to impact output with a lag (possibly a quarter). See the related description of the data used under section '*Implied Impact of COVID-19 Fiscal Stimulus on the Economy*' below.

EMPIRICAL RESULTS

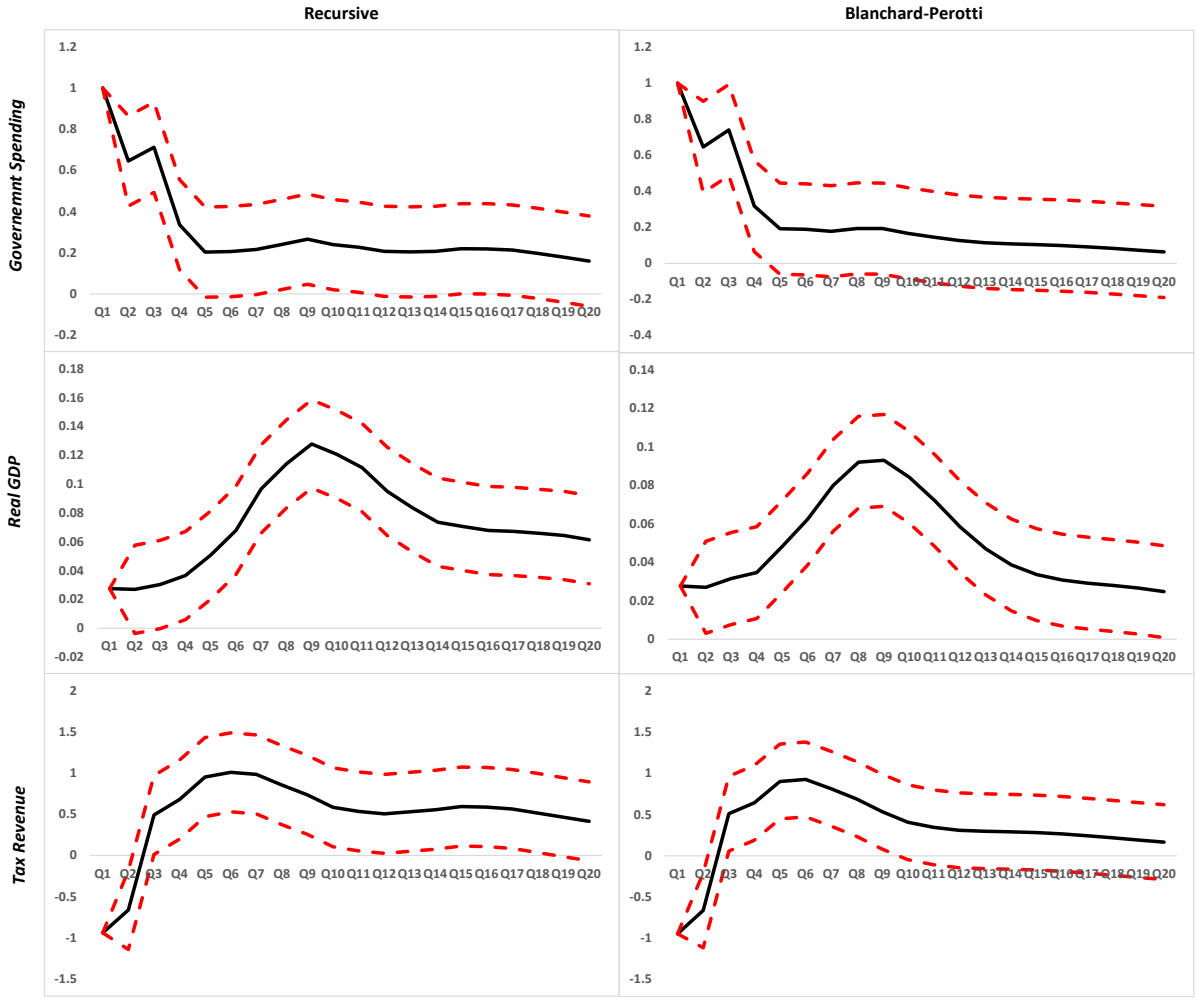
In this section, the baseline results from the VARs are presented in the form of impulse response function. Following Kamp (2020), among others, the impulse response functions are rescaled to show a Dalasi (henceforth GMD) response of macroeconomic variables to a GMD1 shock in the respective fiscal variable – government spending or taxes. To do the rescaling, the original impulse responses are divided by the standard deviation of the fiscal shock in order to have a shock of size one. Thereafter, the new impulse responses are divided by the sample mean of the ratio of the macroeconomic variable of interest and the corresponding shocked fiscal variable. The rescaled impulse response functions are interpreted as the dalasi response in government spending, output and taxes following a GMD1 shock in government spending/taxes.

Government Spending Shock

The results of a pure spending shock are shown in Figure 3 below for the two-identification strategy (representing the two columns). It is worth mentioning that the identification of pure government spending shocks under the two approaches were identical[2]. The results reveal some interesting findings. Firstly, an impulse in government spending leads to virtually identical results for both the recursive and the Blanchard-Perotti approaches which is expected because of the identification strategy used. Furthermore, a pure government spending impulse corresponds to an immediate increase in output within the same quarter albeit very small in magnitude. In other words, a shock in government spending affects output and the effects peaks around the ninth quarter before starting to taper off. More interestingly, this rise in government spending effect is not offset by taxes. In fact, a pure spending shock at impact is accompanied with lower taxes suggesting that the increased government spending was finance through deficit financing – this depicts what obtains in The Gambia in that, increased government spending in most cases is financed through borrowing[3]. Though, taxes are likely to increase in the near future as shown in Figure 3 in response to increased government spending either to mobilise more revenue to finance the increased spending or repay the existing deficit.

[2] In both approaches, government spending is ordered first to show its contemporaneous effect on other variables in the model.
[3] The exceptions to these could be increased spending during emergencies coming from development partners. These kinds of increase spending are both unanticipated and exogenous thus could be classified as pure spending shocks.

Figure 3: Impulse Response of a pure government spending shock



Source: Authors' Calculations

Note: The thick black lines indicate the impulse response function from a pure government spending shock and the dotted red lines are the 95% confidence interval based on a Monte Carlo simulation with 1000 replications.

The implied multipliers from a pure spending shock are presented in Table 2 below. As noted earlier, these multipliers are the dalasi response in output (GDP) to a pure dalasi increase in government spending. A similar approach of re-scaling the implied multipliers to show the monetary response of macroeconomic variables was popularized by Blanchard and Perotti (2002) and since then has been adopted by many researchers in estimating fiscal multipliers. In this study, the impact of government spending multiplier is estimated at 0.03 peaking at 0.13 in quarter nine and this is true for both the recursive and BP approaches. This suggests that a one dalasi increase in government spending in turn increases aggregate output by 0.03 dalasi at impact before rising to 0.13 dalasi or 13 bututs in quarter nine (after two years). A discussion of

the results is delayed for section 1.5. However, one thing is clear from the results, fiscal policy may be less potent in stimulating aggregate output in The Gambia as suggested by tiny spending multipliers.

Table 2: Implied Output Multipliers

		Q1	Q4	Q8	Q12	Q20	Maximum
Government Spending Multipliers	Recursive	0.03	0.04	0.11	0.09	0.06	0.13(Q9)
	Blanchard-Perotti	0.03	0.04	0.11	0.09	0.06	0.13(Q9)
Tax Multipliers	Recursive	-0.04	-0.08	-0.05	-0.01	-0.002	-0.08(Q4)
	Blanchard-Perotti	-0.04	-0.09	-0.06	-0.01	-0.002	-0.09(Q4)

Source: Author's calculations.

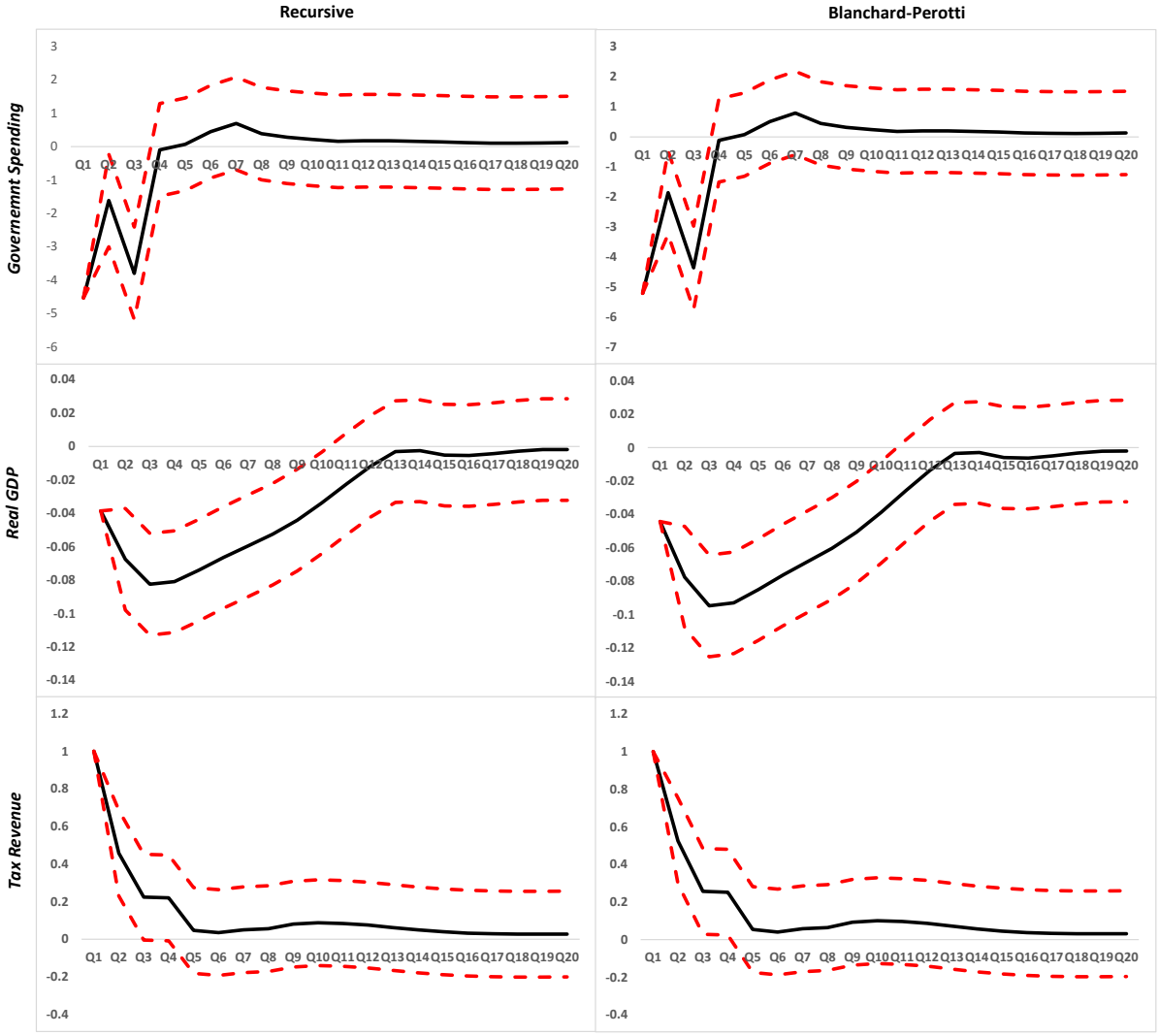
Pure Tax Shock

The impulse response functions of a pure tax shock is shown in Figure 4 below while the implied tax multipliers are presented in Table 2 above. Again, the impulse response under the recursive and BP approach are identical. Both government spending and output decline following a positive shock on tax revenue. The decline in output occurs immediately and bottoming around quarter four (one year after the shock) before returning to its long run equilibrium. Though it fell sharply at impact, government spending rebound and starts to rise after the fourth quarter following the shock in tax revenue.

The tax multipliers under both the recursive and BP are shown in Table 2 above. As in the case of spending multipliers, tax multipliers are the dalasi response of macroeconomic variables following a dalasi increase in tax revenue. In effect, we estimate a tax multiplier of -0.04 at impact reaching its lowest at -0.08 in the fourth quarter. This implies that a one dalasi increase in tax revenue is associated with 0.04 dalasi decline in output at impact and 0.08 dalasi after one year. Again, the detail discussion of the results is reserved for section 1.5 below notwithstanding, the rather low tax multipliers could mean discretionary tax increase have little effect on output. In other words, output could be correlated with automatic stabilizers more than unexpected changes in taxes (pure discretionary increases in taxes which is what we identified as tax shock in this study) thus reacts only little to pure tax shocks[4].

[4] This should motivate further investigation in this area so as to decipher the relative importance of automatic stabilizers and discretionary tax changes on output variations.

Figure 4: Impulse Response of a Pure Tax Revenue Shock



Source: Authors' Calculations

Note: The thick black lines indicate the impulse response function from a pure government spending shock and the dotted red lines are the 95% confidence interval based on a Monte Carlo simulation with 1000 replications.

Alternative Multipliers

As noted in section above, there are several ways of calculating fiscal multipliers. Therefore, we explore the cumulative fiscal multipliers in this section which in addition to its popular use, it is seen as the most appropriate. The approach we adopted above is based on the Blanchard-Perotti approach which calculates the multipliers as the dalasi change in output following a dalasi increase in government spending or tax revenue. This is only useful for comparing impulse response functions but inferior at least theoretically to the cumulative

multipliers. The cumulative multipliers are defined as the ratio of the cumulative output response to cumulative government spending or tax revenue response. Thus, in this paper as done in many other – Mountford and Uhlig 2009; Ilzetzki et al 2013 among others – the present value cumulative multipliers are calculated as follows.

$$N = \frac{\sum_{j=0}^{N}(1+i)^{-j}\Delta y_{t+j}}{\sum_{j=0}^{N}(1+i)^{-j}\Delta g_{t+j}} \frac{1}{g/y} \qquad or \qquad N = \frac{\sum_{j=0}^{N}(1+i)^{-j}\Delta y_{t+j}}{\sum_{j=0}^{N}(1+i)^{-j}\Delta g_{t+j}} \tag{11}$$

Where, y_{t+j} is the response of output (real GDP) at period j, g_{t+j} is the response of the fiscal variable (government spending and taxes) at period j, and i is the nominal interest rate used for discounting the multipliers and is captured here as the average of the central bank monetary policy rate. The calculated implied fiscal multipliers are presented in Table 3 below.

Table 3: Present Value Cumulative Output Multipliers

		Q1	Q4	Q8	Q12	Q20	Peak
		Cumulative Multipliers (Scaled)					
Government Spending Multipliers	*Recursive*	0.04	0.12	0.28	0.38	0.42	0.42(Q20)
	Blanchard-Perotti	0.04	0.12	0.28	0.38	0.42	0.42(Q20)
Tax Multipliers	*Recursive*	-0.24	-0.66	-0.97	-1.01	-1.00	-1.01(Q12)
	Blanchard-Perotti	-0.24	-0.66	-0.97	-1.01	-1.00	-1.01(Q12)
		Cumulative Multipliers (Not scaled)					
Government Spending Multipliers	*Recursive*	0.01	0.03	0.07	0.10	0.11	0.11(Q20)
	Blanchard-Perotti	0.01	0.03	0.07	0.10	0.11	0.11(Q20)
Tax Multipliers	*Recursive*	-0.05	-0.15	-0.21	-0.22	-0.22	-0.22(Q12)
	Blanchard-Perotti	-0.05	-0.15	-0.21	-0.22	-0.22	-0.22(Q12)

Source: Authors' Calculations

We present the present value cumulative multipliers in scaled form as before as well as not scaled form. The scaled cumulative multipliers as usual will represent the dalasi response of the relevant macroeconomic variable of interest while the non-scaled cumulative multipliers are interpreted as percent responses of output. The results under both identification strategies are identical in this case as was seen before for the same reasons. The estimated present value cumulative multiplier for government spending is 0.04 at impact and rises to 0.42 by the end of five years (quarter 20). Economically speaking, a one dalasi increase in government spending corresponds with 0.04 dalasi increase in real GDP at impact (first quarter) and rises to 0.42 dalasi at the end of the fifth year. This does not only indicate a spending multiplier below one but also lower than would be suggested by Keynesian government multipliers presented in most macroeconomic textbooks.

For the case of the non-scaled cumulative multipliers, the results show an estimated government spending multiplier of 0.01 percent at impact before rising to 0.11 percent by the end of five years. In this case, a one percent increase in government spending is associated with a 0.01 percent or 1 percentage points increase in real GDP at impact (quarter one) and rises to 0.11 percent or 11 percentage points at the end of year five (quarter 20). Thus, the results further confirm that spending multipliers in The Gambia are below one as was the case before.

Table 3 above also shows the estimated present value cumulative tax multipliers. As can be seen, the scaled present value cumulative tax multiplier is estimated at -0.24 at impact (quarter one) bottoming out at -1.01 in quarter twelve (3 years). In other words, a dalasi increase in tax revenue corresponds to 24 bututs decline in real GDP in quarter one and by the third year, the fall in real GDP would have surpassed the initial increase in tax to stand at -1.01 dalasi. Similarly, for the non-scaled form, a one percent increase in tax revenue in associated with a 0.05 percent and 0.22 percent decline in real GDP at impact and trough (quarter 12). Based on this, it appears that tax shocks are distortionary in nature and have more effects on output than spending shocks.

Implied Impact of COVID-19 Fiscal Stimulus on the Economy

Like many governments around the world, the government of The Gambia responded to the Covid-19 pandemic in a number of ways including stimulus spending, health measures among others. Data available from the Ministry of Finance and Economic Affairs (MoFEA) show spending related to Covid-19 activities amounted to 1.9 billion dalasi as at end December 2020. A bigger chunk of the spending happened within the June quarter totalling to about 1 billion dalasi. It is important to note that the data used excludes Covid-19 spending done outside the

economy for example to purchase medical equipment. This is important because we are interested in the impact of domestic fiscal spending in the economy. Moreover, the data includes Covid-19 expenditures finance by both domestic revenue – Gambia Local Fund (GLF) – as well as donor funds from development partners.

Table 4: COVID-19 Related Spending (in Millions of Dalasi)

	Amount Approved	***Budget Support***	***Amount Spent***	***Monthly Spending***	***Quarterly Spending***
Jan-20	0.00		0.00	0.00	
Jan-Feb 2020	0.00		0.00	0.00	
Jan-Mar 2020	0.00		0.00	0.00	0.00
Jan-Apr 2020	500.00		60.00	60.00	
Jan-May 2020	1345.07		927.00	867.00	
Jan-June 2020	1345.07		1018.07	91.07	1018.07
Jan-July 2020	1345.07		1118.43	100.36	
Jan-Aug 2020	1845.07		1133.09	14.66	
Jan-Sep 2020	1838.71	270.96	1404.05	270.96	385.98
Jan-Oct 2020	1838.71		1529.65	125.60	
Jan-Nov 2020	1838.71		1664.32	134.67	
Jan-Dec 2020	1838.71		1886.02	221.70	481.97

Source: Authors' calculations based on data from Ministry of Finance and Economic Affairs Budget Directorate monthly expenditure briefs.

Output Effect of Covid-19 Stimulus

Using the estimated government spending multipliers in this paper, we calculated the implied output effect of government spending related to Covid-19 pandemic. The results are presented in Table 5 below.

Table 5: Output Effect of Covid-19 Stimulus (in Millions of Dalasi)

	Q1 (impact)	Q4	Q8	Q20 (Peak)
Output Effect of Quarterly Spending (1b)	40.72	122.2	285.1	427.6
Output Effect of Cumulative Quarterly Spending (1.9b)	75.44	226.32	528.09	792.13

Source: Authors' Calculations using the estimated present value cumulative government spending multiplier (scaled multiplier).

From Table 5, a government spending of about 1 billion dalasi has an output (real GDP) effect of 40 million dalasi at impact while rising to 427.6 million by the end of five years. Similarly, the total government spending of 1.9 billion corresponds to a 75.4 million increase in real GDP at impact and an increase of 792.1 million dalasi in real GDP at end of the fifth year. An alternative way to evaluate the output effect would be to calculate the quarterly spending against the corresponding quarterly implied spending multiplier. This is however not included here because of space.

Table 6: Implied importance of Covid-Spending
in minimizing the recession

	2019 Real GDP	2020	*Growth rate*
	61769.00		
IMF Initial Growth Forecast for 2020		60842.47	-1.5
IMF revised Growth Forecast for 2020		61769.00	0
GBoS Prem. Growth for 2020		61644.34	-0.2
Output Effect of Cumulative Quarterly Spending		226.32	-1.13

Source: Authors' Calculations

From Table 6 above, we intend to show how important the Covid-19 spending have had in minimizing the economic downturn due to the pandemic. We proxy the expected fall in real GDP by the initial forecast of the IMF of -1.5 growth in 2020. We used the revised forecast which we believe took into account the fiscal response to the pandemic as a measure of economic rebound following the government spending among other things. Using the cumulative quarterly spending, we show that Covid-19 related spending narrowed the recession from the initial forecast of -1.5 percent to -1.13 percent by the end of 2020. This is significantly different from the IMF revised growth of zero percent and the -0.2 percent preliminary growth figure by Gambia Bureau of Statistics (GBoS) for 2020. In effect, this points to the fact that the fiscal intervention only had partial effect on the economy and other factors different from government spending such as accommodative monetary policy among others played a more significant role. The results are not surprising owing to the size of fiscal multipliers obtained in this study.

DISCUSSION OF RESULTS

As mentioned above, the estimated government spending multipliers presented in this study are small and below one. This is true even after employing two different identification strategies as well as employing different methods of calculating the implied multipliers. What this points to is that the use of fiscal policy in stimulating aggregate demand and real output could be overrated in the case of The Gambia. In other words, fiscal policy is less potent in terms of spurring growth and policymakers should take this into account especially during recession when such measures are being considered.

However, the reality is that fiscal multipliers are not only low and below unity just in The Gambia. In fact, many studies in both advanced, emerging, and low-income countries have shown that fiscal multipliers are usually below one (see Blanchard and Perotti, 2002; Ilzetzki et al, 2013; Kemp. 2020 among others). As a result, the size of fiscal multipliers depends on time, country and circumstances involve (whether during recessions or expansions times). To this end, there are many reasons why fiscal multipliers could be below one and even negative. Firstly, if there are too many leakages that the fiscal stimulus is spent on imports or saved, then the multipliers will be small. Ilzetzki et al (2013) in their study find that countries open to trade (open economies) have negative multipliers at impact and long run. This could be a factor why we have low multipliers in the case of The Gambia given the relative trade openness (trade to GDP ratio of about 50%) that exist. Much of the increased government spending could end up being used to pay for importation of goods rather than being spent in the domestic economy to have the trickling down effect.

Secondly, countries with flexible exchange rate tend to have lower or negative fiscal multipliers (Ilzetzki et al, 2013). The reason for this stems from the Mundell-Fleming model which suggest that fiscal policy is only effective (increasing output) when the exchange rate is predetermined. In that case, a rise in government spending increases output, raise interest rate and forces capital inflows. The central bank responds by increasing the money supply to stop the exchange rate from appreciating thus accommodates the increase in output. In fact, it is shown that if monetary conditions are accommodative and the exchange rate is fixed, this could increase the fiscal multipliers by a factor of 2 to 3 (Spilimbergo et al, 2009). Again, this could be a reason why we obtain lower fiscal multipliers in The Gambia given that the country has an opened capital account and follow flexible exchange rate regime since the liberalisation of the economy in the 1980s[5]. Finally, countries with high debt burden (above 60% of GDP) are usually faced with counter-productive fiscal policies because of the associated future

[5] Though the de jure exchange rate arrangement is free floating according to the IMF, the de facto exchange rate arrangement is classified as other managed (As of June 2020 AREAER online).

expectation of a tight fiscal position. Ilzetzki et al (2013) find that countries with high debt burden have an impact multiplier estimated at near zero turning negative in the long run. Even though the forward-looking feature of economic agents may not be as pronounced in The Gambia as in other more advanced countries because of agents are liquidity constrained, the fact that the country is in high risk of debt distress (73.9% of GDP) could limit the impact of fiscal stimulus on the economy. Thus, judging by this reasoning, obtaining lower fiscal multipliers for The Gambia should be expected as shown in this paper.

Notwithstanding, the results in this study show that government Covid-19 related spending had a partial role in cushioning the economy from deeper recession following the emergency of the pandemic. In other words, fiscal spending relating to Covid-19 activities help to narrow the recession by about 24 percent as at end 2020.

CONCLUSION

After the 2008-2009 great financial recession, a number of studies re-emerged trying to understand the effect of fiscal stimulus on the macroeconomy. This is owing to the major disagreement on the size and sign of fiscal multipliers that were used to evaluate the effect of fiscal interventions. While there has been a vast literature in this area, the size and sign of estimated fiscal multipliers differ across countries, times and methodologies. Against this backdrop, this paper conducted an empirical estimation of fiscal multipliers for The Gambia using a Structural Vector Autoregressive (SVAR) approach and uses the multipliers to evaluate the implied impact of Covid-19 fiscal stimulus on the Gambian economy.

The results show fiscal multipliers are small and below unity with the exception of tax multipliers in some periods. In other words, the present value cumulative government spending multiplier is estimated to be 0.04 dalasi at impact (quarter one) before rising to 0.42 dalasi at the end of five years. This implies that a one dalasi increase in government spending is associated with a 0.04 dalasi increase in real GDP in the first quarter after the increase in government spending and 0.42 dalasi at the end of five years. Taxes were found to impact output more than government spending in that tax multipliers are higher than spending multipliers. In fact, we estimated an output tax multiplier of -0.24 dalasi or 24 bututs at impact for every one dalasi increase in tax revenue and this number peaks at -1.01 dalasi by the end of quarter twelve (three years). Thus, the use of taxes to finance the budget deficit could be very costly and should raise concerns among policymakers in The Gambia.

Using the estimated government spending multipliers, we calculated the implied effect of the Covid-19 stimulus on the economy. We showed that the 1.9 billion dalasi Covid-19 spending has a 75.4 million dalasi effect on real GDP at impact peaking at 792.1 million by the end of five

years. Specifically, the results show that government Covid-19 stimulus narrowed the recession from -1.5 percent to -1.13 percent (0.37 percentage points). More importantly, of the estimated output loss of about 900 million dalasi, the Covid-19 stimulus was able to cushion 24.4 percent at the end of 2020. However, this figure differs with the 2020 preliminary growth figure of -0.2 by GBoS. In effect, given the small fiscal multipliers obtained, fiscal intervention is less potent than may have been otherwise presumed.

To this end, policymakers should be aware that though fiscal policy can impact output, however, the trickling down effect is small as shown by low spending multipliers. Moreover, the use of taxes to finance the fiscal deficit could both be distortionary and costly. Going forward, more research is recommended to estimate state fiscal multipliers in order to verify whether multipliers during recession are larger than multipliers during economic expansions. In addition, extending to include estimates of private consumption and investment multipliers could be helpful in tracking the effect of fiscal policy on households and firms.

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