Goran Petrevski,
Ss. Cyril and Methodius University, Faculty of Economics – Skopje, Macedonia
Jane Bogoev,
National Bank of the Republic of Macedonia
Dragan Tevdovski,
Ss. Cyril and Methodius University, Faculty of Economics – Skopje, Macedonia

THE TRANSMISSION OF FOREIGN SHOCKS TO THE SOUTH EASTERN EUROPEAN ECONOMIES

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Abstract

This paper investigates the transmission of foreign shocks to the South Eastern European (SEE) economies with fixed exchange rate regimes: Croatia, Macedonia and Bulgaria. Employing recursive Vector Auto Regression (VAR) models, we provide empirical evidence on the influence of various Euro-zone policy and non-policy shocks (the output gap, the money market rate and the inflation rate) on monetary and fiscal policies and economic activity in the analysed countries. Generally, the estimated results imply that Euro-zone economic activity has significant and relatively strong influence on SEE economies and these external shocks are transmitted relatively quickly. Moreover, the results also suggest that if the domestic economy is more integrated with the EU, then these exogenous shocks are more persistent. We can explain these effects by several factors, such as: the fixed exchange rates, the relatively high integration of SEE financial markets to EMU financial markets as well as the dependence of banks on foreign financing.

Key words: *Monetary Policy, Vector Autoregression, Exogenous shocks, South Eastern Europe.*

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1. Introduction

Since the very beginning of the transformation process, the former communist countries have declared their aspiration towards joining the European Union (EU). In this respect, they have engaged in massive institutional and economic reforms which have helped them to coverge to the "old" EU members. As a result, first Bulgaria and Romania and later on Croatia succeeded in achieving the goal of EU accession, while Macedonia has been given the candidate status. Looking forward, SEE countries are faced with another challange related to the EU accession process, namely, that of adopting the single currency.

Therefore, exploring the transmission of EU economic and policy shocks represents a relevant research issue for the former transition economies from SEE, such as: Croatia, Macedonia, and Bulgaria. The main motivation behind our empirical investigation is the fact that all of these economies are small open economies with rigid exchange rate regimes, with different degree of integration within the EU. Hence, the paper provides empirical evidence on the effects of several Euro-zone macroeconomic and policy shocks (output gap, inflation, and interest rates) on several macroeconomic and policy variables in the SEE countries (output, inflation, interest rates and budget surpluses) based on the impulse response functions estimated with recursive VARs. In this way, we are able to assess how the exogenous factors affect macroeconomic performances and policy variables in SEE economies.

Generally, the estimated results imply that Euro-zone economic activity has significant and relatively strong influence on SEE economies and these external shocks are transmitted relatively quickly. Moreover, the results also suggest that if the domestic economy is more integrated with the EU, then these exogenous shocks are more persistent. An additional finding is that shocks in the foreign reference rate are also relatively quickly transmitted to domestic money market rates. We can explain these effects by several factors, such as: the fixed exchange rates, the relatively high integration of SEE financial markets to EU financial markets as well as the dependence of banks on foreign financing. Surprisingly, Euro-zone inflation does not have a significant influence on domestic inflation, which might indicate that inflation in SEE economies is mostly driven by idiosyncratic shocks.

The rest of the paper is organized as follows: Section 2 provides a short overview of the empirical literature on the transmission of foreign shocks and the response of domestic policies. The data description and the estimation methods are presented in Section 3 and Section 4, respectively. The findings of the empirical study are presented in the Section 5.

2. An overview of the empirical literature on monetary and fiscal policy

The effects of foreign real and monetary shocks and the optimal response of domestic economic policies have been discussed extensively in the open economy macroeconomics literature (Prachowny, 1984; Krugman, 1988; Shone, 1989; Karakitsos, 1992; Jha, 1994; Agénor and Montiel, 1996; Hossain and Chowdhury, 1996; Obstfeld and Rogoff, 1996). However, this strand of empirical literature focusing

on the former transition economies is very limited. Within the SVAR framework, one study of the transmission of foreign fiscal shocks to five CEE countries during 1995-2009 shows that German fiscal expansion is followed by an increase in government spending, and a decline in net-taxes, output and inflation in most of these countries (Crespo-Cuaresma et al., 2011). In the region of SEE economies, fiscal and monetary policy have been analysed separately, but to the best of our knowledge, there are no studies which deal with fiscal and monetary policy interactions though Velickovski (2010, 2013) provides for indirect empirical evidence on this topic. He analyses the level of synchronisation of supply and demand shocks in Macedonia and other transition countries vis-à-vis the euro-area. Also, he finds that the output, employment and trade structure are the main determinants of the shock synchronisation in these economies. The main results of these studies point to a low level of synchronisation of supply and demand shocks in the Western Balkan countries vis-à-vis the euro-area as well as a slow or absent convergence of the shocks.

3. Data description

For the empirical investigation we use quarterly data from the first quarter of 1999 to the fourth quarter of 2011. More precisely, for Bulgaria the data set starts from the first quarter of 1999 because of the highly unstable macroeconomic environment prevailing in late 1990s. For Macedonia, the sample starts in the first quarter of 2000 due to the change in the main monetary policy instrument that occured in the beginning of 2000. For Croatia, the sample starts from the second quarter of 2000 for two reasons: *first*, we wish to avoid the effects of the banking crisis from 1998-1999, and *second*, the money market rate data is available only from the second quarter of 2000. The variables used in the empirical research include: primary government balance (as a percent of GDP), money market interest rate, inflation rate and output gap. In addition, the output gap in EMU is included as an indicator of foreign economic activity; Euro-zone money market rate (the 3-month EURIBOR rate) is included as a foreign reference interest rate and Euro-zone inflation as a foreign inflation.

The primary government balance is used as an indicator of fiscal policy. Here, we take the general government in Bulgaria and the central government in Croatia and Macedonia, because for these two countries the data for general government balance is not available for such a long time period. The rationale for that, according to Mackiewicz (2008), is that interest payments represent an exogenous category. Ultimately, in designing the current fiscal policy and the size of expenditures, fiscal authorities cannot influence the size of interest payments and they take them as an exogenous factor, which is determined by the past fiscal policy decisions related to public borrowing (Angelovska-Bezoska et al., 2011). For consistency, the data related to fiscal revenues and expenditures, throughout the whole sample period are adjusted according the Governmental Financial Statistics (GFS) 2001 methodology set by the International Monetary Fund (IMF). Domestic money market interest rates are used as indicators of monetary policy in Croatia and Macedonia. This interpretation cannot be valid for Bulgaria where, due to the features of the currency board, the central bank is not capable of conducting active monetary policy (Minea and Rault, 2011). Interest rates are expressed on annualised levels. Inflation rate is based on Consumer Price Index (CPI). The output gap is calculated as a percentage difference between the real

and potential GDP. In estimating potential GDP and output gap we follow the statistical approach by employing the Hodrick-Prescott (HP) filter method with the default lambda of 1600 (λ=1600).

4. Estimation method

The estimation method applied in this research is based on recursive Vector Autoregression (VAR) models, which have become the main econometric tool for assessment of the effects of monetary and fiscal policy shocks (Stock and Watson, 2001; Lutkepohl and Kratzig, 2004; Enders, 2010).

The dependent variables in the VAR are: y_f, i_f, π_f, y_d, F_d, i_d and π_d. The variables containing the superscript *f* are the foreign variables, while the variables with the superscript *d* are domestic variables. Thus, the variables: y_f; i_f and π_f represent the output gap, money market rate (the 3-month EURIBOR rate) and inflation rate in the Euro-zone, respectively. The variables y_d, F_d,i_d and π_d indicate the output gap, fiscal policy variable, the money market rate and inflation in the domestic economy, respectively. We estimate the VARs separately for the three economies.

We have imposed the following restrictions in the VAR: *a)* the foreign variables (output gap, money market rate and inflation in the Euro-zone) have contemporaneous impact on each of the variables in the three sample countries while the opposite relationship is precluded. The economic activity variables (output gap) in the Euro-zone and in the three analysed countries contemporaneously influence the policy variables (fiscal and monetary policy), while the policy variables do not have a contemporaneous impact on economic activity because they affect the 'real' sector with a certain time lag (see Blanchard and Quah, 1989). The last restriction implies that the economic activity variable and the policy variables in both the Euro-zone and domestic economies of the three countries have contemporaneous impact on inflation while inflation does not have contemporaneous feedback on these variables.

We build our model on the assumption that the Euro-area affects exogenously the sample economies for the following reasons: *first*, all the three economies are relatively small as measured by their GDP and GDP per capita as well as their share in the Euro-zone trade; *second*, they are quite open in the sense that exports plus imports combine more than 100% of their respective GDP (for instance, see Petrevski et al., 2012); *third*, their foreign trade is highly integrated with the Euro-area since more than 40% of their trade is with the Euro-zone member countries; *fourth*, their banking sectors are also highly connected with the Euro-zone banking system because majority of the foreign owned bank capital originates from the EMU economies. As a result, the banks in these countries are dependent on foreign financing from the EMU financial markets (Bogoev, 2011); *fifth*, these economies import many products for final consumption from the EMU countries that may have direct impact on their inflation, while the percentage share of their exports in the total imports of the EMU economies is almost negligible. In contrast, we assume that these economies cannot influence economic developments and economic policy in the Euro-zone. Consequently, in order to specify our VAR models correctly, we impose the so-called block exogeneity restriction (see Cushman and Zha, 1997; Aysegul, 2004).

Following the approach of Cushman and Zha (1997) and Aysegul (2004), the block-exogeneity is imposed in the model so that in the unrestricted VAR, the lags of the foreign variables are included in the equations of the domestic variables, while the lags of the domestic variables are excluded from the equations of the foreign variables. In a matrix notation, in a simplified form, this can be presented as follows:

$$Y(t) = \begin{vmatrix} Y_t^{yf} \\ Y_t^{if} \\ Y_t^{\pi f} \\ Y_t^{yd} \\ Y_t^{Fd} \\ Y_t^{id} \\ Y_t^{\pi d} \end{vmatrix} \quad A(L) = \begin{vmatrix} A_{11}(L) & A_{12}(L) & A_{13}(L) & 0 & 0 & 0 & 0 \\ A_{21}(L) & A_{22}(L) & A_{23}(L) & 0 & 0 & 0 & 0 \\ A_{31}(L) & A_{32}(L) & A_{33}(L) & 0 & 0 & 0 & 0 \\ A_{41}(L) & A_{42}(L) & A_{43}(L) & A_{44}(L) & A_{45}(L) & A_{46}(L) & A_{47}(L) \\ A_{51}(L) & A_{52}(L) & A_{53}(L) & A_{54}(L) & A_{55}(L) & A_{56}(L) & A_{57}(L) \\ A_{61}(L) & A_{62}(L) & A_{63}(L) & A_{64}(L) & A_{65}(L) & A_{66}(L) & A_{67}(L) \\ A_{71}(L) & A_{72}(L) & A_{73}(L) & A_{74}(L) & A_{75}(L) & A_{76}(L) & A_{77}(L) \end{vmatrix} \quad \varepsilon(t) = \begin{vmatrix} \varepsilon_t^{yf} \\ \varepsilon_t^{if} \\ \varepsilon_t^{\pi f} \\ \varepsilon_t^{yd} \\ \varepsilon_t^{Fd} \\ \varepsilon_t^{id} \\ \varepsilon_t^{\pi d} \end{vmatrix}$$

where $Y(t)$ is a Kx1 vector of observations, $A(L)$ is an KxK matrix polynomal in the lag operator L with non-negative powers and $\varepsilon(t)$ is an Kx1 vector of structural disturbances. The dimension of $A_{11}(L)$ is K_1xK_1, $A_{12}(L)$ is K_1xK_2, $A_{13}(L)$ is K_1xK_3 and so on. The dimension of ε_t^{yf} is K1x1, of ε_t^{if} is K2x1 and so on. The restrictions:

$$A_{14}(L) = A_{15}(L) = A_{16}(L) = A_{17}(L) = A_{24}(L) = A_{25}(L) = A_{26}(L) = A_{27}(L) = A_{34}(L) = A_{35}(L) = A_{36}(L) = A_{37}(L) = 0 \quad (7)$$

imply that the first block of foreign three variables (Euro-zone output gap, money market rate and inflation) are exogenous to the model whereas the lags of the domestic variables do not enter in their equations (they are restricted to zero).

After explaining the estimation methods used and the restrictions included in the VAR models, we now briefly explain our estimation strategy:

1. We specify the unrestricted VAR model in order to determine the optimum number of lags of the variables. Here, we select the most parsimonious model due to the relatively limited number of observations compared to the number of variables included. The selection of the lag length is done in two ways: *a)* lag length selection criteria such as: Akaike (AIC), Schwartz (SIC), Hannan-Quinn (H-Q), Sequential modified likelihood ratio test statistic (LR) and Final prediction error (FPE) and *b)* residual-based diagnostic tests (explained below).
2. After specifying the maximum number of lags, in cases where more than one lag is suggested, then we proceed by dropping those lags in the unrestricted VAR that may improve the criterion value. In doing this we employ the so-called "top-down" procedure in selecting the number of lags in each individual equation in the VAR (for more details see Lutkepohl et al., 2006).
3. We estimate the unrestricted VAR model by the feasible generalised least squares (FGLS) estimator;
4. In order to explore whether the unrestricted VAR model is correctly specified and stable we conduct residual-based diagnostic tests, such as: Portmanteau and

Breusch-Godfrey LM tests for autocorrelation, Jarque-Bera Normality test, and Autoregressive conditional heteroskedasticity test (ARCH-LM). If the selected model by the steps 1 and 2 satisfy these residual-based diagnostic tests we proceed further with them. Otherwise, we re-specify the unrestricted VAR by reducing or increasing the number of lags until the residual-based diagnostic tests provide satisfactory results.

5. We tests for the stability of the estimated coefficients of the unrestricted VAR by employing seveal structural break tests for unknown breakpoint: the cumulative sum of the recursive residuals (CUSUM) and the squared cumulative sum of the recursive residuals (CUSUM SQ).
6. If we find no structural breakpoint then we proceed by estimating the recursive VARs by employing maximum likelihood (ML) estimator with scoring algorithm.

5. Model selection and discussion of the results

In this section we present the model selection of the unrestricted VAR and then we continue by explaining the estimated results (mainly the impulse response functions – IRFs) for each country separately.

5.1. Model specification

As already explained, we have selected the unrestricted VAR for each of the three sample economies according to the lag length selection criteria and the residual-based diagnostic tests presented in Table 1.

Table 1: Lag-length selection criteria, residual-based tests and structural stability tests.

Country:	Bulgaria	Croatia	Macedonia
Lag-length selection criteria	/	SIC, H-Q, FPE	/
Number of lags selected	2	1	1
Residual-based diagnostic tests (p-value)			
Portmanteau autocorrelation test	0.09	0.13	/
Breusch-Godfrey LM tests	0.38	0.12	0.07
Jarque-Bera normality test	0.11	0.02	0.23
ARCH-LM	0.60	0.42	0.68
Structural stability tests			
CUSUM	No break	No break	No break
CUSUMSQ	Only for the money market rate	No break	No break

Source: Authors' own calculations performed in JMulti.

As can be seen in Table 1, the lag length selection criteria (SIC, H-Q and FPE) for Croatia indicated one lag whereas in the case of Bulgaria and Macedonia did not

indicate any specific number of lags. Therefore, for Bulgaria and Macedonia we have decided to select the number of lags according to the residual-based diagnostic tests. In these regards, we were led by the non-rejection of the null hypothesis of no serial correlation, normal distribution of the residuals and homoskedastic error terms at least at 5% level of significance. For a cross-check, we also conducted the same residual-based diagnostic tests for Croatia in order to see if the model is properly specified. For the three countries, the null-hypotheses for all the employed residual-based tests pointed to non-rejection at least at 5% level of significance.

Having determined the number of lags in the unrestricted VAR, we proceed by estimating the unrestricted VAR and conducting the structural stability tests: CUSUM and CUSUMSQ. The results are presented in Table 1. The structural stability test results for Croatia and Macedonia suggest an absence of structural breaks during the sample period for any of the variables. For Bulgaria, the test results point to the same conclusion for almost all of the variables, with the exception of the money market rate for which we have obtained mixed results. Here, the CUSUM test suggests no structural break while the CUSUMSQ test indicates one structural break in the beginning of 2008. Because the results are mixed between the two methods and there is no a priori reason why we would expect a structural break of the money market rate in the period suggested, we proceed by estimating the recursive VARs as there is not structural break.

5.2. Discussion of the estimated IRFs from recusrsive VARs

In this section we interpret the impulse responses from the recursive VARs with the imposed restrictions. In assessing the IRFs we calculate the 95% confidence bands of Efton (Efton and Tibshirani, 1993) and Hall (1992), estimated with bootstrap method of 100 replications. The impulse IRFs of the variables from the recursive VAR are provided in the Appendix. In what follows, we discuss the impulse responses generated by the shocks in foreign variables (output gap, euribor and inflation in the Euro-zone). Here, we only pay attention to those where there is a statistically significant response by the two 95% confidence bands.

As can be seen in the Appendix A, a positive shock to the Euro-area output gap (an increase in the positive output gap or a decrease of the negative output gap) with a magnitude of one standard deviation signifcantly and positively affects the economic activity in the three economies. The response of the output gap ranges between 0.4 and 0.6 percentage points and the impulses reach the peak after one or two quarters. The strongest and most persistent reaction of the domestic economic activity can be traced in Bulgaria, which is not surprising given that its economy is more integrated with the Euro-zone. On the other side, the lowest reaction can be noticed in Macedonia, which has not yet started the negotiation process for joining the EU.

The IRFs of fiscal policy behavior to a shock in the output gap in the Euro-zone imply that there is a significant reaction only in Bulgaria where a positive shock in the Euro-area output gap leads to higher budget surplus. This might reflect the attempts of Bulgarian policymakers to offset the spillover effects from the EU-wide expansion (positive aggregate demand shocks) by tight fiscal policy. This result is in line with the

models which provide for a strong case for countercyclical fiscal policy at individual country level within the EU (Bryson, 1993; Galí and Monacelli, 2008; Beetsma and Jensen, 2002). Once again, the finding that these shocks are observed only in Bulgaria is related to its closer integration with the EU. The time lag in the reaction of fiscal policy in Bulgaria is relatively short (only two quarters), which can be explained by the relatedness between the Euro-zone and the Bulgarian economy.

Changes in the Euro-zone economic activity also have a significant influence on domestic money market rates in Bulgaria and Croatia, where a positive shock in the Euro-area output gap leads to higher money market rates. The time lag in the reaction of the money market rate in Bulgaria is relatively short (only two quarters), while in Croatia it is much longer (about eight quarters). This reaction of money market rates can be explained by the level integration of domestic financial markets with the Euro-zone. The economic expansion in the Euro-area may lead to larger demand-side pressures on inflation in EMU member countries that may induce a reaction by the European Central Bank. This will be transmitted to the money market rates in the Euro-zone that, also, will be transmitted further to the money market rates in Bulgaria and Croatia through the banking sector and their borrowing from abroad.

In addition, a positive shock in the Euro-zone economic activity has a positive impact on domestic inflation in Bulgaria, again through the integration between the Bulgarian and Euro-zone economy. Precisely, the Euro-area expansion will induce greater economic activity in Bulgaria, which will put an upward pressure on domestic inflation through the higher domestic demand (demand-side pressures).

When assessing the IRFs to a shock in the 3-month EURIBOR rate (see Appendix B), we notice that it does not have any significant impact on domestic economic activity in the sample economies, while it has a significant and positive influence on fiscal policy behavior only in Bulgaria with a time lag of two quarters. This type of fiscal policy reaction in Bulgaria can be justified on the grounds that, due to the loss of monetary autonomy under the currency board, an increase in EURIBOR leads to higher domestic money market rates. Consequently, this will lead to larger interest payments on the public debt and the concern for preserving the fiscal sustainability may induce fiscal authorities to increase the budget surplus.

A positive shock to the foreign reference rate will induce a significant increase in domestic money market rates in Bulgaria and Macedonia. This finding supports the notion that rigid exchange rate regimes impose severe constraints on the possibility for conducting autonomous monetary policy. In fact, due to the nature of the currency board, this result is quite obvious for Bulgaria where it is also consistent with the presence of high capital mobility which means that domestic interest rates are closely linked with foreign ones via the interest rate parity condition. Finally, our finding is in line with Vizek and Čondić-Jurkić (2010) who show that Croatian and Bulgarian money markets are integrated with EU-15 money markets. On the other hand, the shock to the EURIBOR does not have a significant impact on Croatian money market rates, which is surprising having in mind the dominant presence of foreign banks in the banking sector. The EURIBOR shock is more quickly transmitted in Macedonia (within two quarters). Also, the size of the reaction of the Macedonian money market

rate is stronger and more persistent compared to Bulgaria where this shock is transmitted with a lag of around three quarters. The results for a significant and positive association between the EURIBOR and the Bulgarian money market rate and the absence of a significant reaction in Croatia are consistent with the findings of Petrevski and Bogoev (2012), but in contrast to Minea and Rault (2011). However, the positive and significant reaction of the Macedonian money market rate to a positive shock in the EURIBOR are contrary to the findings of Petrevski and Bogoev (2012).

Assessing the impact of foreign money market rate shocks to domestic inflation in the three economies, we notice that there is not any significant pass-through effect. The exception is Croatia where there is a negative reaction of inflation within the first quarter. These results imply that the inflation dynamics in these economies is predominantly driven by other forces than the common monetary policy, probably due to the fact that they are not members of the Euro-zone.

When analysing the IRFs to a shock in foreign inflation (see Appendix 2 C), we can observe that there is not any significant response by domestic economic activity, fiscal policy behavior and domestic money market rates, apart from Macedonia where a moderate positive reaction of the money market rate can be noticed with a delay of seven quarters. The most puzzling result is the estimated negative relationship between the Euro-zone and domestic inflation in the sample economies. For instance, a positive shock in foreign inflation leads to a lower domestic inflation within a period of one quarter, while afterwards this effect disappears. This is contrary to our prior expectations where we expected a positive relationship. One possible explanation for these odd results might be related to the presence of asymmetric shocks in the sample economies (Veličkovski, 2010). If idiosynchratic shocks have a prominent importance in these economies, then the dynamics of domestic inflation will differ from the Euro-area inflation. For instance, these economies may be more vulnerable to changes in food and energy prices than to changes in the Euro-zone inflation. In these regards, note that foreign demand pressures (shocks in the Euro-zone output gap) affects domestic inflation only in Bulgaria. If this resoning is true, yet, the findings for Bulgaria remain puzzling.

6. Conclusions

This study examines the effects of foreign shocks on SEE economies with fixed exchange rate regimes, such as: Bulgaria, Croatia and Macedonia. Specifically, we have conducted empirical investigation in the response of several macroeconomic and policy variables (output, inflation, interest rates and budget surpluses) in SEE countries to various Euro-zone shocks (output, interest rates and inflation), based on the impulse response functions estimated with recursive VARs. In this way, we are able to assess how the exogenous factors affect macroeconomic performances and policy variables in SEE economies.

Generally, the estimated results imply that Euro-zone economic activity has significant and relatively strong influence on SEE economies and these external shocks are transmitted relatively quickly. Moreover, the results also suggest that if the domestic economy is more integrated with the EU, then these exogenous shocks are more

persistent. An additional finding is that shocks in the foreign reference rate are also relatively quickly transmitted to domestic money market rates. We can explain these effects by several factors, such as: the fixed exchange rates, the relatively high integration of SEE financial markets to EMU financial markets as well as the dependence of banks on foreign financing. Surprisingly, Euro-zone inflation does not have a significant influence on domestic inflation, which might indicate that inflation in SEE economies is mostly driven by idiosynchratic shocks.

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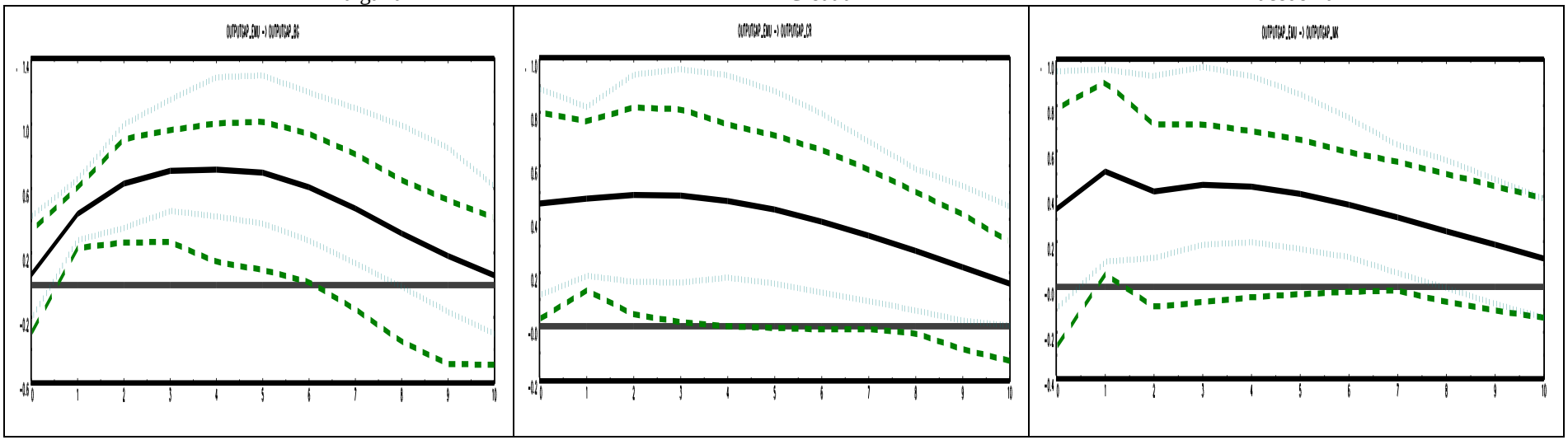
Appendix: IRFs of recursive VAR with 95% confidence intervals of Efton and Hall, respectively.

A: Impulse generated from the output gap in the Euro-zone

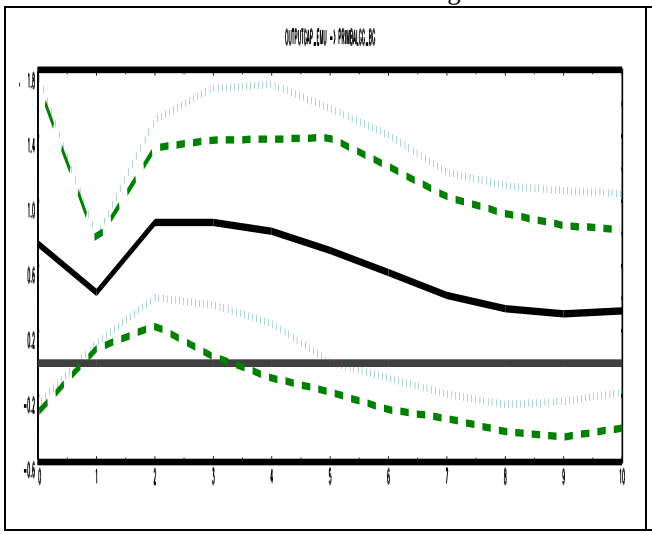
Impulse response of domestic output gaps:

Bulgaria | Croatia | Macedonia

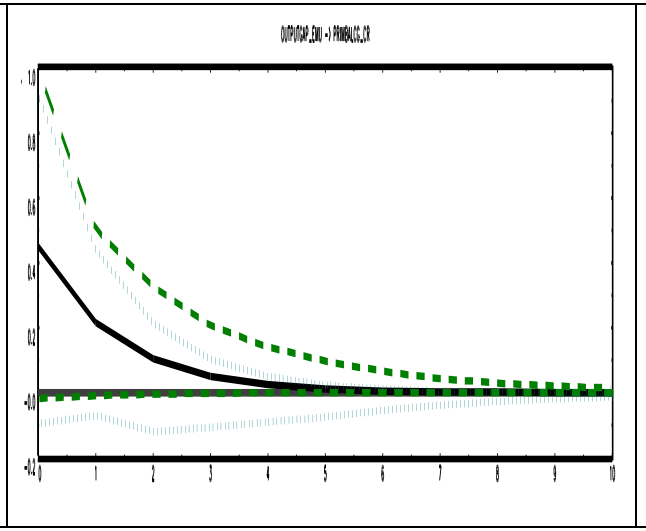


Impusle response of fiscal policy:

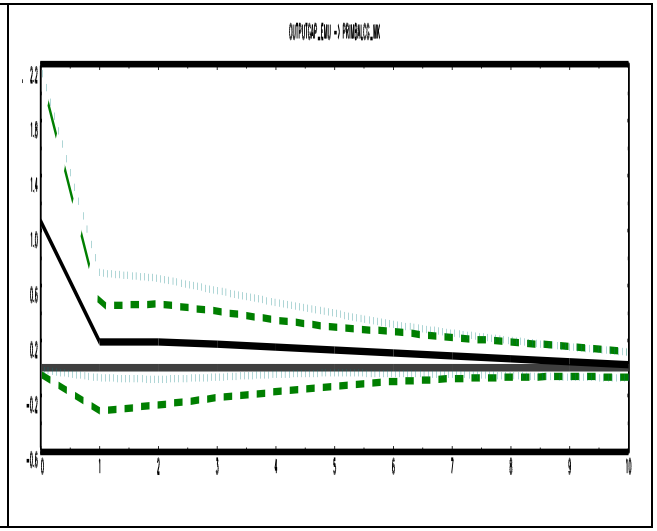
Bulgaria



Croatia

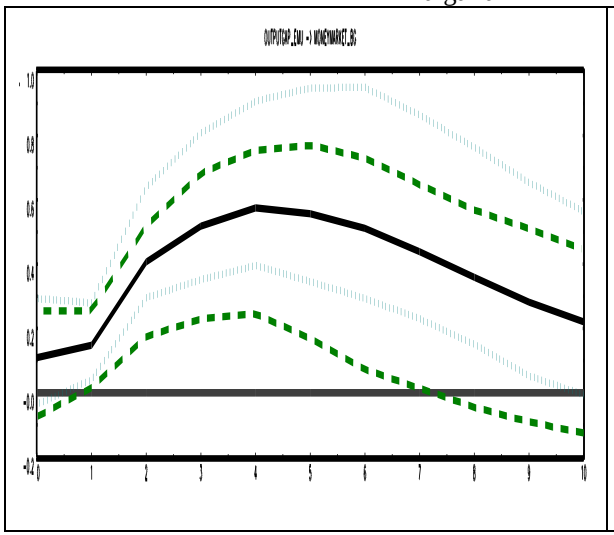


Macedonia

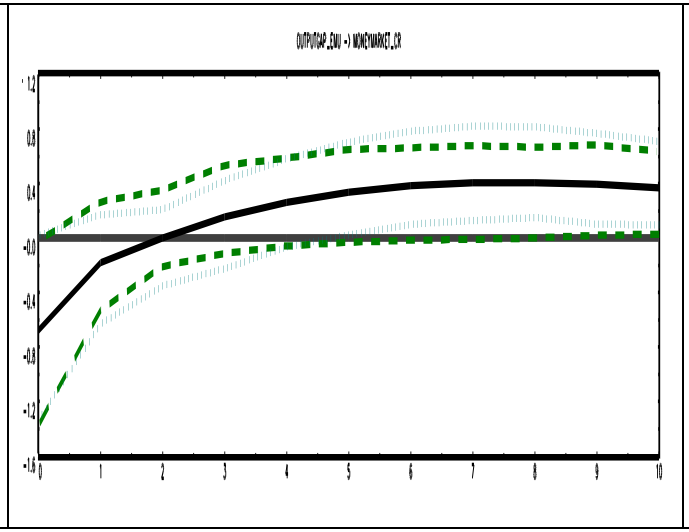


Impusle response of domestic money market rates:

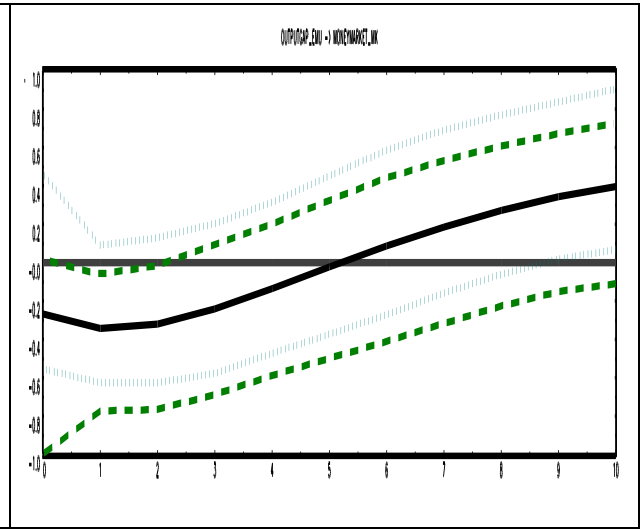
Bulgaria



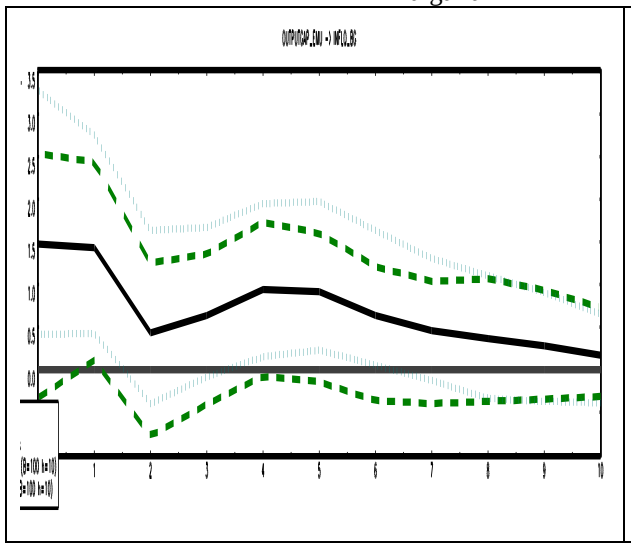
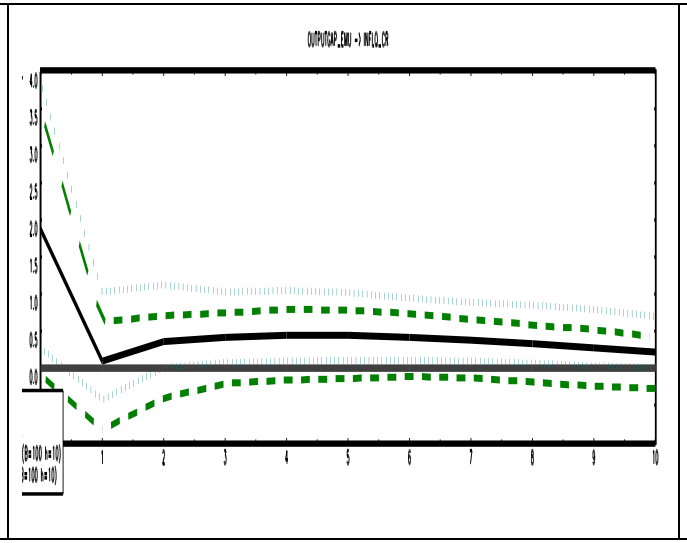
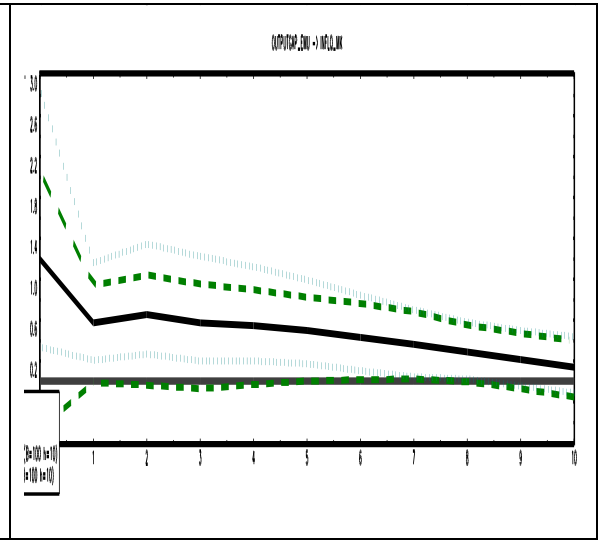
Croatia



Macedonia



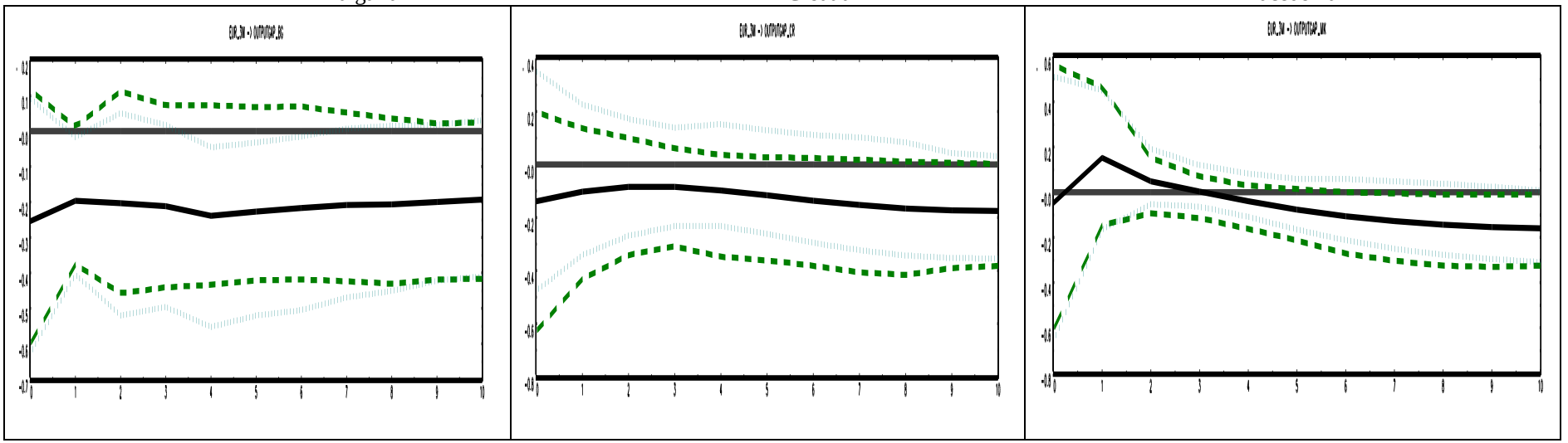
Impusle response of domestic inflation:

Bulgaria	Croatia	Macedonia
		

B: Impulse generated from the 3-month EURIBOR

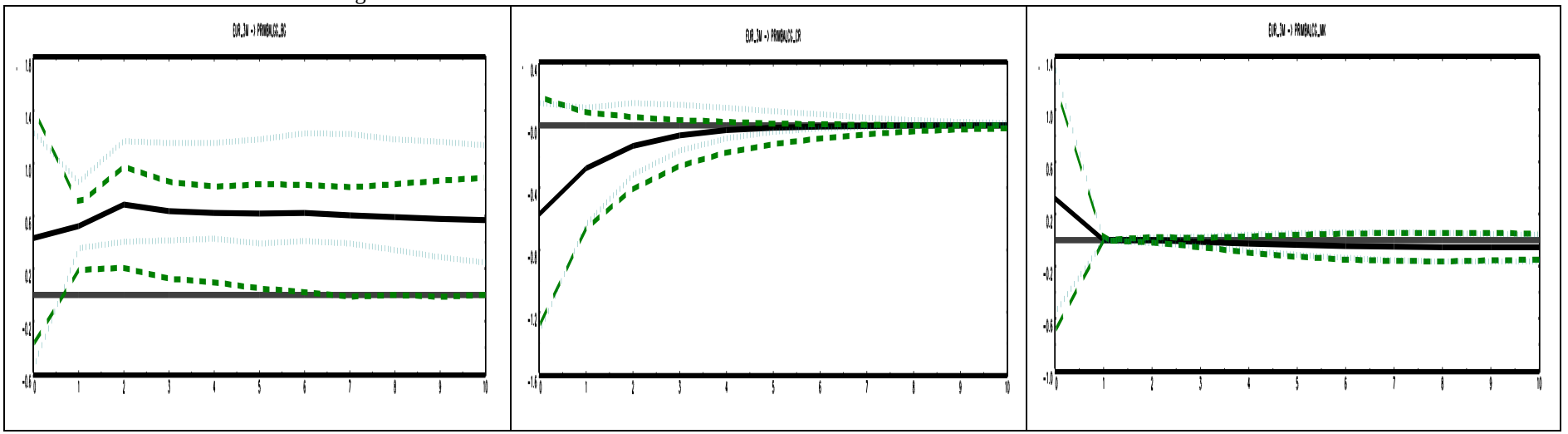
Impulse response of domestic output gaps:

Bulgaria | Croatia | Macedonia



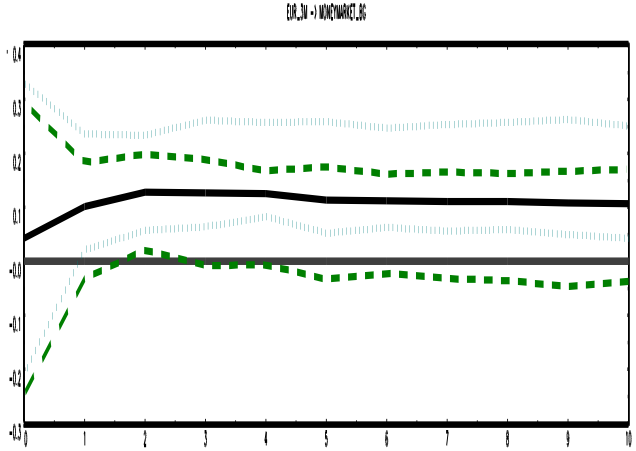
Impulse response of fiscal policy:

Bulgaria | Croatia | Macedonia

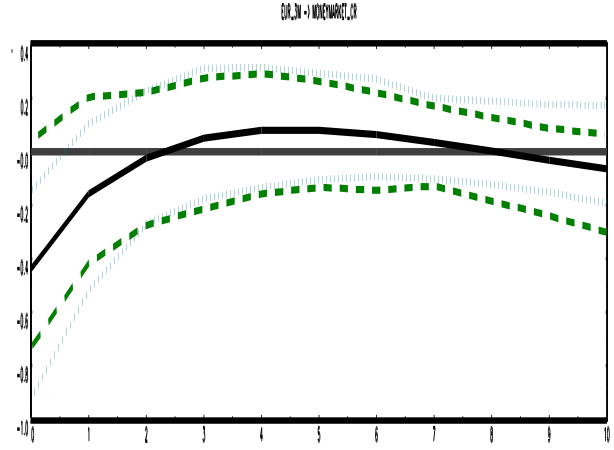


Impulse response of domestic money market rates:

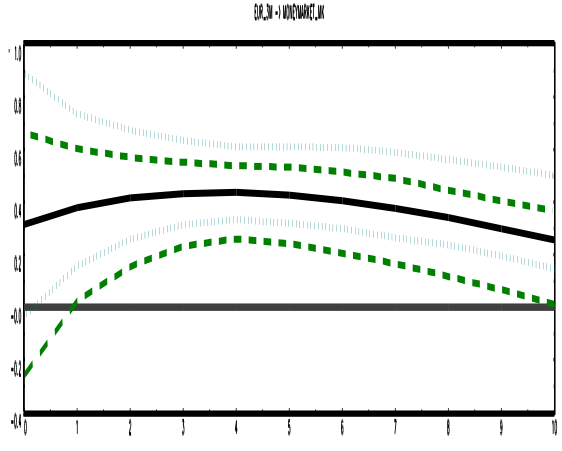
Bulgaria



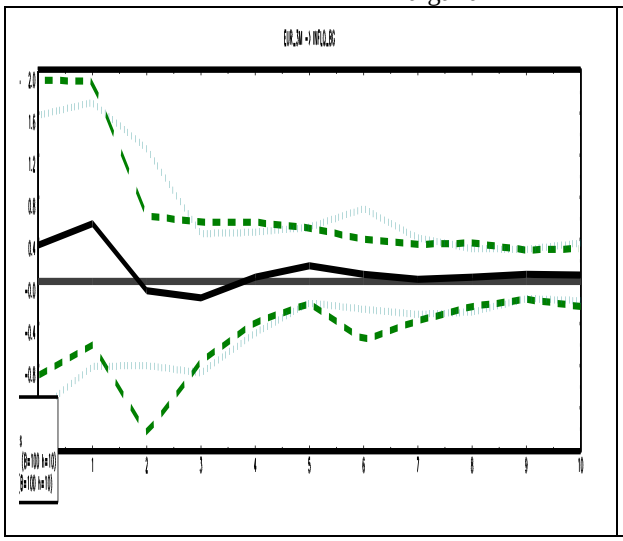
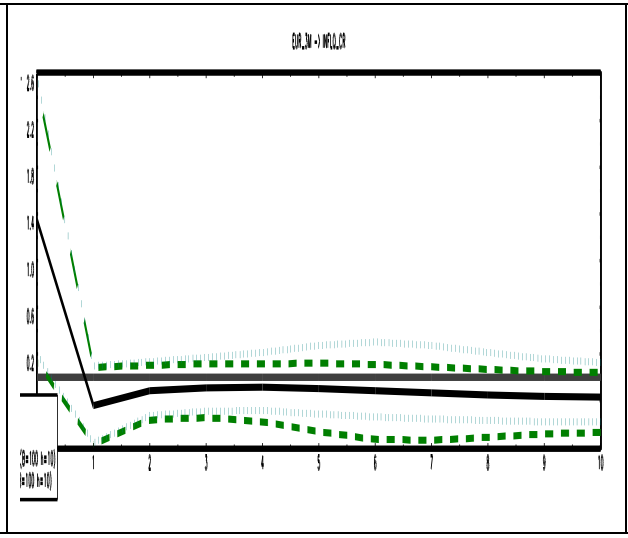
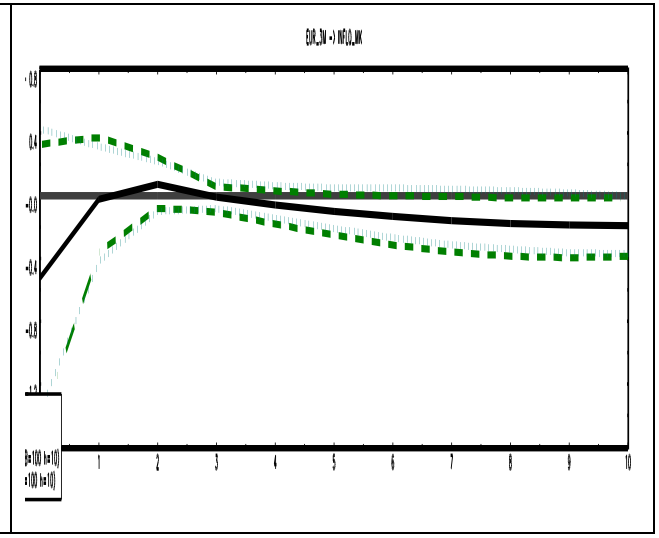
Croatia



Macedonia



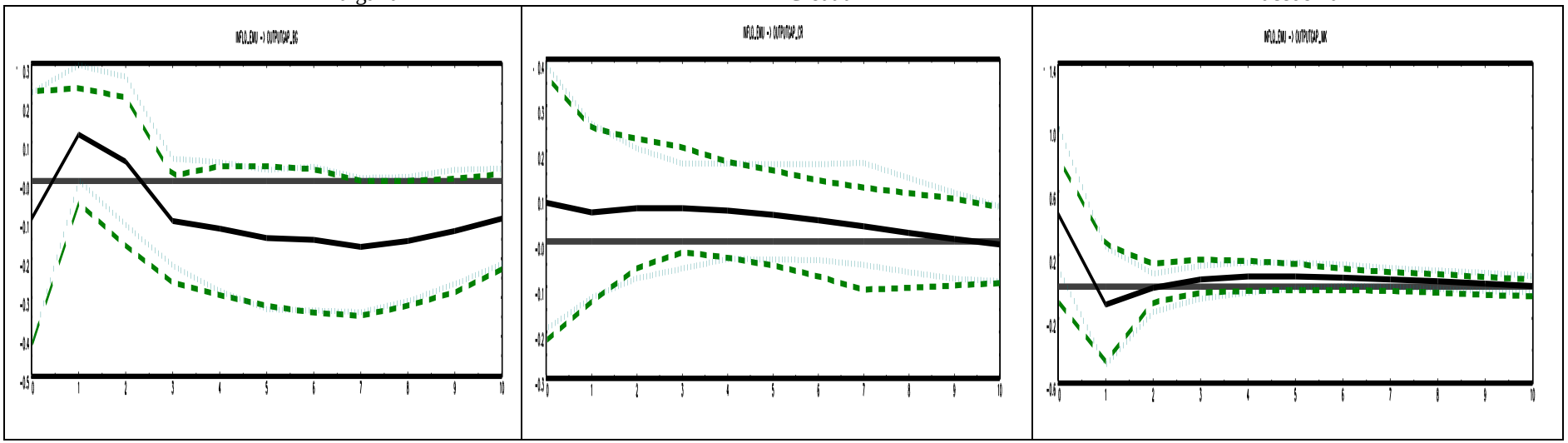
Impulse response of domestic inflation:

Bulgaria	Croatia	Macedonia
		

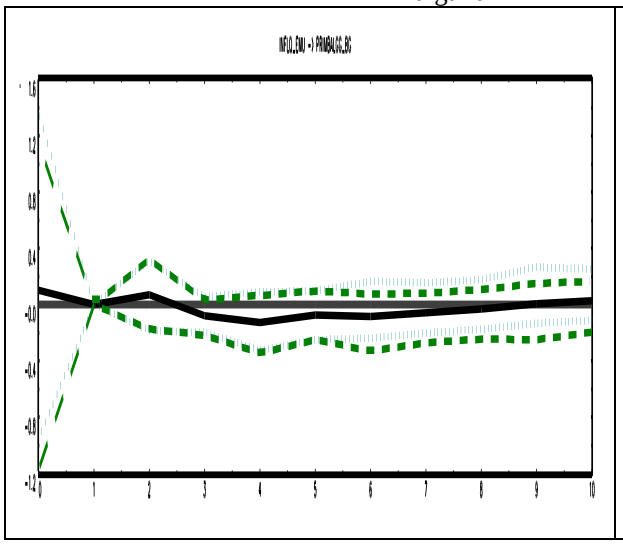
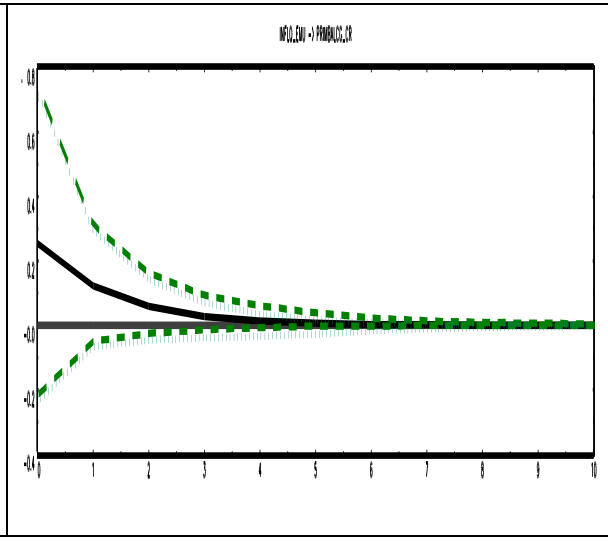
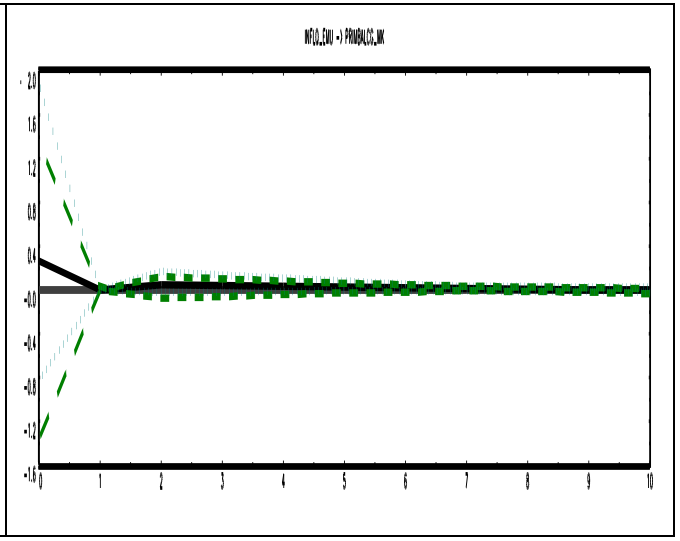
C: Impulse generated from the Euro-zone inflation

Impulse response of domestic output gaps:

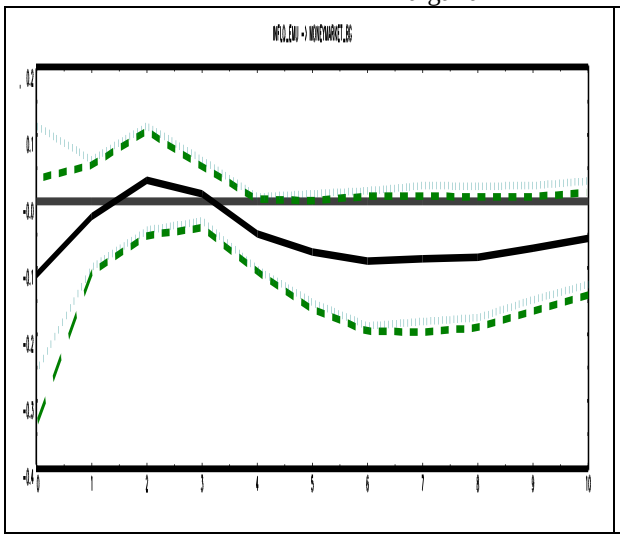
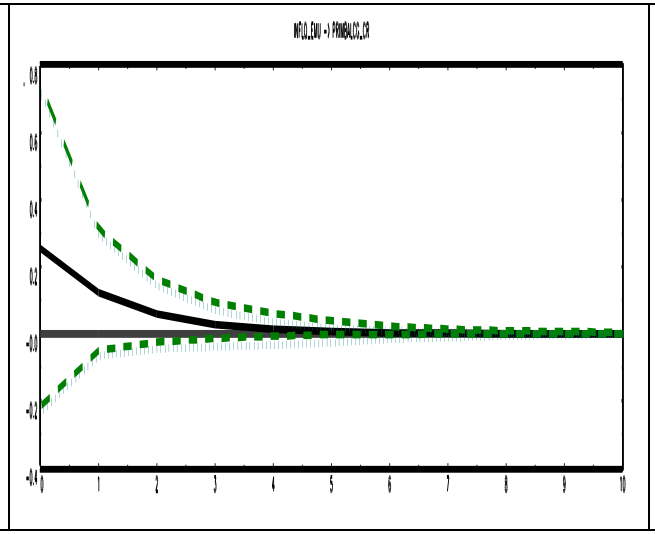
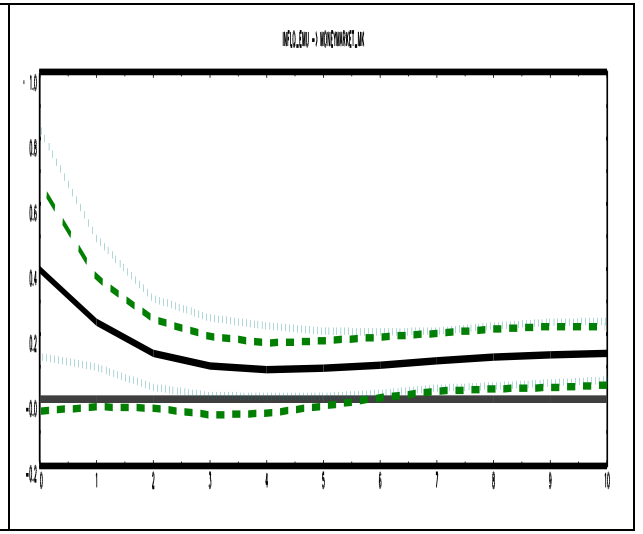
Bulgaria | Croatia | Macedonia



Impulse response of fiscal policy:

Bulgaria	Croatia	Macedonia
		

Impulse response of domestic money market rate:

Bulgaria	Croatia	Macedonia
		

Impulse response of domestic inflation:

Bulgaria	Croatia	Macedonia