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# World Financial Frictions and the Economy of the Czech Republic and Slovakia

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**Abstract**

Business cycles in emerging market economies are correlated with the interest rate that these countries face in international financial markets. From this statement follows a question: what fraction of business cycle fluctuations is due to movements in country interest rate? The vector auto-regression model specification can be used to quantify the macroeconomic effects of world interest rate shocks and country's interest spread shocks. We consider that analyzed economies – Czech Republic and Slovakia – are small emerging and open. Therefore we use the specification to investigate the impact of world financial frictions on the Czech economic activity and Slovak economic activity in the period 2001 – 2012 and, viceversa, the impact of every country overall economic activity on its interest spread premium.

**Keywords:** VAR model, world financial frictions, interest rate shocks, interest spread

**JEL codes:** C32, G15, O16

## 1. Introduction

The key models of real business cycle developed by Kydland and Prescott (1982) used the concept of shocks in total factor productivity. Their famous contribution led to development of microeconomic founded dynamic stochastic general equilibrium (DSGE) models that deliver quantitative predictions for short-run fluctuations in indicators that can be directly compared to actual data.

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Many RBC model modifications were developed to capture various different economic specifications. To analyze short-term (or mid-term) economic performance of the Czech Republic and Slovakia we need to consider that both economies are small emerging and open. The Czech Republic and Slovakia were arisen in 1993 after dividing Czechoslovakia into these two states. Czechoslovakia was part of the communist block of countries with planned economy under the influence of the Soviet Union. Since the nineties, after the transition of economies both countries became the part of the European Union in 2004 and Slovakia became also the part of the Euro Area in 2009.

Uribe and Schmitt-Grohé (2014) provide survey of papers dealing with business cycles in small emerging open economies. Mendoza (1991) used small open economy real business cycle model to explain the Canadian business cycle over the period 1960-2011. However, the model can barely predict business cycles in emerging countries. Problem is that it predicts consumption to be smoother than output. Contrary to this prediction, emerging countries are characterized by consumption being as or more volatile than output. Calderón and Fuentes (2010) showed that the expansion duration used to be shorter and contractions are deeper in Latin American countries than in OECD countries.

Aguiar and Gopinath (2007) suggested that a possible solution to this problem is to introduce nonstationary income shocks. They used Mexico dataset with the sample 1980:Q1 to 2003:Q1. Data fit model, however Uribe and Schmitt-Grohé (2014) noticed three problems. First is that this data sample is relatively short to identify the random-walk, or unit-root, component in total factor productivity. Secondly, model limits attention to a frictionless neoclassical framework. And finally the model omits important possible shocks as world interest-rate shocks and country-spread shocks, which can play an important role in driving business cycles in emerging countries.

García-Cicco, Pancrazi, and Uribe (2010) consider a model with interest-rate shocks and stationary and nonstationary productivity shocks that compete in explanation of business cycle in Latin American countries in period of 1900 – 2005. Authors showed that nonstationary income shock have very small effect on the Latin American business cycles. In the small open emerging market economies – such as Czech and Slovak – different shocks can cause the economic fluctuations. Importance is the interest rate shocks caused by world financial frictions.

Increasing interest rates faced by households and government in small open emerging economy can cause a drop in economic activity caused by decreased mobility of capital. While shocks in total factor productivity have only a short-term impact, interest rate shocks may be theoretically more permanent and can affect the steady growth of theeconomy.

The country interest-rate spread is difference between an interest rate at which developed countries borrow and an interest rate at which the emerging market country borrows in international markets, $r^* - r$. We should consider this country spread to be an endogenous variable because country spread depends on the ability of economic agents to efficiently use resources. There is a large literature arguing that domestic variables affect the interest rate at which emerging markets borrow externally. See, for example, Edwards (1984), Cline (1995), and Cline and Barnes (1997).

Uribe and Yue (2006) showed that world interest rate shocks are significant source of Latin American business cycle. Are characteristics of business cycle in European emerging countries similar as in Latin American countries? The aim of the paper is to verify the impact of world interest rate and country interest spread on the overall economic performance of the Czech Republic and Slovakia and, vice-versa, the impact of the domestic economic performance on the country spread in these countries.

## 2. Methodology and Data

We used vector autoregressive (VAR) models. It is well known that in these models every endogenous variable is a function of all lagged endogenous variables in the system. See Lütkepohl (2005) for more details about VAR models. The mathematical representation of the unrestricted VAR model of order *p* is:

$$\mathbf{y}_t = \mathbf{A}_1\mathbf{y}_{t-1} + \mathbf{A}_2\mathbf{y}_{t-2} + \ldots + \mathbf{A}_p\mathbf{y}_{t-p} + \mathbf{u}_t \qquad (1)$$

where **yt** is a *k* vector of endogenous variables; **A1**, **A2**, …, **Ap** are matrices of coefficients to be estimated; and $\mathbf{u}_t$ is a vector of innovations that may be contemporaneously correlated but are uncorrelated with their own lagged values.

The VAR model (1) can be interpreted as a reduced form model. A structural vector autoregressive (SVAR) model is structural form of VAR model and is defined as:

$$Ay_t - B_1 y_{t-1} + B_2 y_{t-2} + \ldots + B_p y_{t-p} + B\varepsilon_t \quad (2)$$

It is assumed that the structural errors, $\varepsilon$**t** are white noise and the coefficient matrices **B1**, **B2**,…, **Bp** are structural coefficients that in general differ from their reduced form counterparts and **B** is matrix of restrictions, typically diagonal or identity matrix.

A SVAR model can be used to identify shocks and trace these out by employing impulse response analysis and forecast error variance decomposition through imposing restrictions on used matrices. The problem of identification is explained by Gottschalk (2001) in detail. The main purpose of structural vector autoregressive estimation is to obtain non-recursive orthogonalization of the error terms for impulse response analysis. This alternative to the recursive Cholesky orthogonalization requires the analyst to impose enough restrictions to identify the orthogonal (structural) components of the error terms.

Uribe and Yue (2006) proposed a specification of the VAR, through which we can determine the size of the impact of interest rate shocks and recognize endogeneity or exogeneity of country spread in the form:

$$\mathbf{A}\begin{pmatrix} y_t \\ i_t \\ tb_t \\ r_t^* \\ r_t \end{pmatrix} = \mathbf{B}_1\begin{pmatrix} y_{t-1} \\ i_{t-1} \\ tb_{t-1} \\ r_{t-1}^* \\ r_{t-1} \end{pmatrix} + \mathbf{B}\begin{pmatrix} \varepsilon_t^y \\ \varepsilon_t^i \\ \varepsilon_t^{tb} \\ \varepsilon_t^{r^*} \\ \varepsilon_t^r \end{pmatrix} \quad (3)$$

where *yt* and *it* are expressed relative cyclical components of output and gross investment, *tbt* is the trade balance to output ratio, $r_t^*$ is the real world interest rate and *rt* is the real domestic interest rate in each investigation period *t*. The matrix **A** is lower triangular matrix and matrix **B** is identity matrix. We assume that interest rate shocks $(\varepsilon_t^{r^*}, \varepsilon_t^r)$ will be reflected in production, investment and trade balance with a lag of one period.

On the other hand, domestic shocks $(\varepsilon_t^y, \varepsilon_t^i, \varepsilon_t^{tb})$ have an immediate impact on financial markets. We assume that the world interest rate is exogenous, so apply $a_{4j} = b_{4j} = 0$ for all $j = 1, 2, ..., 5$ and for $j \neq 4$, where *a*4*j* and *b*4*j* are elements in the 4th row and *j*-th column of matrix **A** and **B1**, respectively.

We estimated the parameters of the VAR specification (3). The selected lag of model (3) is validated by sequential modified likelihood ratio test statistic and information criteria and by the cross-correlograms of residuals and portmanteau test for autocorrelations. Significant values of cross-correlations for lower lags could be a reason to increase the lag order of an unrestricted VAR. We verified the stability of a VAR model (we verified if all roots have modulus less than one and lie inside the unit circle). See Lütkepohl (2005) for more details. We used the real GDP, real gross capital formation, the trade balance to output (GDP) ratio obtained from the EUROSTAT portal. These economic indicators are seasonally adjusted using procedures Tramo/Seats (original seasonally adjusted series are too short). We obtained monthly series of average interest rates on 10-year German and Czech and Slovak government bonds traded on the secondary market from the European Central Bank (ECB) website.

We received also monthly series of annual inflation rate calculated using the harmonized consumer price index from the EUROSTAT portal. We obtained quarterly series by averaging from the monthly data. We obtained the German and Czech and Slovak real interest rates by subtracting the natural logarithm of the inflation index expressed in the following year by the natural logarithm of the index expressed interest rates in each period. Our analysis covers the period 2001 to 2012. Analyzed period is limited by disclose the extent of the time series of interest rates. Due to non-stationarity of the level variables tested by augmented Dickey Fuller test (1979), we used the first differences of the natural logarithm of GDP, gross capital formation, trade balance to output ratio and real interest rates[2]. We estimated the unrestricted VAR model specification. Using Amisani and Giannini (1997) approach we estimated coefficients of matrix **A** and **B1** in (3). We estimated the parameters of restricted and unrestricted specifications.

[2] Trade balance to output ratio and real interest rates are expressed by index.

Using the logarithm of the maximum likelihood functions of both specifications we calculated the likelihood ratio statistics and verified the significance of restrictions. Test procedures are explained for example in Greene (2003).

We calculated the impulse response functions and realized variance decomposition to quantify the short-term impact of shocks. The methodology of VAR models, impulse response functions and variance decomposition is explained particularly in Lütkepohl (2005).

## 3. Results and Discussion for the Czech Republic

Table 1 shows the VAR lag order selection criteria. All criteria: sequential modified likelihood ratio test statistic (LR), Schwarz information criterion (SC) and Hannan-Quinn information criterion (HQ) confirmed lag order 1 (asterisk nearby extreme value).

**Table 1: VAR Lag Order Selection Criteria**

| Lag | LogL | LR | SC | HQ |
|---|---|---|---|---|
| 1 | 678.2137 | 43.72764* | -31.9621* | -32.7826* |
| 2 | 699.3285 | 30.31869 | -30.6964 | -32.2007 |
| 3 | 726.2440 | 31.74646 | -29.7283 | -31.9164 |
| 4 | 756.3781 | 27.81608 | -28.9252 | -31.7970 |

Source: Calculations of authors

Table 2 shows the verification of the stability of a VAR model. All roots have modulus less than one and lie inside the unit circle. The VAR satisfies the stability condition.

**Table 2: VAR Stability Condition Check**

| Root | Modulus |
|---|---|
| 0.59639 | 0.596390 |
| -0.31388 | 0.313880 |
| 0.229197 - 0.047201i | 0.234007 |
| 0.229197 + 0.047201i | 0.234007 |
| -0.00214 | 0.002136 |

Source: Calculations of authors

The analysis of the cross-correlograms of residuals showed only one significant value (-0.51) in the case of trade balance and by 2 periods lagged German real interest rate. We also realized the portmanteau autocorrelation test in order to eliminate possible wrong VAR lag order decision. Table 3 shows the results of the tests. The portmanteau tests for autocorrelations did not reject the null hypothesis of any residual autocorrelations up to lag *h*.

**Table 3: VAR Residual Portmanteau Tests for Autocorrelations**

| Lags | Q-Stat | Prob. | Adj Q-Stat | Prob. | df |
|---|---|---|---|---|---|
| 1 | 8.902079 | NA* | 9.119203 | NA* | NA* |
| 2 | 34.17298 | 0.1043 | 35.65365 | 0.0770 | 25 |
| 3 | 52.41008 | 0.3807 | 55.2936 | 0.2817 | 50 |
| 4 | 86.93651 | 0.1633 | 93.4544 | 0.0733 | 75 |
| *The test is valid only for lags larger than the VAR lag order. | | | | | |

Source: Calculations of authors

The likelihood ratio tests showed the exogeneity of German interest rate, so $a4j = 0$ for all $j = 1, 2, ..., 5$ and for $j \neq 4$, where $a4j$ is an element in the 4th row and $j$-th column of matrix **A**. Moreover, according to the *z*-statistics, parameters $a51$, $a52$ and $a53$ are statistically insignificant. It follows from Table 3 that the domestic economic activity hadn't an immediate impact on Czech interest-rate spread. The interest rate for the government is immediately affected only by German interest rate.

Table 4 shows the estimates of the final SVAR model. The matrix **A** is lower triangular matrix, this means 10 restrictions needed for identification. Using the normalization we obtain 5 additional unit restrictions. Step by step we restricted 6 from the remaining 10 parameters. All estimated parameters appear to be statistically significant.

**Table 4: Structural VAR Estimates with Test of Over-Identification Restrictions**

| | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| $a_{21}$ | -1.501999 | 0.547714 | -2.742307 | 0.0061 |
| $a_{31}$ | -0.578098 | 0.078606 | -7.354410 | 0.0000 |
| $a_{32}$ | 0.170735 | 0.020394 | 8.371728 | 0.0000 |
| $a_{54}$ | -1.083702 | 0.183941 | -5.891559 | 0.0000 |
| | | | | |
| Log likelihood | 705.0006 | | | |
| LR test for over-identification: | | | | |
| Chi-square(6) | 9.519335 | | Probability | 0.1464 |

Source: Calculations of authors

The structural VAR model is over-identified, so we can test it using likelihood ratio statistics. The logarithm of the maximum likelihood function of unrestricted SVAR model is 709.76. We did not reject the null hypothesis, likelihood test ratio equals to 9.5193 is less than critical value $\chi 2(6) = 12.59$. The tested over-identifying restrictions are valid. Figures 1-3 show the impulse response functions of GDP, gross capital formation, the trade balance to output ratio and the real interest rate to structural one standard deviation Czech interest rate shock ($\varepsilon^{I}$), German interest rate shock ($\varepsilon^{I^*}$) and productivity shock ($\varepsilon^{y}$), respectively. The solid line shows the impulse response function and the dotted lines are two standard deviation bands. Figure 1 shows that interest rate shocks hadn't any impact on the Czech economic cycle in the period 2001 – 2012. As expected, output, gross capital formation and trade balance fell, however this decrease is clearly not significant, as within the bands of two standard deviations it may be considered by the rise in these variables.

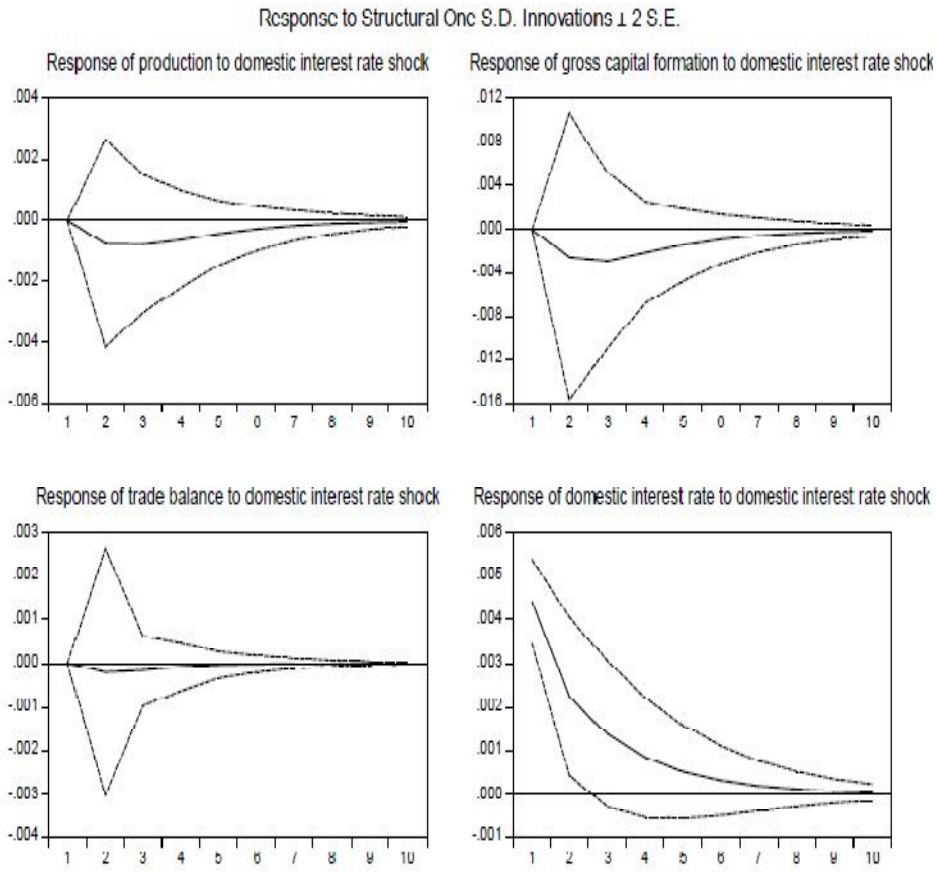


**Figure 1: Impulse Response Functions to Domestic Interest Rate Shock**

Figure 2 shows that German interest rate shock had statistically significant impact only on domestic interest rate.

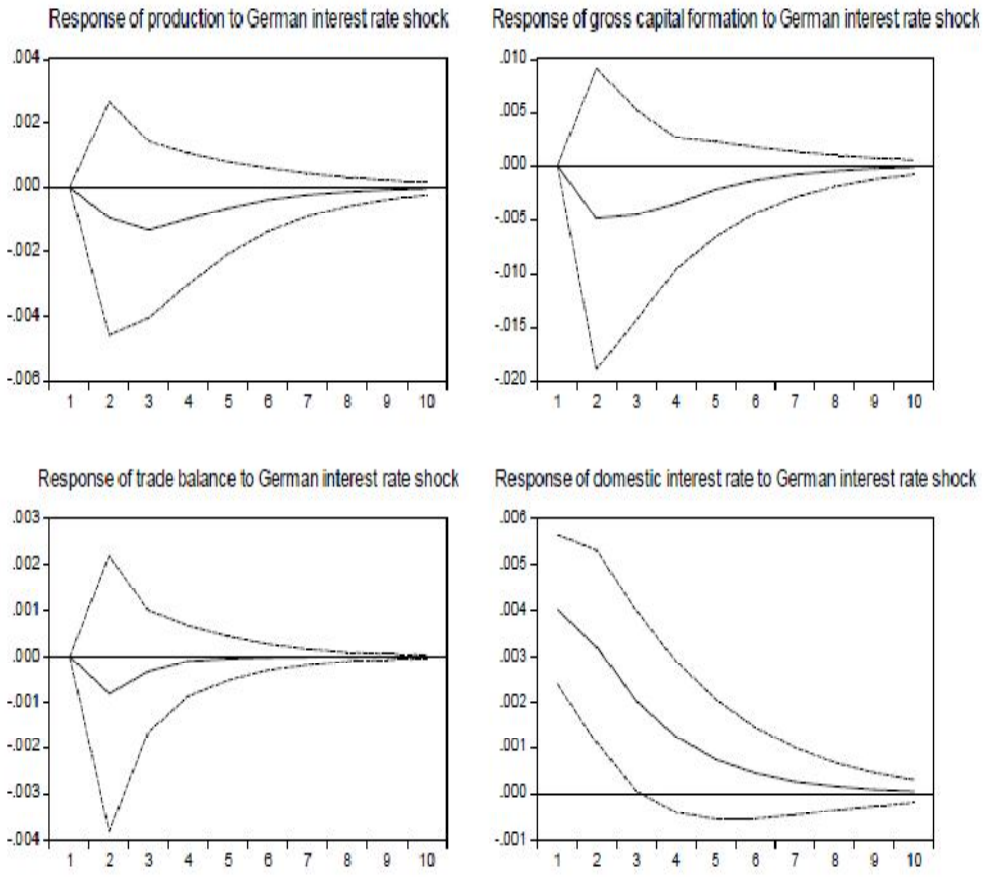


**Figure 2: Impulse Response Functions to German Interest Rate Shock**

Pro-cyclicality of gross capital formation and trade balance can be observed from Figure 3.

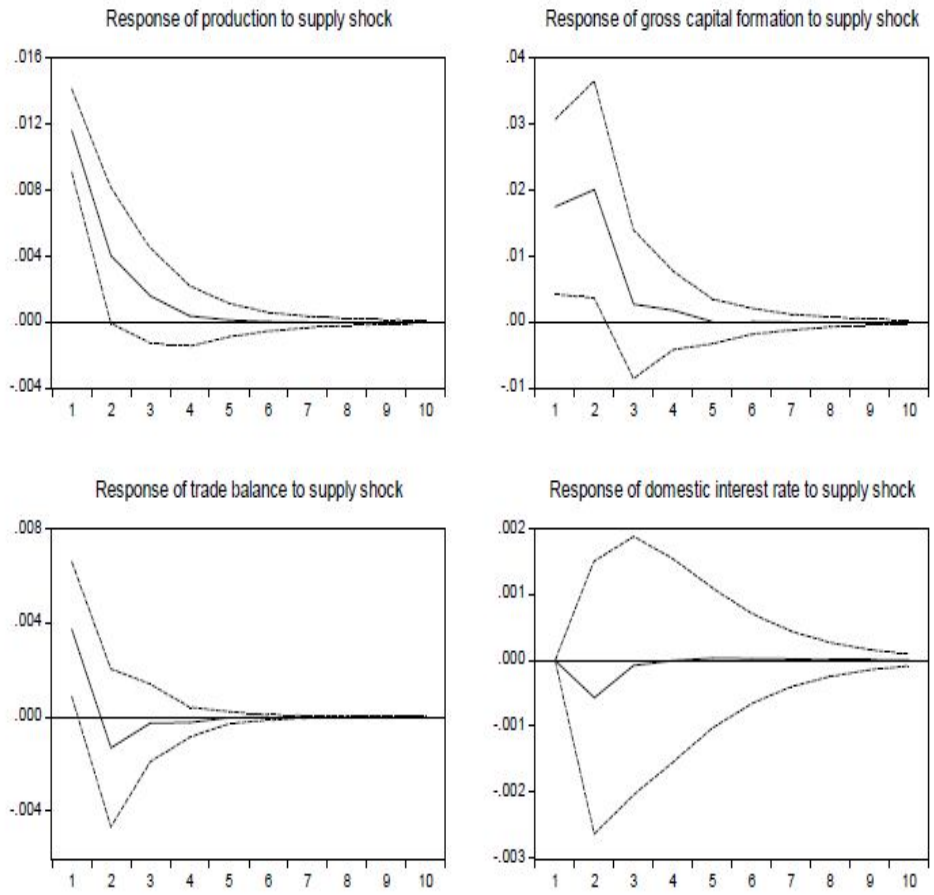


**Figure 3: Impulse Response Functions to Supply Shock**

We state that domestic economic activity has no statistically significant impact on the value of the interest rate faced by the Czech government.

By variance decomposition showed in Table 5 we conclude that interest rate shocks (shock 4 and shock 5) had a small impact on Czech economy. This impact had only about 3.8 % share to changes in output and only about 0.9 % to changes in trade balance. Production shocks (shock 1) had the significant impact about 95 %. At the same time shocks in domestic economic activity (shock 1, shock 2 and shock 3) had no significant impact on changes in domestic interest rate. Domestic shocks to these changes accounted for only about 1.1 %.

**Table 5: Variance Decomposition – Factorization Based on Structural Orthogonalization**

| Variance decomposition of output | | | | | | Variance decomposition of gross cap. formation | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Period | Shock1 | Shock2 | Shock3 | Shock4 | Shock5 | Period | Shock1 | Shock2 | Shock3 | Shock4 | Shock5 |
| 5 | 94.70 | 0.35 | 1.39 | 2.49 | 1.07 | 5 | 26.90 | 68.91 | 1.03 | 2.33 | 0.82 |
| 10 | 94.49 | 0.35 | 1.38 | 2.64 | 1.14 | 10 | 26.85 | 68.80 | 1.03 | 2.44 | 0.87 |
| 15 | 94.49 | 0.35 | 1.38 | 2.64 | 1.14 | 15 | 26.85 | 68.80 | 1.03 | 2.44 | 0.87 |
| 20 | 94.49 | 0.35 | 1.38 | 2.64 | 1.14 | 20 | 26.85 | 68.80 | 1.03 | 2.44 | 0.87 |

| Variance decomposition of trade balance | | | | | | Variance decomposition of domestic inter. rate | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Period | Shock1 | Shock2 | Shock3 | Shock4 | Shock5 | Period | Shock1 | Shock2 | Shock3 | Shock4 | Shock5 |
| 5 | 16.32 | 52.11 | 30.69 | 0.81 | 0.08 | 5 | 0.53 | 0.43 | 0.17 | 53.80 | 45.06 |
| 10 | 16.32 | 52.11 | 30.69 | 0.81 | 0.08 | 10 | 0.53 | 0.43 | 0.18 | 53.90 | 44.96 |
| 15 | 16.32 | 52.11 | 30.69 | 0.81 | 0.08 | 15 | 0.53 | 0.43 | 0.18 | 53.90 | 44.95 |
| 20 | 16.32 | 52.11 | 30.69 | 0.81 | 0.08 | 20 | 0.53 | 0.43 | 0.18 | 53.90 | 44.95 |

Source: Calculations of authors

## 4. Results and Discussion for the Slovak Republic

Table 6 shows the VAR lag order selection criteria. All criteria: sequential modified likelihood ratio test statistic (LR), Schwarz information criterion (SC) and Hannan-Quinn information criterion (HQ) confirmed lag order 1 (asterisk nearby extreme value).

**Table 6: VAR Lag Order Selection Criteria**

| Lag | LogL | LR | SC | HQ |
|---|---|---|---|---|
| 1 | 595.0166 | 72.2457* | -27.6956* | -28.5161* |
| 2 | 613.3293 | 26.2952 | -26.2862 | -27.7905 |
| 3 | 640.5017 | 32.0495 | -25.3312 | -27.5193 |
| 4 | 683.9680 | 40.1227 | -25.2119 | -28.0837 |

Source: Calculations of authors

Table 7 shows the verification of the stability of a VAR model. All roots have modulus less than one and lie inside the unit circle. The VAR satisfies the stability condition.

**Table 7: VAR Stability Condition Check**

| Root | Modulus |
|---|---|
| 0.640531 | 0.640531 |
| -0.474688 | 0.474688 |
| 0.419805 | 0.419805 |
| 0.011098 - 0.261318i | 0.261554 |
| 0.011098 + 0.261318i | 0.261554 |

Source: Calculations of authors

The analysis of the cross-correlograms of residuals showed three significant values in the case of investments and by 3 and 4 periods lagged German real interest rate and domestic interest rate and its 1 period lagged values. Table 3 shows the results of the portmanteau test. The Q-statistics did not reject the null hypothesis of any residual autocorrelations up to lag *h*, however according to the adjusted Q-statistics, residuals are the 4th order serial correlated at the 5 % significance level (at the 1 % level they are not).

**Table 8: VAR Residual Portmanteau Tests for Autocorrelations**

| Lags | Q-Stat | Prob. | Adj Q-Stat | Prob. | df |
|---|---|---|---|---|---|
| 1 | 10.68037 | NA* | 10.94087 | NA* | NA* |
| 2 | 32.13362 | 0.1542 | 33.46678 | 0.1198 | 25 |
| 3 | 56.75138 | 0.2379 | 59.97822 | 0.1577 | 50 |
| 4 | 93.76744 | 0.0703 | 100.8907 | 0.0248 | 75 |
| *The test is valid only for lags larger than the VAR lag order. | | | | | |

Source: Calculations of authors

The likelihood ratio tests showed the exogeneity of German interest rate, so $a4j = 0$ for all $j = 1, 2, ..., 5$ and for $j \neq 4$, where $a4j$ is an element in the 4th row and $j$-th column of matrix **A**. Moreover, according to the $z$-statistics, parameters $a51$, $a52$ and $a53$ are statistically insignificant. The domestic economic activity had not an immediate impact on Slovak interest-rate spread. The interest rate for the government is immediately affected only by German interest rate.

Table 9 shows the estimates of the final SVAR model. The matrix **A** is the same as in case of the Czech Republic. All estimated parameters appear to be statistically significant. The structural VAR model is over-identified, so we can test the restrictions using likelihood ratio statistics. The logarithm of the maximum likelihood function of unrestricted SVAR model is 625.56. We did not reject the null hypothesis, likelihood test ratio equals to 2.5165 is less than critical value $\chi 2(6) = 12.59$. The tested over-identifying restrictions are valid.

**Table 9: Structural VAR Estimates with Test of Over-Identification Restrictions**

| | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| $a_{21}$ | -1.863818 | 0.548505 | -3.397997 | 0.0007 |
| $a_{31}$ | -0.294875 | 0.076209 | -3.869263 | 0.0001 |
| $a_{32}$ | 0.144934 | 0.018987 | 7.633213 | 0.0000 |
| $a_{54}$ | -0.610322 | 0.242217 | -2.519735 | 0.0117 |
| | | | | |
| Log likelihood | 624.3034 | | | |
| LR test for over-identification: | | | | |
| Chi-square(6) | 2.5165 | | Probability | 0.8666 |

Source: Calculations of authors

Figures 4-6 show the impulse response functions of GDP, gross capital formation, the trade balance to output ratio and the real interest rate to structural one standard deviation Slovak interest rate shock ($\varepsilon^r$), German interest rate shock ($\varepsilon^{r^*}$) and productivity shock ($\varepsilon^y$), respectively. Figure 4 shows that interest rate shocks hadn't any impact on the economic cycle in the Slovak economy in the period 2001 – 2012.

As expected, output, gross capital formation and trade balance fell, however this decrease is clearly not significant, as it within the bands of two standard deviations may be considered by the rise in these variables.

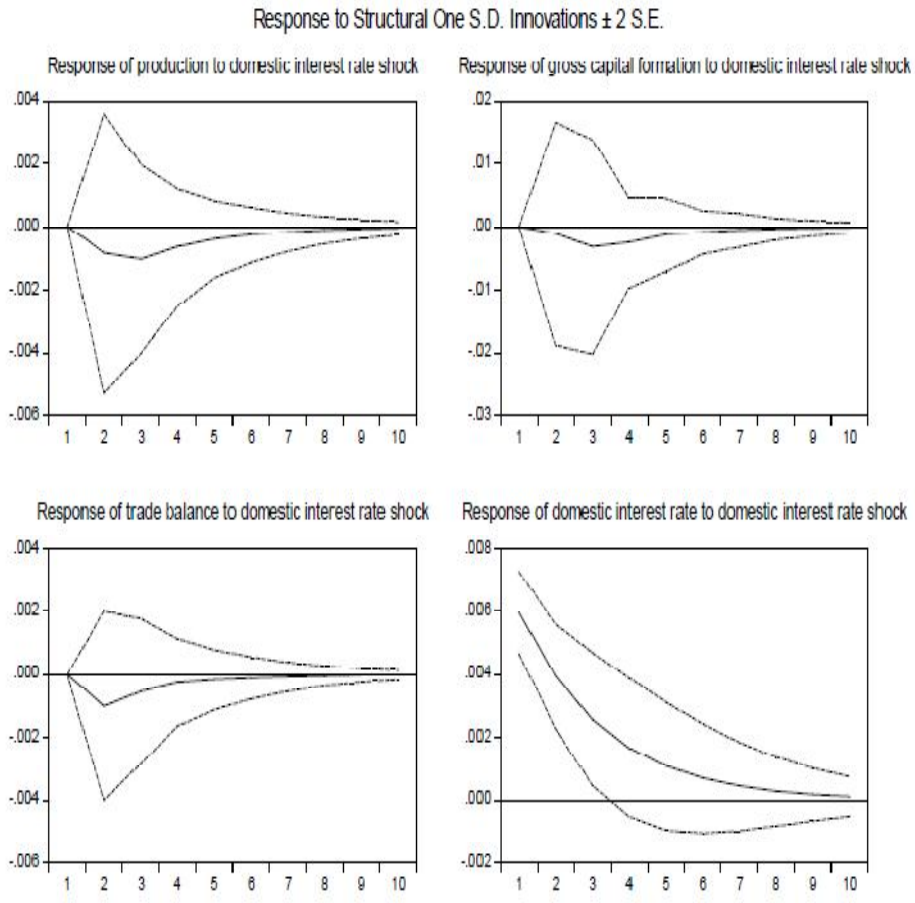


**Figure 4: Impulse Response Functions to Domestic Interest Rate Shock**

Figure 5 shows that German interest rate shock had only statistically significant impact on Slovak domestic interest rate.

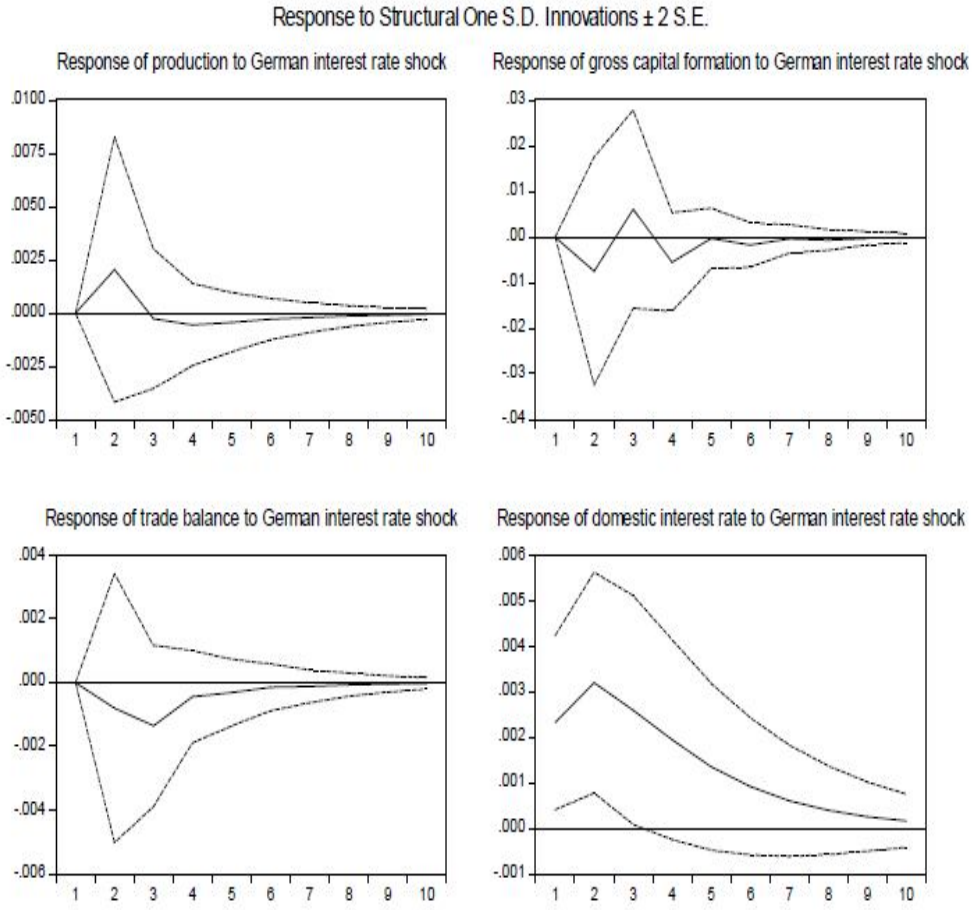


**Figure 5: Impulse Response Functions to German Interest Rate Shock**

Pro-cyclicality of gross capital formation and trade balance can be observed from Figure 6.

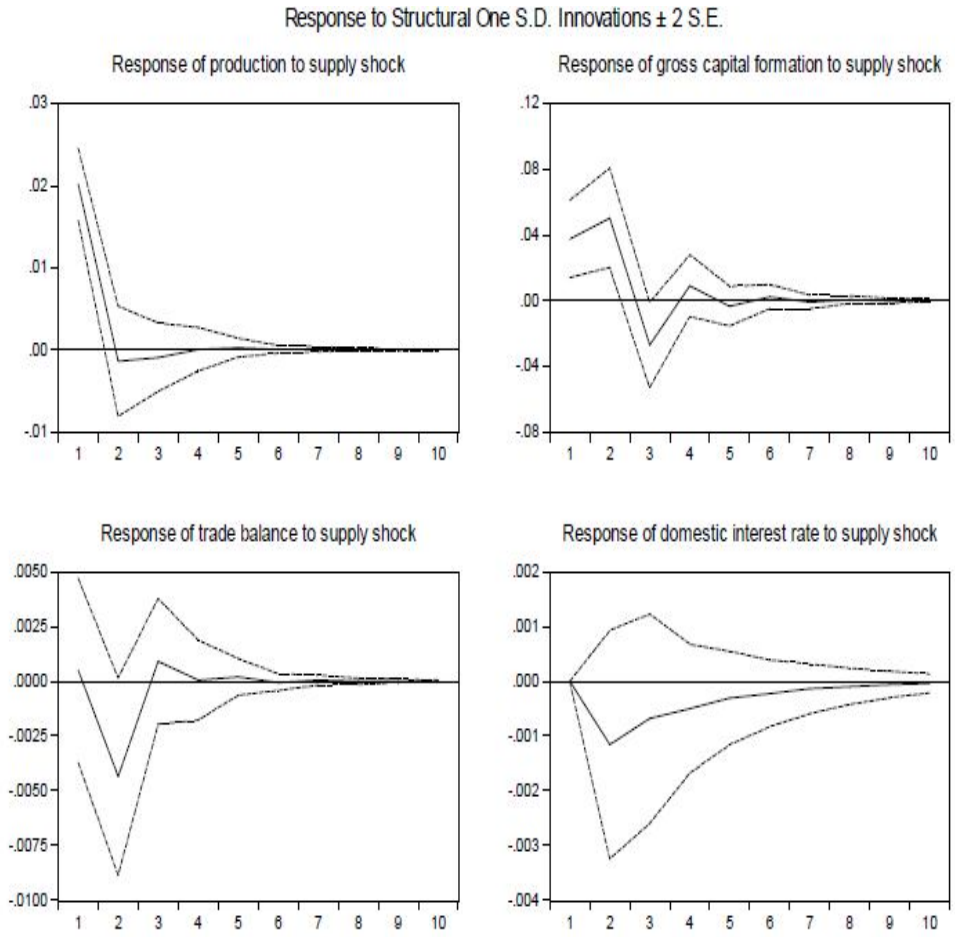


**Figure 6: Impulse Response Functions to Supply Shock**

We state that domestic economic activity has no statistically significant impact on the value of the interest rate faced by the Slovak government. By variance decomposition showed in Table 10 we conclude that interest rate shocks (shock 4 and shock 5) had a small impact on Slovak economy. This impact had only about 1.5 % share to changes in output and just about 2 % to changes in trade balance. Production shocks (shock 1) had the significant impact about 92 %. At the same time shocks in domestic economic activity (shock 1, shock 2 and shock 3) had no significant impact on changes in domestic interest rate. Domestic shocks to these changes accounted for only about 2.5 %.

**Table 10: Variance Decomposition – Factorization Based on Structural Orthogonalization**

| Variance decomposition of output | | | | | | Variance decomposition of gross cap. formation | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Period | Shock1 | Shock2 | Shock3 | Shock4 | Shock5 | Period | Shock1 | Shock2 | Shock3 | Shock4 | Shock5 |
| 5 | 91.97 | 2.53 | 3.91 | 1.07 | 0.52 | 5 | 41.46 | 55.61 | 1.70 | 1.06 | 0.17 |
| 10 | 91.91 | 2.53 | 3.90 | 1.11 | 0.55 | 10 | 41.47 | 55.55 | 1.71 | 1.09 | 0.18 |
| 15 | 91.91 | 2.53 | 3.90 | 1.11 | 0.55 | 15 | 41.47 | 55.55 | 1.71 | 1.09 | 0.18 |
| 20 | 91.91 | 2.53 | 3.90 | 1.11 | 0.55 | 20 | 41.47 | 55.55 | 1.71 | 1.09 | 0.18 |

| Variance decomposition of trade balance | | | | | | Variance decomposition of domestic inter. rate | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Period | Shock1 | Shock2 | Shock3 | Shock4 | Shock5 | Period | Shock1 | Shock2 | Shock3 | Shock4 | Shock5 |
| 5 | 9.47 | 51.12 | 37.45 | 1.31 | 0.65 | 5 | 2.33 | 0.19 | 0.04 | 30.28 | 67.17 |
| 10 | 9.47 | 51.10 | 37.44 | 1.33 | 0.66 | 10 | 2.36 | 0.20 | 0.04 | 31.05 | 66.35 |
| 15 | 9.47 | 51.10 | 37.44 | 1.33 | 0.66 | 15 | 2.36 | 0.20 | 0.04 | 31.06 | 66.34 |
| 20 | 9.47 | 51.10 | 37.44 | 1.33 | 0.66 | 20 | 2.36 | 0.20 | 0.04 | 31.06 | 66.34 |

Source: Calculations of authors

## 4. Conclusions

The aim of the paper was to verify the impact of world interest rate and Czech or Slovak interest spread on the overall Czech or Slovak economic performance and, vice-versa, the impact of the Czech or Slovak economic performance on the Czech or Slovak interest-rate spread. Our contribution doesn't reveal a significant impact of interest rate changes on the Czech economy or Slovak economy. We state that the restrictions on financial markets faced Czech entities and also Slovak entities do not affect the economic activity. The rejection of the impact of interest rate shocks on economic speech and vice versa the rejection of the impact of domestic economic performance on country spread in the period 2001 – 2012 doesn't necessarily mean that the economy of Czech Republic and Slovakia cannot also face to common problems of emerging economy, as Czech Republic is integrated part of the European economic system (although without common currency) and, moreover, Slovakia is integrated part of the Euro Area. Contingent European financial system breakdown surely could have influenced the Czech and Slovak overall economic performance.

Our minor research outcome is relatively great impact of production shock on both output and gross capital formation.

This result favours the small-open-economy-real-business-cycle models in the explanation of Czech and also of Slovak short-run economic performance, see Mendoza (1991), Schmitt-Grohé and Uribe (2003). The main source of Slovak and Czech business cycles are real shocks that include term-of-trade shocks.

We stated the same results for the Czech Republic and Slovakia with the exception of the trade balance reactions on the production shocks, as Czech trade balance is procyclical, while Slovak trade balance is acyclical. Emerging small open economies integrated in European economic system face to different shocks as Latin American countries studied by Uribe and Yue (2006). This outcome probably coheres with our other outcome that both Slovak and Czech economies converge to the European average steady growth, see Szomolányi et al. (2011). While the European financial markets are stable, the Slovak and Czech economies will not experience Latin-American economic development.

## Acknowledgments

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