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Fiscal or monetary dominance in a small, open economy with fixed exchange rate – the case of the Republic of Macedonia*

Borce Trenovski¹, Biljana Tashevska²

Abstract

Taking into account the specific features of the Macedonian economy, as a small, open economy with a fixed exchange rate, the goal of this research is to contribute to the discussion of whether countries with such characteristics are under monetary or fiscal dominant regime and whether the dominance has changed over time and why. We use a recursive VAR model to determine whether budget balances in Macedonia were set exogenously and independently from public sector liabilities in the period 2000 – 2011. The results show that the cyclically adjusted balance of central government does not significantly respond to the public debt changes. Thus the basic conclusion is that in the analyzed period, a little attention is paid to the level of public liabilities (public debt) in setting current discretionary fiscal policy, indicating that fiscal policy can undermine the goal of monetary policy and that it dominates over monetary policy.

Key words: fiscal policy, monetary policy, recursive VAR, dominant regime, Republic of Macedonia

JEL classification: E63, H6

* Received: 02-09-2014; accepted: 10-06-2015

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1. Introduction

Before the global economic crisis, there was a widespread agreement among economists that short-term economic stabilization should be in the hands of monetary authorities, mostly because of one of these reasons: scepticism surrounding the effects of fiscal policies based on the Ricardian equivalence arguments; if the monetary policy provides output stability, where is the role for fiscal policy?; the long lags in fiscal policy implementation and the political restrictions (DeLong and Tyson, 2013).

This crisis caused, on one hand, the discovery of monetary policy limits, its redesign through implementation of various unconventional measures, and on the other hand, an increased significance of expansionary fiscal policies, especially in economies with sufficient fiscal space, and their role in stimulating economic activity, since the long duration of the crisis gives enough time for fiscal policy to achieve its goals (see more details in Blanchard et al. 2010; DeLong and Tyson, 2013; DeLong and Summers 2012; Spilimbergo et al., 2008).

These important shifts in the macroeconomic mix, the enormous anti-crisis packages, the European debt crisis, the buildup of public debt in many advanced countries before and during the global crisis, resulted in re-actualization of research on fiscal and monetary policy effects and interactions. This topic is no less interesting for developing countries (especially for Southeast European countries) which experienced fiscal imbalances and increased public debt in recent years, in times of global crisis, which can significantly influence the future economic performance and the conduct of monetary policy. The empirical literature on the interactions between the key macroeconomic policies in these countries is very limited (compared to advanced countries). This is partly because of the short time series for the key variables (especially for fiscal variables) and the undertaken large structural changes, which further complicate the basis for empirical analyses (see Zoli, 2005). This paper represents, to our best knowledge, one of the first empirical analyses in Macedonia (and one of the few in the SEE region) focused on the interactions between the key macroeconomic policies.

The features of the Macedonian economy, such as the concentration of Macedonian exports, the concentration of the countries where it is realized, the import dependence and trade openness of the country, the large determination of growth and domestic GDP by foreign effective demand, the sensitivity of capital inflows and outflows (the concentration of FDI is one of the reasons for the sensitivity of the Macedonian economy), increase the importance of our analysis of the dominant regime.

Before the global recession, Macedonia experienced a period of rising GDP growth, low inflation rates, low or balanced budget deficits, declining trend of public debt, a slight recovery of the export sector, modest decrease in unemployment rates, a stable banking sector, and a continuous credit expansion in the banking sector.

The fixed exchange rate regime³, implemented by the National Bank of the Republic of Macedonia (NBRM), relates monetary actions with the stock and flows of foreign exchange reserves. In order to maintain the price stability and the stability of the nominal exchange rate, in this period NBRM constantly purchased large amounts of foreign currencies in the foreign exchange market. However, the first signals of the coming changes appeared in the second half of 2007, when the inflation rate began to intensify as a result of the higher food price growth, reflecting the global trends. The upward pressures on the price level and large pressures on the exchange rate, present until the beginning of 2009, caused an unfavorable macroeconomic ambient and required a conduct of a restrictive monetary policy. Since the peak of the global crisis, in the second half of 2009, the pressures on the exchange rate and on inflation relaxed, the expectations of economic agents stabilized, the external sector movements improved, which created conditions for monetary relaxation (see Trenovski and Tashevska, 2014).

Regarding the fiscal policy, in the pre-crisis period, Macedonia ran low budget deficits⁴. Until 2008 the level of public debt was reduced to only 20.6% of GDP, which was one of the lowest level of indebtedness in the region and in Europe. All this provided a solid starting fiscal position and enough fiscal space for the implementation of expansionary fiscal measures in the following period. The changing trend of the fiscal policy of Macedonia began in 2007, before the onset of the crisis, with the introduction of the flat tax rate at the level of 10%, the reduction of the social contributions rates and other tax incentives. The government implemented 5 anti-crisis packages in order to address the challenges of the crisis (see CEA, 2009; Trenovski, 2013b), which had strong fiscal implications. The anti-crisis packages adopted by the government included wide range of policy measures and reforms referred to supporting exports and imports, subsidies to support small and medium businesses, measures directed to enterprises with distorted liquidity and problems with the payment of their liabilities to the state, implementing a new seven-year investment program 2009 – 2016, measures aimed at reducing unemployment, improving the situation of socially vulnerable groups and the standard of living. The fall in budget revenues as a result of the crisis and the increased budget expenditures created higher budget deficits, and substantially increased the public debt, which reached 30.9% of GDP in 2012 and was nearly doubled in 2014 compared to the 2008 level.

Having in mind the response of fiscal policy in the period before and during the global economic crisis, and the characteristics of the Macedonian economy, especially the strategy of de facto fixed exchange rate, we are specifically interested

³ NBRM implements a strategy of de facto fixed exchange rate, even though it is not specified as such in the legal framework.

⁴ The years 2001 and 2002 are exception, due to the armed conflict.

in the following questions/hypothesis: Is there a monetary or fiscal dominant regime in Macedonia in the analyzed period; Whether the public debt level influences the creation of fiscal policy; Whether the dominance of the monetary/fiscal regime has changed in time and why?

The rest of the paper is structured as follows: the second section reviews the relevant empirical literature on fiscal and monetary policy effects and interactions, including a part focused on determining the dominance of one or the other regime; the third section elaborates the methodology and specification of the recursive VAR model used in the determination of the dominant regime; the fourth section describes the variables and data sources; the fifth section includes the empirical results, followed by a robustness check and summarized conclusions in the sixth section.

2. Literature review

The analysis of fiscal and monetary policy interactions and effects is related to three interdependent research fields, which present the foundation for a dominant part of the performed empirical studies in this field (see Kuttner, 2002): the impact of fiscal policy on the basic goals of monetary policy; the implications from strategic interactions between fiscal and monetary authorities; and the impact of fiscal and/or monetary policy on the composition of aggregate demand and output, and on other macroeconomic variables. Here we briefly review relevant empirical research in these fields.

The *first group* of studies, which focus on the implications of fiscal discipline on the conduct of monetary policy, triggered the debate on the need for analysis of the interaction between the key policies. The focus of these studies was introduced in the study by Sargent and Wallace (1981) on the effects of nonsustainable budget deficits on monetary policy and the price level, and continued with a large number of papers on the fiscal theory of the price level (see Leeper, 1991; Woodford, 1995; Canzoneri and Diba, 1996; Canzoneri et al., 2001; Christiano and Fitzgerald, 2000 etc.) The fiscal dominance (or monetary) is often analyzed with an empirical analysis which determines whether public liabilities from the previous period influence the setting of current budget deficits (see in more detail Canzoneri et al., 2001; Tanner and Ramos, 2003; Semmler and Zhang, 2004; Fialho and Portugal, 2005; Zoli, 2005). Our research includes this type of analysis. A smaller group of studies analyzes the specific effects of monetary policy conduct and monetary targets on the behavior of fiscal policy (see Beetsma and Bovenberg, 1999).

The *second group* of studies focuses on the effects and efficiency of monetary or fiscal policy and their impact on macroeconomic variables. The studies of fiscal policy give divergent results on the effectiveness of fiscal policy, the sign and size

of fiscal multipliers, the effects of fiscal consolidation, the presence of Ricardian behavior etc. (for a review see Hemming, Kell and Mahfouz, 2002; Christiansen, 2008; Ilzetzki, Mendoza and Végh, 2011; Auerbach and Gorodnichenko, 2012 etc.) The empirical studies on monetary policy give less divergent results and generally imply that: there is a strong relationship between money and prices in the long run; monetary aggregates or policy-controlled interest rates affect output in the short run; monetary policy affects prices with a certain lag; monetary policy is neutral in the long run (Bernanke and Blinder, 1992; Gordon and Leeper, 1994; Bernanke and Mihov, 1998; Kutan and Brada, 1999; etc).

The *third group* of studies focuses on monetary and fiscal policy interactions, their coordination or non-coordination, or their strategic acting (as substitutes or complementary policies) and their effects on the macroeconomic environment (Dixit and Lambertini, 2000, 2003; Wyplosz, 1999; Méltz, 1997; von Hagen et al., 2001; Lambertini and Rovelli, 2004). There are empirical analyses that confirm that fiscal and monetary policy move in opposite directions (Wyplosz, 1999; Méltz, 1997), while other analyses find that there is assymetry in the dependence of the two policies – a deteriorated fiscal position initiates a monetary contraction, while the monetary policy supports the fiscal expansions (see von Hagen et al., 2001; Dixit and Lambertini, 2003). Most of the studies support the notion that both policies would gain from a certain level of coordination, which has significant positive effects on improvement of the social welfare, while on the other hand, independent decisions of monetary/fiscal authorities would result either in doubling the efforts or in “negative externalities” (see Lambertini and Rovelli, 2004).

The empirical literature focused on emerging or developing countries (especially transition economies), due to the lack of sufficiently long and high-quality data series and to significant structural changes, is very limited. Some of the few studies on developing countries are Tanner and Ramos (2003), who test the fiscal or monetary dominance in Brazil and Zoli (2005), where she uses VAR methodology to test the dominance of the fiscal/monetary regime in developing countries, and then explores the influence of fiscal policy on the reaction function of monetary policy. In the SEE region, fiscal and monetary policy are usually analyzed separately, with very little research focused on their interactions. Some of the few empirical studies of fiscal and monetary policy interactions are Rukelj (2009) for Croatia and Bogoev et al. (2013) for 3 SEE countries (Macedonia, Croatia and Bulgaria). The increased interest in this field, triggered by the economic crisis, provoked the emergence of more empirical studies on the effects of fiscal policy on economic activity in Croatia, Serbia, Macedonia and Bulgaria (Ravnik and Zilić, 2011; Hinić and Miletić, 2013; Karagyozyova-Markova et al., 2013 etc.).

In Macedonia, empirical studies of the interactions and effects of the fiscal and monetary policy are still rare. Some of the studies that touch the topic of interactions of both policies are: Kadieska – Vojnovic (2007), who uses a VAR model to analyze

the relation between budget balance/GDP and public debt/GDP and establishes that the monetary policy was dominant in Macedonia during the period 1999-2006; Angelovska-Bezovska et al. (2011), who find a positive reaction of the primary budget balance to a rise in public debt in Macedonia, using the GMM estimator but their analysis is based on a very short series of annual data (1990-2009). Bogoev et al. (2013), Trenovski (2013a) analyzed the interactions between the two policies with recursive VAR models, while Fetai and Abduli (2014) used a GMM estimator. The three papers find that fiscal and monetary policy in Macedonia act as strategic substitutes, i.e. fiscal expansion was accompanied by monetary tightening.

3. Methodology and model specification

3.1. Methodology

Most empirical studies of monetary and fiscal policy interactions, their effects and efficiency, use VAR models. Alternative approaches are structural models such as DSGE models, or the narrative approach based on well documented policy changes during a longer period (see Romer and Romer, 2010). The main advantage of this methodology is that it enables to determine the effects of shocks and the transmission of economic policies with models that are not restricted by a predetermined theoretical construction (however, important structural features of the economy might be omitted by the empirical model). The disadvantage of VAR due to data based results is addressed with different identification schemes, through which the logic of economic theory is imbedded into the models. It should be highlighted here that the use of different identifying assumptions can lead to different results and conclusions. The most relevant studies of fiscal and monetary policy define specific ways of identification: Bernanke and Blinder (1992) used Cholesky decomposition; Bernanke and Mihov (1998) built a semi-structural VAR; Uhlig (2005) developed a sign-restriction approach, used in Mountford and Uhlig (2005), and Caldara and Kamps (2008); Blanchard and Perotti (2002) employed a structural VAR, using institutional information about government revenues and expenditures for identification; Blanchard and Quah (1989) set long-term restrictions on the reactions of variables in the VAR model. (see also Mirdala, 2009).

In general, VARs come in three varieties: reduced form VAR, recursive VAR and structural VAR or SVAR (see more details in Sims, 1994; Stock and Watson, 2001; Lutkepohl and Kratzig 2004). Our research is based on recursive VAR. The recursive VAR-model is based on a triangular structure of the ordering of variables, where the first ordered variable contemporaneously affects each following variable, while each variable does not contemporaneously affect previous variables. This is a simple form, 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. There are several justifications for using recursive VAR models: *First*, these models are seen as most appropriate choice when the model consists of endogenous variables and the possible two way causation among the variables. *Second*, they enable us to estimate impulse response functions that indicate the interrelations and the transmission mechanism of the imposed shocks in each equation to the rest of the variables in the model. *Third*, these methods enable us to include restrictions about the contemporaneous impact of the variables in the model. Especially encouraging are studies of the effects of fiscal and monetary policy with various identification approaches that confirm that results reached by using the recursive VAR in most studies correlate with those reached by using SVAR with various kinds of restrictions (Caldara and Kamps, 2008).

The general specification of recursive VAR can be presented in the following form:

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

Where y is the $K \times l$ vector of endogenous variables, A^* represents a $K \times K$ matrix of coefficients, μ is the vector of constants, L is the lag operator, ε is the vector of structural errors, t is a time operator; A is a lower triangular matrix which specifies contemporaneous relations between the variables in the model, while B is $K \times K$ identity matrix of error terms.

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

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

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:

$$u_t = A^{-1} B\varepsilon_t \quad (3)$$

Model (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 to have orthogonal structural disturbances ε , certain restrictions need to be set on the parameters in matrices A and B. Specifically, 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 and Kratzig, 2004).

3.2. Model – fiscal or monetary dominance in Macedonia?

Conceptually, under a monetary dominant regime (MD), the government adjusts primary deficits to help reduce debt accumulation and under a fiscal dominant regime (FD), fiscal balances are set independently from public sector liabilities. However, it is not easy to develop a formal empirical test to determine the dominant regime. We follow a quite simple methodology for determining the dominant regime, initially proposed by Canzoneri et al. (2001), followed by Tanner and Ramos (2003), Fialho and Portugal (2005), who analyze the fiscal sustainability and fiscal vs monetary dominance in Brazil in the period 1991 – 2000, Semmler and Zhang (2004), who analyze interactions of key macroeconomic policies in the Eurozone, and Zoli (2005), who tests fiscal vs monetary dominance in developing countries. This approach is based on a VAR-model aimed at assessing whether primary budget balances are set exogenously and independently from public sector liabilities. We make a small change in the model. We use cyclically adjusted budget balances instead of primary budget balances, in order to see more clearly whether the conduct of discretionary policy in the analyzed period took into account the level of public sector liabilities (public debt/GDP). This is especially important in the analyzed period, because the fiscal policy had significant discretionary elements. The robustness check includes the primary balance instead of the cyclically adjusted balance, in order to catch the impact of automatic stabilizers as well. The following VAR is illustrated:

$$X_t = \Theta_0 + \Theta_1 X_{t-1} + \Theta_2 X_{t-2} + \dots + v_t \quad (4)$$

Where $X_t = [\text{cyclically adjusted budget balance, public debt/GDP}]$, Θ_j is a vector of coefficients, v_t is a vector of error terms.

The positive relationship running from current public liabilities to future budget balances indicates a MD regime, while the lack of a significant relationship indicates that budget balances are set exogenously (FD regime). A positive relationship between current budget balances and future public liabilities also indicates a MD regime, although according to the fiscal theory of the price level, it could also be a FD regime.

According to this, we can approach an assessment of MD or FD regime using VAR tools (impulse reaction functions and variance decomposition), by determining the relationships between cyclically adjusted budget balance and public liabilities (public debt/GDP). We use a VAR model, where first the relationship runs from public debt/GDP to cyclically adjusted budget balance, and then from cyclically adjusted budget balance to public debt/GDP. The results need to be interpreted with awareness of the limitation coming from the interpretation of the positive relationship running from current budget balances to future public liabilities, which can be consistent with both MD and FD regime. Another restriction is the specific

analyzed period, since during large economic movements, fiscal authorities might not be willing/or able to pay attention to public liabilities in setting current fiscal policy. (see Zoli, 2005).

The following model is estimated:

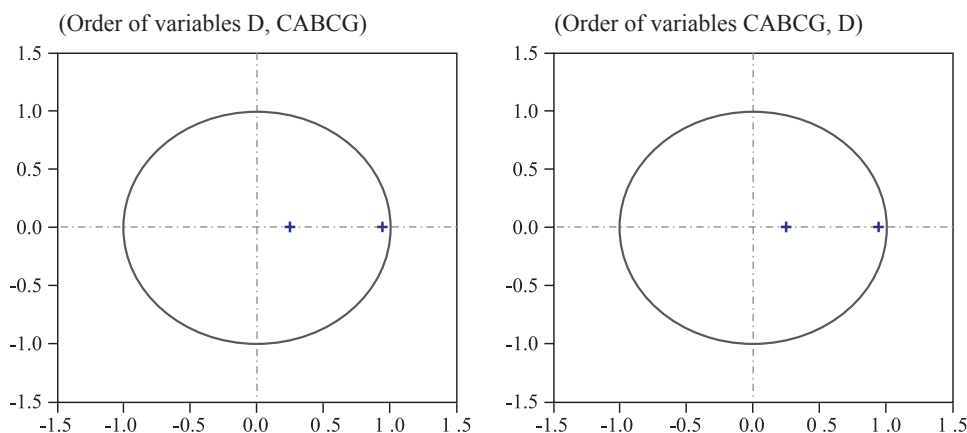
$$CABCG_t = \alpha_0 + \sum_{j=1} \alpha_j CABCG_{t-j} + \sum_{j=1} \beta_j D_{t-j} + \varepsilon_t \quad (5)$$

$$D_t = \gamma_0 + \sum_{j=1} \delta_j CABCG_{t-j} + \sum_{j=1} \gamma_j D_{t-j} + \mu_t \quad (6)$$

Where $CABCG_t$ is the cyclically adjusted balance of the central government, while D_t is public sector liabilities (public debt/GDP).

The first step is to determine the number of lags of the variables included in the VAR model. All five selection criteria (AIC, SC, LR, FPE, HQ) suggest the use of 1 lag (see table A1 in the Appendix). Next we assess the stability of the model.

Figure 1: Inverse root of autoregressive characteristic polynomial



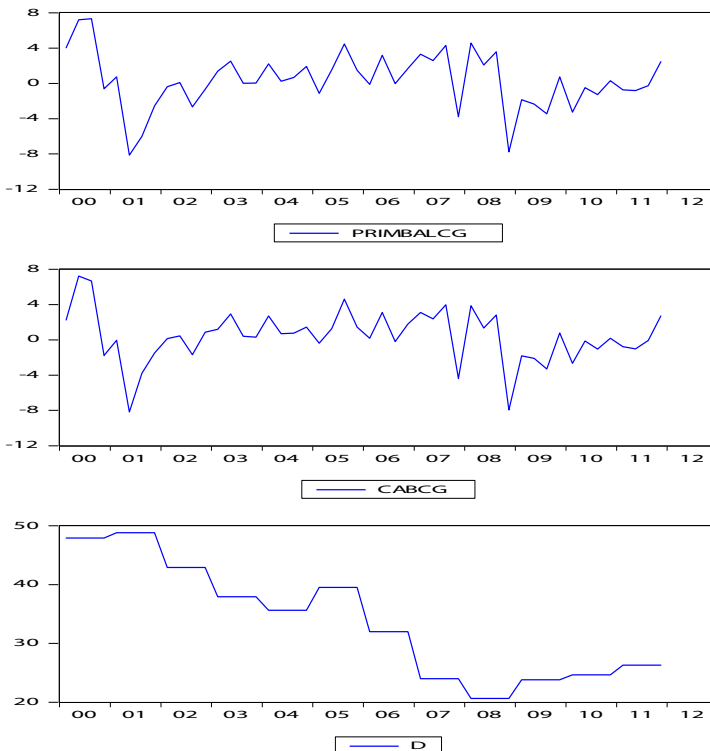
Source: Authors' calculations

The results shown in figure 1 show that all inverted roots of the characteristic polynomial lie inside the unit root circle, indicating a stable VAR-model which enable to proceed with the analysis.

4. Empirical data and analysis

For modelling the interactions between fiscal and monetary policy in the Republic of Macedonia, we use quarterly data from the first quarter of 2000 (having in mind the change of the main monetary instrument at the beginning of 2000) until the fourth quarter of 2011. The variables included in the empirical analysis are: CABCG (cyclically adjusted budget balance of the central government, as % of GDP) and D (public debt as % of GDP). Since there are no available quarterly data for the latter variable before 2004, for that period we use the available annual rate for all respective quarters. For the robustness check we replace CABCG with PRIMBALCG (primary budget balance of the central government as % of GDP). The primary budget balance is calculated as a difference between budget revenues and primary expenditures i.e. total expenditures less interest payments. The variables are in relative amounts (% of GDP) in order to capture their real dynamics and movement and to present more realistically their effect, considering their size compared to the economic activity. All data series are seasonally adjusted. The movement of the variables used in the model are presented in Figure 2.

Figure 2: Movement/dynamics of the variables of the model



Source: Ministry of finance of the Republic of Macedonia

The stationarity of the variables was tested with the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) test, which showed that all variables are stationary in level, except for public debt/GDP, which is stationary at a significance level of 0,1 (0,07 more precisely).⁵ However, since that stability test indicates a stable VAR model, we believe that this does not significantly affect the results and the outcome of our analysis.

The data come from publicly accessible sources, available in the period of conducting the research: public revenues, public expenditures and public debt data are from the Ministry of finance of the Republic of Macedonia, while GDP data are from the State Statistical Office of the Republic of Macedonia. All the calculations are performed using the software package Eviews7.

5. Results and discussion

First by using the *Granger-causality test*, we examined whether the lagged value of one variable helps to predict the other variable of the system. The test shows that only public debt (D) lagged 7 periods (quarters) helps predict cyclically adjusted balance of the central government (CABCG), indicating that in the medium run (2-3 years), CABCG responds to a change in D (see table 1).⁶ This shows that in the medium run the government takes into account the level of indebtedness in the design and implementation of fiscal policy.

Table 1: Granger Causality Test

Sample: 2000Q1 2011Q4

Time lags: 7

Null hypothesis:	Obs	F-Statistic	Prob.
D does not Granger Cause CABCG	41	2.76810	0.0273
CABCG does not Granger Cause D		0.45948	0.8546

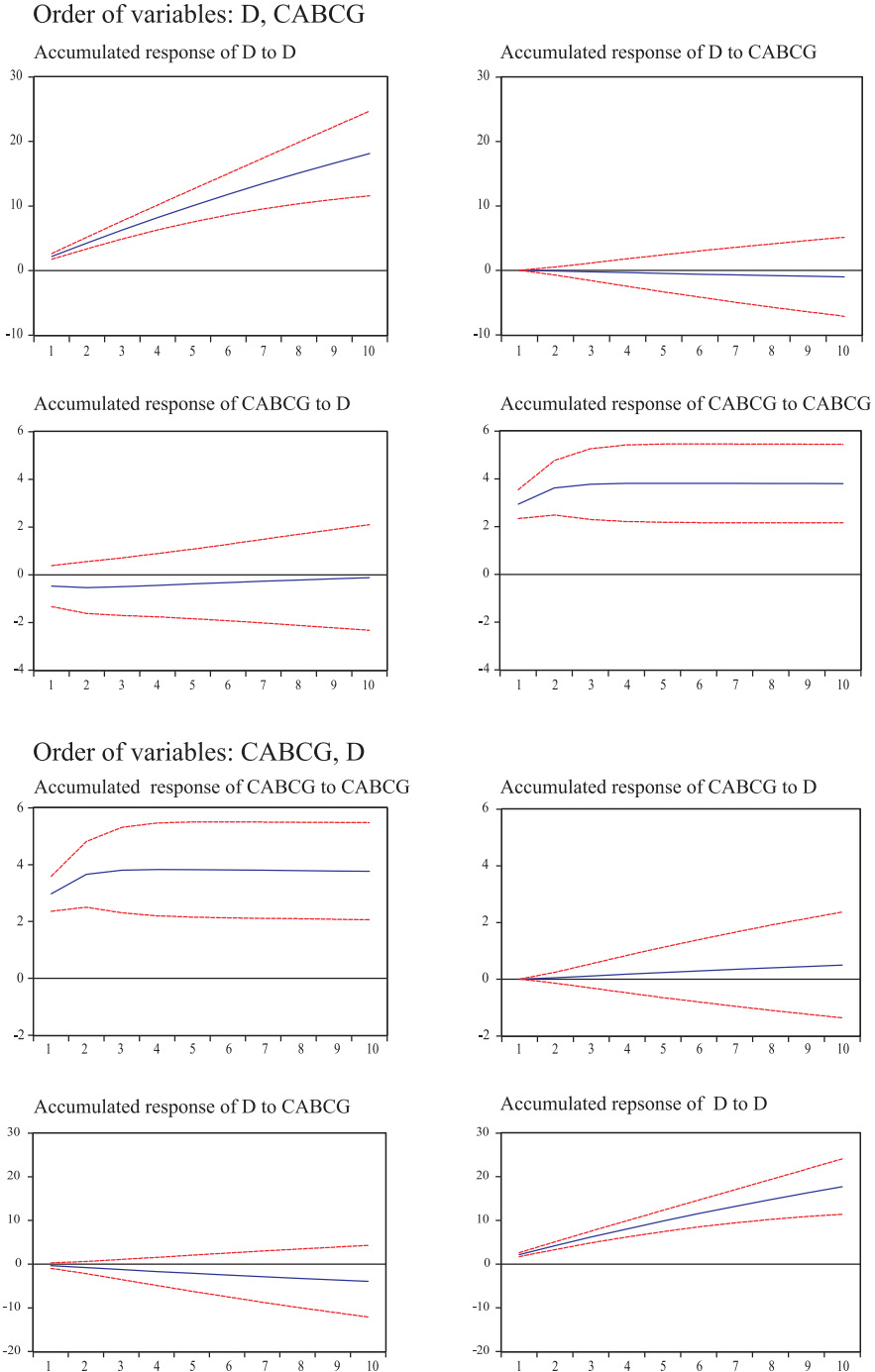
Source: Authors' calculations

The impulse-response functions are plotted in figure 3. The shocks represent a single increase of one standard deviation of the analyzed variables. The dashed lines mark ± 2 standard errors bands. The analysis of the shocks is based on accumulated responses of the rest of the variables.

⁵ The unit root test results are available upon request.

⁶ The Granger causality was tested for up to 10 periods and it was only significant with 7 lags.

Figure 3: Impulse-reaction functions



Source: Authors' calculations

The impulse-response functions generally show that CABCG does not significantly respond to shocks in D. The reversed relationship is also insignificant. A more thorough look at the results (we point out that they are insignificant) reveals that with the order of variables D – CABCG, the accumulated response of CABCG to D shows that CABCG reacts negatively (decreases) in the first year, and the reaction disappears by the end of the second year. Where the order of the variables is CABCG – D, the accumulated response of CABCG to D shows that CABCG increases as a result of a debt shock, though insignificantly. This implies that in Macedonia, in setting current discretionary fiscal policy, a little account is taken of the public debt level. Furthermore, the results indicate that fiscal policy dominates over monetary policy and may undermine the commitment of monetary policy.

The *variance decomposition* showed that most of the variance of the prediction error is explained by the shock to the variables themselves, which slowly falls in the later periods (table A2 and table A3 in the Appendix present the results from the variance decomposition in predicting certain points of the prediction period). With the variables ordered: D – CABCG, the variance of prediction error of D is explained by D itself in almost all quarters (in the 10th quarter only 0.33% are explained by a shock to CABCG), while only 2.63% of the prediction error variance of CABCG in the first quarter is explained by a shock to D, and 2.77% in the 10th quarter. With the order of variables CABCG – D, 4.66% of the prediction error variance of D in the 10th quarter is explained by shock to CABCG, while only 0.29% of the prediction error variance of CABCG in the 10th quarter is explained by shock to D.

For the robustness check we make some changes in the variables, in their order, and we divide the analyzed period into two subperiods in order to see if the obtained results are confirmed for both subperiods, and to detect any differences. Due to the number of changes and test performed, and in order not to burden the paper, we only provide the parts where the differences are important for our analysis.

First we replace the variable CABCG with PRIMBALCG (primary balance of central government as % of GDP) in order to see whether beside the discretionary component of the fiscal policy, perhaps the primary budget balance, which includes also the reaction of automatic stabilisers, responds to the level of public liabilities (or vice versa). Also, we divide the analyzed period into two subperiods: I subperiod from 2000q1 – 2006q4 and the II subperiod from 2006q1 – 2011q4. This is a common approach for a robustness check. These division is also made because there are significant differences in the conduct of fiscal policy between the two periods.

The replacement of CABCG with PRIMBALCG does not significantly alter previous results (the results are presented in figure A1 in the Appendix). The division of the period, however, revealed the following differences (the results of

the impulse-reaction functions remain insignificant):⁷ in the first period (in both cases of variables ordering) the accumulated impulse-reaction functions show that CABCG decreases following a shock to D shock and this reaction enhances in the later quarters. In the second period the accumulated impulse-reaction functions show that after a mild reaction of CABCG decrease as a result of a shock in D, beginning in the second quarter, CABCG starts to rise (when the variables order is CABCG – D, this increase of CABCG to a shock from D is even stronger and close to significant) and stabilizes after the first year. This, with a great deal of reserve, can indicate that in the first period a certain attention was paid to the public liabilities when determining the discretionary fiscal policy, while in the second period the discretionary fiscal policy was set independently of the public liabilities. This, as was mentioned before, despite the great deal of reserve in the interpretation, results from the highest level of public debt and the “conditioned” arrangements with the IMF in the first period, compared to the low level of public debt, and the effects of the global economic crisis on the fiscal variables in the second period (indicating a monetary dominant regime in the first period and a fiscal dominant regime in the second period).

6. Conclusions

The results of the analysis regarding the stated hypotheses show that fiscal policy dominates over monetary policy in Macedonia in the analyzed period, which indicates that fiscal policy can undermine the goal of monetary policy. These results contribute to the scarce empirical literature and research debate related to the fiscal /monetary dominance in small and open transition economies. However this analysis has got also some limitations due to the lack of sufficiently long and high-quality data series for fiscal variables, the undertaken large structural changes in the economy and the lack of a variable that captures the state of the economy. There is a wide range of further analyses for a more thorough determination of the fiscal or monetary policy dominance and their interactions, for example by including monetary policy and economic activity variables in order to assess the effects of fiscal policy on the monetary policy reaction function and vice versa, taking into account the stage of the economic cycle. Having in mind the characteristics of the fiscal policy response and the features of the Macedonian economy, as a small open economy, and especially as a country following a strategy of de facto fixed exchange rate, our research is interesting for monetary and fiscal policy of similar economies, particularly for determining their monetary or fiscal dominance, whether the public debt level influences the creation of fiscal policy, the change in monetary/fiscal regime over time etc.

⁷ Due to lack of space in the paper, all the impulse response functions are available upon request.

References

- Angelovska-Bezovska, A., Bogoev, J., Mitreska, A., Kadievska Vojnovik, M. (2011) "Investigating the Cyclical Behavior of Fiscal Policy in the Republic of Macedonia during the Period of Transition", *Croatian Economic Survey*, 13(1), pp. 57–104.
- Auerbach, A.J., Gorodnichenko, Y. (2012) "Measuring the Output Responses to Fiscal Policy," *American Economic Journal: Economic Policy*, American Economic Association, 4(2), pp. 1–27.
- Beetsma, R., Bovenberg, A.L. (1999) "Does Monetary Unification Lead to Excessive Debt Accumulation?", *Journal of Public Economics*, 74, pp. 299–325.
- Bernanke, B., Blinder, A. (1992) "The Federal Funds Rate and the Channels of Monetary Transmission", *American Economic Review*, 82(4), pp. 901–921.
- Bernanke, B., Mihov, I. (1998) "Measuring Monetary Policy", *Quarterly Journal of Economics*, 113(3), pp. 869–902.
- Blanchard J.O., Dell’Ariccia, G., Mauro, P. (2010) "Rethinking Macroeconomic Policy", *IMF Staff Position Note*, SPN/10/03.
- Blanchard, J.O., 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), pp. 1329–1368.
- Blanchard J. O., Quah, D. (1989) "The Dynamic Effects of Aggregate Demand and Supply Disturbances", *American Economic Review*, 79(4): 655–673.
- Bogoev, J., Petrevski, G., Tevdovski, D. (2013) "Fiscal and Monetary Policy Effects in the South Eastern European Economies", Paper presented at the Researchers Club, National Bank of the Republic of Macedonia. Available from: <http://www.nbrm.mk/?ItemID=1DC7472A6BFE934FB5754801D9706241>.
- Caldara, D., Kamps, C. (2008) "What Are the Effects of Fiscal Policy Shocks? A VAR-based Comparative Analysis", *ECB Working Paper*, No. 877.
- Canzoneri, M., Cumby, R., Diba, B. (2001) "Is the Price Level Determined by the Needs of Fiscal Solvency?", *American Economic Review*, 91(5), pp. 1221–38.
- Canzoneri, M., Diba, B. (1996) "Fiscal Constraints on Central Bank Independence and Price Stability", *CEPR Discussion Papers*, No. 1463.
- CEA (2009) *Review of the Measures of the Macedonian Government Against the Global Economic Crisis*, March, Skopje: Center for Economic Analyses.
- Christiano, L.J., Fitzgerald, T.J. (2000) "Understanding the fiscal theory of the price level", *Economic Review*, Federal Reserve Bank of Cleveland, Issue Q II, pp. 2–38.
- Christiansen, L. (2008) "Fiscal Multipliers – A Review of the Literature", *Appendix II to IMF Staff Position Note*, 08/01.

- DeLong, J.B., Summers, L. (2012) "Fiscal Policy in a Depressed Economy", *Brookings Papers on Economic Activity*, 44(1), pp. 233–297.
- DeLong, J.B., Tyson, L.D. (2013) "Discretionary Fiscal Policy as a Stabilization Policy Tool: What Do We Think Now That We Did Not Think in 2007?", May 31, (online) available from: <http://delong.typepad.com/20130531-delong-tyson-1.4.pdf>.
- Dixit, A., Lambertini, L. (2000) "Fiscal Discretion Destroys Monetary Commitment", Princeton University and UCLA (mimeo).
- Dixit, A., Lambertini, L. (2003) "Interactions of Commitment and Discretion in Monetary and Fiscal Policies", *American Economic Review*, 93(5), pp. 1522–1542.
- Fetai, B., Abduli, S. (2014) "Macroeconomics Effect of Fiscal Policy in Transition Economies: The Case of the Republic of Macedonia", *Journal of International Scientific Publications: Economy & Business*, (8), pp. 1035–1047, Info Invest Ltd, Burgas, Bulgaria.
- Fialho, M.L., Portugal, M.S. (2005) "Monetary and fiscal policy interactions in Brazil: an application of the fiscal theory of the price level", *Estudos Econômicos (São Paulo)*, 35, pp. 657–685.
- Gordon, D., Leeper, E. (1994) "The Dynamic Impact of Monetary Policy: An Exercise in Tentative Identification," *Journal of Political Economy*, CII, pp. 1128–1147.
- Hemming, R., Kell, M., Mahfouz, S. (2002) "The Effectiveness of Fiscal Policy in Stimulating Economic Activity – A Review of the Literature", *IMF Working Paper*, WP/02/208.
- Hinić, B., Miletić, M. (2013) "Efficiency of the fiscal and monetary stimuli: the case of Serbia", Paper presented at the 2nd Research Conference *Policy Nexus and the Global Environment: A New Consensus Emerging from the Crisis?*, Skopje, April 26.
- Ilzetzki, E., Mendoza, E.G., Végh, C.A. (2011) "How Big (Small?) are Fiscal Multipliers?", *IMF Working Paper* WP/11/52.
- Karagyozyova-Markova, K., Deyanov, G. Iliev, V. (2013) "Fiscal Policy and Economic Growth in Bulgaria", Bulgarian National Bank, DP/90/2013.
- Kutan, A. M., Brada, J. C. (1999) "The End of Moderate Inflation In Three Transition Economies?", FRB of St. Louis Working Paper, 99-003A.
- Kuttner, K.N. (2002) "The Monetary-Fiscal Policy Mix: Perspectives from the U.S.", A paper presented at the Conference *The Monetary Policy Mix in the Environment of Structural Changes*, sponsored by the National Bank of Poland, October 24–25.
- Lambertini, L., Rovelli, R. (2004) "Monetary and Fiscal Policy Coordination and Macroeconomic Stabilization. A Theoretical Analysis", *Working Papers* 464, Dipartimento Scienze Economiche, Università di Bologna.

- Leeper, E.M. (1991) "Equilibria under 'Active' and 'Passive' Monetary and Fiscal Policies," *Journal of Monetary Economics*, 27(1), pp. 129–147.
- Lutkepohl, H., Kratzig, M. (2004) *Applied Time Series Econometrics. Themes in Modern Econometrics*, Cambridge University Press.
- Méltiz, J. (1997) "Some cross-country evidence about debt, deficits and the behaviour of monetary and fiscal authorities", *CEPR Discussion Papers*, 1653, Center for Economic Policy Research.
- Mirdala, R. (2009) "Effects of Fiscal Policy Shocks in the European Transition Economies", *Journal of Applied Research in Finance*, 1(2), pp. 141–155.
- Mountford, A., Uhlig, H. (2005) "What Are the Effects of Fiscal Policy Shocks?", SFB 649 Discussion Paper 2005-039, Berlin: Humboldt University.
- Ravnik, R., Zilić, I. (2011) "The Use of SVAR Analysis in Determining the Effects of Fiscal Shocks in Croatia" *Financial Theory and Practice*, 35 (1), pp. 25–58.
- Romer, C.D., Romer, D.H. (2010) "The Macroeconomic Effects of Tax Changes: Estimates Based on a New Measure of Fiscal Shocks", *American Economic Review*, 100(3), pp. 763–801.
- Rukelj, D. (2009) "Modelling Fiscal and Monetary Policy Interactions in Croatia Using Structural Vector Error Correction Model", *Economic Trends and Economic Policy*, 121, pp. 27–58.
- Sargent, T.J., Wallace, N. (1981) "Some Unpleasant Monetarist Arithmetic", *Federal Reserve Bank of Minneapolis Quarterly Review*, 5(3), pp. 1–17.
- Semmler, W., Zhang, W. (2004) "Monetary and Fiscal Policy Interactions in the Euro Area," *Empirica* 31(2), pp. 205–227.
- 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, pp. 381–399.
- Spilimbergo, A., Symansky, S., Blanchard, O., Cotarelli, C. (2008) "Fiscal Policy for the Crisis" *IMF Staff Position Note* SPN/08/01.
- Stock, J.H. and Watson, M. W. (2001), "Vector Autoregressions", *Journal of Economic Perspectives*, 15(4), pp. 101–115.
- Tanner, E., Ramos, A. (2003) "Fiscal sustainability and monetary versus fiscal dominance: Evidence from Brazil, 1991–2000", *Applied Economics* 35, pp. 859–73.
- Trenovski, B. (2013a) *Optimal Macroeconomic Policy in Macedonia – in Terms of the Global Economic Crisis*, Skopje: Center for Economic Analyses – CEA.
- Trenovski, B. (2013b) "Response of the Fiscal Policy on the Global Economic Crisis in the Republic of Macedonia", *Annual of the Faculty of Economics – Skopje*, 48, pp. 1–397.
- Trenovski, B., Tashevska, B. (2014) "Monetary Policy Response to the Global Economic Crisis in a Small, Open Economy with Fixed Exchange Rate – the Case of the Republic of Macedonia", *CEA Journal of Economics*, 9(1), pp. 23–35.

- Uhlig, H. (2005) "What Are the Effects of Monetary Policy on Output? Results from an Agnostic Identification Procedure", *Journal of Monetary Economics* 52 (2), pp. 381–419.
- von Hagen, J., Hughes H., Strauch, R. (2001) "Budgetary Consolidation in EMU", *Economic Papers* 14, March, Brussels: European Commission.
- Woodford, M. (1995) "Price Level Determinacy without Control of a Monetary Aggregate", *Carnegie-Rochester Conference Series on Public Policy*, 43, pp. 1–46.
- Wyplosz, C. (1999) "Economic Policy Coordination in EMU: Strategies and Institutions", *ZEI Policy Paper*, B11.
- Zoli, E. (2005) "How Does Fiscal Policy Affect Monetary Policy in Emerging Market Countries?", *BIS Working Papers* 174, Monetary and Economic Department, April.

Fiskalna ili monetarna dominacija u malom otvorenom gospodarstvu s fiksnim deviznim tečajem – slučaj Republike Makedonije

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Sažetak

Uzimajući u obzir specifičnosti makedonskog gospodarstva, kao malog otvorenog gospodarstva s fiksnim tečajem, cilj ovog istraživanja je dati doprinos raspravi o tome jesu li zemlje s takvim karakteristikama pod dominacijom monetarnog ili fiskalnog režima i da li se dominacija tijekom vremena promijenila i zašto. Koristi se rekurzivni VAR model kako bi se utvrdilo jesu li proračunska salda u Makedoniji postavljena egzogeno i neovisno od obveza u javnom sektoru u razdoblju 2000.–2011. Rezultati pokazuju da ciklički prilagođen saldo središnje vlade bitno ne reagira na promjene javnog duga. Tako je osnovni zaključak da se u analiziranom razdoblju malo pozornosti posvećuje razini javnih obveza (javnog duga) u postavljanju diskrecijske fiskalne politike, što pokazuje da fiskalna politika može potkopati cilj monetarne politike, te da dominira nad monetarnom politikom.

Ključne riječi: fiskalna politika, monetarna politika, rekurzivni VAR, dominantni režim, Republika Makedonija

JEL klasifikacija: E63, H6

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Appendices

Table A1: Criteria for the lag order in the VAR model

Endogenous variables: D and CABCG

Exogenous variables: C

Sample: 2000Q1 2011Q4

Observations: 44

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-264.0619	NA	612.7667	12.09372	12.17482	12.12380
1	-200.1743	119.0632*	40.29506*	9.371559*	9.614858*	9.461786*
2	-196.9809	5.660987	41.86464	9.408224	9.813722	9.558602
3	-195.9838	1.676975	48.15457	9.544718	10.11242	9.755248
4	-194.2375	2.778190	53.68381	9.647160	10.37706	9.917840

Note: * denotes the number of lags selected by the criterion

LR – sequential modified LR test statistic (each test at 5% level); FPE – Final prediction error;
 AIC – Akaike information criterion; SC – Schwarz information criterion; HQ – Hannan-
 -Quinn information criterion.

Source: Authors' calculations

Table A2: Variance decomposition

Order of variables in the VAR model: D, CABCG

Decomposition of variance of D:			
Period	S.E.	D	CABCG
1	2.175016	100.0000	0.000000
4	4.116120	99.75352	0.246485
6	4.844384	99.70363	0.296371
8	5.378404	99.67884	0.321155
10	5.787395	99.66430	0.335697
Decomposition of variance of CABCG:			
Period	S.E.	D	CABCG
1	2.973522	2.629227	97.37077
4	3.056528	2.576300	97.42370
6	3.057686	2.649778	97.35022
8	3.058686	2.713194	97.28681
10	3.059525	2.766281	97.23372

Source: Authors' calculations

Table A3: Variance decomposition

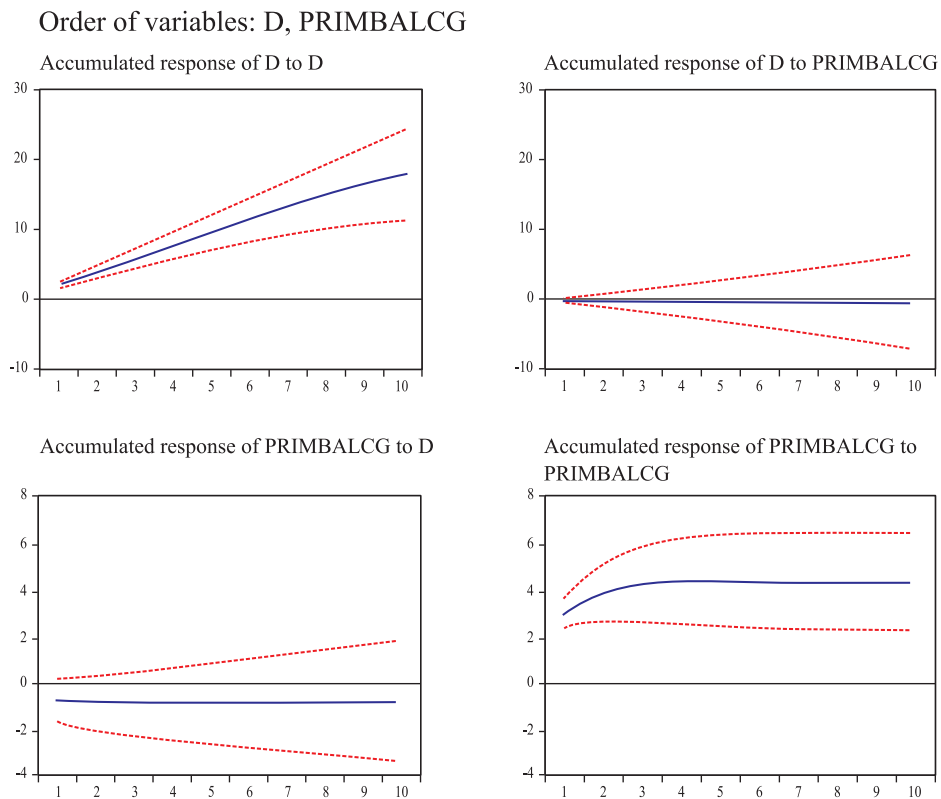
Order of variables in the VAR model: CABCG, D

Decomposition of variance of CABCG:			
Period	S.E.	CABCG	D
1	2.973522	100.0000	0.000000
4	3.056528	99.88862	0.111383
6	3.057686	99.81463	0.185369
8	3.058686	99.75256	0.247435
10	3.059525	99.70069	0.299306
Decomposition of variance of D:			
Period	S.E.	CABCG	D
1	2.175016	2.629227	97.37077
4	4.116120	4.200816	95.79918
6	4.844384	4.455473	95.54453
8	5.378404	4.581403	95.41860
10	5.787395	4.655264	95.34474

Source: Authors' calculations

Figure A1: Robustness check

Accumulated Response to Cholesky One S.D. Innovations ± 2 S.E.



Source: Authors' calculations