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COMPARATIVE ANALYSIS OF THE MONETARY POLICY OF THE NBS AND THE ECB

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Abstract

As a prerequisite for joining the EMU, states must meet certain convergence criteria, because there are significant differences among countries, which have their political and institutional origins, which can affect integration efficiency. All this imposes the need for a comparative analysis of the situation in which Serbia is in relation to the Eurozone. This paper should provide a useful basis, to what extent monetary policy of the NBS agrees or deviates from the monetary policy of the ECB and the EMU, which represent final goal of Serbia on the path of European integration. A comparative analysis of the monetary policy of the National Bank of Serbia and the European Central Bank will be carried out by statistical methods that will show the degree of (in) connection between the two policies and their interconnection, and on the basis of certain common variables.

Key words: monetary policy, ECB, NBS, ANOVA.

1. Introduction

The modern central bank is a product of the 20th century, regardless of the fact that some of the central banks have a much longer history; only about a century ago the world got a true idea of the functions and scope of the work of the central bank. Historically observed, central banks have developed in two ways. The first one, through a slow process of evolution from commercial banks that, having gained additional

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power and responsibility in relation to the functioning of the financial system, became central banks. Second way - through the adoption of laws that have been established from the outset as institutions with the attributes of the central bank (Beck et al., 2004). In the past, central banks were expected - in accordance with law, custom, or both - to use their instruments to achieve multiple goals, such as high growth and employment, securing funds for state expenditures and solving balance of payments problems. Today, the legal and actual independence of central banks is considerably higher than it was twenty years ago, and their primary goal has become price stability.

With the creation of the European Monetary Union, the national central banks have become part of the new central banking system, which is called the Eurosystem. It is made up of the European Central Bank and the national central banks of the Member States that have adopted the euro. These national central banks have lost their monetary sovereignty and no longer make independent decisions. In addition to this system, the European System of Central Banks (ESCB), which includes all member states of the European Union, operates. All EU countries are not members of the EMU at the same time, and except Denmark, Sweden and the UK, they all want to become part of it.

2. Literature Review

The most widespread indices of central bank independence refer to the level of independence determined by law. Real independence can often deviate significantly from legal independence. Such deviations are more significant in developing countries than in industrialized economies. The reason for this is probably better implementation of laws in industrialized economies. Other types of behavior-more focused, focus on the pace of change in the governor's central bank relative to the statutory dynamics (used only for developing countries) and the political sensitivity of the central bank governor. The second index is defined as the frequency of cases in which the Governor changes over a short period after a political change. None of these indexes fully represent the true independence of the central bank, but, when taken together, provide a more complete picture of the differences in central bank independence between countries over time.

In addition, Cukierman, Miller and Neyapti (2002) compare the legal independence of the central bank in former socialist economies with developed economies in the eighties; reveal a significantly higher level of independence in the second group. Real independence depends not only on legal status, but also on various formal and informal institutional arrangements such as the exchange rate regime, the ability of the bank to effectively engage in open market operations, the position of fiscal policy, and the existence of explicit institutional arrangements (out of regulation) which makes stability of the price recognizable by the central bank. A prominent example of this latter are various methods of targeting inflation, adopted by some twenty countries following the implementation of this innovation in New Zealand and Canada in the late 1980s.

The trend towards central bank independence was due to a combination of global and regional factors. The two main global factors underlying the trend include, firstly, an increasing need around the world for the stability of the price triggered by stagflation from the 1970s and the poor economic performance of

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some high-inflation countries, both in Latin America and in other parts of the world economy. Unlike the 1960s and 1970s, the 1980s and 1990s, the view was that inflation and associated uncertainties slowed down growth. The relatively good performance of low-inflation countries, such as Germany and Japan, upheld that attitude by the 1980s (Stella, 2002).

The other factor is globalization, which implied the gradual abolition of control over cash flows and the expansion of international capital markets. These processes have been enhanced by the need for price stability and the greater importance of central bank independence as a signal of macroeconomic responsibility towards domestic and foreign investors. As Maxfield (1998) considers, this factor was particularly important in developing countries whose political systems were eagerly waiting to accelerate access to international capital markets. The International Monetary Fund (IMF) also accepted the view that a high level of independence was desirable and actively promoted the central bank reform in many emerging economies.

Several regional factors have contributed to increasing independence:

• The breakdown of institutions designed to protect nominal stability, such as the European Monetary System (EMS) and the Bretton Woods system, have increased the search for alternative institutions;
• The good result of a very independent Bundesbank has shown that the independence of the central bank can function as an effective instrument for ensuring nominal stability,
• The acceptance of the Maastricht Treaty by the European Economic Community (EEC) implied that many of the countries in the Community must improve the independence of their central bank as a prerequisite for membership in the European Monetary Union (EMU). The inclusion of this provision in the Agreement is linked to the good results of the Bundesbank and Germany's central position within the Community
• After a successful stabilization of inflation, especially in Latin America, policy makers have sought institutional arrangements that can reduce the likelihood of high and sustained inflation in the future. The increase in the independence of the central bank seemed at the time as a natural way to achieve this goal;
• In the former socialist countries, improving central bank independence and creating central banks on the basis of best western practice was part of a wider attempt to create the institutional framework needed for the proper functioning of the market economy. The fact that many banks have been given de jure independence is undoubtedly corroborated by evidence from industrialized economies that have indicated that inflation and legal independence are negatively linked, and that independence and growth are either positively related or not related in general.

3. The monetary policy of the European Central Bank vs. Monetary policy of the National Bank of Serbia

3.1. Structure and functioning of the European Central Bank and its monetary policy instruments

The formation of the European Economic and Monetary Union was a unique experiment, which introduced a new monetary regime with a single currency in much of Europe. The transfer of monetary

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policies from a national level to the level of the EU required a major change in European central banking. A supranational monetary organization was established, the European Central Bank (ECB), which with the 13 national central banks that adopted the euro and thus lost its monetary sovereignty and the possibility of independent decision-making in the monetary sphere, constitutes a new supranational central banking system, called the Eurosystem. In addition to this system, the European System of Central Banks (ESCB) operates, which today encompasses in all EU Member States. The European Central Bank is a specialized, independent institution that has the task of defining and implementing monetary policy, managing exchange operations and ensuring the well functioning of payment system.

The primary task of the European Central Bank is to ensure price stability, i.e. guarding the value of the euro as the single currency of the Member States of the European Monetary Union. By joining the EU, and preparing for membership in the monetary union, the central banks of Member States and potential candidates must harmonize monetary policy and functioning in order to harmonize with the Eurosystem. They have to adjust the monetary regulation instruments, emphasizing the importance of open market operations (in particular, the refinancing operation) and reducing the percentage of required reserves. In addition to meeting the convergence criteria, the national currency of the accession countries must be in the normal range of ERM II two years before entering the Eurozone. ERM II represents a system of flexible courses allowing the fluctuation of national currencies against the euro by up to 15%. The new exchange rate mechanism (the so-called ERM-II), is established on the basis of the Amsterdam European Council resolution of 16 June 1997, replaced the old mechanism of the European Monetary System on 1 January 1999.

The process of accession of new EU member states to the monetary union is quite complicated - all steps towards the EMU must be accepted by the country concerned, the European Council, the European Central Bank and the European Commission (Cukierman, 2002). The entry of each country is based on an individual basis. Engaging in ERM II before the end of economic reforms is a very dangerous move for the accession countries; therefore it is necessary to complete all economic processes and reforms, especially those that are the result of the former socialist regime. There are numerous problems and risks that central banks face, arising from the uncertainty surrounding the changed economic environment in which the monetary policy operates and which must be adapted:

- There are national differences in the transmission of monetary policy.
- There is a risk that countries will be affected by asymmetric shocks.
- The question arises whether, due to the decentralized nature of the system, national interests will dominate in implementation of the monetary policy.
- Increased expectations for income growth, rising credit supply, and declining risk premiums lead to a sharp rise in demand for loans, although cyclical developments sometimes affect the reduction in demand. Whether used for investment or for consumption, these, always available, loans create pressure on national revenues and expenditures.
- The development of the financial system can lead to the possible impact of imperfect capital markets. There may be major deviations in the risk premium and the exchange rate if the

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willingness to accept the euro changes. Also, moral hazard is constantly present as a potential problem.

- Political risks must also be taken into account. Fiscal policy, coupled with a monetary policy, in order to reduce inflation, leads to an increase in interest rates, resulting in unreasonably high short-term capital inflows and unrealistic appreciation. Increased inflows of funds can lead to a rise in demand and an increase in inflation.
- Finally, experiences from other regions should serve as a useful framework for future decision-making.

The Central Bank of Accession States, with their mandate of financial stability, must provide analyzes and data that point to national players, both public and private, on potential or emerging risks. All the dynamics of the financial flows and the movement of the exchange rate must be clearly outlined so that the process of changing the exchange rate regime would be carried out with the full support of the whole nations. The accession countries must support their involvement in the Eurozone by closely monitoring and analyzing the experiences of other advanced economies, including the current states of the Eurozone, and their experience in real and financial convergence (Geraats, 2002).

They need to provide an optimal allocation of resources, whose inflow is expected from the over-appreciated real exchange rate or low risk premium. Regardless of the potential difficulties and momentary ambiguities and stagnation in the negotiations between Serbia and the European Union, Serbia must make the most effort to approach the convergence criteria prescribed for EMU membership. Therefore, the analysis of the monetary policy convergence of Serbia and EMU monetary policy is necessary.

The following aggregates are included in the money supply:

- M1 = Cash in circulation + Demand deposits,
- M2 = M1 + Short-term deposits, which can be withdrawn from the account within 3 months + Term deposits up to two years + Other short-term deposits,
- M3 = M2 + Recovery deals + Money Market Funds + Securities with a maturity of up to two years + Other eligible instruments.

In achieving the ultimate goals of monetary policy, central banks use different instruments of monetary regulation. Their application or combination, depending on the way they are created, affects the quantum of money supply, which will ensure optimum economic development, observed from the aspect of stability and economic growth. The choice of instruments depends on the conditions in which the economic and financial system functions. Therefore, there are differences in monetary regulation instruments in some countries. The European Central Bank has at its disposal a wide range of instruments (Cukierman and Lippi, 2005). The Governing Council of the ECB, with its decisions, defined the monetary policy instruments that the ECB and the Eurosystem use in practice, as well as the conditions for their application. To achieve its objectives, the ECB uses open market operations ,liquidity loans, mandatory reserve.

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3.2. Structure and functioning of the National Bank of Serbia and its monetary policy instruments

The position, organization, powers and functions of the National Bank of Serbia, as well as the attitude of the National Bank of Serbia towards the organs of the Republic of Serbia and international organizations and institutions, are regulated by the Constitution of the Republic of Serbia and the Law on the National Bank of Serbia ("Official Gazette of the Republic of Serbia" No. 72/2003 , 55/2004, 44/2010, 76/2012 and 106/2012). The National Bank of Serbia is independent and independent in the performance of its functions as defined by the Law on the National Bank of Serbia and other laws, and for its work it is responsible to the National Assembly of the Republic of Serbia. The main goal of the National Bank of Serbia is to achieve and preserve price stability. In addition, without prejudice to the achievement of its primary objective, the National Bank of Serbia contributes to the preservation and strengthening of the stability of the financial system. The bodies of the National Bank of Serbia are Executive Board, Governor and Board of Governors.

The Executive Board determines the reference interest rate and other interest rates applied by the National Bank of Serbia in the implementation of monetary policy. In addition, the Executive Board, on the proposal of the Supervisory Board, issues the regulations of the National Bank of Serbia in the field of control and supervisory function, in accordance with the laws regulating the performance of these functions (Blinder., 1998).

The Executive Committee decides on the granting of preliminary approvals as well as on the granting and revocation of operating licenses to banks, the granting and confiscation of insurance companies for licensing activities, the granting and revocation of licenses for the conduct of financial leasing activities, the granting and confiscation of management companies Voluntary pension funds a work permit and a license to manage those funds (National Bank of Serbia, 2013). The Executive Committee makes decisions at sessions, with the majority of votes of all members. In the case of an equal number of votes, the Governor shall decide. The Governor, as Chairman of the Executive Board, signs the decisions made by the Executive Committee. He is obliged to submit to the Council reports on the implementation of monetary policy, reports on the approval and revocation of operating licenses for commercial banks, the legality of work and the solvency of commercial banks and other financial organizations. On the other hand, the Council is not a fully independent body because it is elected by the Serbian Parliament and is obligated to submit a report on its work at least once a year. In order for the Council to independently and impartially make decisions, its members can not have a conflict of interest on any basis, and therefore can not be employed by the National Bank. The Governor's Council consists of five members, including the President, elected by the National Assembly on the proposal of the National Assembly Committee responsible for finance. Council members are elected for five years, with the right to re-election (Statistical Office of the Republic of Serbia).

Monetary policy instruments of the National Bank of Serbia are:

- mandatory reserve,
- open market operations,

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- collateralized loans for maintaining daily liquidity,
- depositing surplus liquid assets of banks with the National Bank of Serbia, discount rate, minimum credit terms of the bank, and
- harmonization of retail loans with the share capital of the bank.

The National Bank of Serbia uses the following three monetary aggregates:

- M1 = Cash in circulation + Sight deposits,
- M2 = M1 + Dinar deposits,
- M3 = M2 + Foreign currency deposits.

The National Bank of Serbia has the following functions:

- determines and implements monetary and foreign exchange policies;
- manage foreign reserves;
- determines and implements, within its competence, activities and measures in order to preserve and strengthen the stability of the financial system;
- issues and revokes work permits and performs control of the creditworthiness and legality of operations of banks and performs other activities in accordance with the law regulating banks;
- issues and revokes the licenses, i.e. powers to perform insurance activities, and supervises the performance of such activities and performs other activities, in accordance with the law regulating insurance;
- issues and revokes operating licenses for voluntary pension fund management companies, supervises this activity and performs other tasks, in accordance with the law governing voluntary pension funds;
- issues and revokes licenses for leasing operations, supervises the performance of these operations and performs other activities, in accordance with the law governing leasing;
- performs the tasks of protecting the rights and interests of the users of services provided by banks, financial leasing companies, insurance companies and companies for managing voluntary pension funds in accordance with the law;
- Issues banknotes and coins and manages cash flows;
- regulates, controls and improves the smooth operation of domestic and international payment operations in accordance with the law;
- performs the tasks determined for the Republic of Serbia by law or contract, without jeopardizing their independence and independence.

4. Statistical analysis of the interdependence between monetary policies of the NBS and the ECB

Statistical analysis of the interdependence of monetary policies of the National Bank of Serbia and the European Central Bank was carried out in the statistical program (SPSS) based on variables that are

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relevant to evaluate the strength of the relationship between these two monetary policies. The monetary aggregates of both central banks and foreign reserves in millions of euros are taken into account. The aforementioned evaluation of the interdependence between the two monetary policies has been carried out on the basis of several of the following analyzes:

- Correlation analysis - Pearson coefficient
- Regression analysis
- Hi square test
- Distribution probability and scatter diagram.

The statistical model and the conducted analysis are based on previously set hypotheses on models of the interdependence of monetary policies:

- H0- There is a minimum level of connection between the two monetary policies to given values of monetary aggregates (in millions of euros)
- H1- There is a statistically significant link between the two monetary policies to the values of monetary aggregates (in millions of euros)

4.1. Correlation analysis of NBS vs. ECB

The coefficient of free linear correlation, as a relative measure, takes values from -1 to +1. If it takes positive values, the correlation between phenomena is either direct or positive (both phenomena exhibit concurrent variations). In the case where $r < 0$, the connection is inverse or negative (when one phenomenon increases the other decreases, and vice versa). If there is a functional connection between the observed phenomena (all the empirical points are right on the right line), we are talking about perfect correlation. Then the coefficient of correlation takes the value -1 (if the connection is inverse) or +1 (if the connection is direct). The correlation coefficient is absolutely closer to the unit means that the correlation between the phenomena is stronger. Against this, the closer it is to zero, the linear relationship is weaker.

In the following tables, the degree of connection between individual variables of the two monetary policies, such as the monetary aggregates of the NBS and the ECB, and the NBS foreign exchange reserves, were analyzed. From this example, based on the significance level (Sig. = 0.000), the zero hypothesis is rejected, i.e. the assumption that there is a minimal correlation between the given variables. On the other hand, it can be seen that the value of the correlation coefficient is quite large but negative or inverse for a given variable, which only speaks of the opposite in the movement of their values. (-0.889, -0.733)

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Correlations

		M1ECB	M1NBS
M1ECB	Pearson Correlation	1	-.889**
	Sig. (2-tailed)		.000
	N	27	27
M1NBS	Pearson Correlation	-.889**	1
	Sig. (2-tailed)	.000	
	N	27	27

**. Correlation is significant at the 0.01 level (2-tailed).

Correlations

		DevrezNBS	M1ECB
DevrezNBS	Pearson Correlation	1	-.733**
	Sig. (2-tailed)		.000
	N	27	27
M1ECB	Pearson Correlation	-.733**	1
	Sig. (2-tailed)	.000	
	N	27	27

**. Correlation is significant at the 0.01 level (2-tailed).

Source:Authors' estimation

4.2. Regression analysis of NBS vs. ECB

Descriptive Statistics

	Mean	Std. Deviation	N
DevrezNBS	1258.78	346.199	32
DeppovECB	2191616.75	90172.663	32
M1ECB	5930917.88	504110.136	32
M2ECB	9662175.00	406707.023	32
M3ECB	10306646.78	401770.341	32

The following tables of the regression model, which in this case examines the impact of the NBS

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foreign exchange reserve on the monetary aggregates of the ECB, are the most important when it comes to interpreting the results. Namely, the coefficient of multiple correlation R, which shows the linear correlation between the original values of the dependent variable and the model of the predicted value of the dependent variable is 0.800, which indicates a very strong connection. The coefficient of determination shows that a good 80% of the variability of the NBS foreign exchange reserves category can be explained by the regression model, that is, the independent variables belonging to the monetary aggregates of the ECB. The value of the corrected determination coefficient (0.770) is very close to the value of the normal coefficient of determination, due to the favorable relationship between the independent variables and the total number of NBS foreign exchange reserves (the number of independent variables is 4, and the number of observations 32).

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.894[a]	.800	.770	165.949	.800	26.979	4	27	.000	.695

a. Predictors: (Constant), M3ECB, DeppovECB, M1ECB, M2ECB

b. Dependent Variable: DevrezNBS

Regarding the ANOVA procedure within the regression model, it examines the validity of the regression model from the statistical standpoint. This is about proving the hypothesis that:

$$H_0: R^2 = 0 \text{ ili } H_1: R^2 \neq 0$$

Based on the output results in the Sig. = 0,000 column, the conclusion is that the zero hypothesis is rejected and that the coefficient of determination is greater than 0, which has been proven. This confirms that the regression model explains a significant amount of variability of the dependent variable.

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2971904.495	4	742976.124	26.979	.000[a]
	Residual	743550.974	27	27538.925		
	Total	3715455.469	31			

a. Predictors: (Constant), M3ECB, DeppovECB, M1ECB, M2ECB

b. Dependent Variable: DevrezNBS

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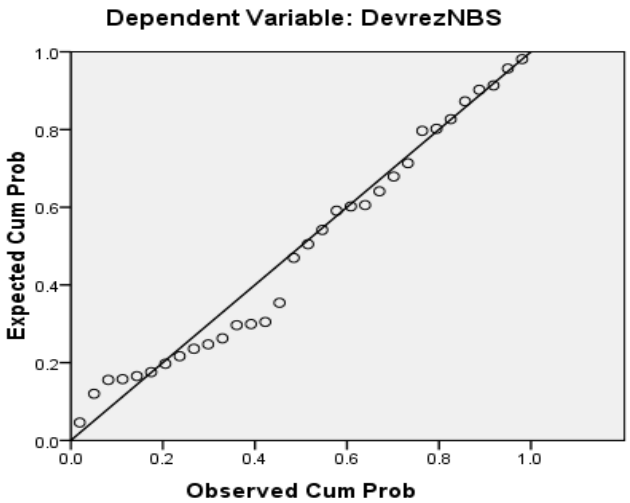
In the last table of coefficients, standardized beta coefficients are noted that show the significance of the influence of individual independent variables on the dependent variable. In fact, these coefficients reduce independent variables to identical phenomena, so that all independent variables are treated the same way with the same scaling scale. Quite logically, some values of the β coefficients are negative, which is consistent with the correlation coefficients from the results shown above. As for factors affecting foreign exchange reserves, the monetary aggregate M1 ECB takes over for the greater primacy in relation to the progress of others.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	29024.613	10619.055		2.733	.011	7236.112	50813.114					
	Deppov ECB	-.005	.000	-1.184	-9.361	.000	-.006	-.004	-.606	-.874	-.806	.463	2.160
	M1ECB	.002	.002	3.258	1.281	.211	-.001	.006	-.191	.239	.110	.001	872.388
	M2ECB	-.006	.002	-7.231	-2.815	.009	-.011	-.002	-.196	-.476	-.242	.001	890.329
	M3ECB	.003	.001	3.198	3.019	.005	.001	.005	-.223	.502	.260	.007	151.400

a. Dependent Variable: DevrezNBS

The distribution of residuals on the P-P Plot and on the dispersion diagram shows the absence of a normal distribution of residuals in the form of rectangles and the formation of the residual curve line on the scattering diagram. In this way, the existence of heteroskedasticity is confirmed.



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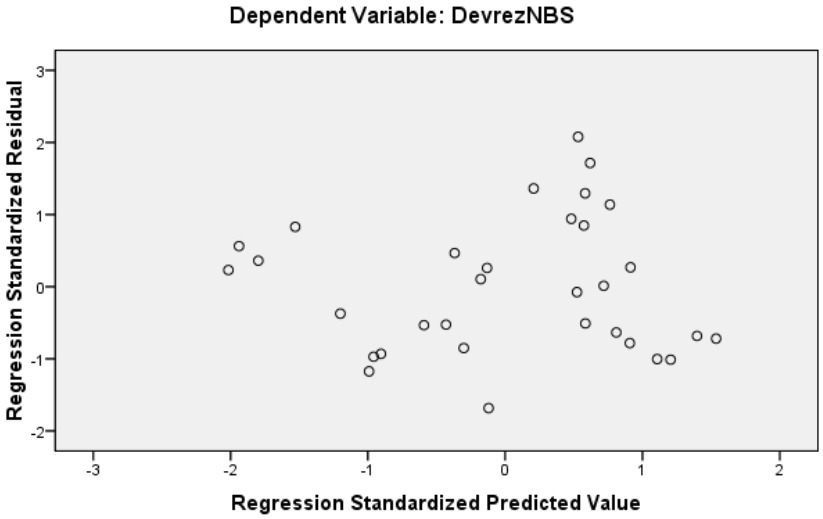

Source:Authors' estimation

5. Conclusion

The Central Bank has dominant position in organizing, directing and regulating the contemporary financial flows of all countries of the world. Central banks have a number of functions, and among the most important is the conduct of monetary policy. The Central Bank is a state institution that oversees the banking system and is responsible for the amount of money and loans that exist in the economy as a whole.

Monetary policy is the basic task of regulating the amount of money in circulation, maintaining a balance between commodity and money funds, to enable the smooth flow of goods traffic and stable economic flows. Monetary policy uses a number of instruments in performing the basic function, regulating the necessary amount of money in the economy. The monetary and economic stability of the country depends on their type, number and efficiency, as well as achieving the envisaged rate of its economic growth.

Comparative analysis of the practices and policies of the National Bank of Serbia and the European Central Bank can further strain further measures and policies of the NBS towards the proclaimed criteria of convergence of the European Union. In the further management of monetary policy, the National Bank of Serbia, in addition to suppressing inflationary tendencies and expectations, needs to focus more on the harmonization of its regulations and practices with the regulations of the European Monetary Union. Also, in order to fulfill the conditions and criteria for introducing the euro as a single currency, it is necessary to achieve a larger role of open market operations as an instrument of monetary policy, with a special emphasis on fine-tuning. Insisting on greater institutional, operational and personal independence in the work of the National Bank of Serbia is something that makes up the modern functioning of a central bank to which should strive and continually improve.

In essence, the functions of the National Bank of Serbia should be reduced to achieving quantitative (regulation of the required amount of money) and qualitative (structure of money and credit) objectives and tasks. The efficiency of achieving these functions can generally be gained through the level of inflation as a

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synthetic indicator of the general state of the economy. In close connection with the exercise of its functions, it is important to underline that monetary policy can - in no case - be an element of socialization of risk in the economy.

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