ИНСТИТУТ ЗА ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ НА БЪЛГАРСКАТА АКАДЕМИЯ НА НАУКИТЕ
ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
ECONOMIC STUDIES

ГОДИНА XXV, 2016, 1

Vladimir Filipovski[1]
Taki Fiti[2]
Borce Trenovski[3]

EFFICIENCY OF THE FISCAL POLICY AND THE FISCAL MULTIPLIERS – THE CASE OF THE REPUBLIC OF MACEDONIA

The aim of this paper is two-fold: to analyze the relevance of fiscal multiplier as concept used in assessing the efficiency of the fiscal policy in general, and to apply empirical analysis on the fiscal policy multipliers in the case of the Republic of Macedonia. On the first aspect, we emphasize the very different results obtained by the extensive empirical literature on the size and sign of fiscal multipliers, both for changes in taxes and changes in government expenditures. On the second aspect, we apply the VAR methodology in the analysis of the efficiency of the fiscal policy of the Republic of Macedonia during the period 2000-2012, so that we could be able to study the effects of various fiscal measures during the relatively good times preceding the global financial crisis and Great Recession as well as the effects of the various countercyclical fiscal measures aimed at alleviating the consequences of the macroeconomic downfall associated with those landmark events. One of the most interesting results of the empirical analysis in the paper is the negative sign obtained for the fiscal multipliers in the case of the Republic of Macedonia.
JEL: C32; E21; E62

1. Introduction

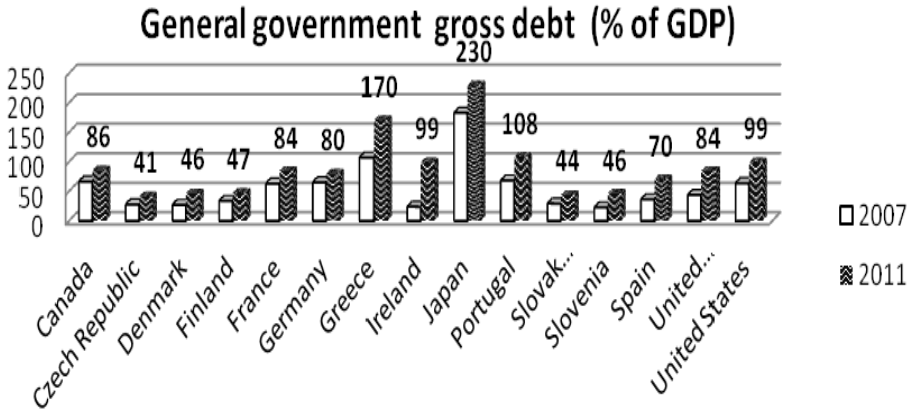
The Great Recession 2007-2009 has returned the fiscal policy at the center stage of the macroeconomic policy debates on how to overcome the consequences of the recession and to secure the sustainability of the process of recovery. That has been a natural consequence

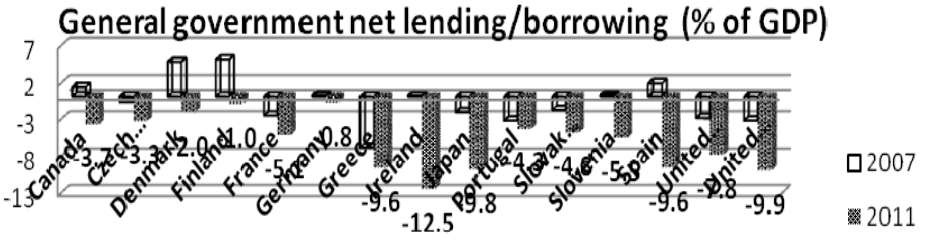
[1] *Vladimir Filipovski is PhD, Full-Time Professor, Ss Cyril and Methodius University, Faculty of Economics, Skopje, Republic of Macedonia; scientific affiliation: macroeconomics, microeconomics, finance; phone: +389-2-3286877, fax: +389-2-3118701, e-mail address: vladfil@eccf.ukim.edu.mk.*
[2] *Taki Fiti is PhD, Full-Time Professor (Academician), Ss Cyril and Methodius University, Faculty of Economics, Skopje, Republic of Macedonia; scientific affiliation: macroeconomics, microeconomics, international economics; phone: +389-2-3286843, fax: +389-2-3118701, e-mail address: takifiti@eccf.ukim.edu.mk.*
[3] *Borce Trenovski is PhD, Assistant Professor, Ss Cyril and Methodius University, Faculty of Economics, Skopje, Republic of Macedonia; scientific affiliation: macroeconomics, public finance, history of economic thought; phone:+389-2-3286887, fax: +389-2-3118701, e-mail address: Borce.Trenovski@eccf.ukim.edu.mk.*

of the large-scale fiscal stimulus programs carried out in a situation very close to a liquidity trap (USA, Japan), which has produced large structural deficits and increased the public debt levels above the average levels seen in the years after the end of the World War II. The discretionary fiscal policy during the Great Recession has resulted in significant increase in structural budget deficits and public debts. In the USA as the epicenter of the crisis, the fiscal stimuli had started as early as 2008, with the Bush Administration's Economic Stimulus Act which envisaged an average tax cut of $1,200 per family. Then, in 2009 President Obama signed the American Recovery and Reinvestment Act, which was structured in three parts: 1/3 as increase in federal government expenditures, 1/3 as tax cuts and 1/3 as transfers to the subnational governments. This has amounted to the biggest countercyclical package in US history.

Many other countries responded to the crisis by embarking on large countercyclical fiscal stimulus programs. China for example, had carried out a package worth around $600 billion (mainly for infrastructure and social programs); Japan had continued with its already expansionary policies carried out as a response to the situation of liquidity trap, and South Korea had also carried out large spending programs (Romer, 2011, p. 14). Similarly, the three big EU economies, Germany, UK and France had experienced a significant increase in their budget deficits during the period 2007-2010 mainly as a consequence of the fiscal stimulus programs. On the other hand, the dramatic escalation of fiscal problems in the less developed economies of the EU periphery had been a consequence of their longer history of breaching the Maastricht fiscal criteria (particularly Greece and Spain), as well as the strong capital inflows through foreign borrowing at low interest rates these countries were enjoying since they became a part of the euro area, which ultimately defocused them from the much needed structural reforms. Similar problems, although on a smaller scale, have taken place in some emerging economies, and in many other developing countries.

Figure1. Increase in budget deficits and accumulation of public debt in selected countries, as a consequence from the crisis.





Source: International Monetary Fund, World Economic Outlook Database, October 2014.

These problems have heated up the debates on the efficiency of the discretionary fiscal policies and on the size of the fiscal multipliers, i.e. the multiplicative effects on output of the changes in various fiscal variables (overall government spending, tax cuts, public investment in infrastructure, military expenditures). Models for estimation of the size of fiscal multipliers (both quantitative and narrative) have been quite imperfect and the paper addresses this issue. Although there have been significant differences in estimates of the fiscal multipliers, and more broadly of the effectiveness of the fiscal stimuli, the extensive research on these issues may have very well helped in identifying some of the determinants of fiscal policy efficiency.

The remainder of the paper is organized as follows. In Section 2 a review of the relevant literature is presented, with a special emphasis on the results of the empirical research on fiscal multipliers. Section 3 provides a short review of the empirical analysis framework. In Section 4 the description of the VAR model and the data is provided. Section 5 presents the results of the empirical analysis and discussion. In Section 6 the main conclusions are presented.

2. Literature review

The issue of efficiency of fiscal policy has been treated in the modern macroeconomics in a broad context of rethinking some key macroeconomic concepts – the roles of state and markets in resource allocation, the consequences of structural budget deficits and accumulation of public debts, the costs of fiscal consolidation and its effects on growth, and etc. And although the fiscal multiplier discussion has been at the center stage of macroeconomics during the whole post-war period, it is evident that much more studies on fiscal policy's effects have been produced during the last couple years than during the whole previous quarter of a century (Romer, 2011).

Within the basic Keynesian model, the spending multipliers are larger than tax multipliers, since the fiscal expansion carried out through tax cuts does not translate completely into a rise in consumption as economic agents (being rational and forward looking) save part of

their increased incomes; and additionally, the marginal propensity to consume differs across agents (Samuelson, 2005). However, two major weaknesses of the basic Keynesian model have been pointed out: (i) the short-run nature of the analysis, which prevents proper assessment of the effects of tax-based fiscal expansions, and (ii) the analysis is focused on the aggregate demand side, which again makes it difficult to properly assess the so-called tax multiplier. In this context, the most pronounced opposition to overestimating the power of the fiscal policy vis-à-vis monetary policy for stabilizing the economy could be found in Friedman (Friedman, 1968).

In the post-financial crisis period, new dilemmas and controversies have been opened which relate to the issues of efficiency/inefficiency of the fiscal policy in macroeconomic stabilization and the real effectiveness of the fiscal stimuli and fiscal consolidations. The new Keynesian economists have been arguing that the Great Recession 2007-2009 has made it evident that the role of the fiscal policy in fighting deep recessions is even more important than was previously thought (Krugman, 2010; Stiglitz, 2010). On the other hand, the new classical economists have fiercely opposed fiscal stimuli-based stabilization policies. They argue that in the long run, economies tend to function at their potential GDP, that the public debt accumulation crowds out private investment, and that the recent crisis has been a direct consequence of too much government involvement in the economy, (Lucas, 2011); moreover, the calculations of fiscal multipliers has been naïve and "ignore what we have learned during the last 60 years of macroeconomic research" (Sargent, 2011).

The controversies are particularly present when it comes to estimating the size of the fiscal multiplier, for at least two reasons: first, the ideological differences that shape the views of the two schools within the mainstream macroeconomics (new Keynesian and new classical) on the roles of the market and government in the resource reallocation; and second, the imperfection of the models used to estimate fiscal multipliers. Hence, the estimations of fiscal multipliers (mainly for USA) vary considerably within quite a wide range – from almost zero, i.e. that stimulus spending doesn't work (Barro, 2009) to the 0.4 – 1.5 range (Alesina, 2012; Blanchard, Perotti, 2002). Similar differences about the estimates of the government spending multipliers in USA had been found in a study published in 1988, in which fiscal multipliers are estimated by using eight different models. The average value of fiscal multipliers at the end of the first year reaches 1.4, and then their value gradually falls to reach 1.0 at the end of the fifth year; and, four of the individual models produce higher than average, while the other four models produce lower than average fiscal multipliers (Samuelson and Nordhaus, 2005).

The more recent estimations of the tax multipliers, based on both quantitative as well as narrative approaches, do not confirm the argument of the basic Keynesian model that those multipliers are lower than the spending multipliers. Those estimations are within the range of 0.5 at the end of the first year, 2.0 after the end of the second year and almost 6.0 after the sixth year (Uhlig, 2010). Christine and David Romer indicate that in the USA the tax cuts that amount to 1% of GDP can, during a period of several years, produce a multiplicative effect on GDP of 3% (Romer and Romer, 2010).

During the recent years following the global crisis of 2008/2009, several important studies on the effects of the fiscal stimuli (i.e. fiscal multipliers) have been produces which, despite the different results and accompanying controversies, have shed new light on and improved

our understanding of the this complex issue. Spilimbergo et al. (2008, pp. 18 – 20) sum up the results from the research of various authors on the fiscal multipliers for the USA as well as for other countries. For example, the estimates for the fiscal multipliers based on VAR models indicate that government spending multipliers are larger in the short run and smaller in the long run. The opposite is the situation with the tax cut multipliers. In this context, Blanchard and Perotti (2002) found that the multiplicative effects of tax cuts and government spending increases vary through time. One study by the UNCTAD experts shows that the impact multipliers of government spending on goods and services in the post-crisis period in the selected countries have been larger than 1.0 (with relatively small differences across countries): Brazil 1.84; China (with its fiscal stimulus package being estimated at around 600 billion dollars) 1.76; Turkey 1.71; Germany 1.38; Japan 1.35; Great Britain 1.32; and etc. (UNCTAD, 2013, p. 13).

On the other hand, the research by Remy (2008) and Barro (2009) indicate that even the unproductive government spending (such as military spending on arms) may have a multiplier larger than 1. In the similar vein, a research for nine EU countries, based on the macroeconomic model of the European Commission, has shown that the tax cut multiplier in the first year is only 0.3 or even less than that, while the government spending multiplier is in the range of 0.3 to 0.7.

Other studies show that tax cut multipliers as well as increased government spending multipliers are larger when the fiscal changes are directed towards agents with higher marginal propensity for consumption (i.e. the population with low incomes) (Spilimbergo et al., 2008, p. 19).

As for the government infrastructure investment, the estimated multipliers vary quite considerably: for a group of major developed economies (Australia, Canada, Germany, United Kingdom and United States) they range from 0 to 4.However, despite the large differences in empirical estimates, economists try to infer some general regularities that determine the size of the fiscal multipliers in different economies (Ilzetski, Mendoza and Végh, 2012).

As far as the fiscal consolidation is concerned, the literature on that issue has been concentrated on several important issues. The first issue is related to the timing of opening the process of fiscal consolidation – on this issue, the new Keynesian approach, which insists on gradualism in reducing budget deficits and public debts to their sustainable levels (in order not to "kill" the post-recessionary recovery) differs considerably from the approach of the proponents of the so-called fiscalausterity (Romer, 2011; Horton, 2012).

The second issue is related to the dilemma on whether the fiscal consolidation should be spending-based or tax-based, i.e. the effects those two approaches produce (Alesina, Favero and Giavazzi, 2012). The third issue is related to the risks that will accompany and complicate the process of fiscal consolidation – the risk of prolonged recessionary tendencies; the demographic challenges, i.e. the population aging and the rise in pension and social security costs; and the risks that the European debt crisis poses to the very existence of the common currency (the euro), and etc. (Filipovski, Fiti, 2013).

Putting aside the ideological differences, the large differences in fiscal multiplier estimates may be contributed to the following two groups of factors:

(1) The complexity of the issue of the fiscal multipliers, particularly its dynamic dimension, as the multiplicative effects of the changes in fiscal variables may be distributed during a number of time periods.

(2) The methodological problems of the fiscal multiplier estimates. A number of methods have been used for such estimates: micro – studies; macro – studies, VAR models, structural methods (for example, the structural macroeconomic models used by the central banks), the narrative methods, and etc. (Spilimbergo, Symansky, Blanchard and Cotarelli, 2008, p. 17-19).

However, the models are imperfect, as are their results. The results are mainly dependent on a model's key assumptions which, in this context, are those related to the marginal propensity for consumption, the type of expectations formation process (adaptive or rational expectations), the way monetary policy is conducted (discretionary or rule-based), the extent of price and wage rigidities, and etc. All this may produce differences in real output effect estimates even for the same type of fiscal intervention. In this context, there are other methodological dilemmas, as for example: does the government spending affect GDP or is it that GDP affects government spending via automatic stabilizers or via some implicit/explicit fiscal policy rule; should the military expenditures be included or excluded in/from the analysis; and etc. (Ilzetski, Mendozaand, Vegh, 2012, p. 4-7).

Furthermore, when an economy is in a state of recession, it is simultaneously affected by a number of factors – apart from the automatic stabilizers, important factors include the reaction of the monetary policy, the state of other economies in the region, particularly those that are export markets for the that particular economy, and the like. Therefore, it is very difficult to disentangle the "net" effect on real GDP of the fiscal expansion from the effects of other important factors. Also, the problem of omitted variable bias should also be kept in mind: "... Any time one is looking at the relationship between two variables, like consumer spending and the tax rebate, you need to worry that a third variable, like the fall in wealth, is influencing both of them" (Romer, 2011, p. 4).

(3) The efficiency of the fiscal policy is closely related to the key characteristics of the country the fiscal multipliers are estimated for, as for example: the level of economic development, the foreign exchange rate regime, the openness to foreign trade, and the level of government indebtedness.

However, the survey of the relevant literature points out to some general conclusions related to the fiscal policy efficiency. First, as Ilzetski, Mendoza and Vegh conclude: "…Based on updated quarterly data on government consumption for 44 countries, we have determined that: (i) the effects on output of the increase in government consumption have been stronger in the industrialized than in the developing countries; (ii) the fiscal multipliers have been relatively high in economies with fixed exchange rate regime, but have been zero in economies with flexible exchange rate regime; (iii) the fiscal multipliers have been lower in open economies compared to closed economies; and (iv) the fiscal multipliers in highly indebted economies have been negative" (Ilzetski, Mendoza and Vegh,

2012, p. 1). Second, the increased government consumption multipliers have more pronounced effects on real output in the short run, while in the long run those effects fade away, while for tax cut multipliers vice versa is true. Third, the long run effects on real output of the tax cuts are significant primarily because of the tax multiplier effects on aggregate supply (something which has been neglected in Keynesian models). Fourth, the fiscal multiplier effects of both government consumption increases and tax cuts are higher the more those fiscal variable changes are directed towards those social groups with higher marginal propensity for consumption (Fiti, 2013).

3. Empirical analysis framework

Motivation for the empirical analysis: Keeping in mind the response of the fiscal policy prior to and during the global economic crisis, as well as the characteristics of the Macedonian economy as a small, open country that practices the strategy of a *de facto* fixed exchange rate, we are especially interested:Given the slow recovery of economic activity in the country, the analysis of the efficiency of the fiscal stimulus (public expenditures/ income) i.e. their effects on economic activity is especially interesting; Empirical research in this area for the developing countries, particularly the SEE countries, are truly rare. Hence, this study is one of the first empirical analyses in Macedonia that focuses on the effectiveness of fiscal policy. Thus, this analysis is of particular importance for the understanding of the transmission mechanism and the effects of the key macroeconomic policies in the small, open economies with a fixed exchange rate such as Macedonia.

The majority of empirical studies that focus on the interactions, above all on the effects and efficiency of the monetary and fiscal policy, use VAR models which have the advantage of not being limited by predetermined theoretical constructions (while, on the other hand, this could be an obstacle). The most relevant studies of fiscal and monetary policy, which define specific identification methods, are Bernanke and Blinder (1992) who analyzed the monetary policy channels in the U.S. setting a series of assumptions regarding the lack of a simultaneous impact of the policy shocks on the remaining macroeconomic variables and vice versa. Using the Cholesky decomposition, Bernanke and Mihov (1998) built a semi-structural VAR in which no restrictions are set on the relationships between the variables in the system while setting restrictions that relate to the instruments of monetary policy. Blanchard and Perotti's approach (2002)[4]is based on institutional information outside of the model for automatic response of public expenditures and taxes to economic activity, as well as certain assumptions on the time when the country is implementing the discretionary fiscal measures in response to the changes in output. The sign-restriction approach developed by Uhlig (2005) and Caldara and Kamps (2008) is another identification approach in VAR Some empirical studies refer to Blanchard and Quah's (1998) study, which specifically sets long-term restrictions on the responses of the VAR model variables (Blanchard and Quah, 1998, Mirdala, 2009).

[4] Further expanded by Peroti (2005).

More recently, with the greater attention paid to this issue during the global crisis, a larger number of empirical studies were conducted which specifically analyze the effects of the fiscal policy on economic activity in Croatia, Serbia, Macedonia and Bulgaria (see Ravnik and Zilić, 2011; Hinić and Miletić, 2013; Karagyozova-Markova and Iliev[5], 2013).

In Macedonia, empirical studies of the interactions and effects of the fiscal and monetary policy continue being rare and remain in the rudimentary phase. To our best knowledge, the only study conducted that touches upon the topic of interactions of both policies is that of Kadieska-Vojnovic (2007), that uses VAR to analyze the connection between budget balance/GDP and public debt/GDP and Trenovski and Tashevska (2015) with the same methodology analyze fiscal vs. monetary dominance in Macedonian economy. Another study that focuses on the effects of the fiscal and monetary policy in the SEE countries with a fixed exchange rate (Macedonia, Croatia and Bulgaria), using a recursive SVAR is that of Petrevski et al., 2013. One empirical analyses of fiscal policy have appeared more recently: one analyzes the effects of the fiscal policy on the Macedonian economy by using the recursive SVAR (see Kurtishi, 2012).

4. Econometric model and data description[6]

4.1. The VAR Model

We already pointed out that in the studies on the interactions and effects of the fiscal and monetary policy, the dominant methodology are VAR-models. Generally, the forms of VAR include: reduced form of VAR, recursive VAR, and structural VAR or SVAR (for more details on these forms of VAR see Lutkepohl, 1993; Sims, 1986; Stock and Watson, 2001; Lutkepohl and Kratzig, 2004).

The recursive VAR-model is exactly identified SVAR, based on a triangular structure of the order of variables, where the first ordered variable contemporaneously affects each following variable, while each variable does not contemporaneously affect previous variables. This is one of the simplest forms of SVAR, but is extremely sensitive to the order of variables. However, the risk of confusing results should be reduced by setting the order of variables according to the knowledge and practices of economic theory, and not to individual assessments of researchers. The general specification of recursive VAR is:

$$Ay_t = A^* \mu + \sum_{i=1}^{p} A^* L^i y_t + B\varepsilon_t \qquad (1)$$

Where y is the Kx1 vector of endogenous variables, A^* is KxKmatrix of coefficients, μ is the vector of constants, L is the lag operator, ε is the vector of structural errors,t is a time

[5] The study by Karagyozova-MarkovaandIliev (2013)also uses the Bayesian structural VAR.

[6] The model and empirical research is part of wider empirical study analysingthe interactions and effects of the fiscal and monetary policy in Macedonia (for details seeTrenovski, 2013).

operator;A is a lower triangular matrix which specifies contemporaneous relations between the variables, B is K x K identity matrix.

In order to estimate model (1), first we need to estimate its reduced form:

$$y_t = A^{-1}A^*\mu + \sum_{i=1}^{p} A^{-1}A^* L^i y_t + u_t \tag{2}$$

Where the same symbols from equation (1) apply, with the main difference in u, which represent the reduced form of random errors of structural shocks ε from equation (1). The relationship between u and ε is the following:

$$u_t = A^{-1}B\varepsilon_t \tag{3}$$

Equation (1), known in the literature as AB model, is used to estimate short term relationships among variables. In order to exactly identify models (1) and (3) and have orthogonal structural disturbances ε, at least K(K-1)/2 restrictions need to be set to matrices A and B respectively, or a total of K(3K-1)/2 restrictions, where K is the number of endogenous variables in the model (Lutkepohl, 1993; Lutkepohl and Kratzig, 2004).

The focus in the model turns towards a more detailed empirical analysis of the interactions and transmission of the effects of fiscal and monetary policy on economic activity. In our model, the dependent variables *y* of the model/equation (1) are: G*, Y, P, D, DR, IR and π(INF).* The variables *G, P,* and *D* are instruments or representatives of the fiscal policy in the model, DR and IR represent the response of the monetary policy, Y represents the economic activity, and πis inflation. *The first intention and goal of this model is deeper and comprehensive analysis of interactions/effects between fiscal and monetary policies, but having in mind limited space and the scientific thesis of this paper, we are presenting/elaborating the part concerning effectiveness of fiscal policy in the country (fiscal multipliers).*

The specification of the recursive VAR-model (which we use as a base to calculate fiscal multipliers) in a matrix form can be presented in the following way:

$$\begin{vmatrix} 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ \alpha_{21} & 1 & 0 & 0 & 0 & 0 & 0 \\ \alpha_{31} & \alpha_{32} & 1 & 0 & 0 & 0 & 0 \\ \alpha_{41} & \alpha_{42} & \alpha_{43} & 1 & 0 & 0 & 0 \\ \alpha_{51} & \alpha_{52} & \alpha_{53} & \alpha_{54} & 1 & 0 & 0 \\ \alpha_{61} & \alpha_{62} & \alpha_{63} & \alpha_{64} & \alpha_{65} & 1 & 0 \\ \alpha_{71} & \alpha_{72} & \alpha_{73} & \alpha_{74} & \alpha_{75} & \alpha_{76} & 1 \end{vmatrix} \begin{vmatrix} u_t^G \\ u_t^Y \\ u_t^P \\ u_t^D \\ u_t^\pi \\ u_t^{DR} \\ u_t^{IR} \end{vmatrix} = \begin{vmatrix} 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{vmatrix} \begin{vmatrix} \varepsilon_t^G \\ \varepsilon_t^Y \\ \varepsilon_\varepsilon^P \\ \varepsilon_t^D \\ \varepsilon_t^\pi \\ \varepsilon_t^{DR} \\ \varepsilon_t^{IR} \end{vmatrix}$$

The structure of the VAR model used in this paper rests on some theoretical assumptions as well as the practices of other similar empirical studies. The first variable in the model is the

level of public expenditures, which contemporaneously affects each of the subsequent variables, but is not affected by any of them. We do this primarily because we wish to test the impact of the economic policy instruments (in this case fiscal policy) on economic activity and on the other macroeconomic variables. We also follow the logic that as the structure and level of public spending are set defined at the beginning of the year, they are assumed to be set independently of level of the economic activity (i.e. the output gap) and therefore that they affect the output and other macroeconomic variables in a given year (such an ordering is often used in analysis of the effects of fiscal policy, see Blanchard and Perotti, 2002). Next variable in order is the level of output, which is assumed to influence the remaining variables in a given period. The third variable in order is public revenues which (along with public expenditures and output) affect the levels of public debt and monetary variables. The fourth variable is the inflation rate which is assumed to affect the level of foreign exchange reserves and the money market interest rates. The last variable in the model is money market interest rate which is assumed to affect other variables only with a time lag (consistent with standard assumption that monetary policy effects are only felt with certain time lags).

In order to make a more accurate determination of the concrete effects of the fiscal stimuli , we attempt to calculate the multipliers of public expenditures and public revenues[7]. Depending on the period for which the fiscal multiplier is calculated, most often several methods for its quantification are recommended. *Current (shock) multipliers* (Fm) show the change caused by a one unit increase of a given fiscal variable (Δf_{t0}) on economic activity at the time of the shock. This is calculated in the following way:

$$\text{Fm} = \frac{\Delta y_{t0}}{\Delta f_{t0}}$$

The *Accumulated Fiscal Multiplier* up to a period T represents an accumulated change in the indicator of economic activity caused by a one unit change in the fiscal variable up to period T.[8] It is calculated as:

$$KFm = \frac{\sum_{t=0}^{T} \Delta y_t}{\sum_{t=0}^{T} \Delta f_t}$$

The *Maximum Fiscal Multiplier* represents the biggest change of the indicator for economic activity of a given time period (up to period T) caused by a one unit change in the fiscal variable throughout the period t_0.

[7] Fiscal multipliers are generally defined as a change in real GDP or some other measure of economic activity as a result of a unit change in some fiscal variable.

[8] In this context, there is mention of a short term multiplier (up to a year) and a medium term multiplier (for which a time horizon of two or three years is often taken).

$$MFm = \frac{max\Delta y(t_0 + T)}{\Delta f_{t0}}$$

The calculation of the fiscal multipliers is based on the accumulated impulse-response function of the variable for economic activity (in our case in order to verify the results we took two cases – in one we used the GDP growth rates, and in the other, the output gap) for the shock in public spending and public revenues (we used the share of public revenue and expenditure in GDP).[9]

4.2. The description of variables and data

We use quarterly data for the period 2000:Q1 – 2011:Q4(thereby taking into account the change in the main monetary policy instrument in early 2000). The fiscal policy is represented by the folowing variablesseasonally adjusted budget expenditures as % of GDP (G), seasonally adjusted budget revenues as % of GDP (R) and public debt as % of GDP (D). The economic activity is represented by two variables: Y quarterly growth rate of seasonally adjusted GDP, in millions of denars, at constant prices, 2005 as a base year (Y) and the output gap whereby the potential GDP and the actual-potential output gap were calculated by using the Hodrick-Prescott (HP) filter-method (λ=1600).The monetary policy variables that we useare:average quarterly money market interest rate (IR) which has a more pronounced fluctuations during theanalysed period but consistently follows the reference interest rate of the Central Bank), and foreign exchange reserves as % of GDP (FX).Finally, we use annualized quarterly inflation rate (INF) calculated from the CPI index as an indicator of the situation in the monetary *sector.*

The seasonal adjustments of the data series (on real GDP, budget ependitures and revenues and CPI)have been made by using the "CENSUS X-12" model.The stationarity of the variables has been tested with the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests, which have shown that all the variables,except the FX variable, are stationary in levels (budget revenues and expenditures are trend stationaryand the public debt/GDP variable is stationary at a significance level of 0.1 (precisely 0.07)). However, we believe that the non-stationarity of one of the variables may not have a substantial effect on the results of our analysis due to the stationarity of all other variables (taken as levels), the stability of the VAR model, and the old Sims/Lutkepohl dilemma of whether the variables in (S)VARmodels have to be stationary; also, the main aim of our analysis is in fact to calculate the multipliers of public revenues/expenditures.

[9] Usually the tax multiplier is calculated for the part of the public revenue and the part of the public revenue which includes revenue tax is used (most often deducting transfers.) However, we believe that it would be particularly interesting to calculate the multiplier of total public revenues, considering the large number of reforms carried out in previous years, which had included other items in addition to taxes (e.g. contributions)and affected the change in revenue structure (and hence their effects on economic activity).

The data come from the following sources: the Ministry of Finance of the Republic of Macedonia (for the data on public revenues, public expenditures and public debt),the National Bank of the Republic of Macedonia (for the data on the money market interest rate, foreign exchange reserves and inflation rates), and theState Statistical Office of the Republic of Macedonia(for the data on GDP).

5. Results of empirical analysis and discussion

Public expenditure/GDP(G) shock. A shock to G (an increase of the share of public expenditures in GDP by one standard deviation, i.e.about 3.6 percentage points) results in a significant reduction of Y (deepening the output gap) which stabilized after the first year, but still remains in the negative zone with a high significance of the results. This indicates a negative impact (negative multiplier) of the rise in G on economic activity. As a response to the shock, P shows a rising trend which becomes significant after the first year and remains in the zone of significance up to the 10^{th} quarter (i.e. almost throughout the entire period of analysis). D has a rising trend which is significant during the entire period analyzed, while DR has a decreasing trend which becomes significant after the second quarter and remains significant till the end of the analyzed period. As a result of the shock in G and the reduction of DR, the monetary policy reacts and IR records a significant rising trend which is significant in the first six quarters. This results in the reduction of INF, which becomes significant after the third quarter(see Figure A.1 in Appendix).

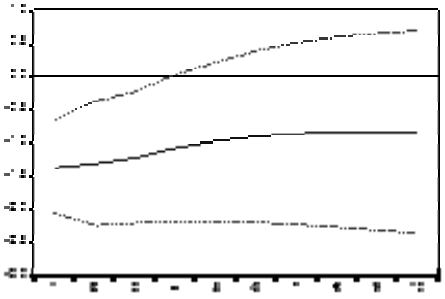
Public revenue/GDP (P) shock. A shock (an increase in the share of public revenue in GDP by one standard deviation, i.e. by 2.5 percentage points) results in: an increase in Y which is significant in the first year (positive multiplierr); reduction of public debt, which is in the zone of significance in the first three quarters; reduction in DR, which is significant in the first six quarters; slight reduction in IR, which is close to significant in the first three quarters; and a slight reduction of G and INF, but the results are insignificant. The full scenario could be interpreted as follows: the shock in public revenues (due to the various structural changes, tax reforms etc.) has a positive effect on the expansion of the output gap, and on a greater reduction of the public debt compared to an increase in public spending(see Figure A.1 in Appendix).[10]

The specific effects of the main instruments of fiscal policy (public revenues and expenditures) on economic activity are most commonly determined by calculating multipliers of public revenues and expenditures, which show the change of the economic activity variable upon changes in the fiscal variable by one unit. We tried to calculate these in accordance with the definition of various multipliers given in the section on models specification and available data. The fiscal multiplierss are calculated using two variables for economic activity: GDP growth rate and the outut gap.

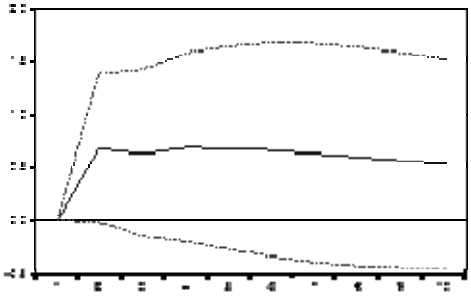
[10] This confirms the behavior of the two policies as strategic substitutes, but also points to an interesting conclusion – that in the case when we have a restrictive fiscal policy (a shock on the side of the public revenues) and a modest expansion of the monetary policy, movement in the variable on economic activity (output gap) is positive.

Accumulated responses of Y to fiscal shocks

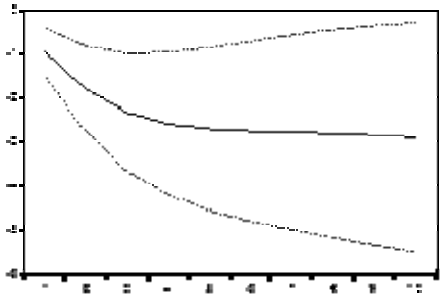
Accumulated response of GDP (growth rates) to G shock of one Cholesky S.D.



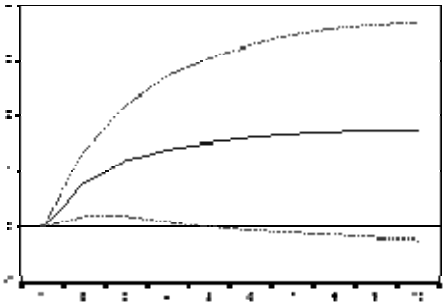
Accumulated response of GDP (growth rates) to R shock of one Cholesky S.D.



Accumulated response of the output gap to G shock of one Cholesky S.D.



Accumulated response of the output gap to R shock of one Cholesky S.D.



The public expenditure multiplier using the growth rate of GDP as a variable for economic activity shows that: the impact multipliers overlap with the maximum multipliers for public expenditures and are -0.38 in the first quarter (i.e. with each increase in public expenditures by one unit/denar, GDP decreases the most in the first period by 0.38 units/denars); the short-term multipliers (for which usually the end of the first year is taken) is -0.3, while the medium-term multipliers at the end of the second and third year stabilize and amount -0.23.

The public revenues multipliers show that: the impact multipliers[11] are 0.27 (with the rise in public revenues by one unit/denar, GDP increases in the first quarter by 0.38 units/denars: the maximum multiplier overlaps with the short-term multiplier at the end of the first year and is 0.27; the medium-term multiplier at the end of the second year is 0.24, while at the end of the third year it is 0.2.

[11] We took the multipliers in the second quarter as impact multipliers, because in creating the model it was assumed that economic activity has an impact on public revenues in the given period, but it impacts the economic activity with a certain delay.

These values of the multipliers are also confirmed with the calculation that uses the output gap as a variable for economic activity. The public expenditure multiplier using the output gap as a variable of economic activity shows that: the impact multiplier is -0.26 (with an increase of public expenditure by one unit/day, the output gap widening by 0.26 units/day); the short-term multiplier at the end of the first year is -0.7, while the medium-term multipliers are -0.78 and -0.85 for the second and third year respectively; the maximum multiplier cannot be determined in the period analyzed and has a steady trend of a slight increase. The public revenues multiplier shows that: the impact multiplier is 0.31 (with an increase of public revenue by one unit/day, the output gap widens to 0.31 unit/day); maximum multiplier is achieved in the ninth quarter and is 0.68; the short-term multiplier at the end of the first year is 0.56, while the medium-term multiplier at the end of the second year is 0.67, and at the end of the third year it is 0.66. The multiplier of public expenditure using the GDP growth rate as variable for economic activity indicates that: the impact multiplier coincides with the maximum multiplier for public expenditure and is -0.38 in the first quarter; the medium term multiplier is -0.3, and the medium term multiplier at the end of the second and third year stabilizes and is -0.23.

Table 1

Fiscal Multipliers

Period (quarter)	Variable of economic activity – GDP growth rates		Variable of economic activity – output gap	
	Public expenditure multiplier	Public revenues multiplier	Public expenditure multiplier	Public revenues multiplier
1	-0.37931	0.000000	-0.26549	0.000000
4	-0.29816	0.273224	-0.72228	0.557939
8	-0.23167	0.238624	-0.78139	0.677774
9	-0.22936	0.225639	-0.79281	0.683409
12	-0.23462	0.200345	-0.85326	0.659789

Particularly interesting are the negative values obtained for the public expenditure multipliers, which differ from those obtained by Kurtishi (2012), whose estimate of the *impact* multiplier for public expenditure in Macedonia is 0.5, but then the multiplier enters a negative zone after the third quarter, while his estimate for the public revenue multiplier is 0.2. It is also interesting that we obtained positive values for public revenue multipliers, which is also the case in Kurtishi's analysis, as well as the analysis of the case of Serbia; but what makes us different from other countries in the region are the negative public expenditure multipliers (see Ravnik and Zilic, 2011; Kurtishi, 2012, Hinic and Miletic, 2013; Karagyozova-Markova and Iliev, 2013). Results of negative public expenditure multipliers (and positive public revenue multipliers) have also been reached in a number of studies on other countries. Ilzetski et al. (2012) show that: public expenditures have a greater impact on economic activity in advanced countries than in developing countries (where the impact is negative and insignificant); fiscal multipliers are larger in countries with fixed exchange rates, while they are zero in countries with flexible exchange rates; long-term fiscal multipliers are around 1 in relatively closed economies, and zero in relatively open economies; countries with high central government debt (above 60% of GDP) have a negative fiscal multiplier. Auerbach and Gorodnichenko (2012) find small,

even negative multipliers, during expansions. They estimate peak multipliers of 0.57 during expansions and 2.48 during recessions (they also point out that the positive fiscal multiplier is due to public investments and not current expenditures). Cogan et al. (2010), comparing public expenditures multipliers in new and old Keynesian models, conclude that the impact of the US fiscal stimulus on GDP is very small in the short run, and turns negative in the longer run (due to the crowding out of private consumption and investments). Fernández and Hernández de Cos (2006) also confirm that higher public expenditures can stimulate output only in the short run, having negative effects on output and inflation in the medium run. Aiyagari et al. (1992), working within a neoclassical framework, show that temporary changes in public expenditures have a very small effect on output (public consumption multiplier of 0.07). Other studies also confirm negative or insignificantly small effects of public expenditures on output, and possible positive public revenues multipliers (Aschauer and Greenwood, 1985; Ramey, 2011).

Robustness check of the results

The following additional analyses were conducted to verify the robustness of the results (we mostly focus on sections that emphasize a particular response or they contradict the results from the main analysis):

- We replaced the output gap with the GDP growth rate in order to see whether the impact on economic activity of the other variables in the model and vice versa remain unchanged.
- Given that there was some doubt about the order of the variables in the VAR-model, especially about whether the economic activity variable should be first (as is used by some of the models that analyze relationships between economic activity and economic policies), we placed the output gap (Y) first in the model, followed by G, P, D, INF, DR, IR;
- According to economic theory and the situation in the country, we can assume that when determining public expenditures (which we set first in the model), policy makers are aware of the public debt level, so we put it in the first place in the model to see how it impacts our initial results.
- We divided the analyzed period into two sub-periods: 2000Q1 - 2006Q4 and 2007Q1 - 2012Q1, to see whether there are differences in the economic policies and their effects in the two sub-periods. This analysis is particularly important considering that these periods coincide with a regime change in conducting economic policies that had started in 2005/2006 and took a full effect during the Great Recession 2008-2009 (the main findings are included in the Conclusions).

The comparison of the original results with those of the robustness check analysis shows that:

- the results of our analysis are almost fully confirmed in the robustness check analysis;

- the negative reaction of the economic activity variable to a shock to G is confirmed in almost all cases, as is its positive reaction to a shock to R, which is of particular importance for fiscal policy. Only with growth rates of GDP placed first in the model, there is an insignificant reduction of Y as a response to a shock to G.
- when the first variable in the model is the output gap, its shock causes a prompt significant decline in G (followed by an insignificant rise after the second quarter) and a decline in IR up to the fifth quarter (significant in the first two quarters).
- when GDP growth rate is used instead of the output gap, a positive shock to growth rate is followed by a fall in IR, while when using output gap a positive shock to the gap is followed by a rise in IR This could be due to the signals for overheating of the economy coming from a higher output gap, while the increased growth rate during crisis does not neceassarily trigger setting a higher reference interest rate.

6. Conclusions

Our analysis suggests that an increase in public expenditures in the Republic of Macedonia have a negative effect in a sense of worsening the output gap, and such an effect stabilizes after the first year, but still remains in the negative zone. These results have a high degree of significance and they indicate a negative impact, i.e. a negative multiplier of the increase in public expenditures on economic activity. The calculations of the public expenditure multipliers in the short, medium and long term strongly confirm this negative impact of the public expenditures shocks on the economic activity in the country.

The Republic of Macedonia's has a small, open economy with a fixed exchange rate regime. In such an economy, an increase in public expenditures may well be expected to translate to a large extent into an increase in imports, which, via worsening the current account deficit, would provoke a tightening of the monetary policy, increase in interest rates, which would lead to crowding out of the private sector from investment in the economy. Also, much of the underutilized capacity of resources, including the high unemployment rate, have not been cyclical, but rather a long-term, structural in their nature. Hence, the measures that effectively increase (or even maintain the constant) level of budgetary transfers and public sector wages and pensions, may very well have large opportunity costs in a form of foregone public investment in infrastructure, and the subsequent foregone increas in GDP. All these factors may explain why public expenditure multipliers in the Republic of Macedonia show small, and what is even more important, negative values. We also found a greater negative effect of public expenditure shock on economic activity in the first sub-period, which to some extent confirms the thesis that the multipliers are higher and fiscal policy is more efficient during economic crises and recessions.

Such analytical results lend support to the argument that it is the composition, i.e. the structure of government spending which critically determines the efficiency/inefficiency of fiscal stimuli. In the case of the Republic of Macedonia, the fiscal space was used up in a relatively short period of time by an "unproductive", i.e. low social rate of return

government spending on: monuments, administrative buildings, furniture and the like (which often meant spending public money on imports) as well as public borrowing to finance non-investment, i.e. current expenditures like public sector wages, increases in pensions, transfers and the like.

On the public revenue side, our analysis suggests that an increase in public revenues, mainly due to various structural changes and tax reforms in the spirit of the Laffer curve, has a positive effect in a sense of improvement of the output gap (more pronounced positive effects since 2006). This conclusion is also confirmed in the dynamic context, by the estimated public revenues multipliers for different time horizons, i.e. for the short, medium and long run.

The estimated multipliers for public revenues are less than one, although larger in absolute value than those for public expenditures, and, what is more important, they have positive values. This may very well be a reflection of the tax reforms in a country undergoing deep structural change during the transition period, as is the case with the Republic of Macedonia. The recent changes involved introduction of a flat tax (and determined at relatively low level of 10%) for personal and corporate income taxes. This was accompanied by a decrease in rates for social security contributions (pension, health and unemployment insurance). All these measures may have had a supply-side type of effects: (1) they contributed to shrinking the relative size of the informal economy, (2) they have reduced the labor cost tax wage, (3) they may have improved the incentives in the private sector and the competitive environment in the economy in general, with positive effects on GDP, i.e. the level of economic activity.Similar results are also found in other countries following the EU integration path (Bulgaria, Slovakia, Hungary, Serbia, Czech Republic, etc.), confirming the thesis of expansionary effects of fiscal contraction.

References

Alesina, A., Favero, C., Giavazzi, F. (2012). The output effect of fiscal consolidations. – In: Growth and Sustainability Policies for Europe, Grasp Project #244725, funded by the European Commission's 7th Framework Programme (August).

Alesina, A. (2012). Fiscal Policy after the Great Recession. Published online on 12th September 2012, #International Atlantic Economic Society 2012.

Alesina, A. and Perotti, R. (1996). Fiscal Adjustments in OECD Countries: Composition and Macroeconomic Effects. – IMF Working Papers 96/70.

Auerbach, A. J. and Gorodnichenko, Y. (2012). Measuring the Output Responses to Fiscal Policy. – American Economic Journal: Economic Policy 4 N 2, p. 1-27.

Barro, R. and Redlick, Ch. Stimulus Spending Doesn't Work.

Barro, R. J. (1989). The Ricardian Approach to Budget Deficit. – Journal of Economic Perspectives, 3(2), p. 37-54.

Bernanke, B. and Blinder, A. (1992). The Federal Funds Rate and the Channels of Monetary Transmission. – American Economic Review, 82(4), p. 901-921.

Bernanke, B. and Mihov, I. (1998). Measuring Monetary Policy. – Quarterly Journal of Economics, 113(3), p. 869-902.

Blanchard, J, O. and Quah, D. (1989). The Dynamic Effects of Aggregate Demand and Supply Disturbances. – American Economic Review, 79(4), p. 655-673.

Blanchard, J. O., Dell'Ariccia, G. and Mauro, P. (2010). Rethinking Macroeconomic Policy. – IMF Staff Position Note, SPN/10/03.

Blanchard, J. O. and Perotti, R. (2002). An Empirical Characterization of the Dynamic Effects of Changes in Government Spending and Taxes on Output. – The Quarterly Journal of Economics, 117(4), p. 1329-1368.

Caldara, D. and Kamps, C. (March 2008). What Are the Effects of Fiscal Policy Shocks? A VAR-based Comparative Analysis. – ECB Working Paper, N 877.

Christiansen, L. (2008). Fiscal Multipliers - A Review of the Literature. Appendix II to IMF Staff Position Note 08/01, "Fiscal Policy for the Crisis".

Cogan F, J.; Cwik, T.; Taylor, J. B. and Wieland, V. (2010). New Keynesian versus Old Keynesian Government Spending Multipliers. – Journal of Economic Dynamics and Control 34, N 3, p. 281-295.

Friedman, M. (1968). The Role of Monetary Policy. – American Economic Review, Marche.

Fernández, F. de C. and Hernández de Cos, P. (2006). The Economic Effects from Exogenous Fiscal Shocks in Spain: A SVAR Approach. – Working Paper Series N 647, European Central Bank.

Giavazzi, F. and Pagano, M. (1990). Can Severe Fiscal Contractions be Expansionary? Tales of Two Small European Countries. – NBER Macroeconomics Annuals, 5, p. 111-116.

Giavazzi, F., Japelli, T. and Pagano, M. (2000). Searching for Non-Linear Effects of Fiscal Policy: Evidence from Industrial and Developing Countries. – NBER Working Papers 7460.

Hinić, B. and Miletić, M. (2013). Efficiency of the fiscal and monetary stimuli: the case of Serbia. 2nd Research Conference "Policy Nexus and the Global Environment: A New Consensus Emerging from the Crisis?", Skopje, April 26.

Hinić, B., Miletić, M. (2013). Efficiency of the fiscal and monetary stimuli: the case of Serbia. National bank of Serbia, Directorate for economic research and statistics, 2nd Research Conference "Policy Nexus and the Global Environment: A New Consensus Emerging from the Crisis?", Skopje.

Horton, M. (2010). Now Grim a Fiscal Future. – Finance and Development, IMF, September.

Iliev, V. (2013). Fiscal Policy and Economic Growth in Bulgaria Bulgarian National Bank. 2nd Research Conference "Policy Nexus and the Global Environment: A New Consensus Emerging from the Crisis?", Skopje.

Ilzetski, E., Mendoza, E. and Végh, C. (2012). How Big (Small?) Are Fiscal Multipliers?. – National Bureau of Economic research, Working Paper 16479.

Fernandez-Villaverde, J., Garicano, L. and Santos, T. (2013). Political Credit Cycles: The Case of the Eurozone. – Journal of Economic Perspectives, Vol. 27, N 3, p. 145-160.

Kadieska-Vojnovik, M. (2007). Economic Policy and Macroeconomic performanse, the Case of the Republic of Macedonia. Master thesis, University of Sheffield.

Karagyozova-Markova, K., Deyanov, G. and Iliev, V. (2013). Fiscal Policy and Economic Growth in Bulgaria. – Bulgarian National Bank, DP/90/2013.

Krugman, P. (2010). This is Not a Recovery. New York Times, August 26.

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

Kutan, A. M. and Brada, J. C. (1999). The End of Moderate Inflation In Three Transition Economies?. – FRB of St. Louis Working Paper 99-003A,

Lucas, R. (2009). In defence of the dismal science. – The Economist, August 6th 2009.

Lucas, R. (2011). Chicago Economics on Trial. Interview with Robert Lucas, http://www.online.wsj.com/article.

Lutkepohl, H. and Kratzig, M. (2004). Applied Time Series Econometrics. CambridgeUniversity Press.

Mélitz, J. (1997). Some Cross-Country Evidence about Debt, Deficits and the Behavior of Monetary and Fiscal Authorities. – CEPR Discussion Paper N 1653.

Mirdala, R. (2009). Effects of Fiscal Policy Shocks in the European Transition Economies. – Journal of Applied Research in Finance, 1(2), p. 141-155.

Mountford, A. and Uhlig, H. (2005). What Are the Effects of Fiscal Policy Shocks?. – SFB 649 Discussion Paper 2005-039, Humboldt University, Berlin.

Petrevski, G., Tevdovski, D. and Bogoev, J. (2013). Fiscal and Monetary Policy Effects in the South Eastern European Economies (draft).

Ravnik, R, and Zilić, I. (2011). The Use of SVAR Analysis in Determining the Effects of Fiscal Shocks in Croatia. – Financial Theory and Practice, 35 (1), p. 25-58.

Ravnik, R. and Zilić, I. (2011). The use of svar analysis in determining the effects of fiscal shocks in Croatia. – Financial theory and practice, 35 (1), p. 25-58.

Romer, C. (2011). What We Know About the Effects of Fiscal Policy? Separating Evidence from Ideology. HamiltonCollege, November 7, 2011.

Romer, C. and Romer, D. (2010). The Macroeconomic Effects of Tax Changes: Estimates Based on a New Measure of Fiscal Shocks. – The American Economic Review, Vol. 100, N 3, June.

Romer, C. D. and Romer, D. H. (2010). The Macroeconomic Effects of Tax Changes: Estimates Based on a New Measure of Fiscal Shocks. – American Economic Review, 100(3), p. 763-801.

Romer, C. (2011). Policy Responses to the Great Recession: the interaction of Leadership and Economic Ideas. Iowa State University, December.

Rukelj, D. (2009). Modelling Fiscal and Monetary Policy Interactions in Croatia Using Structural Vector Error Correction Model. – Economic Trends and Economic Policy, 121, p. 27-58.

Samuelson, P. and Nordhaus, W. (2005). Economics. Eighteenth Edition, McGraw-HillInternational Edition.

Sargent, T. (2010). Interview with Thomas Sargent. Mineapolis Fed, http://www.reason.com/archives/2011/10/10/a-nobel-for-thomas-sargent.

Sims, C. A. (1994). A Simple Model for Study of the Determination of the Price Level and the Interaction of Monetary and Fiscal Policy. – Economic Theory, 4, p. 381-399.

Spilimbergo, A., Symansky, S., Blanchard, O. and Cotarelli, C. (2008). Fiscal Policy for the Crisis. – IMF, Decembar 29, 2008 SPN / 08 / 01.

Stiglitz, J. (2010). Fiscal conservatism may be good fore one nation, but threatens collective disaster. – The Independent, Tuesday, 15 June 2010.

Stock, J. H. and Watson, M. W. (2001). Vector Autoregressions. – Journal of Economic Perspectives, 15(4), p. 101-115.

Tanner, E. and Ramos, A. (2003). Fiscal sustainability and monetary versus fiscal dominance: Evidence from Brazil, 1991–2000. – Applied Economics 35, p. 859-873.

Trenovski, B. and Tashevska, B. (2015). Fiscal or monetary dominance in a small, open economy with fixed exchange rate – the case of the Republic of Macedonia. – Proceedings of Rijeka Faculty of Economics: Journal of Economics and Business, Vol. 33, N 1, p. 125-145.

Trenovski, B. (2013a). Optimal Macroeconomic Policy In Macedonia – in terms of the global economic crisis. Center for Economic Analyses – CEA, Skopje, p. 165.

Trenovski, B. (2013b). The Key Macroeconomic Policies In Terms Of The Global Economic Crisis. Center for Economic Analyses – CEA, Skopje, p. 296.

Uhlig, H. (2005). What Are the Effects of Monetary Policy on Output? Results from an Agnostic Identification Procedure. – Journal of Monetary Economics 52 (2), p. 381-419.

Uhlig, H. (2010). UndesrstandingThe Impact of Fiscal Policy: Some Fiscal Calculus. – The American Economic Review, Vol. 100, N 2, May 2010.

UNCTAD. (2013). Trade and Development Report 2013. New York and Geneva.

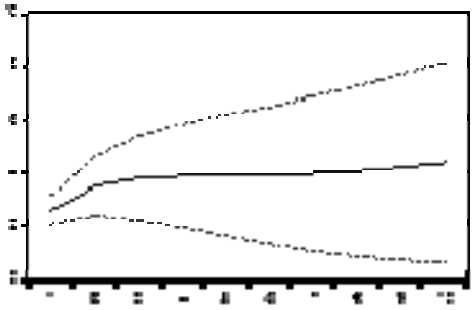
Zoli, E. (2005). How Does Fiscal Policy Affect Monetary Policy in Emerging Market Countries?. – BIS Working Papers 174, Monetary and Economic Department, April.

APPENDIX

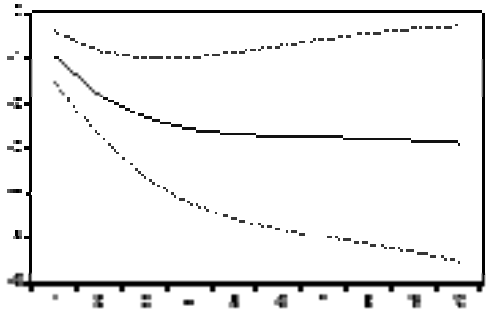
Figure A.1. Impulse-response functions

Accumulated Response to Cholesky One S.D. Innovations in G

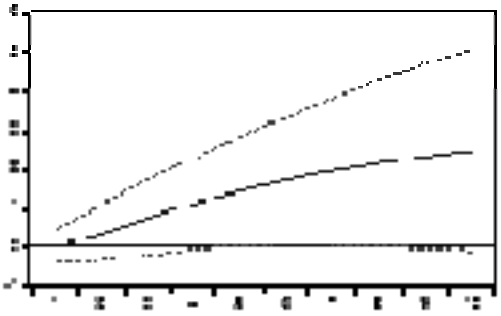
Accumulated response of G



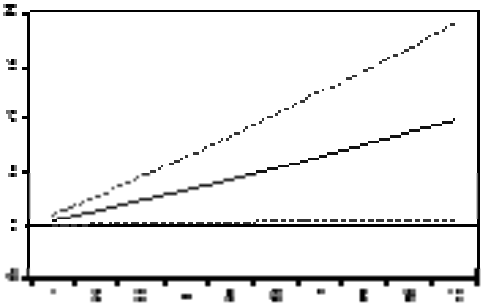
Accumulated response of Y



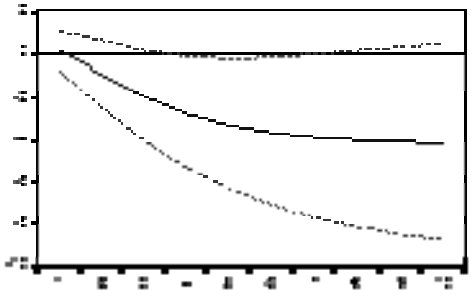
Accumulated response of R



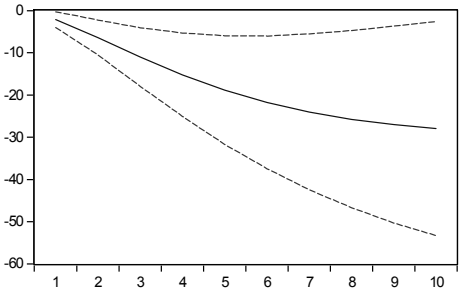
Accumulated response of D



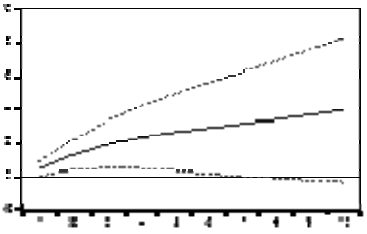
Accumulated response of INF



Accumulated response of FX

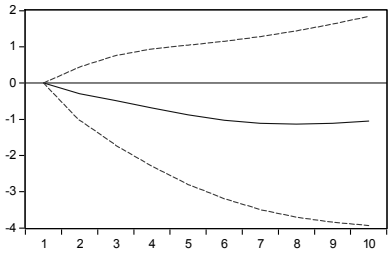


Accumulated response of IR

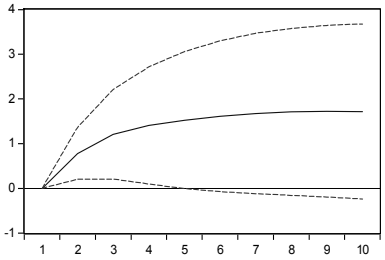


Accumulated Response to CholeskyOne S.D. Innovations in R

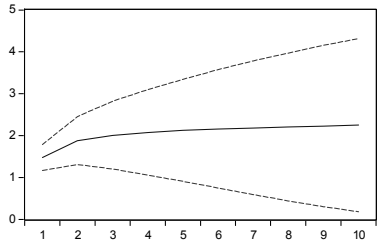
Accumulated response of G



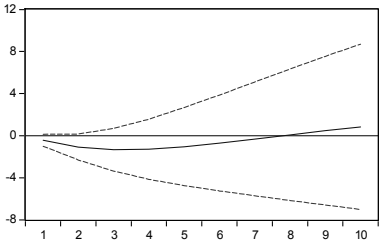
Accumulated response of Y



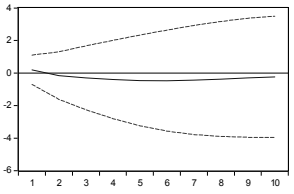
Accumulated response of R



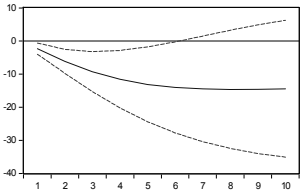
Accumulated response of D



Accumulated response of INF



Accumulated response of FX



Accumulated response of IR