

Lidija Madžar<sup>1</sup>  
Alfa BK University, Belgrade  
Faculty of Finance, Banking and Auditing

ORIGINAL SCIENTIFIC ARTICLE  
DOI: 10.5937/ekonomika2304055M  
Received: September, 23. 2023.  
Accepted: December, 22. 2023.

## TESTING THE MONETARY TRILEMMA THEORY ON THE EXAMPLE OF SERBIA<sup>2</sup>

### Abstract

*Monetary trilemma (MT) is an economic concept based on the idea that a country cannot concurrently have exchange rate stability, free capital flows and monetary independence, which is why it has to choose two of these three available options. The purpose of this article is to determine the validity of the MT hypothesis in Serbia, in the period from 2006 to 2022. After constructing the MT measures, the article approaches to multiple linear regression with the aim of establishing the binding relations among these variables. Serbia has a stable exchange rate policy and extensive capital flow controls, as well as monetary independence that could be much greater. Serbia appears to have voluntarily given up its monetary autonomy in favour of its exchange rate stability and financial closure. The originality of this article stems from the novel approach to this issues, being informative for domestic policy makers in their further policy considerations.*

**Key words:** *monetary trilemma, exchange rate stability, financial openness, monetary independence, Serbia, linear regression.*

**JEL classification:** *E12, E42, E52, E62, O24*

## ТЕСТИРАЊЕ ТЕОРИЈЕ МОНЕТАРНЕ ТРИЛЕМЕ НА ПРИМЕРУ СРБИЈЕ

### Апстракт

*Монетарна трилема (MT) је економски концепт који се заснива на идеји о томе да земља не може истовремено да има стабилност девизног курса, слободу токова капитала и монетарну независност, због чега мора да изабере две од ове три расположиве опције. Сврха овог чланка је да утврди валидност хипотезе о деловању MT у Србији, у периоду од 2006. до 2022. године. Након конструкције мера MT, у чланку се спроводи вишеструка линеарна регресија са циљем утврђивања природе везе између ових варијабли. Србија се карактерише стабилном политиком девизног курса и обимним мерама контроле токова*

<sup>1</sup> lidi.madzar@gmail.com, ORCID ID 0000-0002-1708-5683

<sup>2</sup> This article is a part of the research results on project U 01/2023 Green economy in the era of digitization, realized by Faculty of Finance, Banking and Auditing, Alfa BK University from Belgrade, Serbia.

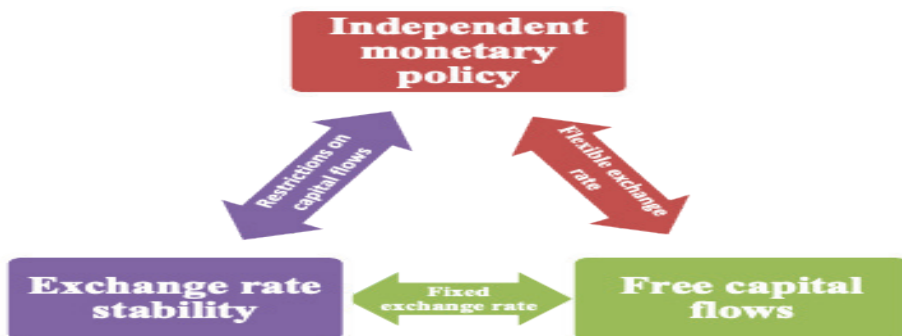
капитала, као и монетарном независношћу која би могла да буде далеко већа. Наиме, чини се да се Србија добровољно одрекла своје монетарне аутономије у корист стабилности свог девизног курса и финансијске затворености. Оригиналност овог чланка протиче из потпуно новог приступа овим питањима, из чега и произилази његов значај за креаторе домаће монетарне политике у њиховим даљим разматрањима.

**Кључне речи:** монетарна трилема, стабилност девизног курса, финансијска отвореност, монетарна независност, Србија, линеарна регесија.

## Introduction

The Monetary trilemma is a term in economic theory that indicates that a country has three equal options at its disposal when conducting its monetary and economic policy. These three goals of economic policy include: a) exchange rate stability, b) freedom of cross-border capital flows, i.e. financial integration, and c) independent monetary policy. Although the trilemma indicates that the country is faced with three possible policy choices, these options are mutually conflicting and exclusive because they cannot be all realized at the same time. Therefore, the trilemma suggests that a country can in a given time pursue and choose between any two of the three offered monetary policy objectives. The Monetary trilemma, or the so-called *Impossible trinity*, has its foundation in the Mundell-Fleming trilemma model, which indicates inherent instability during the simultaneous application of all three available policy options within the framework of the country's monetary policy (Tica, Globan & Arčabić, 2019, p. 63). In this way, the vertices of an imaginary triangle, as illustrated in Figure 1, can also represent these available and mutually exclusive economic and monetary policy options.

Figure 1: Policy choices in the Monetary trilemma issue



Source: Rieber (2017)

Thus, the Mundell-Fleming trilemma framework suggests that in a regime of free capital flows and a fixed exchange rate, the central bank cannot have monetary autonomy, nor it can contribute to the internal stabilization goals of its economic policy.

For example, when a country pursues a policy of fixed exchange rate and financial openness, its interest rate must follow the interest rate of the base country, in which case it gives up its monetary autonomy. Conversely, if a country does not peg its interest rate to the interest rate of the base country and has a liberal capital account, it breaks the peg, thus achieving its monetary independence, but it may at the same time deter investors from further investments, thus generating domestic currency depreciation. Another implication of the Mundell-Fleming trilemma is that in the case of closed capital flows or a flexible exchange rate, a country should be able to achieve its domestic economic and monetary policy objectives. In this way, and according to the postulates of the Monetary trilemma model, a flexible exchange rate compared to a fixed exchange rate gives the economy a certain amount of agility and freedom, whenever it has a need for an inflow of fresh capital (Carmi, 2020, p. 14).

In the context of this article, monetary policy independence is perceived as the ability of the central bank to set independently its interest rates from the movement of the interest rate in the base country (Aizenman, Chinn & Ito, 2012, pp. 6-7), as well as a capability of realization of the defined objectives of its monetary policy. At the same time, the choice of exchange rate regime represents a fundamental macroeconomic issue, especially in small open economies that need fresh capital inflows. This article is dedicated to testing the hypothesis about the Monetary trilemma functioning in the Republic of Serbia (RS), as a good example of small open economy, in the period from 2006 to 2022 for which there are available data. Thus, the time horizon under investigation includes the beginning of the 21st century when Serbia, after its period of international isolation from the 1990s, opened up and began its extensive economic reforms. However, this period has broader implications as it includes stages of large capital inflows and substantial appreciation of its real exchange rate (Petrović & Gligorić, 2010, pp. 23-24), especially in the wake of and after the global financial crisis of 2008, but also the recent global health *Covid-19* and Ukrainian crisis.

The next section of the article provides a brief literature overview on the *Impossible trinity* of macroeconomic policies, while the third one explains the construction of the Monetary trilemma measures used in this analysis. The fourth section discusses the obtained results, while the last section concludes the article, with a hint of the general characteristics and problems of the current monetary policy framework in Serbia. The scientific contribution of this article is reflected in its novelty, as well as in the fact that, at least according to the author's knowledge, no one has investigated the issue of Monetary trilemma in Serbia.

## Theoretical Backgrounds

Up to this point, many authors have researched and addressed the issue of the Monetary trilemma and its feasibility in practice. As already indicated, the Monetary trilemma theory is often attributed to Robert Mundell and Marcus Fleming, who, in the middle of the last century, completely separately described the relationships among the stability of the exchange rate, the freedom of cross-border capital flows, and the autonomy of monetary policy. However, Maurice Obstfeld and Alan M. Taylor, who presented the modern Monetary trilemma model in their epoch-making article from 1997, laid its deeper foundations. Obstfeld and Taylor

(1997) studied the impact of global capital market integration on the trend of international capital mobility in the period from the 19th to the end of the 20th century, with an extensive discussion of capital movement controls and the achievement of domestic policy goals under conditions of changing monetary regimes. They were the first who introduced the notion of the macroeconomic policy trilemma, which forces policy makers to make trade-offs among these mutually conflicting economic policy goals. The goal of capital mobility prevailed in the circumstances of broad policy support for conducting a monetary policy subordinated to the exchange rate, as well as in the conditions of a monetary regime put in the service of fulfilling domestic policy goals, at the expense of exchange rate stability (Obstfeld & Taylor, 1997, p. 1).

In their somewhat later article, Obstfeld, Shambaugh and Taylor (2004, p. 75) conclude that even in the disordered period between World War I and World War II, economic policy was burdened with a choice among a fixed exchange rate policy, open capital markets, and independent monetary policy. Later, Obstfeld, Shambaugh and Taylor (2008, pp. 1-9) broadened the scope of their analysis and examined the role of rapid growth in international reserves in the contemporary era of globalized capital markets. They concluded that the share of domestic financial obligations ( $M_2$ ) in GDP, financial openness, the possibility of accessing foreign currency, and the exchange rate regime are among the main factors of holding foreign exchange reserves. All these factors are very important, while they multiply and mutually compound each other in their impact on the level of international reserves of a given country. Here again, the role of the Monetary trilemma comes to the fore, but in a somewhat different context. From this aspect, the demand for central bank reserves in its role as lender of last resort (LLR) is growing in all those economies where there is a risk of capital flight. The role of holding international foreign exchange reserves goes even further, indicating that they represent a key instrument for managing domestic financial instability, as well as a key tool for defending the exchange rate in conditions of increasingly strong financial globalization. In addition to affecting terms of exchange and improving the trade balance, foreign exchange reserves protect the domestic banking sector and credit markets, and thus prevent the depreciation of the national currency.

Among others, the authors Helen Rey and Joshua Aizenman further expanded the scope of this analysis, pointing out its complexity in the conditions of contemporary global capital flows. Aizenman, Chinn and Ito (2013, pp. 447-458) introduced entirely new measures for measuring key aspects of the Monetary trilemma (metrics of exchange rate flexibility, monetary independence, and capital account openness), also considering the role of significant accumulation of international reserves that has taken place since the beginning of the 21st century. The authors, by testing the linearity of the *binding* Monetary trilemma model, provided substantial empirical evidence of the existence of an *Impossible trinity* of the three aforementioned macroeconomic policy objectives. In their more recent paper, Aizenman, Chinn and Ito (2022, pp. 24-27) also introduce international reserves as a fourth variable, turning the trilemma of essential macroeconomic policies into a kind of *Monetary quadrilemma*. They point out that economic policy makers change its goals and configurations with the aim of stabilizing economic and financial conditions or minimizing vulnerability. In a financially highly globalized world, in addition to these three mutually exclusive standard goals, the holding of international reserves also plays an important role since they serve as a tool to ensure liquidity. The authors finally conclude that, in general, developing countries increased their foreign exchange reserves after the Asian Financial

Crisis (AFC), which especially applies to those ones that were exposed to higher terms of trade (TOT) shocks and higher rates of economic decline. Their findings indicate that holding international reserves is a good incentive to insure against some future financial crisis.

Finally, Helen Rey (2015) recently challenged the existence of the Monetary policy trilemma, pointing out that regardless of whether a country implements a fixed or flexible exchange rate regime, there is only a *Monetary dilemma* that refers to the choice between free cross-border capital flows and independent monetary policy. Rey emphasizes that in the conditions of the global capital flows financial cycle, asset prices and credit expansion, countries with greater capital inflows become more sensitive to its components. At the same time, the global financial cycle is not adapted to the economic specificities of the given country, leading to a possible excessive growth of the volume of loans and to the asset bubble bursting, and therefore to potential financial crises. Since in circumstances of capital mobility the global financial cycle constraints domestic monetary policies, the trilemma turns into a dilemma suggesting that monetary autonomy is possible only in the presence of imposed controls on the capital account. Rey (2013) concludes that, in addition to implementing capital control measures, the issue of monetary dilemma and financial instability can probably be solved by directly targeting the source of the problem, i.e. of excessive leverage and abundant credit expansion.

### Construction of the Monetary Trilemma Metrics

The purpose of this article is to determine the validity of the hypothesis of Monetary trilemma in the case of Serbia, in the period from 2006 to 2022 for which there are available data. The methodology for calculating the indicators of the Monetary trilemma is taken from the article by Aizenman et al. (2013, pp. 448-449). In doing so, the data used are derived from the IMF's International Financial Statistics database and the IMF's relevant Annual Reports on Exchange Arrangements and Exchange Restrictions (AREAER). As already mentioned, monetary independence is treated as a deviation of the domestic interest rate from the interest rate of the base country (Cevik & Zhu, 2019, p. 6). For this purpose, the Index of the extent of monetary independence (MI) was used, which is calculated based on the annual correlations between monthly money market rates in Serbia and the Eurozone as the currency area to which Serbia has unofficially pegged its currency. In addition, the European Union (EU) is Serbia's largest trading partner, while the euro is often used as the currency of denomination. Thus, the MI index is calculated based on the following formula:

$$MI_t = 1 - \frac{\text{corr}(i_i, i_j) + 1}{2} \quad (1)$$

where  $i_i$  indicates the domestic money market rate, while  $i_j$  indicates the Eurozone money market rate. The MI index ranges from 0 to 1. While its lower values suggest monetary policy dependence, higher values of this indicator imply greater monetary autonomy levels.

The stability of the exchange rate is calculated by the Index of exchange rate stability (ERS) in the form of the annual standard deviations of the dinar monthly exchange rates against the euro in the observed period, based on the following mathematical expression:

$$ERS_t = \frac{0.01}{0.01 + \text{stdev}(\Delta(\log(\text{exch\_rate}))} \quad (2)$$

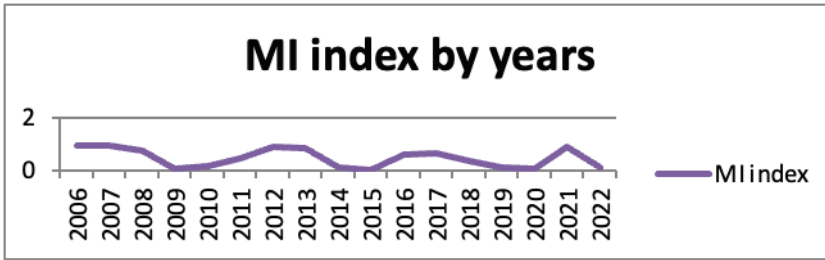
The ERS index also has a range from 0 to 1, where higher values of this index indicate a more stable trend of the dinar exchange rate against the euro. This variable was further coded in such a way that if the monthly rate of the exchange rate change stayed within its bounds of  $\pm 0.33\%$ , the exchange rate was treated as fixed and assigned a value of 1. On the other hand, if its monthly rate of change went out of its bounds of  $\pm 0.33\%$ , the exchange rate of the Serbian dinar was perceived as flexible and was assigned a code of 0. Furthermore, if the exchange rate of the dinar during 11 of the 12 months of a given calendar year had a percentage change of 0, it was considered fixed exchange rate for that observed year (code 1).

Following the approach of Aizenman et al. (2013, pp. 448-449) and Mody & Murshid (2005, pp. 254-255), the Index of financial openness, i.e. financial integration (KAOPEN index) was compiled based on data on imposed control measures on current and capital transactions from the IMF aforementioned AREAER documents for all observed years. The indicators that contributed to the construction of the KAOPEN index included the following variables: a) a variable indicating the presence of dual and/or multiple exchange rates ( $k_{1t}$ ), b) a variable indicating restrictions imposed on current account transactions ( $k_{2t}$ ), c) a variable indicating the restrictions imposed on capital account transactions ( $k_{3t}$ ), and d) a variable indicating the surrender of export proceeds and/or the earnings repatriation requirements ( $k_{4t}$ ). For this purpose, binary dummy variables were created based on the tabular presentation of restrictions on external accounts from the AREAER reports, with the note that their values were reversed to emphasize the effects of financial openness (code 1). On the other hand, the complete absence of financial integration was given the code 0. When it comes to the third variable ( $k_{3t}$ ), the paper covered all 13 categories of restrictions on the capital account, which mainly refer to the controls of the short-term and long-term capital market functioning, commercial and financial loans, granting guarantees, direct investments, personal capital and real estate transactions, as well as to the control of the credit institutions and institutional investors operations.

## Research Results and Discussions

Figure 2 clearly shows that in the observed time frame from 2006 to 2022, periods of monetary autonomy and absence of monetary independence alternated, with pronounced periods of monetary dependence, especially in the aftermath of the global financial crisis of 2008, during the *Covid-19* crisis and at the beginning of 2022 when the Ukrainian war began. The average value of the MI index in the observed period was 0.4637, indicating more the absence than the presence of monetary independence. At the same time, Serbia achieved its greatest monetary independence, measured by the deviation of the money market rate from the Eurozone money market rate, near the beginning of the observed period in 2007 (MI index = 0.9549). On the other hand, the country had the lowest monetary autonomy in 2015, when its MI index was only 0.0337. The average value of the MI index of Serbia was MI index = 0.4637, pointing to a moderately strong monetary dependence of the country in the observed period (Table 1).

Figure 2: The MI index trend by years



Source: Author's figure

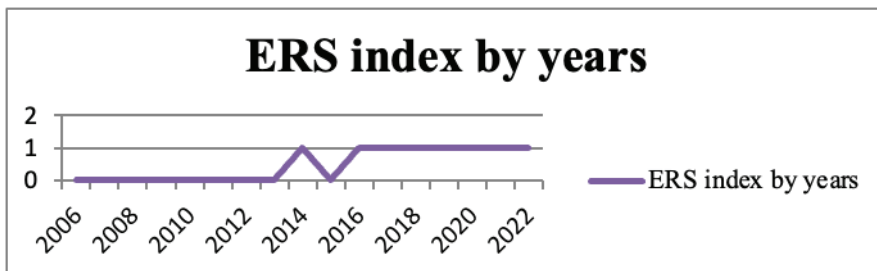
Table 1: Summary descriptive statistics of all Monetary trilemma variables in the period from 2006 to 2022

| Variables                 | Mean   | Median | Maximum | Minimum | Standard deviation |
|---------------------------|--------|--------|---------|---------|--------------------|
| MI index                  | 0.4637 | 0.4408 | 0.9549  | 0.0337  | 0.3651             |
| ERS index                 | 0.4829 | 0.0349 | 1.0000  | 0.0199  | 0.5026             |
| KAOPEN <sub>t</sub> index | 0.1124 | 0.1500 | 0.1500  | 0.0000  | 0.0452             |

Source: Author's calculations

In Figure 3, after a period of marked flexibility of the exchange rate (the code 0) and some fluctuations, a long-term growth trend of the ERS index can be observed, suggesting an increase in the stability of the dinar exchange rate in the observed period. The average value of the ERS index was 0.4829, also suggesting moderate stability of the dinar exchange rate against the euro (Table 1). At the same time, Serbia had the highest stability of its exchange rate, measured by the annual deviation of the monthly exchange rate of the dinar against the euro, in 2014 and in the period from 2016 to 2022, when the ERS index had a value of 1. On the other hand, the country experienced the highest recorded instability of its exchange rate in 2007, 2008 and 2010, immediately after the outbreak of the global financial crisis from 2008 (ERS index = 0.0199).

Figure 3: The ERS index trend by years



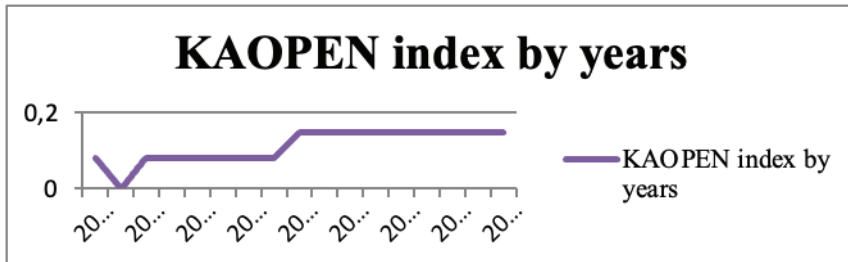
Source: Author's figure



For the purpose of clarification and construction of the  $KAOPEN_t$  index, Principal component analysis (PCA) was applied to all four variables included in this indicator. The goal of applying the PCA method was also to determine the variable that made the greatest contribution to explaining the variance of the data. In this way, the Financial openness index ( $KAOPEN_t$ ) of the Serbian economy was reduced to the first standardized principle component of the variables  $k_{1t}$ ,  $k_{2t}$ ,  $k_{3t}$  and  $k_{4t}$  in time  $t$ . Given the fact that there was no change in the variables  $k_{1t}$ ,  $k_{2t}$  and  $k_{4t}$  in the observed period, it was not even possible to implement their standardization and normalization, which is why the PCA method was applied to the variables on the level. Despite this, the first eigenvector of the constructed  $KAOPEN_t$  index amounted to  $(k_1, k_2, k_3, k_4) = (0.00, 0.00, 1.00, 0.00)$ , indicating that the variability of this indicator was largely determined by the third variable  $k_{3t}$  – restrictions imposed on capital account transactions.

The trend of the Serbian  $KAOPEN_t$  index in the observed period indicates considerable financial closure and the extensive presence of measures to control cross-border capital flows (Figure 4). The average value of the  $KAOPEN_t$  index was 0.1124 (Table 1), suggesting that throughout the observed period there were abundant capital flow control measures. At the same time, in 2007, the highest intensity of financial closure was recorded ( $KAOPEN_t = 0$ ), while in the period from 2014 to 2022, the financial openness of the Serbian economy was slightly higher ( $KAOPEN_t = 0.15$ ).

Figure 4: The  $KAOPEN_t$  index trend by years



Source: Author's figure

After applying the Augmented Dickey-Fuller (ADF) unit root test and determining the stationarity of all considered variables, in its next step, the article approached to testing the validity of the hypothesis about the existence of the Monetary trilemma in Serbia. In other words, at this point, the article focused on the examination of the mutually *binding* relationship among these variables in the context of the Monetary trilemma, that is, on the consideration of the question whether Serbia was faced with trade-offs based on an *Impossible trinity*. For this purpose, a specific functional form of the relationship among these three macroeconomic policy goals could be conceptualized, being expressed in a linear mathematical form. If it were the case, the linear expression of the trilemma would imply that the weighted sum of all three variables generates a constant number, in which case the growth of one of them would cause the fall of weighted sum of the other two variables. Therefore, following the approach of Aizenman et al. (2012, p. 18) and with the aim of testing the validity of the Monetary trilemma hypothesis in Serbia, the article uses the following linear



functional form (Equation 3) that equates the weighted sum of observed variables with a constant, i.e. in this case with the number 1:

$$aMI_t + bERS_t + cKAOPEN_t + \varepsilon_t = 1 \quad (3)$$

where a, b and c are the coefficients of the considered macroeconomic variables, while  $\varepsilon_t$  is the error term.

However, from the conducted regression analysis, and in accordance with the approach of Aizenman et al. (2012; 2013, & 2022), it follows that the Monetary trilemma hypothesis is not valid in the case of Serbia since very small values of the tests' validity parameters were obtained. More precisely, very small values of the adjusted coefficient of determination were obtained both in the case of simple ERS index calculation based on the Formula (2) above (Adjusted R-squared = 13.66%) and also in the case of the Coded ERS index calculation corrected for coding effects (Adjusted R-squared = 17.29%). These findings indicate that there is still no linear relationship between the observed variables. In addition, neither the values, nor the obtained probabilities of the F-statistics gave the expected results (Table 2). Serbia, especially in recent times, is characterized by a policy of stable exchange rate and controlled capital flows, but also by moderate monetary autonomy, which, at least according to the postulates of the Monetary trilemma theory, could be much greater.

Table 2: Results of the performed linear regression

| Variables                  | Model A – ERS index |            |             |        | Model B – Coded ERS index |            |             |        |
|----------------------------|---------------------|------------|-------------|--------|---------------------------|------------|-------------|--------|
|                            | Coeff.              | Std. error | t-Statistic | Prob.  | Coeff.                    | Std. error | t-Statistic | Prob.  |
| <b>ERS</b>                 | 0.1604              | 0.8079     | 0.1985      | 0.8455 | 0.2282                    | 0.2820     | 0.8094      | 0.4318 |
| <b>KAOPEN<sub>t</sub></b>  | -4.6240             | 3.7677     | -1.2273     | 0.2400 | -6.0315                   | 3.1342     | -1.9244     | 0.0749 |
| <b>C</b>                   | 0.8678*             | 0.3116     | 2.7849      | 0.0146 | 1.0311*                   | 0.2670     | 3.8615      | 0.0017 |
| <b>R-squared</b>           | 0.2445              |            |             |        | 0.2763                    |            |             |        |
| <b>Adjusted R-squared</b>  | 0.1366              |            |             |        | 0.1729                    |            |             |        |
| <b>F-statistic</b>         | 2.2658              |            |             |        | 2.6722                    |            |             |        |
| <b>Prob. (F-statistic)</b> | 0.1404              |            |             |        | 0.1040                    |            |             |        |

Note: \* indicate significance at the level of  $\alpha = 0.05$

Source: Author's calculations

Subsequent *post hoc* tests indicated the normality of the distribution of the residuals (Jarque-Bera = 0.9460,  $p = 0.6231 > 0.05$ ), the absence of serial correlation in the residuals of the estimated regression model (Breusch-Godfrey Serial Correlation LM test: F-statistic = 1.2183, Prob.(F(2,12)) = 0.3298 > 0.05) and the absence of heteroskedasticity (Breusch-Pagan-Godfrey heteroskedasticity test: F-statistic = 0.1197, Prob.(F(2,14)) = 0.8881 > 0.05). All these findings suggested that it is a valid and well-fitted model.

With these findings, the article did not fit with the research results of Aizenman et al. (2012; 2013, & 2022) and Obstfeld et al. (2004; 2008, & 2015) and only partially fitted in the findings of Rey (2013, & 2015), since in the regime of its stable exchange

rate, Serbia can still choose between the regime of financial openness and monetary independence. However, it seems that the country has simultaneously chosen its financial closure and low independence of its monetary policy. The objective limitation of this study is reflected in the relatively short time series given the availability of data for analysis. It is possible that with a slightly larger sample and a longer time horizon, the results of this research would be somewhat different. The other limitation of this research is also reflected in the fact that there was not enough space in the article to examine the influence of foreign exchange reserves on the management of the Monetary trilemma macroeconomic policies in Serbia. Therefore, the inclusion of international country reserves in these considerations could be the subject of some further future research.

### Concluding Remarks

This research has proven that Serbia, unlike many other countries, does not face the challenges of choosing two of the three policy options of the *Impossible monetary trinity*. In the observed period from 2006 to 2022, the country showed a gradual increase in exchange rate stability with pronounced and long-standing restrictions on the capital account, which was accompanied by a moderate absence of monetary autonomy, at least measured by the deviation of the domestic money market rate from the Eurozone money market rate. Although, according to the postulates of the Monetary trilemma theory, Serbia's monetary independence could be much greater, the latest AREAER report states that the country *de jure* implements a soft managed floating exchange rate regime, while in essence, i.e. *de facto* it is classified as a stabilized arrangement (IMF, 2023, pp. 3285-3286). This implies that the short-term dinar exchange rate has remained within its range of 2% for the last six months or longer, it does not float, and that its stability appears as a result of the actions of the official monetary authorities. All this further refers us to the conclusion that there is enough room left for the country to increase its monetary sovereignty, assuming that this stand is in line with the official and unofficial goals of its monetary and economic policy.

Serbia has been conducting a noticeable policy of a *de facto* fixed, i.e. stable exchange rate for a long time. At the same time, fixing the exchange rate actually implies renouncing of monetary autonomy and placing monetary policy in the function of its defence, thus essentially prioritizing the maintenance of the exchange rate in relation to inflationary goals, financial stability and economic growth. In this way, a fixed exchange rate leads to the absence of active monetary policy and monetary sovereignty, that is, to a kind of voluntary renunciation of the free management of domestic currency (Obradović, 2020), which can lead to the accumulation of numerous financial and economic difficulties. Namely, this kind of exchange rate regime, and especially its hard pegs, leads to the absence of an independent monetary policy because in such regimes it cannot be adjusted, while the country's interest rates are tied to those of the monetary anchor country (Stone, Anderson & Veyrune, 2008). Among other things, Serbia decided to adopt the *de facto* fixed exchange rate of the dinar due to the activities of various lobby groups and foreign investors, whose economic interests are favoured and supported by this kind of monetary regime (Šoškić, 2015, p. 18). These facts also explain the absence of a linear relationship among the observed variables, and therefore the non-functioning

of the Monetary trilemma in Serbia. Namely, it seems that Serbia, in its quest for a stable exchange rate, voluntarily renounced its monetary sovereignty, but also the freedom of its capital flows.

In addition, domestic monetary policy has been actually more restrictive than necessary for a long time, as it has *de facto* shifted from inflation targeting, as the officially proclaimed monetary model, to exchange rate targeting. This shift also contributed to somewhat lower rates of economic growth, while the domestic monetary policy prevented itself from managing the amount of dinars in circulation more freely. Also, this kind of monetary model, among other things, does not represent an acceptable solution for getting out of the crisis. Finally, a high degree of unofficial euroization is also present in the country, which in itself implies monetary stability and the absence of a certain degree of monetary sovereignty. Euroization in Serbia, combined with the growing current account deficit and the decline in price competitiveness of the domestic economy, has turned into a serious threat to the sustainability of such monetary regime (Janković & Stanišić, 2012, p. 397).

Bearing in mind that the policy of using the exchange rate as a nominal anchor in conditions of consistently higher domestic inflation than that in the Eurozone has caused the emergence of high unofficial euroization, we can conclude that Serbia missed an opportunity to continue with conducting a successful exchange rate policy (Miljković & Vučković, 2006, pp. 253-254). For 17 years, Serbia has been officially implementing pure inflation targeting in the circumstances of its financially underdeveloped and highly euroized economic environment. However, since the results of this monetary strategy did not give the expected outcomes, it should be resorted to reducing euroization, increasing the institutional independence of the monetary authorities, reducing the sensitivity of inflation to commodity prices, reducing non-performing loans and increasing the level of transparency of the central bank foreign exchange operations with the aim of increasing efficiency of the inflation targeting strategies in the country (Šoškić, 2015, pp. 26-27).

## References

- Aizenman, J., Chinn, M. D., & Ito, H. (2012). The “Impossible Trinity” Hypothesis in an Era of Global Imbalances: Measurement and Testing. Portland, OR: Economics Faculty Publications and Presentations, Portland State University.
- Aizenman, J., Chinn, M. D., & Ito, H. (2013). The “Impossible Trinity” Hypothesis in an Era of Global Imbalances: Measurement and Testing. *Review of International Economics*, 21(3), 447-458. DOI:10.1111/roie.12047.
- Aizenman, J., Chinn, M. D., & Ito, H. (2022). The Impact of Crises on the Trilemma Configurations. NBER Working Paper Series, Working Paper no. 30406, August 2022. Cambridge, Massachusetts: National Bureau of Economic Research. Retrieved on July 23, 2023, from [https://www.nber.org/system/files/working\\_papers/w30406/w30406.pdf](https://www.nber.org/system/files/working_papers/w30406/w30406.pdf)
- Carmi, E. (2020). *An enduring truth: the Mundell-Fleming trilemma in emerging economies: A study of policy levers to cope with global financial shocks*. Unpublished Public Policy Master Thesis, May 2020. Sciences Po School of Public Affairs, Paris, France.

- Cevik, S., & Zhu, T. (2019). Trinity Strikes Back: Monetary Independence and Inflation in the Caribbean. IMF Working Paper, WP 19/197, September 2019. Washington D.C.: International Monetary Fund.
- International Monetary Fund. (from 2006 to 2023). Annual Reports on Exchange Arrangements and Exchange Restrictions. Washington, D.C.: IMF.
- International Monetary Fund. (2023). International Financial Statistics. Retrieved on July 24, 2023, from <https://data.imf.org/?sk=4c514d48-b6ba-49ed-8ab9-52b0c1a0179b>
- Janković, N., & Stanišić, N. (2012). Problem izbora adekvatnog režima deviznog kursa u Srbiji. *Ekonomске teme*, 50(13), 391-414.
- Miljković, D., & Vučković, V. (2006). Serbian Foreign Trade, Competitiveness and Exchange Rate Policy. *Agora Without Frontiers: A Quarterly Journal of International Economy and Politics*, 12(2), 248-261.
- Mody, A., & Murshid, A. P. (2005). Growing up with capital flows. *Journal of International Economics*, 65(1), 249-266. <https://doi.org/10.1016/j.jinteco.2004.02.003>.
- Obradović, M. (2020). Monetarna politika vezala sebi ruke: Dejan Šoškić, profesor Ekonomskog fakulteta u Beogradu, bivši guverner Narodne banke Srbije. June 9, 2020. Retrieved on July 24, 2023, from <https://novaekonomija.rs/vesti-iz-izdanja/monetarna-politika-vezala-sebi-ruke>
- Obstfeld, M., & Taylor, A. M. (1997). The Great Depression as a Watershed: International Capital Mobility over the Long Run. NBER Working Paper no. 5960, March 1997. Cambridge, Massachusetts: National Bureau of Economic Research. DOI 10.3386/w5960.
- Obstfeld, M., Shambaugh, J. C., & Taylor, A. M. (2004). Monetary Sovereignty, Exchange Rates, and Capital Controls: The Trilemma in the Interwar Period. IMF Staff Papers, Vol. 51, Special Issue. Washington, D.C.: International Monetary Fund.
- Obstfeld, M., Shambaugh, J. C., & Taylor, A. M. (2008). Financial Stability, the Trilemma, and International Reserves. NBER Working Paper Series, Working Paper no. 14217, August 2008. Cambridge, Massachusetts: National Bureau of Economic Research.
- Obstfeld, M. (2015). Trilemmas and trade-offs: living with financial globalisation. BIS Working Papers, no. 480, January 2015. Basel, Switzerland: Bank for International Settlements.
- Petrović, P., & Gligorić, M. (2010). Exchange Rate and Trade Balance: J-curve Effect. *Panoeconomicus*, 1(2010), 23-41. DOI: 10.2298/PAN1001023P.
- Rey, H. (2013). Dilemma not Trilemma: The Global Financial Cycle and Monetary Policy Independence, August 2013. Retrieved on July 23, 2023, from <https://conferences.wcfia.harvard.edu/sites/projects.iq.harvard.edu/files/peif/files/ajaxrequesthandler.pdf>
- Rey, H. (2015). Dilemma not Trilemma: The Global Financial Cycle and Monetary Policy Independence. NBER Working Papers no. 21162- Cambridge, Massachusetts: National Bureau of Economic Research.

- Rieber, W. J. (2017). A Model to Explain the Monetary Trilemma Using Tools from Principles of Macroeconomics. *Journal of Economics and Economic Education Research*, 18(3). Retrieved on July 23, 2023, from <https://www.abacademies.org/articles/a-model-to-explain-the-monetary-trilemma-using-tools-from-principles-of-macroeconomics-6814.html>
- Shambaugh, J. S. (2004). The Effect of Fixed Exchange Rates on Monetary Policy. *The Quarterly Journal of Economics*, 119(1), 301-352.
- Stone, M., Anderson, H., & Veyrune, R. (2008). Exchange Rate Regimes. Washington, D.C.: International Monetary Fund.
- Šoškić, D. (2015). Inflation Targeting Challenges in Emerging Market Countries: The Case of Serbia. *Economic Annals*, 60(204), 7-30. DOI:10.2298/EKA1504007S.
- Tica, J., Globan, T., & Arčabić, V. (2019). The Mundell-Fleming Trilemma and the Global Financial Cycle: An Empirical Test of Competing Hypotheses. *Romanian Journal of Economic Forecasting*, 23(3), 62-80.