Evaluation of the European Central Bank's Monetary Policy in Terms of Taylor Rule

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Abstract

The purpose of this paper is to analyze, using Taylor rule, the impact of European Union (EU) enlargement on national banking systems and the optimal monetary policy interest rate in an ideal monetary union composed by all 27 EU states. We employ the inflation, Gross Domestic Product (GDP) and the GDP forecast from EU 27 for the 2001-2011 period. Considering the pillars mentioned before, namely inflation and GDP, the monetary policy from the Euro Area may be described by a rule which uses gap on both, inflation and output. A starting point is the Taylor rule (1993), whose main idea is that central banks react to inflation deviations from target levels. We evaluate the impact of the economic environment and its deviations on national banking systems and on banking competition. The analyzed data were extended to all EU countries, previous research has examined different models of the Taylor rule for the Euro Area. The results are included in the trend of the previous research. Interest rate estimation using Taylor rule for European Union countries led to a significant difference, in line with current evolutions and disparities. This article contributes to the scientific knowledge both with a longer analyzed period and also with a review that includes all the countries from EU.

Keywords: Banking system, Monetary policy, Taylor rule, European integration, EU enlargement

JEL Classifications: G21, G28, L51

1. Introduction

Through the monetary policy implemented by central banks, regulatory bodies are monitoring the level of essential indicators of macroeconomic equilibrium. Inflationary phenomenon is seen as a monetary one, considering that the increase trend of the price movements are or should be controlled by the central bank, which is the issuing of currency organism and through the money supply, can influence the level and the speed of the price increases at one moment. One thing that should not be forget is that inflation is a result of imbalances appeared in the real economy, which cannot be directly controlled by the central bank, so it is necessary to correlate monetary policy measures with other measures of economic policy (particularly fiscal ones) to maintain the reduced inflation levels.

The role of central banks in financial stability was an integral part on their genetic code. Central bank through monopoly on final liquidity and the role of "mother of banks" is an important pillar in the ensemble required to maintain and manage the stability.

In the postwar period two models of central bank developed. One model could be defined as the Anglo-French and the other as German. These two models are differentiated by the following main characteristics: a) the objectives followed by the central bank and b) related to the central bank's institutional structure:

a) The objectives of the central bank. The Anglo-French model considers that central bank pursues several objectives like price stability, a stable business cycle, the maintenance of a low unemployment rate and financial stability. Price stability is one of the goals of the Anglo-French model and does not get any preferential treatment. This is very different from the German model point of view, where price stability is considered to be the primary objective of the central bank. Although the central bank may establish other objectives too, they are always conditioned by the fact that their pursuit shall not affect the price stability.

b) The institutional structure of the central bank. The Anglo-French model is characterized by the political dependence of the central bank, the decisions being traditionally subject to the Government's (Minister of Finance) approval. Things are very different considering the German model, where the basic principle is political

independence. The interest rate decisions are made by the central bank without the interventions of the political authorities (De Grauwe, 2009).

When European countries negotiated the Maastricht Treaty, it must have been made a choice between these two models. The Anglo-French model was used as a guide, but the German model prevailed. The role of the Euro System in prudential supervision started with the Maastricht Treaty, which entitles to contribute also to the financial stability, but in the same time limited to the national responsibilities.

This paper is structured as follows. Sections II consists of literature review. Section III explains the data and the methodology used. Section IV discusses the empirical results and section V concludes.

2. Literature Review

The global financial crisis has brought a new perspective on the role of central banks on promoting financial stability. Caruana (2010) considers that there are three general conclusions on central banks:

1) Will be almost every time first public institution that will act in the case of financial crises. This raises the question how to differentiate the responsibilities of a central bank from the government ones during a crisis time;

2) Must have financial stability realistic goals, which are in accordance with basic monetary responsibilities. Macro prudential policy aims to follow these objectives of financial stability, but cannot be performed in a closed space. This should take into consideration and also to be supported by other policy actions, especially by monetary policy;

3) Central banks should have the necessary tools and skills to meet such objectives and institutional arrangements, which should allow them to shape the actions of the supervisory authority that controls these instruments.

In the last fifteen years, monetary policy tool developed by Taylor (Taylor, 1993) has become widely used in evaluating monetary policy of central banks. Taylor rule had the side effect renewal the interaction and communication between central bank economists and those belonging to academic circles. Two separate lines of research helped to close this gap, and Taylor played an important role on both. First, models of fixed prices and adaptable wages, and later models of fixed information that dominated rules without reactions. Second, Taylor rule expressed monetary policy through an interest rate instrument more than a monetary growth rule. This simple idea helped transposition of the monetary theory in more practical terms (Koenig et al, 2012).

The Maastricht Treaty defined the European Central Bank as a very independent institution. Today it is widely considered that a high degree of the central bank independence and a clearly defined mandate to restrain inflation are important institutional devices to maintain price stability. In the case of European Central Bank, its statute defines as main objective the price stability, which according the Governing Council of ECB, is measured by the increase from year to year of the Harmonized Index of Consumer Prices (HICP), for Euro Area, less than or close to 2% on medium term.

We consider that the Taylor rule research directions are divided in two: the first one is using real-time data, cumulative or not with predictions, meanwhile the second one uses information about communication tools of the central bank and their impact on monetary policy rate decisions' predictability.

From the first line of research are Croushore and Stark (1999), using real-time macroeconomic data, consist of quarterly or instant case, demonstrated that in case of USA data revisions affect in a substantial way policy analysis and economic forecasts. Analyzing the monetary policy history of the USA, Orphanides built a database using current quarterly estimates/forecast required by the Taylor rule based on information available only in real time.He has shown that recommendations based on policy real-time information registered significant differences than the ones obtained on revised data analysis (Orphanides, 2001).

Monetary policy strategy of the European Central Bank (ECB) is based on two pillars. One of them has in center the role of money. Long-term inflation is a monetary phenomenon; the Governing Council of ECB announced a quantitative reference value for the annual growth rate of monetary aggregate M3. The other pillar is largely based on assessment measures expectations for price developments and risks to price stability in Euro Area, as a whole. Sauer and Strum by estimating several policy instruments and reaction functions for the European Central Bank (ECB) and using Taylor rule for Euro Area concluded that without considering the long-term strategy, changes of the monetary policy rate from the past are too small from the inflation changes point of view. Another aspect highlighted is that European Central Bank had a different policy from the one of the National Bank of Germany (Sauer, Sturm, 2007). European Central Bank is on a quite difficult position when had to set the optimal interest rate considering the different increasing or decreasing degrees of the EU economies. Through single currency a new regime with low inflation and macroeconomic stability is introduced in many countries from Euro Area. According to experts, this

thing is actually guaranteed, because the Euro Area is supervised and coordinated by the independent central bank in the world, namely the European Central Bank. Research in EU countries showed that greater bank independence is reflected in lower inflation. Also, experience has shown that countries where central banks were not immune from political influence (Italy, Spain) have experienced higher inflation.

Depending on the outcome achieved, monetary policy will become restrictive; reference rate applied by the ECB will increase, if the effective inflation rate is above target inflation and/or if the gap registered is inflationary or expansionary when the economy is on a recession period (Spulbăr, Nițoi, 2012).

Taking into consideration that in the last 25 years, the communication and circulation of information became an aspect with a growing importance of the monetary policy, in literature there is an important part oriented on the aspects mentioned above, central bank, predictability of its decisions and macroeconomic objectives. In the second research direction are frame Sturm and De Haan (2011) that examined whether information and communication of the European Central Bank added date compared with the ones obtained using Taylor rule, which used expected inflation and output growth on real time. The results suggest that indicators, even if they are different sometimes from one another, adds information that predict monetary policy of the European Central Bank. Also, when the interbank rate is used in Taylor model, the European Central Bank communication indicators remain significant (Sturm and De Haan, 2011).

Heinemann and Ulrich (2007) and Rosa and Verga (2007) used an index of information and communication of the European Central Bank, namely the one based on the introductory statement of the ECB President at the press conference following the monetary policy meeting. The difference between Heinemann and Ulrich and Rosa and Verga is the fact that first two provide an alternative decoding algorithm based on significant differences that appeared from the utilization of certain words and expressions from the press conference that followed the meeting before the increasing, the stagnation or the decreasing of the interest rate, mean while the last two provided a glossary of transforming qualitative information from the press conference in an ordered scale. Central banks are more concerned with long-term predictability, which occurs when the audience develops a real understanding on how central bank thinks and works. Blinder et al. in 2008 underlined the fact that monetary policy reaction function should be so well understood that all the relevant news for the financial markets had to result from developments in the economy, not from the actions or statements of the central bank.

3. Data and methodology

We employ the pillars mentioned before, namely inflation and Gross Domestic Product (GDP), the monetary policy from the Euro Area may be described by a rule which uses gap on both, inflation and output. A starting point in this study is the Taylor rule (1993), whose main idea is that central banks react to inflation deviations from target levels:

$$\boldsymbol{i_t = \pi_t + r_t^* + a_\pi(\pi_t - \pi_t^*) + a_y y_t} \quad (1)$$

Where:

$\boldsymbol{i_t}$ – target short-term nominal interest rate; $\boldsymbol{\pi_t}$ – rate of inflation as measured by the GDP deflator; $\boldsymbol{\pi_t^*}$ - desired rate of inflation; $\boldsymbol{r_t^*}$ - assumed equilibrium real interest rate; $\boldsymbol{y_t}$ – logarithm of real GDP, determined by a linear trend. $\boldsymbol{a_\pi}$ and $\boldsymbol{a_y}$ must be positive (Taylor's proposal is $\boldsymbol{a_\pi = a_y}$ = 0.5). The equation becomes:

$$\boldsymbol{i_t = \pi_t + r_t^* + 0.5 * (\pi_t - \pi_t^*) + 0.5 y_t} \quad (2)$$

From a theoretical point of view, Svensson (1999) shows that this rule is optimal reaction for a central bank that follows inflation target in a simple model that seeks past (using IS and Phillips curve).

Taylor rule used in this simulation is:

$$\boldsymbol{i_t = i_t^* + \pi_t + 0.5 * (\pi_t - \pi_t^*) + 0.5 * (y_t - y_t^*)} \quad (3)$$

Where: $\boldsymbol{i_t}$ is the interest rate, $\boldsymbol{i_t^*}$ is the long-term equilibrium real interest rate (usually determined based on historical observations), $\boldsymbol{\pi_t}$ is the level of inflation, $\boldsymbol{\pi_t^*}$ is the inflation target, $\boldsymbol{y_t}$ is the gross domestic product (GDP) and $\boldsymbol{y_t^*}$ is the annual change percentage level of potential GDP.

Considering equations (2), (3) and the fact that ECB's inflation target is close to 2%, and an average real interest rate in Duisenberg period (1998-2003) was 1.5%, initial values proposed by Taylor are $\boldsymbol{i_t^*}$ = 2% and $\boldsymbol{\pi_t^*}$ = 2% for USA, the equation becomes:

$$\boldsymbol{i_t = 2\% + \pi_t + 0.5 * (\pi_t - 2\%) + 0.5 * (y_t - y_t^*)} \quad (4)$$

The objective of this study is to analyze and to compare the monetary policy of the EU 27 in the period 2001-2011 using Taylor's rule. In the following analysis we assume that each governor is using the same model of the Taylor rule. The only difference between countries is national inflation rate and the output gap; their variations are used to evaluate economic performance and monetary policy strategy.

4. Empirical results

Considering the many changes from the EU financial sector for over a decade, the structure of financial supervision architecture, whether is located inside or outside of the central bank is an important stability and development factor of the economic system as a whole. In the same trend, of change in financial system, another factor that supported numerous deregulation and reforms is banking competition. Within EU, regulatory developments in this area, including the transition to Single Market were made in order to foster competition, to improve efficiency, productivity and profitability of the banking systems, in the same time one of the main objectives was to increase competition both nationally and cross-borders.

In the following table are presented the data calculated through equation 4 for EU 27:

Table 1. Interest rate calculated using Taylor rule for EU 27, 2001- 2011 period (%)

Country	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
AT	3.86	3.24	3.14	3.68	4.04	3.89	4.02	3.76	3.01	3.79	4.11
BE	4.04	4.00	3.98	4.15	4.37	4.30	4.35	4.15	3.19	3.81	3.88
BG	8.20	6.69	4.29	6.19	9.42	8.86	11.26	10.45	6.29	4.81	6.97
CY	5.39	3.19	7.08	5.24	4.40	4.99	6.66	7.07	1.65	3.91	3.22
CZ	6.64	4.65	2.90	6.05	1.65	2.55	5.35	3.91	3.90	0.26	1.25
DE	3.12	3.42	3.09	3.06	2.61	2.32	3.64	2.76	3.13	2.60	2.77
DK	4.49	4.30	3.64	4.33	4.88	4.13	4.28	6.23	2.99	5.87	2.80
EE	8.50	6.71	6.08	6.49	8.09	10.83	13.68	7.29	0.88	3.08	5.75
ES	6.20	6.36	6.17	6.05	6.35	6.15	5.27	4.37	9.37	2.40	3.38
FI	5.01	3.28	1.30	2.49	2.47	2.86	5.01	4.93	3.33	2.43	5.65
FR	4.01	4.21	3.99	3.68	3.91	4.14	4.59	4.53	2.68	3.05	3.34
GR	5.12	5.41	5.94	4.96	4.81	4.54	5.55	6.71	4.76	3.69	3.63
HU	13.31	10.50	7.40	7.25	4.50	5.50	7.43	7.28	5.52	5.11	5.52
IE	8.50	7.04	5.08	4.20	5.08	5.60	3.29	-0.39	-2.15	-0.47	2.98
IT	4.88	5.20	5.11	4.39	3.81	3.71	4.37	4.52	4.05	2.39	3.31
LT	1.62	2.17	1.24	4.56	8.65	8.56	10.54	11.79	-1.84	4.06	7.84
LU	2.05	4.11	8.05	3.81	6.63	8.72	5.67	6.40	2.06	6.90	6.73
LV	3.69	5.62	5.58	9.04	12.22	11.92	22.38	16.39	0.36	-0.32	7.44
MT	5.29	4.78	5.52	3.21	4.57	5.05	5.11	4.59	4.53	4.94	3.59
NL	7.11	5.83	4.17	2.73	4.43	3.77	3.86	4.13	1.55	3.32	3.13
PL	5.49	4.25	2.39	6.11	4.65	3.50	5.99	5.10	5.71	3.41	5.17
PT	5.57	5.73	4.99	4.47	4.52	4.78	4.83	3.57	2.88	3.06	2.65
RO	39.62	25.54	26.09	17.11	14.30	12.81	15.08	13.64	8.49	5.58	9.13
SE	4.36	3.54	3.76	2.33	2.89	3.95	4.77	5.12	4.02	3.04	2.90
SI	10.68	9.62	7.55	5.28	3.67	4.13	6.20	6.13	4.91	0.92	2.79
SK	7.03	5.89	7.33	7.86	4.41	4.97	3.15	4.86	0.75	2.50	3.64
UK	3.44	4.54	4.36	4.50	4.19	5.24	4.27	5.12	3.62	4.87	4.33
ECB Interest rate	3.94	2.75	2.25	2.38	2.25	3.00	3.88	3.17	1.44	1.13	1.25

Source: author's calculation and processed data from – World Bank (http://databank.worldbank.org/ddp/home.do), European Commission – Economic Forecast 1991-2001, 2002, 2003, 2004, 2007, 2009 (http://ec.europa.eu/economy_finance/eu/forecasts/index_en.htm); the rest of the tables containing processed data are available upon request from authors

Interest rate estimation using Taylor rule for European Union countries led to a significant difference between them, in line with current evolutions and disparities. As can be seen in previous table, there is an obvious discrepancy between interest rates estimated through Taylor's rule and the monetary policy rate of the European Central Bank. So, from the analysis and Table no. 1 we can extract the following conclusions:

Interest rate calculated using the Taylor rule for countries that joined the EU before 2004 or EU 15 should be 3-4% bigger in 2001-2011 period; a difference less than 3% is required to Belgium, Luxembourg, United Kingdom, Finland; Germany is the country that according to the results obtained using Taylor's rule is closest to the monetary policy rate of European Central Bank. The conclusion that emerges from this analysis is that, since 2001, monetary conditions promoted by EU tend to match with those of Germany.

The interest rate calculated using Taylor's rule for the New Member States (NMS) that joined the EU in May 2004 (Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia) shows that the real interest rate for these countries should be higher with 4% in most of the cases for the entire analyzed period, even after joining the European Union;

In Romania and Bulgaria, even after 2007, was recorded high inflation, and implicit an optimal interest rate much different from the one set by the ECB, the differences range being between 4% and 11%. The banking systems from these countries became uncompetitive across borders caused by the high inflation, the banking products and services becoming too expensive to compete on the external markets;

Negative rates recorded in Ireland during 2008-2010 period are due to the economy, which was already a boom period.

5. Conclusions

In countries where the optimal interest rate is significantly different from the ECB's one, like in the case of New Member States where the results show that the real interest rate for these countries should be higher with 4% and also in the case of Romania and Bulgaria where the differences range between 4% and 11%, monetary policy generates asymmetries in terms of GDP and inflation, not providing an ideal framework for stabilization and equilibrium;

According to Taylor's rule, in countries where interest rate should be with 3-4% or higher, the fact that it registered low values led to economic growth above potential, and to the appearance or enhancement of inflation, that had a negative impact on competition, especially considering the ongoing process of deregulation and increased cross-border operations and services, making uncompetitive the countries with a high level of inflation.

A stable economic environment where the banking competition had not been negative influenced by a higher inflation or by large differences (less than 3%), during 2001 – 2011 period, from the interest rate calculated according to Taylor's rule find in Belgium, Luxembourg, United Kingdom, Finland. And Germany is the country that according to the result presented in table no. 1 is the one that achieved the closest real interest rate to the one promoted by the monetary policy rate of European Central Bank.

The results are included in the trend of the previous research; for example Croushore and Stark (1999), using real-time macroeconomic data, consisting of quarterly or instant case, demonstrated that in the case of USA data revisions affect in a substantial way policy analysis and economic forecasts. Our analyzed sample was extended to all European Union countries, the previous research explored different ECB Taylor rules for the euro area Sturm and De Haan (2011) and Sauer and Sturm (2007). In the same time, our results contradict the aspect highlighted by Sauer and Strum (2007), that European Central Bank had a different policy from the one of the National Bank of Germany. Our conclusion is that since 2001, monetary conditions promoted by ECB tend to match with those of National Bank of Germany.

For future research, in the analysis can be introduced information and communication of the European Central Bank, considering previous research made by Sturm and De Haan (2011), which demonstrated that this factors had a significant impact on monetary policy.

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