

THE COORDINATION OF FISCAL AND MONETARY POLICIES IN DEVELOPING COUNTRIES. THE CASE OF ROMANIA

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Abstract: *The coordination of fiscal and monetary policies plays an important role in achieving sustainable growth and macroeconomic stability. Although monetary and fiscal policies are considered to be independent, they have the same objectives. There is no agreement in the literature on the hierarchy of the two policies, so their coordination remains in the responsibility of each country. Moreover the economic, political and social situation of each country dictates the mix of the two policies. From a doctrinal point of view, the Keynesians find fiscal policy more effective, while the monetarists conclude that monetary policy has priority. The present paper explores the level of coordination between fiscal and monetary policies in Romania during 2004-2016 using the Set Theoretic Approach (STA). Following the established typologies of the nature of research, this study combines elements from both, the theoretical and empirical sides. In its turn, the empirical research has a qualitative nature combined with quantitative elements. The quantitative nature is given by the analysis of times series on the following macroeconomic variables: budget deficit (percentage of GDP), money supply (percentage of GDP), annual inflation rate and annual GDP. To determine the correlation between the two policies, the GDP, inflation, money supply and the budget deficit are analysed. The econometric methodologies used were applied in RStudio program using time series for the selected indicators. In the first phase, ADF, PP and the KPSS root unit tests were made on the indicators, establishing if the data is stationary. Further on, using the Granger Causality Test, the relationship between the budget deficit and the money supply is discussed. The main findings, according to the STA methodology, generally indicate a weak level of policy coordination estimated to be 30%. A cause for poor coordination of fiscal and monetary, for Romania's case, could be the lack of institutions to ensure good communication and collaboration between authorities. It is worth underlining that in the current context of Romania, solutions must come from a healthy economic vision, based on responsible economic governance. Also, strengthening confidence in public institutions and economic policies are the bases for further development.*

Keywords: *Monetary policy; fiscal policy; policy coordination; governance.*

JEL Classification: *E52; E62.*

1. Literature review

Monetary and fiscal policies as part of macroeconomic policy are subordinated to the fulfilment of its objectives, e.g. economic growth, full employment, price stability, and should support, even indirectly and undeclared, the long term development of a country.

Although fiscal and monetary policies are considered to be independent, they have the same purposes. Decision-makers have at their disposal instruments that can shape and influence these policies toward achieving the stated goals. The manner in which policies interlink is known as coordination. The coordination of monetary and fiscal policies has a long history and is based on well-known economic theories. According to Sargent and Wallace (1981) the above policies interact as a whole. Further on, Sargent (1987) argues that the best way to study the interactions between fiscal and monetary policy is to involve the central bank and authorities in a standard “chicken game”, in which there can be only one winner. Regarding the models used for macroeconomic policy-making, the most important is Mundell-Fleming (1963). This macroeconomic model can be applied in a democratic state with a market economy and is a generalization of the classic-Keynesian model developed by J. Hicks (1937).

There is no agreement in the literature on the hierarchy of the two policies, so their coordination remains in the responsibility of each country. Moreover the economic, political and social situation of each state dictates the mix of the two policies. From a doctrinal point of view, the Keynesians find fiscal policy more effective, while the monetarists conclude that monetary policy takes precedence.

Given the importance of fiscal and monetary policies for the long term economic development, it is necessary to quantify the level of coordination between the two policies. *The hypothesis of the present paper is to measure the coordination degree between monetary and fiscal policies for Romania's case in the period 2004-2016.* This hypothesis is based on three essential questions: Firstly, which of the two authorities responsible for policy making has the privilege of the first step? Secondly, what is Romania's situation regarding the coordination of the two policies? And thirdly, what is the solution if the two policies pursue the same objectives but in a different way?

Considering the purpose of this paper and the three questions that derived from it, is necessary to review the evolution of fiscal and monetary policies in Romania in the first part and to measure the level of coordination of these policies, in the second part.

Following the established typologies of the nature of research, this study combines elements of a theoretical and empirical nature. In its turn, empirical research has a qualitative nature combined with quantitative elements. The quantitative elements are given by the analysis of statistical data, time series, on the following macroeconomic variables: budget deficit (percentage of GDP), money supply (percentage of GDP), annual inflation rate and annual GDP. The database used in this study contains annual statistical surveys for the period 1995-2016, for the case of Romania. The source of data on the indicators used is the Eurostat database, National Bank of Romania, World Bank and the National Institute of Statistics.

The research methodology is based on the Set Theoretic Approach (STA) model. To support the hypothesis of the present paper the STA (Set Theoretical Approach) model was used. Despite the importance of the analysed topic, in providing macroeconomic balance, the available literature indicates only a few studies to determine the degree of policy coordination in Romania.

Caraiani (2012) in his study on macroeconomic policy coordination finds, a weak degree of interactions between fiscal and monetary policies.

Cazacu (2015) highlights in his research the importance of monetary and fiscal policy mix. In the analysis, the author integrates the monetary and budget shocks into a

self-regressive model of structural vectors (SVAR) for Romania's economy. The mix between the policies, as well as their impact on the production gap and inflation, is analysed through simultaneous and on the long-term. The results for the period 2000-2014 do not provide clear evidence of strategic interaction between monetary and fiscal authorities.

Following the literature review concerning the coordination of the fiscal and monetary policies, we have identified that most of the studies are carried out using autoregressive vectors (VAR). However, applying the same VAR model, with the same variables, can produce conflicting results. For this reason, the Set Theoretical Approach (STA) approach is used by Arby and Hanif (2010), Oboh (2017) and Englama et al. (2013) in their studies, in which they measure policy coordination in countries such as Nigeria and Pakistan.

These empirical evidence found in the literature, supports the present study, although analysed by different methods, the results are similar.

2. The evolution of monetary and fiscal policy in Romania

Monetary policy is coordinated by central banks and is achieved through the influence of monetary variables (e.g. monetary aggregates, interest rate, exchange rate) on economic ones (e.g. price level, gross domestic product, unemployment rate).

During the last decades, among academics and practitioners (central banks), there is a consensus that price stability is favourable to both emerging and developed economies and this responsibility falls on the authorities in charge of monetary policy.

Romania is part of the open emerging economies category and therefore the challenges of monetary policy in ensuring the objective of price stability is a difficult task. Price stability is achieved through inflation targeting. This strategy (inflation targeting) was implemented in Romania in 2005, and this decision was based on the need to weaken the relationship between monetary aggregates and inflation. Isărescu (2005) emphasized the need to calibrate monetary policy according to inflation, rather than through an intermediate target, in the context of the capital account liberalization.

Between 2009 and 2016, the NBR (National Bank of Romania) had implemented monetary policy decisions based on the disinflationary expectations of demand and the extension of the economic program agreed by Romania with the international financial institutions. Also the NBR constantly reduced the interest rate in this period determining a low inflation. These tendencies can be seen in Figure 1, below, that represents the Annual inflation rate (%) and the monetary policy interest rate (%) in Romania between 2000 and 2016. On the other hand, the low and negative (2015-2016) inflation indicator was a result of fiscal consolidation measures implemented by the government during the mentioned period (reduction of the VAT).

The inflation rose, and in 2017 had a positive slope. Despite all these events, inflation remained within the range of variation throughout the period.

The analysis of monetary policy reveals the strong impact of fiscal measures over the goal of price stability (inflation) assumed by the NBR. We can conclude that there are notable interdependencies between government actions and measures adopted by the NBR Board.

The fiscal policy is conducted by government authorities through public revenue and spending. This is an important governmental leverage for managing the economy and having the capacity to influence the evolution of GDP.

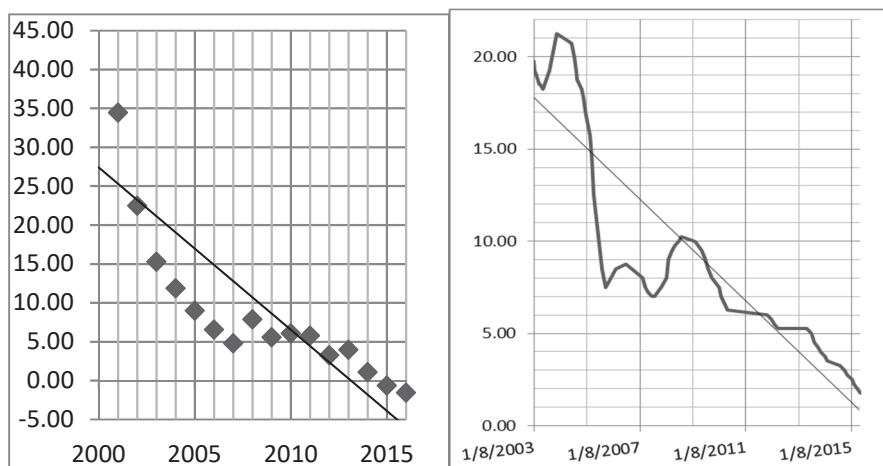


Figure 1: Annual inflation rate and the monetary policy interest rate (%) in Romania
Source: Graphic representation based on data obtained from NBR

The fiscal policy on the economic growth phase in Romania before the crisis was an expansionist one and contributed to the strong imbalance of the whole system. Unfortunately, Romania missed the opportunity to create reserves on the boom phases as a measure of protection against a possible economic slowdown. Due to the fact that the fiscal-budgetary measures for the whole pre-crisis period did not concern the creation of a fiscal space, we can argue that Romania's fiscal position was relatively weak compared to other countries, such as Poland. Romania's weak fiscal position is rooted in the many inconsistencies in political decisions and frequent fiscal changes. A repercussion of this style has led to increased fiscal pressure on the business environment, so the private sector has suffered.

From the presented research it is possible to synthesize the following idea, regarding the macroeconomic decisions in Romania, the fiscal policy (influenced by the political factor) adopts a series of measures (some strongly criticized) and the NBR has to adapt to achieve the primary objective (price stability), but also for economic stability, a classic example of a "chicken game", explained in theory by Sargent (1987).

3. Results and discussions

3.1. Descriptive statistics

Implementing the STA model requires first of all, the use of descriptive statistics for two of the variables money supply and budget deficit. The descriptive statistics tests provide an overview over the distribution of time series data used.

The first indicator being analysed is the monetary indicator. The numerical method for descriptive statistical tests is as follows: the average is 36.58 percent of GDP, registering a maximum of 41.25 percent of GDP in 2016 and a minimum of 31.9 percent of GDP in 2006. The D'Agostino skewness test has a value of -0.20, which

is less than 0, resulting that the distribution is approximately symmetric. The Anscombe-Glynn Kurtosis test has a value of 1.81 which is less than 3, and would show a platykurtic distribution (but not excessive). Given that the differences are not very high between the results and the recommended values, we can say that the data has a normal distribution. Below we can see the distribution of statistical observations on the money supply and the evolution over time. The data on money supply shows an upward trend (Figure 2).

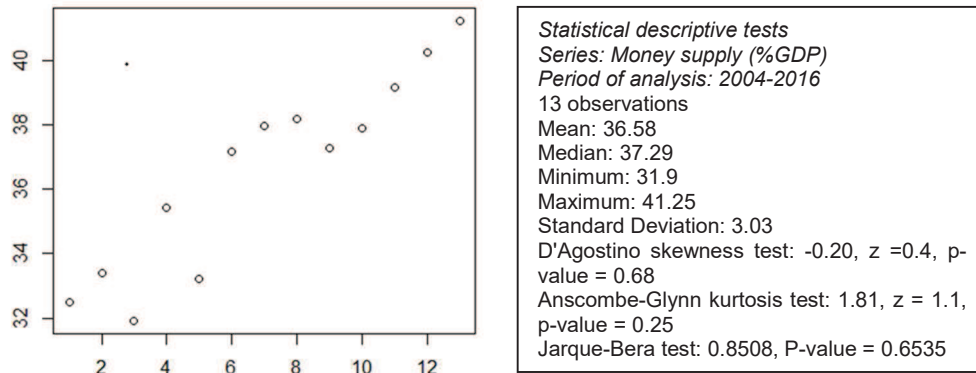


Figure 2: Distribution of statistical observations and descriptive statistics of the money supply

Source: Interpretation of data obtained from World Bank in the Rstudio program

It can be noticed that in Romania, the highest frequency of the budget deficit is between -2, -4. This is positive given that Romania, through the Maastricht Treaty, has committed itself to the budget deficit not exceeding 3 percent of GDP.

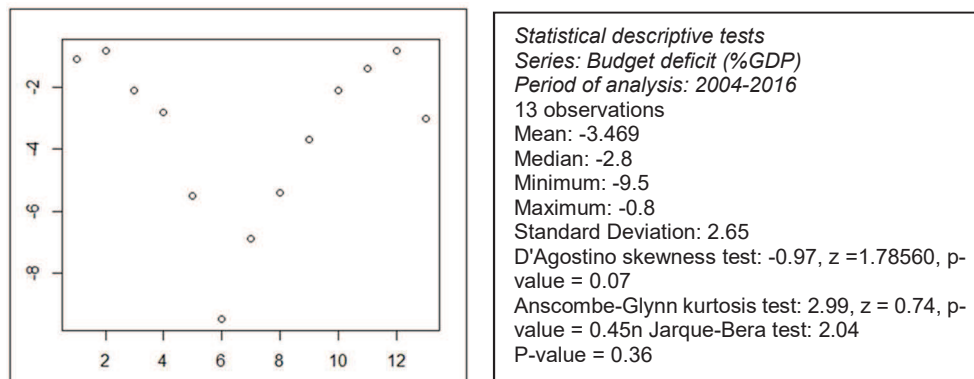


Figure 3: Distribution of statistical observations and descriptive statistics on budget deficit

Source: Interpretation of data obtained from Eurostat in the Rstudio program

In addition to the graphical method, we also applied the numerical method for descriptive analysis of statistical data. The minimum value of the budget deficit is

recorded at -9.5 in 2009, which coincides with the peak of the economic crisis, and the maximum value is registered in 2015 by -0.8. The standard deviation is 2.65. The D'Agostino skewness test has a value of -0.97, which is less than 0, resulting in the distribution being tilted to the right, containing more extreme values to the left. The Anscombe-Glynn Kurtosis test has a value of 2.99, which is less than 3 and involves a platykurtic distribution, sharper than a normal distribution.

3.2. Unit root tests

After we have applied the descriptive statistics tests, in this second stage, we apply the unit root tests. To conduct research through causality tests, we first need to perform unit root tests on data on budget deficit and money supply. Applying these tests is one of the key requirements for using time series. For this purpose, we applied the following tests: The Augmented Dickey Fuller (ADF), Philips-Perron test and the KPSS test, developed by Kwiatkowski, Phillips, Schmidt and Shin. The results of the ADF, PP and KPSS test are presented in Table 1. All the data series are stationary in the first difference.

Table 1: Augmented Dickey Fuller, Philips Perron and KPSS stationary test results

Tests	ADF (t-statistic)		PP (z-statistic)		KPSS (t-critic)	
	Original series	First difference	Original series	First difference	Original series	First difference
Budget deficit	-2.17	-1.77*	-4.13	-8.78*	0.26*	0.212*
Money supply	-2.05	-1.07*	-14.94	-17.73**	1.14***	0.035*

“Note: *, ** and *** denote significance at 1%, 5% and 1% levels of probability.”

3.3. Causality tests

Taking into account the results of unit root tests, the next step is to apply the Granger causality test between the two variables are: budget deficit and money supply. For the STA model, a preliminary analysis is needed to determine the operational independence of fiscal and monetary policies. The Granger causality test assumes that if the past values of a variable y contribute significantly to determining the current and future values of the variable x, then it is said that y is a Granger cause of x.

The Pair Granger causality test is intended to determine whether there is a causal relationship between the money supply and the budget deficit. As shown in Table 4, the money supply does not contribute to a budget deficit, and the budget deficit does not lead to changes in the monetary mass, therefore the null hypothesis is accepted.

Table 2: Granger Causality Pair Tests

Null hypothesis	F-statistic	Probability
Money supply does not cause any changes to the budget deficit	0.1163	0.7409
The budget deficit does not cause future changes to the money supply	0.3384	0.7257

Sample: 2004-2016; Nr. Observations = 13; Lags = 2.

As a result of the tests carried out, it can be established that the indicators for the monetary and fiscal policies analysed in the study are independent. Taking this matter into account we can determine the coordination of the two policies.

3.4. The Set Theoretical Approach model

The Set Theoretical Approach (STA) adopts set theory to model explicit coordination. In order to determine the degree of coordination of the fiscal and monetary, two matrices are built.

The first is the matrix of the macroeconomic situation, while the second is the matrix on the responses of fiscal and monetary policies. As policies are expected to cause a substantial change in output and inflation growth, the impact on economic growth is measured as real GDP deviations from the average sample. Similarly, an inflation shock is any value of this indicator that exceeds the target range variation assumed for each year of analysis.

The monetary policy variable is a change in the money supply, while the fiscal policy variable is a change in the annual budget deficit. A change or a positive value indicates an expansionist policy, while a change or negative value indicates a restrictive policy. By comparing the matrix of the macroeconomic situation with the matrix of fiscal and monetary policy responses, we identify the number of years in which shocks occur (Arby and Hanif, 2010)

Table 3 presents the macroeconomic environment matrix for Romania, identifying the shocks on inflation and economic growth.

The method of interpreting or classifying the years in the "positive" or "negative" category is as follows the year is in the "positive" category when inflation in one year exceeded the range of variation and the year is in the "negative" category when the inflation values remain within the range of variation.

Regarding the shocks in growth (fiscal policy target) the classification is as follows: the year is classified as "positive" when GDP is above the average of the years surveyed and the year is in the "negative" category when the GDP is below the average of the years surveyed.

The "PP" cell indicates the years in which the deviations from the average values of the indicators studied are positive. Similarly, the "NN" cell indicates the years in which GDP and inflation diverge negatively from the average and threshold values. The "PN" cell shows the years when the real GDP growth was higher than the average and the inflation was lower than the threshold. Finally, the "NP" cell represents the years when the macroeconomic situation in Romania was characterized by a decrease in GDP and an increase in inflation.

Table 3: The macroeconomic for Romania (2004-2016)

Shocks to growth (GDP) (Fiscal Policy Target)		Shocks to inflation (Monetary Policy target)	
		Pozitive (P)	Negative (N)
		Pozitive (P)	PP: 2008, 2010, 2011, 2013
Negative (N)	NP: 2004, 2005, 2006, 2009	NN: 2007	

Table 4 contains the macroeconomic policy response matrix for Romania (2004-2016). The "CC" cell contains the years in which both the budget deficit and the

money supply declined, implying the response of both policies to the positive macroeconomic shock. In the same vein, the "EE" cell indicates years in which both the budget deficit and the money supply have increased, indicating that fiscal and monetary authorities have begun to adopt an expansionist policy in response to negative shocks. The "CE" cell shows the years when the budget deficit figures have fallen and the monetary values have risen. The "EC" cell shows the years when the situation was the reverse of the "CE" cell. Then, the degree of coordination between monetary and fiscal policies is calculated based on the distribution of the years, as shown in Table 5.

Table 4: Macroeconomic Policy Response for Romania (2004-2016)

Policy response			Monetary Policy Response	
			Contraction (C)	Expansion (E)
Fiscal Policy Response	Contraction (C)	CC: 2004, 2012	CE: 2005, 2010, 2011, 2013, 2014, 2015	
	Expansion (E)	EC: 2006, 2008,	EE: 2007, 2009, 2016	

The level of coordination for each of the four economic environments is calculated as follows:

$$p = n(PP \cap CC) + n(PN \cap CE) + n(NP \cap EC) + n(NN \cap EE) = 0 + 2 + 1 + 1 = 4. \quad (1)$$

$$C = p/\tau = 4/13 = 0.3 \text{ or } 30\% \quad (2)$$

τ = number of years in the study.

From the calculation the coordination between the two policies is 30%.

Table 5. Years of Coordination and Non-Coordination

Years of coordination of monetary and fiscal policies 2006, 2007, 2014, 2015
Years of non-coordination of monetary and fiscal policies 2004, 2005, 2008, 2009, 2010, 2011, 2012, 2013, 2016

According to the results, the degree of coordination between fiscal and monetary policies, measured by changing policy indicators in response to economic shocks for the study period, is 0.30. Therefore, the degree of coordination during the analysed period can be considered weak. If the index was higher than 0.5 there would have been an average coordination.

4. Conclusions

The study quantifies the degree of coordination of fiscal and monetary policies in Romania, using the STA approach with time series data covering the years 2004 and 2016. The empirical analysis shows a low level of coordination between the two policies. After the implementation of the measurements through the changes in policy indicators in response to economic shocks, the extent of policy coordination for the study period was estimated at 30%. The data is annual, resulting in a maximum of 13 observations for each variable. In the first stage, root unit tests were used to test the two variables. Based on the results obtained in the first phase of the

analysis, in which we tested the existence of unit root for the variables with the ADF, PP and KPSS tests, we can state that between 2004 and 2016 variables I(1) are stationary. Further on the Granger causality test shows a probability of 74% for no causality between the money supply and the deficit was found and 72% probability for no causality between the deficit and the money supply. With these probabilities the null hypothesis is accepted, according to which the two variables are not influenced in future values.

The fact that we have applied the root tests at a relatively small amount of time can influence the accuracy of the tests. However, we have opted for annual data, to the detriment of quarterly ones, which would have increased the number of observations in the time series as they tend to imply certain constraints over the time period. So we chose a baseline with fewer observations, but more relevant to the subject of the study.

The study showed that no coordination was taking place during periods of high GDP growth and inflation. The years in which the two policies were coordinated in Romania were 2006, 2007, 2014 and 2015.

A cause for poor coordination of monetary and fiscal policies, for Romania's case, could be the lack of institutions to ensure good communication between authorities. In this regard, the National Committee for Macroprudential Supervision was formed. The aim of this committee is to ensure first of all coordination in the field of macroprudential supervision at national level. In particular, a correlation between monetary and fiscal policies is desirable. This deduction is based on the fact that macroprudential oversight pursues financial stability by implementing suitable instruments. Coordinating the monetary and the fiscal policies for ensuring financial stability is a first economic step towards Romania's long term development. Following the empirical study and assuming that coordination of fiscal and monetary policies leads to sustainable growth, we can conclude that Romania still has many goals to achieve, such as: adopting legislative frameworks, educating the population, steady economic growth, maintaining budgetary deficits within the Maastricht convergence criteria, contribute to the medium and long term in achieving sustainable development.

It is worth underlining that in the current context of Romania, solutions must come from a healthy economic vision, based on responsible economic governance. Strengthening confidence in public institutions and economic policies are the bases for further development. Deciding authorities need to implement a long-term strategy that goes beyond the short term and the quantitative side in favour of qualitative approaches with a longer time perspective for the economic development of Romania.

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