

## The transmission mechanism of fiscal policy in North Macedonia: a Bayesian VAR approach

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### Abstract

The aim of this research is to empirically investigate the transmission mechanism of fiscal policy in North Macedonia. We estimate a Bayesian VAR model using quarterly data for the period 2006q1 – 2020q4 and a recursive approach in order to identify exogenous fiscal shocks and an open economy model specification. The findings suggest that the effectiveness of a government spending shock on stimulating output in North Macedonia is limited. Our findings suggest that a tax shock is more effective as a short-term stabilization tool. In line with the '*expansionary fiscal contraction*' prediction, our findings suggest that a fiscal tightening will result in a crowding in of output in North Macedonia. The transmission mechanisms of fiscal policy in North Macedonia is consistent with the Keynesian theory suggesting a crowding in effect of fiscal shocks on private consumption, private investment, private employment and real wages. Considering the limited effectiveness of fiscal policy, we recommend that policy makers in North Macedonia give preference to structural reforms that would address these supply-side problems, which in the long term would result in higher output and employment.

**Keywords:** fiscal policy, fiscal multipliers, Bayesian VAR, North Macedonia.

### Introduction

In this research we investigate the short-term effects of fiscal policy on output, employment and other macroeconomic variables and try to thoroughly investigate the transmission mechanism of fiscal policy in North Macedonia in order to be able to discriminate between New Classical and Keynesian predictions of fiscal policy. North Macedonia is a small open economy in transition with persistent macroeconomic imbalances that are structural in nature: rigid labor market (skill shortages, skill mismatches, brain drain, high and structural unemployment); strong dependence on imports and persistent current account deficits; and obsolete and low levels of capital stock insufficient to employ the labor force (Darvas and Vadas, 2005; Kastrati et al., 2017). The use of monetary policy as a short-term stabilization tool is limited due to exchange rate peg, underdeveloped financial markets, low levels of foreign currency reserves, high levels of euroization, and excess liquidity (Velickovski, 2013; Jovanovic et al., 2015). Consequently, the role of fiscal policy in stabilizing the short-time fluctuations of output is very important, and, therefore, the study of fiscal policy effectiveness in North Macedonia may provide evidence and useful policy recommendations. We employ an open economy VAR model estimated by Bayesian methodology, for a sample period of 2006q1-2020q4. The choice of the variables in the model and the method of estimation is determined by the structural characteristic of the country and data availability.

The rest of the paper is organized as follows: the first section provides a brief literature review on fiscal policy theoretical models; the second and third sections a description of data and methodology is provided; the fourth section provides the results of the baseline model; the fifth section provides the findings on the transmission mechanism of fiscal policy; and the final sections provides concluding remarks and policy recommendation.

### Literature review

The disagreement between both schools of thoughts in economics is about the transmission channel of fiscal policy: crowding in vs. crowding out effects on private investments, private consumption and private employment (Gechert and Will, 2012). One might get a full spectrum of positive through to negative fiscal multipliers within the same theoretical framework, reflecting different assumptions of the model

In a new classical model, with flexible prices, assuming the economy is in equilibrium and that there are no spare or non-used capacities, there is no role for fiscal policy. Their argument against the effectiveness of fiscal policy is 'Ricardian equivalence' (Barro, 1979), which derives from the permanent income hypothesis, non-liquidity constrained consumers and the rational expectation assumption. This hypothesis states that debt-financed government spending may not increase consumer spending, because the public will anticipate a future tax increase in order to pay off the debt, hence they will save the tax cut instead of consuming it. New classical theory suggests that a fiscal spending shock financed by lump-sum taxes will induce a 'negative wealth effect', leading to a decrease in private consumption, real wages and marginal productivity of labour, as well as to an increase in labour supply, and consequently output and employment will increase, but, the multiplier is less than one due to the 'crowding out' effect of private consumption (Baxter & King, 1993). Real Business Cycle (RBC hereinafter) studies that account for the way fiscal shocks are financed and allow for distortional effects of taxation in the case of tax-financed expansionary fiscal policy, report negative multipliers. On the other hand, RBC models assuming that public spending increases productivity, report multiplier values higher than one (Linnemann, 2006).

In a Keynesian model, assuming a demand deficient economy with sticky prices and non-forward looking agents, a stimulus to demand can have multiplier effects on output. Under Keynesian assumptions, fiscal policy is expected to be more effective in a closed economy compared to an open economy. In a closed economy model, an increase in government spending will increase private consumption and consequently aggregate demand, output and money demand will increase. However, if we assume that the money supply is fixed, this results in an increase of interest rates, which in turns partially crowds out private investment (Hebous, 2009). In the Keynesian model, in an open economy, the use of fiscal stimulus under a flexible exchange rate regime will increase real interest rates, triggering capital inflow and, given price stickiness, the real exchange rate will appreciate, which will lead to a loss of international competitiveness and trade balance deterioration as a result. The expansionary effect of fiscal stimulus may be entirely offset by the reduction in net

exports, in which case there is no fiscal multiplier. In contrast, under a fixed exchange regime, monetary policy will react in order to prevent the interest rate increase, hence exchange rate appreciation, thereby amplifying the effect of the fiscal multiplier.

A simple NK-DSGE model, adding micro-foundations and some market failure in the models of general equilibrium analysis of inter-temporal optimisation by rational economic agents, misses the Keynesian positive effect of fiscal expansion on consumption. Its predictions are in line with those of the RBC model and the reported multipliers are lower than one. However, several modifications in DSGE models may provide multipliers higher than one. For instance, introducing non-Ricardian households who are liquidity constrained and consume all of their current income will also generate a positive effect of fiscal shock on consumption (Gali et al., 2007). Additionally, the monetary policy reaction is a crucial factor determining the efficiency of fiscal policy. If the monetary policy is non-accommodative or in the extreme case of a zero lower bound, the monetary authorities will not react to the increased inflationary pressures, caused by positive fiscal shock, by increasing interest rates, hence the crowding out effect in private investments is mitigated (Rendahl, 2012). On the other hand, if finite horizon consumers are assumed who anticipate spending reversal as a response to increasing public debt, in a model with nominal rigidities, a negative fiscal shock increases output and consumption. This is consistent with that an economy may in the short term grow as a consequence of fiscal austerity, conditionally on the assumptions that *'austerity will improve labour market efficiency and the competitiveness of the economy'* (Briotti, 2005, p.8).

Macro-econometric models (MACRO hereinafter), which are in essence extensions of the Keynesian IS-LM model (augmented by some neoclassical features in the long run) predict a crowding in of private consumption/ investment due to a fiscal shock, and therefore report multipliers higher than one.

There is a consensus among economists that the response of the labour market variables to fiscal shocks depends on the type of shock considered and the way the increases are financed (Baxter and King, 1993; Pappa, 2009; Gomes, 2009; Monacelli et al., 2010). Baxter and King (1993) suggest that if the government spending is financed by lump sum taxes, this will cause an increase in hours worked and real wages will decrease. However, if distortionary income taxes are used to finance government spending, both hours worked and after-tax real wages will decrease. They argue that since higher taxes imply lower after-tax factor rewards, there is a strong incentive to substitute work effort with leisure and also to curtail investment, which results in lower output and employment. A fiscal stimulus affects the labour market through the 'negative wealth effect', 'wage and/or interest rate pressure' and 'productivity enhancing' channels. The employment consequences depend on the state of the economy and on which of these channels prevail. In a new classical economy, a positive fiscal shock, financed by a lump-sum tax, induces the 'negative wealth effect' and an increase in the labour supply. However, the increase in labour supply may be entirely offset by the decrease of private employment due to 'wage and/or interest rate pressure', since a fiscal shock absorbs resources and the 'productivity enhancing' channel is absent. New classical theory suggests that labour productivity declines, since extra public spending increase the interest rate, thereby crowding out private investments and

reducing the capital stock. In a Keynesian economy, with underemployed resources, the 'wage and/or interest rate pressure' channel is absent. Keynesian models of both traditional partial equilibrium and new general equilibrium types, suggest that a fiscal stimulus, apart from increasing the labour supply due to the 'negative wealth effect', will also increase labour demand, generating an increase in output, but not necessarily in the real wage, given demand determined unemployment. The increase in real wages occurs if the rise in public spending leads to a 'productivity enhancing' effect or through assumptions of complementarity between private and government consumption, sticky prices and, rule-of thumb-consumers (Gali et al., 2007). Rule-of-thumb consumers partly insulate aggregate demand from the negative wealth effects generated by the higher levels of taxes needed to finance the fiscal expansion, while making it more sensitive to current disposable income. Sticky prices make it possible for real wages to increase or, at least, to decline by a smaller amount even in the face of a drop in the marginal product of labour.

To our best knowledge there is no study to date that investigates thoroughly the transmission mechanism of fiscal policy in North Macedonia using a Bayesian VAR model. The short span of data available on fiscal variables on a quarterly basis and its disputable quality are the main reasons prohibiting the researchers to estimate a more complex model on fiscal policy in Macedonia. Tevdovski et al. (2019) investigate the macroeconomic effects of fiscal and monetary policy in North Macedonia and Croatia using a Bayesian VAR model. They use quarterly data for the period 2000q1-2011q4 and their model consists of the following variables: fiscal variables, interest rate, inflation, output gap, Euro-zone output gap, 3 month Euribor, and Euro-zone inflation. Their findings suggest that fiscal policy is countercyclical in North Macedonia and a fiscal policy tightening will result to an increase of GDP and a decline of inflation and interest rates. Our study is differently from Tevdovski et al. (2019) because it explores the effects of government spending and government revenue separately and computes fiscal multipliers. Most importantly, our study employs a more complex model and investigates thoroughly the transmission mechanism of fiscal policy in North Macedonia and tries to distinguish between different theoretical predictions of fiscal policy literature.

### **Data description**

The quarterly fiscal series for North Macedonia starts from 1997. However, before 2005 quarterly data are interpolated from annual fiscal data. Hence, considering the endogeneity bias due to bad quality of the data and the change in methodology in data after 2005, we are constrained to define the sample period from 2006q1-2020q4. All original variables in nominal terms are deflated by using CPI (2005) and seasonally adjusted by the TRAMO-SEATS method in EViews. All variables, except interest rate, debt and import/GDP are log transformed. The government spending (*lg*), government revenue (*ltax*) and public debt/GDP (*debt*) data are taken from the bulletins of the Ministry of Finance. Data on GDP (*lgdp*), 3 month Central bank bills rate (*interest*), the real effective exchange rate (*lreer*), import/GDP (*imp*), private consumption (*lprivcons*) and private investment (*lprivinves*) are taken from NBRM,

while the total employment (*lemp*), private employment (*lprivemp*) and real wage data (*lwage*) are taken from State Statistical Office of North Macedonia.

We employ several unit root tests to investigate the order of the integration of the variables in the model. The standard Augmented Dickey Fuller (ADF) test is conducted for all the series augmented by a deterministic term and a constant. In the presence of a unit root, including a constant makes the testing equation a random walk with drift, which allows for both deterministic and stochastic influences on the variables of interest over the sample period. The number of lagged differences used on the specification of the testing equation is based firstly on the model diagnostics, and secondly on the information criteria. In the presence of a structural break in time series the ADF test is weakened i.e. its capacity to reject the unit root null is reduced. Hence, the ADF test with structural break is conducted in a presence of a single structural break (in each case identified by the algorithm included in JMulti). The results presented in Table 1 suggest that all variables in the model are integrated in order one I(1). Consequently, we use the first differences of the variables in the baseline model.

**Table 1: Unit root tests**

Variable	Unit root test	Deterministic terms	Lags	Test statistic	5% critical value
<b>lg</b>	ADF test with no structural break	intercept, no time trend	2	-1.6597	-2.86
	ADF test with structural break	Shift dummy (2009 Q1)	3	-1.3728	-2.88
<b>ltax</b>	ADF test with no structural break	intercept, no time trend	2	-1.0760	-2.86
	ADF test with structural break	Shift dummy (2009 Q1)	3	-1.1830	-2.88
<b>lgdp</b>	ADF test with no structural break	intercept, no time trend	1	-1.1998	-2.86
	ADF test with structural break	Shift dummy (2009 Q1)	0	-2.3178	-2.88

<b>debt</b>	ADF test with no structural break	intercept, no time trend	2	-1.3699	-2.86
	ADF test with structural break	Shift dummy (2009 Q1)	1	-0.3880	-2.88
<b>interest</b>	ADF test with no structural break	intercept, no time trend	2	-0.6871	-2.86
	ADF test with structural break	Shift dummy (2009 Q1)	2	-0.0799	-2.88
<b>lreer</b>	ADF test with no structural break	intercept, no time trend	2	-1.5821	-2.86
	ADF test with structural break	Shift dummy (2009 Q1)	3		-2.88
<b>imp</b>	ADF test with no structural break	intercept, no time trend	1	-1.2584	-2.86
	ADF test with structural break	Shift dummy (2009 Q1)	1	-0.6859	-2.88
<b>lprivcons</b>	ADF test with no structural break	intercept, no time trend	2	-0.8547	-2.86
	ADF test with structural break	Shift dummy (2009 Q1)	1	-1.3485	-2.88
<b>lprivinves</b>	ADF test with no structural break	intercept, no time trend	2	-0.6479	-2.86
	ADF test with structural break	Shift dummy (2009 Q1)	3	-0.7357	-2.88
<b>lemp</b>	ADF test with no structural break	intercept, no time trend	2	-1.5428	-2.86
	ADF test with structural break	Shift dummy (2009 Q1)	1	-1.7538	-2.88

<b>lprivemp</b>	ADF test with no structural break	intercept, no time trend	1	-0.9689	-2.86
	ADF test with structural break	Shift dummy (2009 Q1)	0	-0.3583	-2.88
<b>lwage</b>	ADF test with no structural break	intercept, no time trend	2	-0.6794	-2.86
	ADF test with structural break	Shift dummy (2009 Q1)	1	-0.8853	-2.88

### Methodology

The vast majority of the empirical literature uses VAR models, and applies various methods of identification of exogenous fiscal shocks. A structural VAR model is in the following form:

$$AX_t = B(L)X_{t-1} + \varepsilon_t \quad \text{Eq. (1)}$$

where,  $X_t$  includes the endogenous variables of interest,  $A$  is the matrix of coefficients capturing the contemporaneous relationships,  $B(L)$  captures the dynamic relationships between endogenous variables, and  $\varepsilon_t$  is a vector of orthogonal structural shocks. A reduced form VAR takes the following form:

$$X_t = C(L)X_{t-1} + u_t \quad \text{Eq. (2)}$$

where  $C(L)$  is a combination of  $A$  and  $B(L)$  matrixes, and  $u_t$  is a vector of reduced form residuals. The relationship between the structural and reduced form residuals is given by:

$$\varepsilon_t = A^{-1}u_t \quad \text{Eq. (3)}$$

The main challenge while studying the effectiveness of fiscal policy is to identify the exogenous discretionary policy (via the structural shocks  $\varepsilon_t$ ) by imposing restrictions on  $A$ . We follow Fatás and Mihov (2001) and apply the recursive approach and identify fiscal shocks by Choleski decomposition, which imposes zero restrictions in order to ensure a recursive ordering on the VAR variables and to avoid contemporaneous reactions of the fiscal variable to business cycle fluctuation.

In our investigation, considering that North Macedonia is a small open economy in transition we will use an open economy model with the variables ordered as follows: the log of real government spending ( $lg_t$ ); the log of cyclically adjusted real government revenues ( $ltax_t$ ); the log of real GDP ( $lgdp_t$ ); the short-term interest rate ( $i_t$ ); the import/GDP ratio ( $imp_t$ ); and the log of the real effective exchange rate ( $e_t$ ). In order to avoid the “curse of dimensionality” problem of VARs. we analyse the

transmission channels through which fiscal policy affects the economy by extending the baseline model with one additional variable at a time. Therefore, we run six additional specifications of the baseline model and one of the following variables: public debt/GDP, private consumption, private investment, total employment, private employment and wages.

Our baseline model presented in matrix notation is presented as follows:

$$\begin{bmatrix} 1 & 0 & 0 & 0 & 0 & 0 \\ -\alpha_{itaxig} & 1 & 0 & 0 & 0 & 0 \\ -\alpha_{igdpig} & -\alpha_{igdpitax} & 1 & 0 & 0 & 0 \\ -\alpha_{iig} & -\alpha_{itax} & -\alpha_{igdp} & 1 & 0 & 0 \\ -\alpha_{impig} & -\alpha_{imptax} & -\alpha_{impigdp} & -\alpha_{impi} & 1 & 0 \\ -\alpha_{eig} & -\alpha_{eitax} & -\alpha_{eigdp} & -\alpha_{ei} & -\alpha_{eimp} & 1 \end{bmatrix} \begin{bmatrix} ig_t \\ itax_t \\ igdp_t \\ i_t \\ imp_t \\ e_t \end{bmatrix} = A \begin{bmatrix} ig_{t-1} \\ itax_{t-1} \\ igdp_{t-1} \\ i_{t-1} \\ imp_{t-1} \\ e_{t-1} \end{bmatrix} + Bfc + Cld + \begin{bmatrix} \varepsilon_t^{ig} \\ \varepsilon_t^{itax} \\ \varepsilon_t^{yigdp} \\ \varepsilon_t^i \\ \varepsilon_t^{imp} \\ \varepsilon_t^e \end{bmatrix}$$

where  $A_0$  is restricted to a lower triangular matrix with unit diagonal;  $\alpha_{j,k}$  denote the contemporaneous reaction of variable  $j$  to shocks in variable  $k$ ; B and C denote the corresponding coefficients to pulse dummy and shift dummy for the financial crisis, respectively.

In order to overcome the “over-fitting parameters” problem we estimate the VAR model using the Bayesian methodology. Bayesian methodology is more advantageous compared to a simple VAR model, since it allows estimating time-variant parameters. Specifically, Bayesian methodology employs some form of ‘partial pooling’ (a random coefficient model) which implies that the coefficients of the VAR are different for different periods (t), yet are drawn from a distribution whose mean and variance are constant across time. In a VAR model

$$X_t = A_0 + B(L)X_{t-1} + u_t \quad \text{Eq. (4) is assumed:}$$

$$a_t = \mu + v_t \quad \text{Eq. (4)}$$

where  $\alpha = [\text{vec } B(L), \text{vec } A_0]'$  and  $v_t \sim (N, \Sigma_v)$ . The Bayesian method uses Eq. (4) as a common prior distribution and this prior combined with the likelihood of the data gives the posterior distribution of the  $\alpha_t$  and the average value  $\mu$ . We use independent Normal- Wishart prior, and set the prior parameters following Caldara and Kamps (2008). In the Impulse Response Function (IRF) graphs, instead of standard error bands we compute 95% Bayesian credible intervals (posterior probability distribution). The diagnostics and Bayesian information criteria suggest the use of one lag in the baseline model.

## Results

In this section we investigate the effects of fiscal impulses on output and other variables in the model and compute fiscal multipliers for fiscal shocks, accordingly. It should be noted that fiscal multipliers presented in Table 2 are computed transform

the original IRF of output as follows: 1) dividing the original IRF point estimates by the standard deviation of the government spending shock in order to obtain the IRF point estimate to a one unit shock i.e. 1% of government spending; 2) the unit shock of government spending is divided by the average share of spending in GDP in the corresponding sample. The values that we obtain represent the impact multipliers of the corresponding horizon. For the sake of comparison with other studies we compute fiscal multipliers also for the tax shock, despite the criticism of Caldara and Kamps (2008) that the recursive approach is not appropriate for identifying the tax shocks in a VAR model. However we refrain from investigating the transmission mechanism of fiscal policy in the case of tax fiscal impulse,

The IRFs in Fig.1 suggest that an increase of government expenditure will result to an increase in output, albeit significant only in the first three quarters. The impact multipliers of government spending, are smaller than one, suggesting that the effectiveness of this fiscal shock is limited on stimulating output in North Macedonia. Interest rates decrease as a response to an increase in government spending, suggesting an accommodative monetary policy, however, the response is insignificant. The response of import to a government spending shock is mainly insignificant. The significant appreciation of real effective exchange rate in the first three quarters in line with the New Keynesian theoretical predictions and suggest that North Macedonia loses its price competitiveness in the global market. The results suggest that an increase in government spending is accompanied with a significant increase in taxes in the first year.

The IRFs in Fig.2 suggest that a contractionary fiscal policy i.e. an increase of taxes in North Macedonia will result to a significant increase of output up to three quarters. Tevdovski et al. (2019) report a similar finding.

The peak multiplier presented in Table 2 suggests that an increase of taxes of 1% will result to an increase of GDP of 1,11%. The fiscal multipliers of the tax shock are relatively higher compared to the government spending shock suggesting that, if shocks are symmetrical, taxes are a more effective fiscal impulse on stimulation output in North Macedonia.

These results, albeit counter-intuitive, are contrary to the New Keynesian theoretical predictions and in line with the Real Business Cycle theoretical prediction. Our results are similar to Kurtishi(2013) and Trenoski (2015) who report negative fiscal multipliers for Macedonia. The response of interest rate, albeit insignificant, suggests a contractionary response of monetary policy i.e. a moderate increase of interest rates as a response of an increase of taxes. Differently from the government spending shock, the results suggest a short-lived increase of imports as a response of increased taxes. This result, albeit counter-intuitive can be explained by the increase in output sufficient to trigger a significant increase in imports at the first quarter. Government spending also significantly increases in the first three quarters as a response to tax shock in North Macedonia.

In terms of robustness check we augment the baseline model with the share of public debt as a percentage of GDP. The results are very similar to the baseline model, however the positive effect of government spending on output fades away much quicker, becoming insignificant after the first quarter. The IRF of public debt response,

presented in Fig.3 suggests that the expansionary fiscal policy is debt- financed i.e. an increase in government spending will result to persistent increase to public debt/ GDP ratio, significant to almost 2 years after the initial shock.

**Table 2: Fiscal multipliers – North Macedonia**

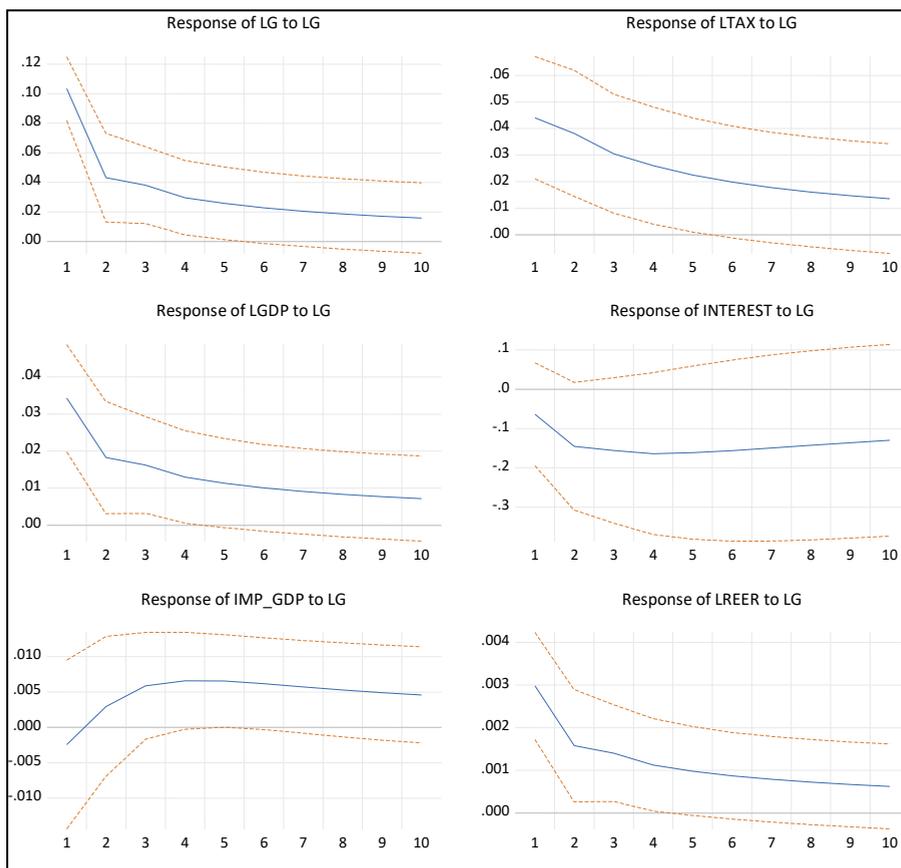
Quarter	1	2	3	4	5	6	7	8	9	10
Spending multiplier	0.85**	0.45**	0.40**	0.32**	0.28	0.24	0.22	0.20	0.19	0.17
Tax multiplier	1.11**	0.99**	0.58**	0.41	0.27	0.18	0.11	0.06	0.03	0.01

\*\*denotes significant multiplier at 5% critical value.

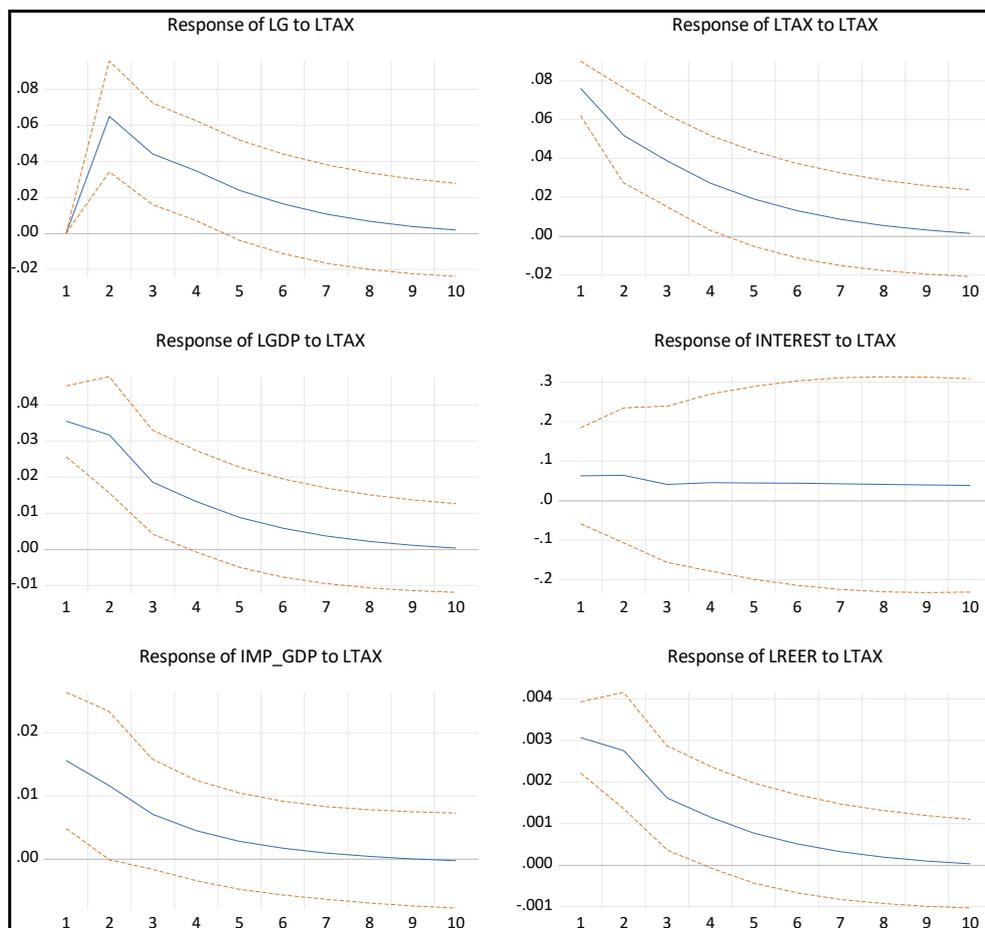
### The transmission mechanism of fiscal policy in North Macedonia

The results of the baseline model are contradictory and not sufficient to distinguish

**Fig.1 IRFs of a Bayesian VAR model: positive government spending shock**

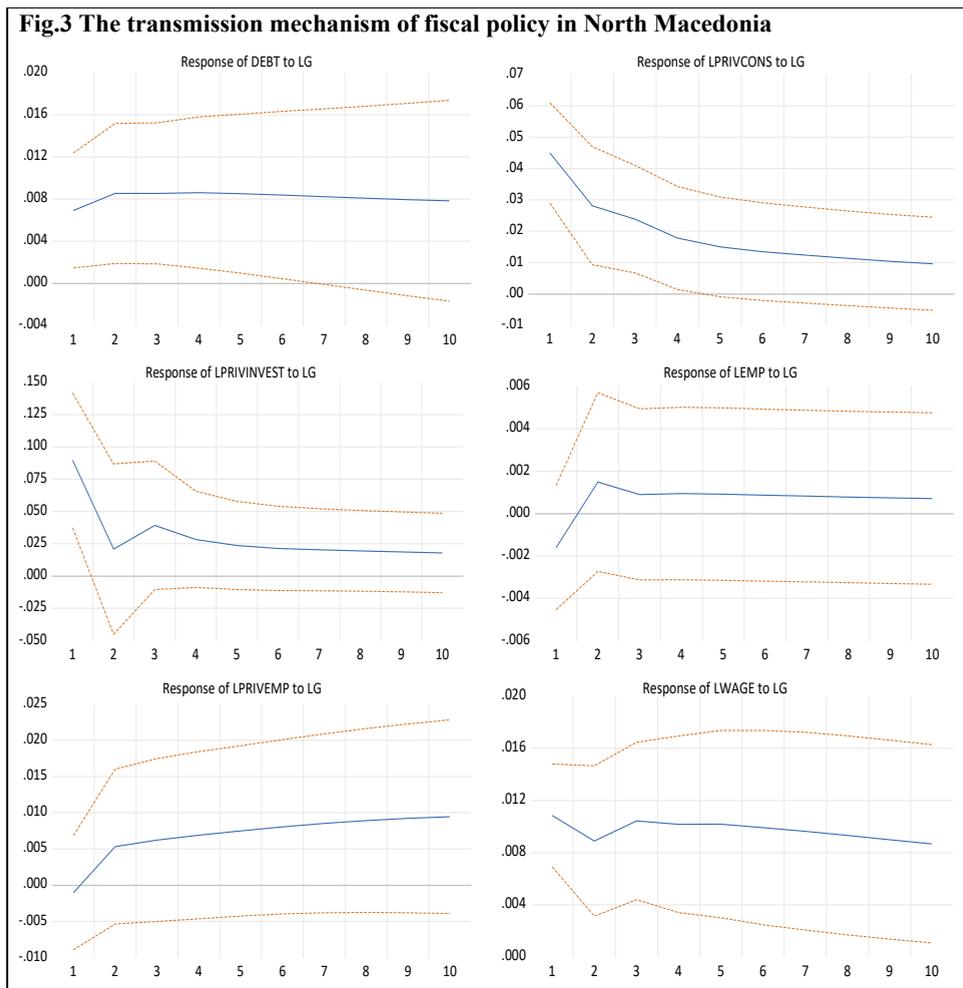


**Fig.2 IRFs of a Bayesian VAR model: positive tax revenue shock**



between the competing theories on fiscal policy. Government spending shock results in a positive effect on output, in line with the Keynesian theory; while a tightening of fiscal policy by increasing taxes will also result in an increase of output, in line with New Classical theory. Therefore, in order to delve deeper into the transmission mechanism of fiscal policy in North Macedonia we augment the baseline model with additional variables and investigate the theoretical predictions of both school of economic thought about the crowding in vs. crowding out effects on private consumption, investment, private employment and wages.

The results presented in Fig.3 suggest that an increase in government spending will result in a significant increase of private consumption for the first year after the initial shock. The findings suggest a significant brief increase in private investment in the first quarter after the shock. The results suggest a persistent increase in real wages due to an expansionary fiscal shock. The responses of total employment and private employment are insignificant, however the direction of the responses suggest an



increase of both variables after a positive government spending shock.

The findings regarding the transmission mechanism of fiscal policy in North Macedonia are consistent with the Keynesian theoretical prediction and contrary to the New classical theory. However as shown in the literature review, the modified RBC models adopting a non-separable utility function in consumption and leisure, the modified RBC assuming deep habits in consumption and modified NK-DSGE models assuming liquidity constrained consumers also predict a crowding in effect of fiscal shocks on private consumption, investment, employment and real wages. The findings are similar to the transmission mechanism of fiscal policy in advanced countries by Raveni (2021).

## Conclusions

The aim of this paper is to investigate the transmission mechanism of fiscal policy in North Macedonia and to quantify the effect of fiscal instruments on output by

computing fiscal multipliers. We start by providing a brief theoretical prediction of different models used by Keynesian and New Classical schools of economic theory. We estimate an open economy Bayesian VAR model, using a sample of data from 2006q1-2020q1 and the recursive approach to identify fiscal shocks. The findings suggest that instrument of government spending is limited on stimulating output in Macedonia. The peak government spending multiplier is only 0.85. The results are in line with the findings of most papers on transition countries. Our findings are in line with 'expansionary fiscal contraction' predictions suggesting that an increase in taxes will result in an output increase. Our findings suggest that the tax instruments are relatively more efficient than government spending on stimulation output. These results are in line with findings of other studies of fiscal policy in North Macedonia. However, we used a second-best approach while identifying tax socks, therefore the findings regarding the tax impulse should be interpreted with caution. . The results suggest that an expansionary fiscal policy will reduce the price competitiveness of the North Macedonian economy.

The transmission mechanism of fiscal policy in North Macedonian is consistent with the theoretical prediction of Keynesian models. An increase of government spending will result in a crowding in of private consumption, private investment, private employment and real wages.

Conclusively, considering that in North Macedonia the findings of this study suggest that fiscal policy is limited as a stabilization tool, the monetary policy is constrained by exchange rate peg and macroeconomic imbalances are structural in nature we recommend that policy makers give preference to structural reforms that would address these supply-side problems, which in the long term would result in higher output and employment.

## References

- Barro, R. (1979), 'On the Determination of the Public Debt', *Journal of Political Economy*, 87(5):940–71.
- Baxter, M. and King, R. G. (1993), 'Fiscal policy in general equilibrium', *American Economic Review*, 83(3):315–34.
- Briotti, M.G. (2005), 'Economic Reactions to Public Finance Consolidation: A Survey of the Literature', *European Central Bank Occasional Paper Series*, No. 38, October.
- Caldara, D. and Kamps, C. (2008), 'What are the effects of fiscal policy shocks: a VAR- based comparative analysis', *ECB Working Paper Series*, Nr.877.
- Darvas, Z. and Vadas, G. (2003), 'Univariate potential output estimation for Hungary', *MNB Working Papers*, 2003/8.
- Fatás, A. and Mihov, I. (2001), 'The Effects of Fiscal Policy on Consumption and Employment: Theory and Evidence', *CEPR Discussion Papers*, 2760.
- Galí, J., López-Salido, D. and Vallés, J. (2007), 'Understanding the Effects of Government spending on consumption', *Journal of the European Economic Association*, 5(1), 227-270.
- Gechert, S. and Will, H. (2012), 'Fiscal multipliers: A Meta Regression Analysis', *Macroeconomic Policy Institute, Working Paper*, July 2012.
- Gomes, P. (2010), 'Fiscal policy and the labour market: The effects of public sector employment and wages', *Technical report, IZA Discussion Paper No 5321*.
- Hebous, S. (2011), 'The Effects of Discretionary Fiscal Policy on Macroeconomic Aggregates: A

Reappraisal', *Journal of Economic Surveys*, 25(4), 674–707.

Jovanovic, B., Krstevska, A, and Popovska-Kamnar, N. (2015), 'Can monetary policy affect economic activity under surplus liquidity? Some evidence from Macedonia', *NBRM Research Paper*, 2015.

Kastrati, A., Pugh, G., and Toci, V., (2017), 'Output gap in transition economies using unobserved component method: The case of Czech Republic, Estonia and Kosovo', *EKON. MISAO I PRAKSA DBK*, Nr. 2. , 477-500.

Kurtishi, N. (2012), Model for estimation of fiscal policy and its influence on Macedonian economy, *Master thesis, Faculty of Economy* , Skopje.

Linnemann, L. (2006), 'The Effect of Government Spending on Private Consumption: A Puzzle?', *Journal of Money, Credit, and Banking*, 38 (7), 1715–1735.

Monacelli, T., Perotti, R., and Trigari, A. (2010), 'Unemployment Fiscal Multipliers', *Technical Report 15931, National Bureau of Economic Research*.

Pappa, E. (2009), 'The effects of fiscal shocks on employment and the real wage', *International Economic Review* 50 (1), 217-244.

Raveni, A. (2021), 'The determinants of fiscal multipliers in transition countries: A Panel VAR model', *South East European Journal of Sustainable Development*, 5 (3), 132-147.

Rendahl, P. (2012), 'Fiscal Policy in an Unemployment Crisis', *Cambridge Working Papers in Economics 1211*, Faculty of Economics, University of Cambridge.

Tevdovski, D., Pertevski, G. and Bogoev, J. (2019), The effects of macroeconomic policies under fixed exchange rates: A Bayesian VAR analysis ', *Economic research* , 32 (1), 2138-2160.

Trenovski, B., Filipovski, V. and Fiti, T. (2016), ' Efficiency of the fiscal policy and the fiscal multipliers- the case of the Republic of Macedonia', *IkonomicheskiIzsledovania*, vol.1.

Velickovski, I. (2013), ' Assessing independent monetary policy in small, open and euroized countries: Evidence from Western Balkan', *Empirical Economics* (45), 137-156, Springer.