Single Monetary Policy versus Macroeconomic Fundamentals in Slovakia[1]

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Abstract

After introduction of Euro since January 2009 the Slovak Republic does not perform its independent monetary policy but is affected by the Euro area policy including common interest rates. Interbank interest rate is considered as a proxy-variable aggregating overall monetary policy setting. The objective of the paper is to evaluate compatibility of the Euro area interest rates with macro-economic situation in Slovakia. In other words, the key question is whether common interest rates respond sufficiently to inflation gap, output gap or other indicators. Reaction function is estimated via linear regression with the Newey-West approach for the pre-Euro period as well as Euro period in the Slovak Republic. Results demonstrate that the Euro area interbank interest rates did not react sufficiently neither to Slovak inflation nor output gap. These led to extremely low inflation during last month approaching the critical point of deflation with possible negative impacts on Slovak economy.

Keywords: *interest rates, monetary rules, output gap, inflation gap*

JEL Classification: E44, E52, F36

Introduction

Since January 2009, after integration of the Slovak Republic to the Euro area, key interbank interest rate has been EURIBOR (Euro Interbank Offered Rate) or its overnight alternative rate EONIA (Euro Overnight Index Average) also for the Slovak Republic. However, it is questionable, to which extent common

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interest rate reacts appropriately to macroeconomic evolution of particular Euro area countries. In our case we will focus on the Slovak Republic. We believe that above mentioned rates reflect overall monetary policy setting as they aggregate monetary policy conditions in the chosen economy. Setting of monetary policy conditions in the Euro area does not have to be convenient for all countries. This can be true especially during crisis.

The evaluation of single monetary policy is not simple due to at least three reasons. Firstly, six-seven year period is too short to consider problematics with such a wide impact on micro- as well as macroeconomic sphere. Secondly, year 2009 was important for the Slovak Republic not only because of Euro introduction, but due to crisis and debt crisis (Sipko, 2014; Ficová and Sipko, 2014), too, which burst fully out in the Slovak Republic especially in that year. Finally, the Euro area is still in evolution. Number of the Euro area member states and integration ambitions are rising. We are far from a stabilised situation that should naturally and gradually lead to higher symmetry (Mikušová Meričková and Halásková, 2014). In other words so called endogenous argument should be achieved according to which even a heterogeneous group of countries will gradually lead to higher homogeneity thanks to integrating measures. Nevertheless regional aspects and impact of small and medium-sized firms on economic diversification have to be considered, too Belás et al. (2015a), Belás, Sipko and Bilan (2015b), Stejskal et al. (2016), Belás and Sopková (2016), Virglerová, Dobeš and Vojtovič (2016), Dúbravská et al. (2015), Ključnikov et al. (2016).

Therefore, within the paper we will try to evaluate monetary rules application in the context of financial and economic crisis for the Slovak Republic and the Euro area as a whole.

Primary objective of the paper is to evaluate the compatibility of the European Central Bank (ECB) monetary rules with Slovak macroeconomic conditions in Slovakia during crisis and to consider calculated rules from the point of view of several aspects (time consistency, Taylor principle, etc.).

Taylor type rules quantification was realised via linear regression with the Newey-West approach (Newey and West, 1987).

1. Theoretical Background and Previous Research

Up to the 19th century, discretionary monetary policy had been applied in general in the world. Economic policy rules had been existing only under the form of a gold standard or exchange rate stability (Lewis, 2010). However, at the end of the 19th century, first simple monetary rules were suggested. Their main goal was to face time inconsistency problem in monetary policy.

Time inconsistency phenomenon in economic policy implementation was analysed among first by Kydland and Prescott (1977), Calvo (1978), Barro and Gordon (1983). Their research implies that discretionary monetary policy approach with the possibility of everyday change leads to worse macroeconomic results in long run. Implementation of a solid nominal anchor can reduce time inconsistency problem in monetary policy. On the other hand some authors claim (Mishkin, 2009) that financial markets need a moment of surprise and only then monetary instruments will be efficient and undesired macroeconomic phenomena will be eliminated or at least reduced. Financial and economic crisis starting in 2007 discredited the Taylor monetary rule. Rudebusch (2009), vice-president of San Francisco's National Bank, calculated that the interest rate should reach the values of about –5% according to the Taylor rule (TR) during crisis. This fact was according to him a failure of the rule.

Others, e.g. Carlstrom and Fuerst (2008) on the contrary assume that only expected monetary policy will be beneficial. This is true especially in the case of foreseeing economic agents and in the context of self-fulfilling prophecy. Gerlach and Schnabel (2000) warned that implementation of the Taylor rule can be rather problematic during crisis. However, they suggested the Taylor rule for the newly created Euro area. Interest rate stemming from their calculations perfectly corresponded to the really applied one apart from years 1992 and 1993 when several European countries (e.g. Great Britain, Sweden[2] and partially Germany) were affected by currency crisis. The rule depicts past situation and provides us with certain guidelines how to proceed in future (Orphanides, 2007).

Gerlach and Schnabel (2000) tested other variables in equation such as growth rate of M3 aggregate, real exchange rate between Euro and U.S. Dollar, etc. Despite the fact they did not have better results as in the case of the original rule.

2. Methodology

Taylor (1993) originally applied non-econometric mathematic method based on substitution into the equation. Linear regression is frequently used for quantification of particular parameters. Various linear regression alternatives were implemented by e.g. Maria-Dolores (2005), Angeloni, Flad and Mongelli (2007), Ziegler (2012) and others.

As the Taylor rule parameters are often considered to be stationary, some authors employed VAR (Vector autoregression) method as e.g. Gerlach-Kristen (2003) and Frömmel, Garabedian and Schobert (2011). Belke and Cui (2009)

[2] The currency crisis was one of the reasons why Great Britain and Sweden finally did not become the Euro area members.

calculated first differences of time series to ensure stationarity and consequently they estimated model with error correction term and variance decomposition.

Time varying parameters were applied by Horváth (2008) and Frömmel, Garabedian and Schobert (2011). Frömmel, Garabedian and Schobert (2011) employed Quandt-Andrews test (Quandt, 1960; Andrews, 1993) and dummy variables to determine structural breaks.

We estimated the Taylor type rules for the Slovak Republic using linear regression with *Newey-West standard errors approach.* The approach solves potential problems with heteroskedasticity and autocorrelation. Apart from other authors, the approach is recommended e.g. by Ziegler (2012).

Whole sample is divided into two parts. The first sub-sample captures period since January 2000 to December 2008. The second one concerns crisis period and integration of the Slovak Republic to the Euro area, i.e. from January 2009[3] to March 2015 (Hontyová and Ivanová, 2012).

The division was confirmed by the Quandt-Andrews break point test (Quandt, 1960; Andrews, 1993), which identified mainly year 2009 as an important break point of macroeconomic indicators in the Slovak Republic. The result was confirmed by the Chow break point test (Chow, 1960) at the 1% level of significance.

Calculations will be based on function applied e.g. by Frömmel, Garabedian and Schobert (2011) which in addition to standard elements involves inertia (smoothing) factor and exchange rate. These variables should not be neglected in the case of the Slovak Republic as it is small and open economy:

$$i_t = \lambda i_{t-1} + (1-\lambda)\left(\phi i^*_t + \gamma(\pi_t - \pi^*_t) + \beta(y_t - y^*_t) + \delta_1 s_t + \delta_2 s_{t-1}\right) + \varepsilon_t \quad (1)$$

where

i_t – stands for short term nominal interest rate,

λ – a *smoothing* parameter as it is assumed that nominal interest rate i.e. a central bank instrument should not vary abruptly,

i^*_t – equilibrium interest rate measured as the sum of growth rate of potential output and targeted inflation rate,

π_t and π^*_t – current inflation and inflation target respectively,

y_t and y^*_t – stands for real and potential output respectively,

s_t – exchange rate,

γ, β, φ – weights of inflation and output gaps and equilibrium interest rate respectively,

δ_1 and δ_2 – exchange rate coefficients,

ε_t – an error term.

[3] Unlike old European Union member states and other industrialised countries, the Slovak Republic was affected by crisis mainly since 2009. Slovak economic growth was 6.4% and –4.7% in 2008 and 2009 respectively (Eurostat, 2015).

Taylor´s (2001) interpretation of exchange rate coefficients δ_1 and δ_2 is:

1. if $\delta_1 < 0$ and $\delta_2 = 0$, higher nominal exchange rate will create pressure on short term interest rate reduction, it is so called "*relaxed*" policy;

2. if $\delta_1 < 0$ and $\delta_2 > 0$ and $\delta_1 + \delta_2 < 0$, then initial interest rate reaction will be partially compensated in the next period;

3. if $\delta_1 < 0$ and $\delta_1 = -\delta_2$, then interest rate reacts to exchange rate change;

4. if $\delta_1 < 0$ and $\delta_2 < 0$, then weight linked to exchange rate stability is significant, this condition corresponds to exchange rate targeting.

Consequently we will estimate several backward-looking (formula 1) and forward-looking (formula 2) rules for the Slovak Republic as in practice, central banks react to current as well as predicted values and to different types of inflation and output indicators.

$$i_t = \lambda i_{t-1} + (1-\lambda)\left(\phi i_t^* + \gamma(\pi_{t,k}^F - \pi_{t,k}^*) + \beta(y_t^F - y_t^{*F}) + \delta_1 s_t + \delta_2 s_{t-1}\right) + \varepsilon_t \quad (2)$$

In our case backward-looking rules are based on previous and current data. As calculated function will react with a certain delay, its perception will be backward-looking. Application of forecasted values of inflation $\pi^F_{t,k}$, where k = 1 or k = 12 is 1 and 12-month horizon respectively, or output y^F_t (using industrial production index or economic sentiment indicator) will ensure forward-looking character of our results (Miciuła, 2014).

3. Data

Data in their level values were applied in line with several relevant researches which focus on small and open economies, transition or post-transition countries and in accordance with the result of the Augmented Dickey-Fuller (ADF) test. From January 2000 to March 2015 183 observations were available (Eurostat, 2015; Štatistický úrad SR, 2015; World Economic Survey, 2015).

As suggested by Clarida, Gali and Gertler (1998), Sauer and Sturm (2003) and others, output gap is calculated using the Hodrick-Prescott filter (Hodrick and Prescott, 1997). Gross domestic product (GDP) in line with original Taylor rule is less frequent in current literature and its use in our model was not statistically significant. Therefore we applied the Hodrick-Prescott filter for Slovak *industrial production index* (IPI). Output gap is calculated as a deviation of current IPI logharitm from its trend. Despite the fact that ratio of services to other sectors is growing, it is assumed that industrial sector creates cycles as it leads and influences evolution on the rest of economy (Sauer and Sturm, 2003). Instead of output gap it is possible to apply *economic sentiment indicator* (ESI); ESI expresses mood of economic agents thus it has prognostic capacities.

Harmonised index of consumer prices (HICP) is used as inflation indicator (π_t). In the model marked as ECB since 2009, targeted inflation (π^*) for the Slovak Republic is the same as inflation targeted by the ECB, i.e. 2% for simplification as official target is below or close to 2%. In the alternative model marked National Bank of Slovakia (NBS) prior to the year 2009, we consider particular inflation target for the Slovak Republic set by the NBS.

Except of current inflation it is possible to employ expected (or forecasted) inflation, too. Its application is suitable mainly in the case of forward-looking rules (Lascsáková, 2015; Lajčin, Frankovský and Štefko, 2012). Predicted data on inflation are provided by the World Economic Survey (WES, 2015).

Overnight BRIBOR (Bratislava Interbank Offered Rate) is employed as a nominal interest rate up to year 2008. Euro Overnight Index Average (EONIA) is included since 2009 due to integration of the Slovak Republic to the Euro area. The approach is analogical with others (Sauer and Sturm, 2003). Evolution of EONIA and BRIBOR was significantly correlated as a consequence of integration process. We have avoided application of policy base rate as it seems to be dysfunctional (often equal to zero) these last years and influenced by up to now less standard monetary instruments as quantitative easing, etc. In addition, their integration to our model was not statistically significant. On the other hand interbank interest rates are more complex as they aggregate overall monetary policy conditions (Ziegler, 2012).

Equilibrium real interest rate is expressed as the sum of growth rate of potential output and targeted inflation rate in line with Justiniano and Primiceri (2010). Some authors including Taylor (1993) suggest constant equilibrium real interest rate. However, we suppose that equilibrium real interest rate may vary especially in transition countries. Horváth (2006) explained idea of time varying equilibrium interest rates in the case of the Czech Republic. Similar deviations were found out by Belke and Klose (2009) or Garnier and Wilhelmsen (2009) on the sample of different countries.

As Slovakia is small and open economy, *real effective exchange rate* (REER) should not be omitted. We will apply $REER_t$ and lagged $REER_{t-1}$ similarly to Obstfeld and Rogoff (1995).

4. Results, Discussion and Limitations

We have estimated several Taylor type rules for the Slovak Republic: backward and forward-looking rules, with current and forecasted inflation gap, with industrial production index, with economic sentiment index, with smoothing factor and with real effective exchange rate.

4.1. Linear Regression Results

We do not base our conclusions on a single specification, we try to formulate our findings on average or most frequent results captured in the following tables. We assume that in reality central bank measures respond to several signals and indicators at the same time.

Monetary policy reaction functions covering the period from 2000 to 2008 are mentioned in Table 1.

T a b l e 1

Taylor-type Rules Estimations for the Slovak Republic, 2000 – 2008

	Infl. target	γ	β	δ_1	δ_2	λ	φ	*Adj. R^2*
Simple TR	NBS	1.879*	0.009				0.542*	0.523
Open economy TR	NBS	2.041**	0.011	–0.107	0.320		0.623**	0.748
TR with smoothing factor	NBS	1.194**	0.007			0.899***	0.356*	0.867
Open economy TR with smoothing factor	NBS	0.841*	0.028	0.011*	0.164**	0.924**	0.478*	0.812
Forward-looking TR – IPI	NBS	1.785** k = 1 0.692** k = 12	0.203*				1.044*	0.625
Forward-looking TR with smoothing factor – IPI	NBS	1.451* k = 1 0.921* k = 12	0.018			0.775**	0.875*	0.691
Forward-looking open economy TR – IPI	NBS	1.210** k = 1 0.446* k = 12	0.013*	–0.009	0.229		0.652**	0.572
Forward-looking open economy TR with smoothing factor – IPI	NBS	0.956* k = 1 0.348** k = 12	0.045***	–0.123*	0.154	0.816**	0.863*	0.887
Forward-looking TR – ESI	NBS	1.423***k = 1 0.503* k = 12	0.022*				0.817**	0.759
Forward-looking TR with smoothing factor – ESI	NBS	0.379***k = 1 0.255** k = 12	0.005**			0.628*	1.188*	0.899
Forward-looking open economy TR – ESI	NBS	1.056***k = 1 0.317** k = 12	0.120*	–0.098	0.067		0.876*	0.821
Forward-looking open economy TR with smoothing factor – ESI	NBS	0.856***k = 1 0.065***k = 12	–0.009*	0.004	0.197	0.519**	1.051*	0.847

Note: *, **, *** represent 10%, 5%, and 1% significance level; k = 1 or k = 12 is 1 and 12-month horizon respectively; TR – Taylor rule; IPI – industrial production index; ESI – economic sentiment index; NBS – inflation target set by the National Bank of Slovakia.

Source: Created by the authors.

This period is characterised by inflation targeting and preparation to the Euro area integration. As expected, higher weight is associated with inflation gap than with output. Taylor principle ($\gamma > 1$) is maintained in several cases. Thus we can conclude that higher inflation was compensated with sufficient interest rate rise. Forward-looking rules were calculated with time horizon from 1 to 12 months ($k = 1,\ldots,k = 12$). However, we cannot clearly conclude whether the Slovak Republic applied accommodating (passive) or stabilization (anti-inflation active)[4] policy.

Output gap was significant only in forward-looking rules. Nevertheless its coefficients are very low. Therefore interest rate was not sensitive to output changes. In most of the cases the policy was rather anti-cyclical (positive sign of the coefficient). Interest rate did not respond much to current exchange rate. As $\delta_1 < 0$ and $\delta_2 > 0$ is valid almost in all cases, we can identify a compensation effect. Exchange rate appreciation led to interest rate drop in the following period.

Smoothing effect i.e. impact of previous interest rate on current one was relevant. Consequently, interest rate fluctuations were very small. We can conclude that the NBS was applying time consistent monetary policy focused on officially declared inflation targeting.

Monetary policy reaction functions covering the period from 2009 to 2015 are in Table 2. Those years were influenced by financial and economic crisis as well as integration of the Slovak Republic in to the Euro area.

As expected, evidently higher weight is attributed to inflation than output gap. The Taylor principle is maintained only in four cases out of twelve. From 2009 to 2015, inflation evolution was not adequately compensated by interest rate setting.

Although inflation in the Euro area was very low throughout observed period, interest rate was very low, too with aim to encourage economic growth. Thus we can evaluate common interest rate evolution as rather accommodating in respect to Slovak inflation.

Exchange rate coefficients were often positive and significant. Yet, their small values imply that the influence was only minor. Generally speaking, neither current nor previous values were reflected by interest rate. This statement is in line with free exchange rate regime in the Euro area.

Interest rate smoothing is statistically significant but with smaller coefficients than during previous period. It seems that EONIA unlike BRIBOR evolves more independently in financial markets. However, this observation can be also influenced by financial and economic crisis when interest rate fluctuations are more frequent.

Our findings confirm the idea that during the crisis (since 2009) output was more targeted than inflation. In addition, there was relatively high symmetry of

[4] Accommodating policy means that inflation evolution is not sufficiently offset by interest rate change, in the case of stabilization policy the opposite is true. Stabilization policy actively deals with inflation behaviour.

economic growth expectations in the Euro area and in Slovak Republic. Nominal interest rate evolution was influenced by its own past values, however less than in the previous period. Exchange rate impact on interest rate was not so important which is quite natural for such a big economy as the Euro area is.

Table 2

Taylor-type Rules Estimations for the Slovak Republic, 2009 – 2015

	Infl. target	γ	β	δ_1	δ_2	λ	φ	$Adj.\ R^2$
Simple TR	ECB	0.571*	0.026				0.568*	0.569
Open economy TR	ECB	0.842*	0.011	0.006*	–0.005		0.745*	0.628
TR with smoothing factor	ECB	1.216	0.312*			0.536**	0.013	0.528
Open economy TR with smoothing factor	ECB	0.765**	0.129*	0.014	0.011*	0.623*	0.394*	0.856
Forward-looking TR – IPI	ECB	0.896**k = 1 0.102* k = 12	–0.005				0.514**	0.799
Forward-looking TR with smoothing factor – IPI	ECB	1.233**k = 1 0.038 k = 12	0.014			0.459*	0.513**	0.815
Forward-looking open economy TR – IPI	ECB	0.846***k = 1 0.013**k = 12	0.125**	0.019**	0.022*		0.261*	0.925
Forward-looking open economy TR with smoothing factor – IPI	ECB	1.245***k = 1 –0.017**k = 12	0.134*	0.031	0.003*	0.326*	0.054**	0.826
Forward-looking TR – ESI	ECB	1.024**k = 1 0.249**k = 12	0.019*				0.236*	0.893
Forward-looking TR with smoothing factor – ESI	ECB	0.956***k = 1 0.648* k = 12	0.208*			0.675*	0.198	0.836
Forward-looking open economy TR – ESI	ECB	0.887**k = 1 0.003* k = 12	0.016*	0.018*	0.019**		0.615**	0.904
Forward-looking open economy TR with smoothing factor – ESI	ECB	0.672**k = 1 –0.002**k = 12	0.064	0.016*	–0.015*	0.722*	0.247***	0.897

Note: *, **, *** represent 10%, 5%, and 1% significance level; k = 1 or k = 12 is 1 and 12-month horizon respectively; TR – Taylor rule; IPI – industrial production index; ESI – economic sentiment index; ECB – inflation target set by the European Central Bank.

Source: Created by the authors.

4.2. Comparison of Monetary Policy Reaction Functions in the Euro Area and Slovak Republic

On the basis of our above mentioned findings and other relevant researches we can compare monetary policy reaction functions in the Euro area and the Slovak Republic in respect to their particular macroeconomic conditions. Overview of this monetary policy setting is captured in Table 3.

T a b l e 3

Monetary Policy Reaction Functions in the Euro area and Slovak Republic

Reaction function aspects \ Country	Euro area before 2008	Slovak Republic before 2009	Euro area after 2008	Slovak Republic after 2009
Monetary policy	time consistent	time consistent	time inconsistent	time consistent
Discretion/rule	rule	rule	discretion	rule
Taylor principle	maintained	violated	violated	violated
Interest smoothing	significant	significant	significant	significant but weaker
Inflation gap	significant	significant	significant	significant
Output gap	significant, anti-cyclical	partially significant but small coefficient, neutral policy	significant, higher weight than in case of inflation gap, anti-cyclical	partially significant but small coefficient, neutral policy
Exchange rate	n.a.	usually not significant	n.a.	significant but small coefficient
Forward/backward looking policy	both types of reaction functions significant	both types of reaction functions significant	both types of reaction functions significant	both types of reaction functions significant

Note: n.a. – not available data, i.e. exchange rate was not included into the Euro area reaction function as it is not small and open economy.

Source: Results for Slovakia created by the authors and comparisons with the Euro area based on research by Blattner and Margaritov (2010); Belke and Klose (2011; 2013).

Differences between the Euro area and Slovak Republic exist mainly in the field of output gap. The NBS focused more on inflation gap which can be explained by several facts: i) disinflation process in the Slovak Republic; ii) integration ambitions of the Slovak Republic and fulfilment of Maastricht criteria; iii) evident inflation targeting in the Slovak Republic unlike the euro area where money supply is targeted, too.

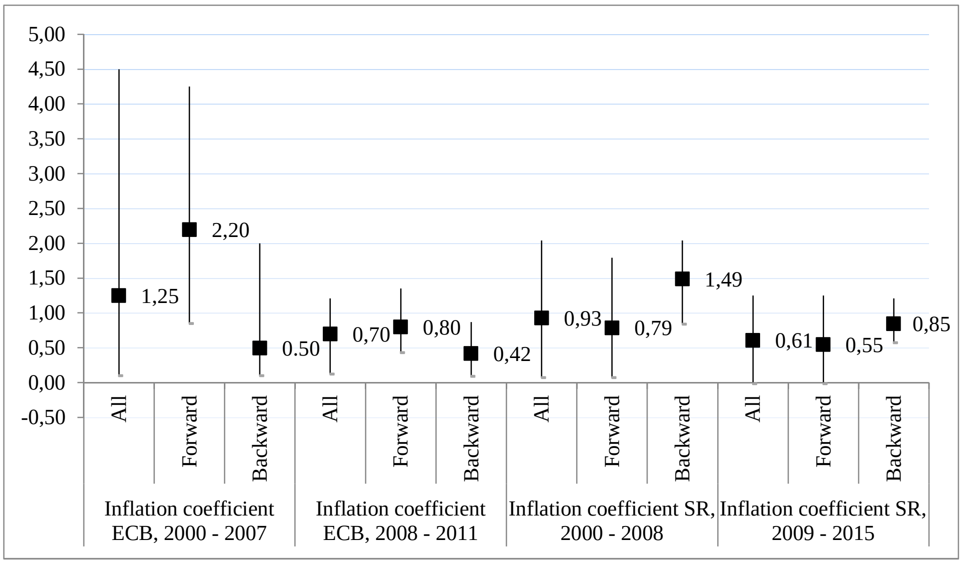
Blattner and Margaritov (2010) analysed 3,330 combinations of different monetary rules for the Euro area taking into account different indicators of inflation and output. They believe that the ECB reacts to different macroeconomic signals which can be relevant for different economic agents as discussed by Belás et al. (2015c).

Coefficients of inflation and output indicators according to Blattner and Margaritov (2010), Belke and Klose (2011) for the Euro area and our own findings for Slovakia are captured in Figures 1 and 2 respectively.

Generally speaking we can conclude that the ECB set interest rate before crisis sufficiently actively in respect to inflation evolution as inflation coefficients are very often above one. Since 2009 common interest rate EONIA has been even less reacting to Slovak inflation. The Taylor principle was violated for the Euro area as a whole. This can be explained by crisis. It does not have to be interpreted as inadequate common monetary policy or as asymmetric inflation between the Euro area and Slovak Republic.

F i g u r e 1

Comparison of Inflation Coefficients for the Euro Area and Slovak Republic

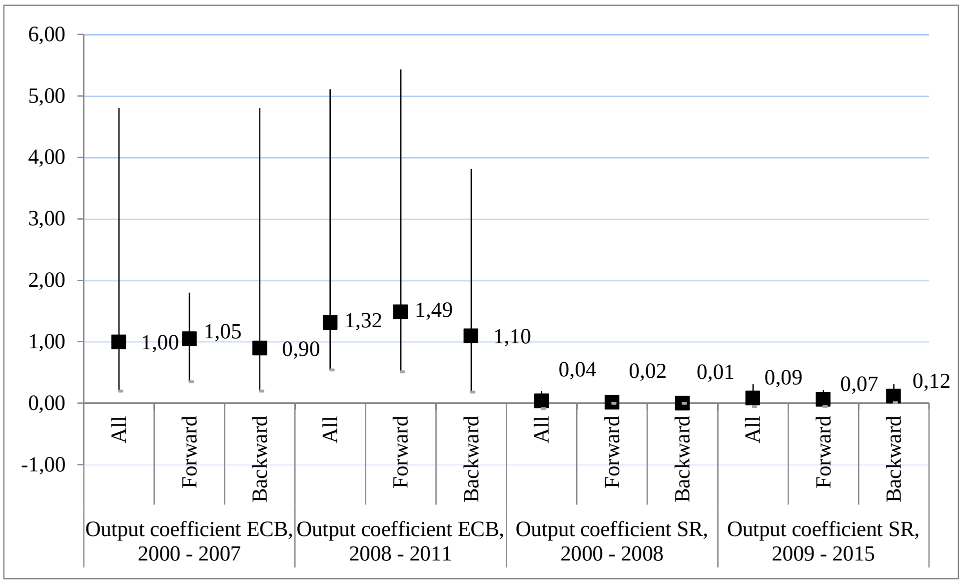


Note: All – all rules; forward – forward-looking rules; backward – backward-looking rules.

Source: Results for the Slovak Republic created by the authors and comparisons with the Euro area by Blattner and Margaritov (2010); Belke and Klose (2011; 2013).

F i g u r e 2

Comparison of Output Coefficients for the Euro Area and Slovak Republic



Note: All – all rules; forward – forward-looking rules; backward – backward-looking rules.

Source: Results for Slovakia created by the authors and comparisons with the Euro area by Blattner and Margaritov (2010); Belke and Klose (2011; 2013).

Nevertheless, coefficient signs are almost in all cases correct for the Euro area as well as for the Slovak Republic. The signs are in line with theory and practical implications that rise of interest rate should decrease inflation and vice versa. It seems that central banks reactions were correct but not always sufficient.

The ECB reacted actively not only to changes in inflation but also to output changes. Mean value of output coefficients is approximately 1, i.e. output growth was compensated by even interest rate growth and vice versa. As signs of all coefficients and not only of mean values are positive we can consider the ECB monetary policy to be obviously anti-cyclical in long-run.

Mean output coefficients for the Slovak Republic are around 0. Their deviation is minimal. It seems that the NBS did not react at all to output before 2008. After 2009 neither common interest rate in the Euro area reflected Slovak output despite the fact that EONIA responded quite sensitively to the Euro area output (Belke and Klose, 2011). All above mentioned results can be implied at the same time by numerous microeconomic effects as discussed for example by Štefko, Habánik and Butoracová (2010), Majková, Solík and Sipko (2014), and Chochoľáková et al. (2015).

Conclusions

Several years after introduction of Euro in the Slovak Republic we have possibility to evaluate success of this decision. Main goal of the paper was to consider monetary policy rules in the context of monetary union and economic crisis from the point of view of the Slovak Republic.

Common interest rate in the Euro area during crisis did not reflect sufficiently the evolution of inflation or deflation. The Taylor principal was violated and monetary policy was not time consistent in regard to the official ECB declarations. Interest rates did not evolve according to Taylor-type rules with respect to Slovak economy. That fact contributed to current deflation situation in the Slovak Republic but also in other countries in Europe. Inefficiency of single monetary policy for the Slovak Republic can be explained by several facts; e.g. simplifications of Taylor-type rules and adverse shocks in the Euro area larger economies, etc.

However, we assume that reaction functions will be more symmetric in future due to the theory of self-fulfilling prophecy and so called endogenous argument. Monetary integration should lead to higher symmetry among economic cycles and others economic fundamental of integrated countries in long run.

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