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INTEREST RATE PASS-THROUGH TO DEPOSIT INTEREST RATES IN A DUAL-CURRENCY MONETARY SYSTEM: THE CASE OF SERBIA

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Since the financial system in Serbia is characterized by a high level of euroization, there are two distinct deposit interest rate pass-through processes at work: the domestic interest rate pass-through and the imported (cross-border) interest rate pass-through. The findings for the domestic interest rate pass-through imply that the long-term pass-through varies within a range below unity, so the pass-through from the interbank (money) market rate to deposit rates is incomplete; the evidence on the short-term pass-through is weak, and the speed of adjustment to the long-term equilibrium is relatively high. The imported interest rate pass-through shows the stronger evidence of cointegrating relationships across interest rates in comparison to the domestic interest rate pass-through, and very closely mimics the interest rate pass-through in the euro area in all relevant criteria. In effect, the findings show that the monetary policy in the euro area is integrated well with the domestic monetary policy in Serbia in terms of the cost adjustment of the deposit portion of banks' liabilities. Overall, the findings show that the monetary policy in the euro area is integrated well with the domestic monetary policy in Serbia in terms of the cost adjustment of the deposit side of banks' balance sheets stemming from the monetary policy decisions.

Keywords: interest rate pass-through, monetary policy transmission, deposits, autoregressive distributed lag model

JEL Classification: E43, E52, G21

INTRODUCTION

The easing and tightening of monetary policy are constituent parts of steering the economy to overall stability and economic welfare. The monetary policy stance is communicated to the public through changes in key policy rates. Low inflation, weak economic growth or the stagnation of economic activity with low investment may prompt the central bank to lower interest rates, which should spur economic activity in conjunction with the other economic policy instruments. If interest rate steering is insufficient to provide the revival of economic activity, the traditional monetary policy may be accompanied by unconventional monetary policy measures, such

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as quantitative easing. Through massive purchases of medium- and longer-term financial assets, novel unconventional measures, such as the asset purchase program or the pandemic emergency purchase program strongly influence the flattening of the yield curve, i.e. the lowering of the longer-term market interest rates that are difficult to accomplish through managing the short-term interest rates that are within the scope of the traditional monetary policy (Lukić, 2012). This failure of interest rate steering holds even though certain central banks pushed some of their key policy rates into the negative zone, which was effectively true for the interest rate on the deposit facility of the European Central Bank.

The interest rate channel appears to be inefficient in specific circumstances. Unconventional monetary policy measures complement conventional monetary policy measures in order to produce a full-blown monetary effect on the financial system and the economy in a low inflation environment (Darracq Pariès, Moccero, Krylova & Marchini, 2014; Hristov, Hülsewig & Wollmershäuser, 2014; van Borstel, Eickmeier & Krippner, 2014). R. Horvath, J. Kotlebova and M. Siranova (2018) highlight that unconventional measures helped to strengthen the pass-through of the conventional monetary policy in the euro area that has been impaired by the sovereign debt crisis.

This paper focuses on the cost adjustment of the deposit side of banks' balance sheets stemming from the monetary policy decisions. It contributes to discerning the specifics of the monetary policy transmission mechanism in Serbia, as an example of the country in which economic agents have rather strong preferences for deposits in both the domestic currency and the foreign currency. The high presence and reliance on the non-domestic currency in the monetary system adds to labeling it as a dual-currency monetary system.

The paper focuses on the interest rate pass-through in the realm of deposit interest rates. Since the Serbian financial system is characterized by a high level of euroization, there are two distinctive deposit interest rate pass-through processes at work. Interest rates on the dinar deposit portfolio are aligned with the key policy rate of the National Bank of Serbia, whereas interest rates on the euro-denominated deposit portfolio should be aligned with the key policy rate of the ECB. The former process may be referred to as the domestic interest rate pass-through, and the latter as the imported (cross-border) interest rate pass-through.

This paper has two main research objectives. First, it explores if the monetary policy in the euro area influences the cost of euro deposits for the banks operating outside the euro area. While it is likely that the domestic key policy rate should have an impact on the interest rates of the domestic currency deposits, it does not straightforwardly indicate that the same is applicable to foreign-currency deposits, since depositors in a country outside the euro area do not have an easy option to transfer deposit balances to the banks operating in the euro area, where (as a standard) interest rates should be linked to the euro-area key policy rate. Second, in a quantitative sense, the paper compares the smoothness and magnitude of the domestic interest rate pass-through and the imported (cross-border) interest rate pass-through.

LITERATURE REVIEW

Yet undoubtedly, in the high-inflation environment, the traditional interest rate channel of the monetary policy is of primary importance. It is essential for central banks to have a good knowledge of how fast and to what extent change in their key policy rates is transmitted to the range of market and bank retail interest rates (Borio & Fritz, 1995; Mojon, 2000; de Bondt, 2005; European Central Bank, 2010; Aziakpono & Wilson, 2013). This is the first step in the transmission mechanism of the monetary policy aimed at initiating the adaptations of and propagating changes in the overall economy, changes in the supply of and demand for goods and services, which will lead to preserving price stability. Retail interest rates are likely to influence aggregate demand (Kwapil & Scharler, 2010).

The interest rate pass-through is the cornerstone for an effective operation of the other main channels of the monetary policy that are dependent upon the

smooth functioning of the interest rate channel (Egert, Crespo-Cuaresma & Reininger, 2007). If change in the key policy rate is not properly transmitted to market and bank interest rates, then the credit channel, the exchange rate channel, or the asset price channel is expected to be ineffective.

Deposits represent the largest portion of banks' liabilities. As such, they are the main source of funds for banks. A stable deposit base contributes to bank soundness (Živković, Stankić, Marinković & Lukić, 2023). The stability of deposits makes them particularly well suited for funding risky and illiquid assets (Drechsler, Savov & Schnabl, 2017).

One part of deposits is commonly non-interest bearing, namely transaction and sight deposits, whereas savings and term deposits, which are interest-bearing, account for a significant part of total deposit liabilities. A rise in the key policy rate may, to differing degrees, be transmitted to various financial asset classes, and inside the subclasses of the general financial asset classes as well. As a general financial asset class, deposits are among them, and the subject matter of the analysis carried out in this paper is the development and response of their interest rates.

Deposit interest rates are most often declared as fixed rates, because of which the formal repricing procedure and the decision made by the management of each bank are needed for new interest rates to come into effect. Lending interest rates are frequently declared as variable, which makes them automatically repriced and aligned with the reference market interest rates predominantly determined by changes in the key policy rate. Accordingly, loan interest rates have an inherent adjustment mechanism, which boosts the interest rate pass-through, although no similar mechanism has yet been incorporated in changes in deposit interest rates in any way.

So far, research has often neglected the field of the interest rate pass-through, for which reason J. Gregor, A. Melecký and M. Melecký (2019) conducted a meta-analysis of the literature including 52 papers on the interest rate pass-through, not dealing with deposit interest rates at all. Instead, attention was predominantly paid to the pass-through to loan interest rates. G. Petrevski and J. Bogoev (2012) explored the interest rate pass-through in Southeastern Europe in North Macedonia, Croatia, and Bulgaria, the countries that have adopted rigid exchange-rate regimes and pegged in some way their currencies to the euro but did not investigate the deposit rate pass-through. They concluded that the long-term pass-through on lending rates was complete only in North Macedonia. Due to that which and the sluggishness of short-term adjustment altogether, the interest rate channel was not assessed as effective in the examined countries.

As a rule, banks set their interest rates in line with the prevailing market interest rates that serve as a benchmark. When setting interest rates on various loan products, banks add a varying mark-up on the defined benchmark. In the same fashion, deposit rates are determined by subtracting a markdown from the same benchmark (Rousseas, 1985; De Graeve, De Jonghe & Vander Vennet 2007; Andries & Billon, 2016). Thereby, banks' costs of funding and costs of deposits are closely connected with the prevailing level of market interest rates.

If the key policy rate rises, banks are expected to raise deposit rates, but the previous markdown on deposits does not need to remain the same. If the markdown increases, banks execute a low pass-through with positive effects on their earnings. Based on the US data, I. Drechsler *et al* (2017) show that the deposit spread (the difference between the Fed fund rate and the deposit rate) extends when the Fed funds rate increases, which consequently induces a deposit outflow from the banking system. Provided that economic subjects have access to developed financial markets and can resort to bonds, deposit contraction occurs, which induces lending contraction by the banking sector, whereby the transmission of the monetary policy is triggered.

The fewer the financial and investment alternatives of savers, the greater the market power of banks. Banks are more prone to seize the opportunity that accompanies an increase in key policy rates. The average saver in emerging markets, whose financial system is usually bank-centric, does not have many

available options for channeling short- and medium-term savings towards other financial institutions or financial markets, while long-term savings remain low. Money market funds and investment in government bills and notes are not a popular investment vehicle in emerging market economies, so banks have relatively more market power in emerging market countries than in the developed. If the elasticity of demand for deposits is lower than unity, the pass-through may become disproportionate at the expense of savers (Egert *et al*, 2007).

T. Messer and F. Niepmann (2023) observe that deposit rates are sticky and only move slowly when there is change in the key policy rate. F. De Graeve *et al* (2007) argue that interest rates on demand and savings deposits are very rigid, whereas with respect to time deposits, it is far less the case. Based on their meta study on the literature, N. Andries and S. Billon (2016) find that the size of the long-term pass-through is much larger for loan rates compared to deposit rates. The interest rate on deposits is negatively influenced by real gross domestic product and inflation, and small banks have to pay a premium on deposit rates to attract an amount of the needed deposit funds (Gambacorta, 2008). The literature mostly emphasizes that the pass-through to deposit rates seems to be less complete but increases for deposits of longer maturities (de Bondt, 2002). H. Sander and S. Kleimeier (2004) find out that the average long-term pass-through coefficient for different types of deposits is below 0.5, simultaneously arguing that more competition enhances the pass-through to deposit interest rates.

A. Ferrer, G. Ganics, A. Molina Iserte and J. M. Serena (2023) argue that the pass-through of the Euribor to deposit rates is weaker in the banking systems with higher excess liquidity and a more concentrated deposit market, and that a recent surge in Euribor has, to a lesser extent, had an influence on deposit rates in comparison to historical experiences. When banks have abundant excess reserves, they do not have a strong incentive to mobilize deposits since they do not fall short of funds; hence, deposit rates behave even more sluggishly. S. Kho (2025) explored the downward and upward stickiness of deposit rates and found out that the pass-through to deposit rates was slower (faster) when interest rates rose (declined) in the national banking sectors with a higher degree of market concentration. T. Messer and F. Niepmann (2023) claim that a low pass-through to deposit rates is likely if ample liquidity is combined with limited banks' capacity to expand lending. I. Moder (2023) investigated the monetary policy spill-over from the ECB's monetary policy to retail rates on euro-denominated loans and deposits in the Central, Eastern and Southeastern European countries with national currencies. The paper compared the features of the pass-through from the key policy rate of the ECB and the key policy rate of the domestic central banks to deposits and loans in the euro currency but did not explore the pass-through from the domestic key policy rate to deposits in the domestic currency.

AIM OF THE PAPER

This paper focuses on the cost adjustment of the deposit side of bank's balance sheet stemming from a monetary policy decisions. It contributes to discerning specifics of monetary policy transmission mechanism in Serbia, as an example of country in which economic agents have rather strong preferences for deposits in both domestic and foreign currency. A high presence and reliance on non-domestic currency in the monetary system adds to labeling it as a dual currency monetary system.

The paper centers on interest rate pass-through in the realm of deposit interest rates. Since the financial system in Serbia is highly euroized there are two distinctive deposit interest rate pass-through processes in action. The interest rates on the dinar deposit portfolio are being aligned with key policy rate of National bank of Serbia, and the interest rates on euro denominated deposit portfolio should be aligned with the key policy rate of the ECB. The former process may be referred to as domestic interest rate pass-through, and the later process as imported (cross-border) interest rate pass-through.

The research interest of the paper is twofold. First, it explores does monetary policy in the euro area influence the cost of euro deposits for banks operating

outside the euro area. While it is likely that domestic key policy rate should impact on the interest rates of domestic currency deposits, it is not straightforward that the same holds for foreign currency deposits, since depositors in out of euro area country do not have an easy option to transfer deposit balances into banks operating in euro area where, by default, interest rates should be linked to euro area key policy rate. Second, it compares, in a quantitative sense, smoothness and magnitude of domestic interest rate pass-through and of imported (cross-border) interest rate pass-through.

METHODOLOGY

The choice of the applied methodology is driven by the features of the time-series variables. The non-stationarity of economic time-series variables is a common problem with them. If not adequately addressed, non-stationarity may lead to the detrimental econometric consequences that materialize in spurious regression and misinterpretations of the results. A concept of cointegration is developed to circumvent this problem in estimating regression models (Mladenović & Nojković, 2012). In the case where two variables, the dependent variable and the explanatory variable, are non-stationary of order one I(1), a special case may arise, where a linear combination of them turns out to be a stationary process I(0). On the one hand, the series might not be cointegrated, which means that their linear combination is of the same order one I(1) as well, while on the other hand, if a linear combination has a constant mean and variance over time, and the covariance between two values of the series depends only on the length of time between the values, it is referred to as stationary, or of order zero I(0). The stationarity of a linear combination stems from the fact that two time-series variables do not diverge from each other in the course of time due to sharing similar stochastic trends (Engle & Granger, 1987).

A typical bivariate (the dependent variable and one regressor) ARDL model takes the following form:

$$y_t = \alpha_0 + \alpha_1 y_{t-1} + \alpha_1 y_{t-2} + \cdots \alpha_p y_{t-p} + \beta_0 x_t + \beta_1 x_{t-1} + \beta_2 x_{t-2} + \cdots + \beta_q x_{t-q} + \varepsilon_t \quad (1)$$

The ARDL model has three distinctive variants. The above-mentioned variant specifies all the variables in levels. The second variant deals with long-term and short-term estimates, whereas the third is described by the error-correction model.

Given that the simplest bivariate ARDL model is ARDL (1,1), two last variants can be demonstrated using it as an example. The baseline expression of the model in levels is:

$$y_t = \alpha_0 + \alpha_1 y_{t-1} + \beta_0 x_t + \beta_1 x_{t-1} + \varepsilon_t \quad (2)$$

Rearranging expression so as to subtract y_{t-1} from both sides, and add $\beta_0 x_{t-1} - \beta_0 x_{t-1}$ to the right-hand side yields:

$$y_t - y_{t-1} = \alpha_0 + (\alpha_1 - 1) y_{t-1} + \beta_0 (x_t - x_{t-1}) + (\beta_0 + \beta_1) x_{t-1} + \varepsilon_t \quad (3)$$

This expression is further simplified:

$$\Delta y_t = \alpha_0 + (\alpha_1 - 1) y_{t-1} + \beta_0 \Delta x_t + (\beta_0 + \beta_1) x_{t-1} + \varepsilon_t \quad (4)$$

The long-term component relates to the coefficients attached to y_{t-1} and x_{t-1}, while the short-term component in the expression is captured by the Δx_t term (the first difference of the regressor).

The third variant absorbs the long-term component of the model into the error correction term in order to assess convergence to the long-the equilibrium. The question arises as to how deterministic components, such as the constant, should be included in the third variant. The one possibility implies the exclusion of the constant α_0 from the error correction term that captures the long-term equilibrium. Namely:

$$\Delta y_t = \alpha_0 + (\alpha_1 - 1) \left[y_{t-1} + \frac{\beta_0 + \beta_1}{\alpha_1 - 1} x_{t-1} \right] + \beta_0 \Delta x_t + \varepsilon_t \quad (5)$$

This is referred to as the ARDL model with the unrestricted constant. The long-term part in the brackets relates to the simple regression model of the type: $y_t = \alpha + \beta x_t + \varepsilon_t$, which, expressed in the error term, is: $\varepsilon_t = y_t - \alpha - \beta x_t$. When the constant is excluded from the long-term regression equation, which is the unrestricted constant case, then: $\varepsilon_t = y_t - \beta x_t$. In order for the error correction term to be represented in a proper manner, $ECT_{t-1}=\left[y_{t-1} - \frac{\beta_0+\beta_1}{\alpha_1-1} x_{t-1}\right]$, needs to be replaced by α_1 - 1 sa (– (1 - α_1)).

So, the final expression of the ARDL model with the unrestricted constant reads as follows:

$$\Delta y_t = \alpha_0 + (-)(1-\alpha_1)\left[y_{t-1} - \frac{\beta_0+\beta_1}{1-\alpha_1} x_{t-1}\right] + \beta_0 \Delta x_t + \varepsilon_t \quad (6)$$

The term (1 - α_1) is important and is called the adjustment factor. It serves as the parameter that describes the speed of adjustment to the long-term equilibrium, provided that a one-off shock has occurred. In this paper, that shock takes the form of change in the monetary policy rate. This shock is of exogenous nature, since the decision is made by the independent central bank which is primarily responsible for price stability.

In the ARDL model with the restricted constant, the constant is included in the error correction term, so the expression looks slightly different from the expression of the model with the unrestricted constant:

$$\Delta y_t = (-)(1-\alpha_1)\left[y_{t-1} - \frac{\alpha_0}{1-\alpha_1} - \frac{\beta_0+\beta_1}{1-\alpha_1} x_{t-1}\right] + \beta_0 \Delta x_t + \varepsilon_t \quad (7)$$

In the model with the restricted constant, the constant is attached to the long-term part (the error correction term), whereas in the model with the unrestricted constant, it is matched with short-term dynamics (the first-differenced terms). The constant in the restricted model represents the fixed spread between the dependent variable and the regressor and has a specific economic meaning.

An important advantage of using the ARDL is that both the long-term coefficient and the short-term coefficient can be obtained directly from the same equation.

The analysis of the pass-through from market rates to retail interest rates carried out in this paper relies on the general ARDL (p,q) model inaugurated in M. Pesaran and Y. Shin (1999), and refined by M. Pesaran, Y. Shin and R. J. Smith (2001):

$$r_i^B = \alpha + \sum_{i=1}^{p} \beta_i r_{t-i}^B + \sum_{j=0}^{q} \gamma_j r_{t-j}^M + \epsilon_t \quad (8)$$

where r_i^B denotes the bank retail interest rate, r_t^M represents the benchmark market interest rate, p and q denote the maximum lag of the dependent variable and the explanatory variable, respectively.

After reformulating the general model in first differences, the following is obtained:

$$\Delta r_i^B = \alpha + \sum_{i=1}^{p-1} \beta_i \Delta r_{t-i}^B + \sum_{j=0}^{q-1} \gamma_j \Delta r_{t-j}^M + \theta_1 r_{t-1}^B + \theta_2 r_{t-1}^M + \epsilon_t \quad (9)$$

which the error correction form of the ARDL is derived as follows:

$$\Delta r_i^B = \alpha + \sum_{i=1}^{p-1} \beta_i \Delta r_{t-i}^B + \sum_{j=0}^{q-1} \gamma_j \Delta r_{t-j}^M + \theta_1 r_{t-1}^B + \theta_2 r_{t-1}^M + \epsilon_t \quad (10)$$

where

$$\theta_1 = -(1 - \sum_{i=1}^{p} \beta_i), \text{ and } \theta_2 = \sum_{j=0}^{q} \gamma_j \quad (11)$$

The coefficients β_i and γ_j show the dynamics of the short-term alignment towards the long-term equilibrium, where γ_0 is the immediate pass-through coefficient. θ_1 accounts for the speed of adjustment to the long-term equilibrium, and the ratio $\frac{\theta_2}{\theta_1}$ represents the long-term pass-through. This approach adopts the methodology proposed by G. J. de Bondt (2005) and I. Moder (2023), who employed the single-equation error correction model in order to empirically analyze the interest rate pass-through. According to the equation, the model with the restricted constant is chosen.

The relevant lag length (p and q) is chosen based on minimizing the Akaike Information Criterion (AIC) out of all the lags up to the lag 8. If the number of the lags needed to address the issue of the autocorrelation of the residuals of the model exceeds

10, it is not worthwhile estimating the model further. However, such an issue did not arise in the empirical examination.

After estimating the particular specification of ARDL, the long-term equilibrium relationship between bank retail interest rates and the market interest rate is assessed on the ground of the bounds testing approach (Pesaran et al, 2001). The F-Bounds test uses the F-test for the parameters θ_1 and θ_1:

$$H_0 = \theta_1 = \theta_2 = 0 \quad (12)$$

The distribution of the test statistic is non-standard. Thereby, M. Pesaran *et al* (2001) provide special bounds to be used. The two limits associated with critical values are defined. The first limit is the upper-bound critical value, provided that all the variables are I(1), and the second limit is the lower-bound critical value under the assumption that all the variables are I(0). If the computed F-statistic is below the lower bound, no cointegration is possible since the variables are stationary. If the F-statistic is above the upper bound, the null of no cointegration is rejected. If the F-statistic falls in between the two bounds, then the test is inconclusive. If the bounds test is not passed, the ARDL specification is yet useful, because short-term coefficients may be interpreted in an economically meaningful way.

Of course, all estimations reported are tested for the presence of serial correlation and heteroscedasticity. The problem of serial correlation is solved by adding the lagged first differences of the variables in the model, so residuals are eventually free from autocorrelation. Newey-West standard errors are used in estimations where needed so as to operate with heteroscedasticity and the autocorrelation consistent standard errors that correct the value of the test statistic.

DESCRIPTIVE STATISTICS

The reaction of the deposit interest rates to the change in the market interest rates, which serve as a proxy for the change in the key policy rate, is assessed for the period from 2013 to 2024 period. The sample of the deposit interest rates under consideration covers the monthly data from January 2013 to December 2024 (a total of 144 observations). All bank interest rates reflect new business, which is important for insulating the effects of the change in the key policy rates only on new term deposits as opposed to all outstanding term deposits with terms and conditions agreed in the previous periods. All the time series are retrieved from the interest rate statistics of the National Bank of Serbia (NBS).

Table 1 summarizes the interest rates used in the analysis of the domestic and cross-border interest rate pass-throughs of the monetary policy in Serbia.

The choice of the maturity of the term deposits was guided by the available statistical records of the NBS. Thereby, three deposits' maturity buckets are taken into consideration: the maturity of the deposits of up to one year, the maturity of the deposits between one and two years, and the maturity of the deposits

Table 1 The variables used in the analysis

Household interest rates	Non-financial corporation interest rates
Deposits with a maturity of up to one year in RSD	Deposits with a maturity of up to one year in RSD
Deposits with a maturity of over one and up to two years in RSD	Deposits with a maturity of over one and up to two years in RSD
Deposits with a maturity of over two years in RSD	Deposits with a maturity of over two years in RSD
Deposits with a maturity of up to one year in EUR	Deposits with a maturity of up to one year in EUR
Deposits with a maturity of over one and up to two years in EUR	Deposits with a maturity of over one and up to two years in EUR
Deposits with a maturity of over two years in EUR	Deposits with a maturity of over two years in EUR

Source: Authors

exceeding two years. Since current accounts are not remunerated in Serbia, and sight deposits are not recognized as a distinctive category in the official interest rate statistics, it was impossible to check the interest rate pass-through for overnight deposits. I. Moder (2023) remarks that official interest rate statistics in Serbia lack granularity in deposits' maturity buckets in comparison to the other European countries that are not part of the euro area.

In practice, term deposits are denominated in the local currency (dinar) and the euro. The term deposit timeseries denominated in the euro comprise the deposits explicitly denominated in the euro and the euro-indexed deposits. The cash flows related to the euro-indexed deposits, encompassing money depositing and withdrawal, are performed in the local currency, but the amount of cash flows is determined by the current exchange rate between the dinar and the euro. In effect, there is no difference between euro-denominated and euro-indexed deposits. The existence of both categories of deposits lays the ground for examining the imported (cross-border) interest rate pass-through of the ECB's monetary policy.

Finally, two types of depositors are individually treated and appraised in order to reveal whether there are differences in the reaction and evolution of the deposit interest rates stemming from the type of banks' counterparty – households (augmented by non-profit institutions serving households) and non-financial corporations. It may be the case that the deposits of a counterparty are more valuable to banks, for instance due to their stability or size, which may have an impact on the evolution of the respective interest rates.

Figure 1 graphically displays the evolution of the Euribor rates and euro deposit interest rates for households and non-financial corporations with the maturity of less than one year. The timeframe covers two distinctive periods with respect to the positive and negative key policy rates in place. Prior to the

Table 2 The descriptive statistics of the interest rates' time series

Household deposit interest rates	Mean	Max	Min	St. deviation
Deposits with a maturity of up to one year in RSD	4.15	9.94	1.52	2.19
Deposits with a maturity of over one and up to two years in RSD	4.86	12.49	1.67	2.51
Deposits with a maturity of over two years in RSD	5.63	14.7	1.87	2.89
Deposits with a maturity of up to one year in EUR	1.44	3.67	0.37	1.01
Deposits with a maturity of over one and up to two years in EUR	1.77	4.48	0.49	1.06
Deposits with a maturity of over two years in EUR	1.8	4.63	0.66	0.99
Non-financial corporation deposit interest rates				
Deposits with a maturity of up to one year in RSD	4.1	10.95	1.22	2.38
Deposits with a maturity of over one and up to two years in RSD	3.71	19.53	0.00	3.83
Deposits with a maturity of over two years in RSD	2.74	34.16	0.00	5.52
Deposits with a maturity of up to one year in EUR	1.27	3.4	0.28	0.9
Deposits with a maturity of over one and up to two years in EUR	1.11	4.58	0.00	1.16
Deposits with a maturity of over two years in EUR	0.48	2.43	0.00	0.54
Market interest rates				
3M BELIBOR	4.35	11.51	0.87	2.79
6M BELIBOR	4.53	11.89	1.07	2.81
3M EURIBOR	0.46	3.97	-0.58	1.43
6M EURIBOR	0.56	4.12	-0.54	1.45
12M EURIBOR	0.67	4.16	-0.5	1.43

Source: Authors

ECB's policy of negative interest rates (the negative deposit facility rate), the spread between euro deposit interest rates and Euribor rates was rapidly narrowing. The spread then stabilized with entering the period of negative interest rates, with euro deposit interest rates strictly exceeding Euribor rates. The second period of the positive and rising key policy rate brought about a turnaround in the sign of the spread, converting the sign from positive to negative, i.e. Euribor rates overrunning euro deposit interest rates in terms of their size.

DEPOSIT PORTFOLIO AND FINANCIAL EUROIZATION

Deposits approximately account for ¾ of the total banking sector's liabilities in Serbia (National Bank of Serbia, 2023). Local deposits add to the stability of banks' operations because they represent a stable domestically raised source of funding, which mitigates the risk of parent banks' financing and dependence on the factors of the international environment. However, short-term deposits prevail over long-term deposits (deposits whose maturity exceeds one year), meaning that the maturity structure of deposits might be improved. Over 90% of all deposits are made up of sight deposits and deposits maturing within one year. Figure 2 displays the combination of the currency and maturity composition of the deposit liabilities.

The NBS is actively engaged in promoting and propagating the use of dinar-denominated deposits and loans that lay the ground for strengthening the domestic leg of the monetary policy transmission mechanism. The share of the total dinar deposits in the banking sector went up from 19.3% in 2012 to 44.2% in 2024. The dinar household savings increased their share from 1.9% in 2012 to 9% in 2024. The rise in the deposit dinarization is by far the most significant achievement in the dinarization strategy.

Apart from Serbia, a non-negligible number of countries keep exceptionally close economic and trading ties with the countries that have adopted the euro and vastly tolerate the use of the euro in the financial system. It is not deemed beneficial for Serbia to replace its national currency with the euro by means of unilaterally introducing the euro to its monetary system (Marković & Furtula, 2009), although N. Stanišić (2012) highlights the benefits of monetary integration reflected in macroeconomic stabilization.

It is conducive to have a snapshot of the general

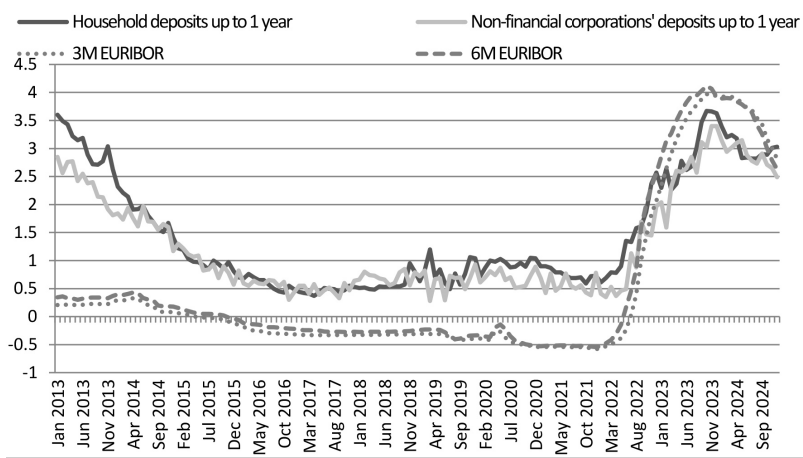

Figure 1 The evolution of the Euribor and euro deposit interest rates

Source: Authors

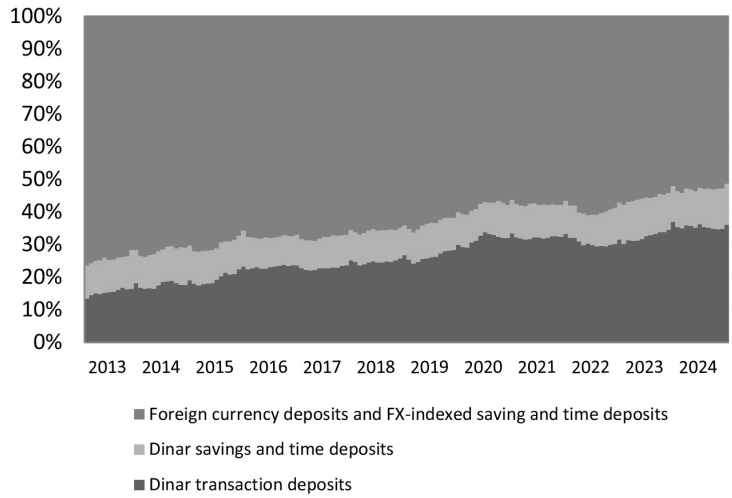

Figure 2 The deposit portfolio composition of the banking sector

Source: National bank of Serbia (2023). Annual Financial Stability Report. Belgrade, RS: NBS

euroization trends across countries so as to appraise the relative standing of and achievements made by Serbia. Table 3 depicts deposit euroization in the European Union countries that have preserved their national currencies and the EU candidate countries. It is evident that Serbia has made the greatest progress in the deposit de-euroization process (a process identical to the de-dollarization process) in the last decade but still has the largest degree of euroization in the financial system across countries.

The importance of deposit financing for banks may be put in the context of comparison with the first next viable financing alternative in emerging

Table 3 The outstanding euro-denominated bank deposits as a percentage of the total deposits

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Bulgaria	35.7%	35.2%	32.7%	31.9%	30.4%	29.5%	28.0%	30.1%	28.3%	28.6%
Croatia	62.2%	60.6%	59.4%	56.7%	54.2%	51.0%	49.2%	47.4%	-	-
Czech Republic	6.8%	7.4%	7.8%	7.2%	5.8%	6.3%	6.7%	7.0%	7.8%	8.5%
Hungary	15.6%	15.1%	15.0%	18.3%	16.1%	16.1%	16.2%	17.9%	19.3%	23.7%
Poland	6.1%	6.1%	6.3%	7.1%	8.0%	7.7%	7.9%	7.5%	8.5%	10.5%
Romania	29.5%	28.8%	27.5%	26.5%	26.9%	28.6%	29.8%	30.3%	30.6%	29.2%
Albania	40.5%	40.9%	40.1%	40.1%	43.6%	44.3%	44.9%	43.5%	45.5%	47.9%
Bosnia and Herzegovina	41.4%	39.5%	38.4%	36.4%	35.3%	33.2%	40.0%	39.1%	36.9%	34.5%
North Macedonia	50.1%	48.7%	36.2%	36.6%	36.6%	35.8%	35.0%	36.7%	36.9%	132.4%
Serbia	71.6%	70.1%	66.3%	64.2%	62.9%	61.1%	59.5%	54.9%	54.2%	53.7%
Turkey	16.1%	15.2%	15.3%	15.9%	16.1%	18.3%	19.2%	17.9%	21.1%	14.7%

Source: European Central Bank. (2023). The international role of euro. European Central Bank, DE: Frankfurt. https://www.ecb.europa.eu/pub/ire/html/index.en.html

European countries, i.e. cross-border interbank financing. Launched in 2009, the Vienna Initiative spurred Western European parent banks with subsidiaries in the Central, Eastern and Southeastern European countries so as to reduce their exposure to subsidiaries in the aftermath of the global financial crisis. After a period of excessive and unsustainable credit expansion before the crisis, funded by channeling cheap money from the European money market to banks in foreign ownership in the CESEE, the countries were faced with external and internal imbalances. The subsidiaries deleveraging process started as part of the Vienna Initiative project and led to a decline in cross-border parent-bank financing. However, it is present in each instance as an alternative to deposit sources. This capital flow makes Euribor rates highly relevant for euro deposit interest rates for households and non-financial corporations.

The domestic loan-to-domestic deposit ratio is an indicator that conveys the effects of subsidiaries' recalibrated strategy based on the domestic sources of funding. It shows to what extent domestic loans are financed by domestic deposits. At the onset of the global financial crisis, this ratio varied between 100% and 150% across the CESEE countries, the average ratio being 130% (Vienna Initiative, 2019). The ratio declined afterwards, only to reach the average level of 100% in the late 2010s, emphasizing the shifting of funding from foreign sources to the domestic deposit base, primarily local euro deposits. This surge in the importance of local euro deposits justifies the analysis of the imported interest rate pass-through which this paper includes.

EMPIRICAL RESULTS AND DISCUSSION

Checking if no single series is integrated of order two is a precondition for utilizing ARDL models. An augmented Dickey-Fuller test was employed and, depending on the series properties, a different version of the ADF test and the test statistics were used, namely including a trend and an intercept, an intercept or no deterministic components. The level data and the first differences of the interest rates were tested for the unit root, and the obtained

Table 4 The augmented Dickey-Fuller unit root test

Household deposit interest rates	ADF unit root test	Non-financial corporation deposit interest rates	ADF unit root test
Deposits with a maturity of up to one year in RSD	I(0)	Deposits with a maturity of up to one year in RSD	I(1)*
Deposits with a maturity of over one and up to two years in RSD	I(1)*	Deposits with a maturity of over one and up to two years in RSD	I(0)
Deposits with a maturity of over two years in RSD	I(0)	Deposits with a maturity of over two years in RSD	I(0)
Deposits with a maturity of up to one year in EUR	I(1)	Deposits with a maturity of up to one year in EUR	I(1)
Deposits with a maturity of over one and up to two years in EUR	I(1)	Deposits with a maturity of over one and up to two years in EUR	I(1)*
Deposits with a maturity of over two years in EUR	I(1)*	Deposits with a maturity of over two years in EUR	I(0)
Market interest rates in RSD	ADF unit root test	Market interest rates in EUR	ADF unit root test
3M BELIBOR	I(1)	3M EURIBOR	I(1)*
6M BELIBOR	I(1)	6M EURIBOR	I(1)
		12M EURIBOR	I(1)*

*These time series were estimated as I(0) at the 10% significance level.

Source: Authors

results confirm that some series are I(0), whereas the first differences of those that do not pass the test at the level of 5% significance were further analyzed and validated as stationary. Also, five time series were I(0) processes but at the 10% significance level; nevertheless, it was deemed needed to continue the testing until the series were stationary at the 5% significance level or lower.

To allow for the comparability of the coefficients across the models, each deposit rate was estimated and, in parallel, a cointegration relationship with the two market interest rates most relevant to that deposit rate was modeled.

The Belibor rates with 3-months and 6-months maturities were selected as relevant market interest rates for dinar deposits. However, it should be kept in mind that the transactions volume on the money market for these maturities is either low or nonexistent, primarily due to the high level of liquidity in the banking system, and the fact that these rates predominantly serve as a benchmark for variable-rate loans in the domestic currency. In terms of its relevance, this remark does not apply to the Euribor market interest rates for which three maturities were selected, and the transaction volume is satisfactory. Also, European banks' surveys show that 3-months, 6-months and 12-months Euribor rates serve most commonly as the reference interest rate employed as the underlying rate in many contracts (loan, hedging). Matching market interest rates with bank interest rates of comparable maturity excludes the effect of the term structure in the pass-through from the effect of marginal costs whose effects the paper is inherently interested in.

First, the domestic deposit interest rate pass-through of the Serbian monetary policy will be observed. Based on the F-bounds test results that indicate the existence of a cointegrating relationship between money market rates in Serbia and dinar deposit rates,

Table 5 The domestic deposit interest rate pass-through of the Serbian monetary policy

Household deposit interest rates	Reference rate	Lag structure	F-bounds test	Immediate pass-through	Long-term pass-through	Adjustment speed	Long-term constant
Deposits with a maturity of up to one year in RSD	BELIBOR 3M	(7,2)	4.105*(1)	0.10*	0.63***	-0.14***	1.22***
	BELIBOR 6M	(7,5)	2.59	0.11	0.54***	-0,096*	1.43**
Deposits with a maturity of over one and up to two years in RSD	BELIBOR 3M	(7,7)	39.63***	0.55***	0.77***	-0.34***	1.33***
	BELIBOR 6M	(5,3)	11.81***	0.56***	0.81***	-0.25***	1.06**
Deposits with a maturity of over two years in RSD	BELIBOR 3M	(8,1)	10.63***	0.11	0.52***	-0.20***	2.54***
	BELIBOR 6M	(8,1)	36.19***	0.09	0.53***	-0.20***	2.43***
Non-financial corporation deposit interest rates							
Deposits with a maturity of up to one year in RSD	BELIBOR 3M	(6,7)	3.65*(1)	0.40***	0,57***	-0.06***	1.51**
	BELIBOR 6M	(3,2)	3.57*(1)	0.45***	0.45	-0.05***	1.92
Deposits with a maturity of over one and up to two years in RSD	BELIBOR 3M	(2,4)	7.17***	-0.50	0.76***	-0.34***	0.08
	BELIBOR 6M	(2,4)	6.98***	-0.60	0.76***	-0.34***	-0.04
Deposits with a maturity of over two years in RSD	BELIBOR 3M	(8,4)	13.16***	-0.29	0.62*	-0.55***	-0.8
	BELIBOR 6M	(8,4)	12.98***	-0.29	0.63**	-0.56***	-0.93

(1) Inconclusive at the significance level of 5%, but significant at the 10% level.

Source: Authors

the respective relationship is denied in only one case (household deposits up to one year and 6M Belibor), whereas it is only marginally present (at a 10% level) for the other three cointegrating relationships tested vis-à-vis deposits up to one year maturity.

In the case of the deposits with a maturity of over one and up to two years, and over two years, the cointegrating relationship is broadly confirmed across both types of depositors, which allows for further considering the size and significance of the coefficient estimates.

The value of the long-term pass-through coefficient normally takes the value between zero and one but a value greater than one cannot be excluded a priori. The value of one indicates a complete pass-through, where change in the money market rate is one-for-one transmitted to bank interest rates. The estimates of the long-term pass-through coefficients are overall high, and in the case of the deposits with a maturity of over one and up to two years approach to unity for both household (0.77-0.81) and non-financial corporation deposits (0.76), with the still present gap to complete the pass-through. The long-term pass-through coefficient for the rate on non-financial corporation deposits with a maturity of up to one year is not significantly different from zero, which further puts into question the relevance of the cointegrating relationship for this class of deposits (the 6M Belibor benchmark), and is marginally significant for the deposits with a maturity of over two years (the 3M Belibor benchmark). The long-term pass-through for the rest of the deposits may be described as moderate and incomplete, simultaneously strongly present as well.

The short-term pass-through coefficient indicates a contemporary change in the deposit interest rates initiated by contemporary change in the benchmark rate (i.e. change within a month after the change in the benchmark market rate). If the immediate pass-through coefficient is not significant, it means that no measurable change in the deposit interest rate occurs within a one-month period after the benchmark rate adjustment. The larger the immediate pass-through coefficient, the more impactful the first-round effect of the benchmark rate correction. Only with regard to the rate on the household deposits with a maturity of over one and up to two years (0.55-0.56) and the non-financial corporation deposits with a maturity of up to one year (0.40-0.45) is it noticeably large and significant. However, in all the other cases, it is basically not different from zero. Hence, and overwhelmingly, deposit rates react sluggishly to changes in benchmark market rates, which points to the fact that the short-term pass-through is weak.

The next important estimate is the speed of adjustment to the long-term equilibrium. It shows how much of the remaining deviation from the long-term equilibrium is corrected within a single period. For example, the value of the adjustment speed for the non-financial corporation deposits with a maturity of two years (which is -0.55) is interpreted as the 55% of the disequilibrium between 3M Belibor and the respective deposit rate corrected within a single period (a period of one month). The negative and significant adjustment speed coefficient warrants that the deposit rates are to converge in a conceivable future to the long-term equilibrium relationship between them and the benchmark rate. In all the sub-models that passed the F-bounds test, the adjustment speed is negative and significant.

Additional information may be derived by transforming the adjustment coefficient speed, i.e. obtaining the time required for the long-term equilibrium to be reached. The inverse of the adjustment speed parameter implies the time lag (measured in months) after which change in the market interest rate is fully passed through to the level of deposit interest rates. For instance, the non-financial corporation deposits with a maturity of two years exhibit a very fast speed of adjustment, because it takes them less than two months to fully adjust to changes in the market interest rate. On the other hand, the non-financial corporation deposits with a maturity of up to 1 year show a slow speed of adjustment, with more than 16 months needed for a full pass-through. The period needed to reach the final pass-through for household deposits ranges from 3 to 7 months.

The long-term constant originating from the estimated ARDL model with a restricted constant has an economic interpretation as well. It effectively incorporates a bundle of the time-invariable influences that are beyond inclusion in the equilibrium term, i.e. it represents the other factors that stand behind the spread between the market interest rate and retail bank rates. The long-term constant for the non-financial corporation deposit rates is different from zero only for the category of the deposits with a maturity of up to one year (the 3M Belibor benchmark). The irrelevance of the long-term constant of the non-financial corporation deposits is at odds with the significance of the long-term constant for the rates on the household deposits that are significant in all the sub-models.

Having considered the results and the features of the domestic monetary policy pass-through, which includes the impact of the interest rate decisions of the National Bank of Serbia, attention can be focused on the transmission of the key policy rate formulated in the euro area to the euro deposit interest rates in Serbia. The discussion will focus on the comparison between the dinar interest rate pass-through and the euro deposit interest rate pass-through.

The first step in the analysis implies dealing with the existence of the cointegrated relationship between market interest rates in the euro area and euro deposit interest rates in Serbia. For this purpose, the F-bounds test is used again, showing that 11 out of the 12 examined cointegrating relationships are significant at the level of at least 5%, while one cointegrating relationship is significant at the level of 10%. These results are better than the results obtained upon examining the cointegration relationships of the domestic monetary policy pass-through, where one relationship was not significant and three relationships were significant at the 10% level.

When considering the size of the obtained long-term pass-through coefficients, several observations can

Table 6 The euro deposit interest rate pass-through of the cross-border (the euro area) monetary policy in Serbia

Household deposit interest rates	Reference rate	Lag structure	F-Bounds test	Immediate pass-through	Long-term pass-through	Adjustment speed	Long-term constant
Deposits with a maturity of up to one year in EUR	EURIBOR 3M	(4,2)	4.53**	0.095	0.59***	-0.09***	0.99***
	EURIBOR 6M	(5,8)	4.3**	0.03	0.63**	-0.10***	0.92***
Deposits with a maturity of over one and up to two years in EUR	EURIBOR 6M	(2,4)	4.18**	-0.51	0.4**	-0.10***	1.29***
	EURIBOR 12M	(2,4)	3.89*(1)	-0.3	0.53***	-0.10***	1.22***
Deposits with a maturity of over two years in EUR	EURIBOR 6M	(10,8)	10,72***	-0.02	0.006	-0.16***	1.03***
	EURIBOR 12M	(4,7)	6.99***	-0.19	0.11**	-0.10***	1.14***
Non-financial corporation deposit interest rates							
Deposits with a maturity of up to one year in EUR	EURIBOR 3M	(6,8)	9.57***	0.93***	0.56***	-0.22***	0.80***
	EURIBOR 6M	(3,8)	7.72***	0.72***	0.59***	-0.19***	0.78***
Deposits with a maturity of over one and up to two years in EUR	EURIBOR 6M	(3,1)	5.74***	0.78	0.54***	-0.36***	0.72***
	EURIBOR 12M	(1,4)	15.43***	0.13	0.53***	-0.51***	0.69***
Deposits with a maturity of over two years in EUR	EURIBOR 6M	(5,1)	6.94***	0.02	-0.003	-0.46***	0.39***
	EURIBOR 12M	(5,1)	6.92***	-0.08	0.001	-0.46***	0.39***

(1) Inconclusive at the significance level of 5%, but significant at the 10% level.

Source: Authors

be made. In the case of the deposits with a maturity of up to one year, the coefficients are slightly higher and statistically more significant for the euro interest rate pass-through compared to the dinar interest rate pass-through. In the case of the deposits with a maturity of over one and up to two years, the situation is reversed, namely they are relatively higher and statistically more significant in the dinar interest rate pass-through compared to the euro interest rate pass-through. Furthermore, in the case of the euro deposits with a maturity of over two years, the obtained results suggest that, in only one out of the four cointegration relationships, the long-term pass-through is significant; where it is significant, it is of a very small size. In effect, whether the cointegration relationship is genuinely valid for the longer-term euro deposits interest rates is open to question.

When considering the immediate pass-through, the results are slightly better in the dinar interest rate pass-through, but in principle they are very similar. In the euro interest rate pass-through, significance was confirmed only in the case of the deposits with a maturity of up to one year from non-financial corporations. However, the short-term pass-through is extremely big in size (0.93 and 0.72). It is intriguing that, for these deposits, the short-term pass-through is higher than the long-term pass-through, from which it follows that the initial reaction of interest rates on the deposits of non-financial corporations with a maturity of up to one year to the change in Euribor is extremely fast and the pass-through is almost complete, but in a course of time, the effect diminishes in size and the long-term stabilization of the cointegration link is achieved at lower levels (0.56 and 0.59).

In order to provide a deeper insight into how the long-term equilibrium between 3M Euribor and non-financial corporations' deposits with a maturity of up to one year is achieved over a given time horizon, Figure 3 depicts the cumulative dynamic multiplier, showing the estimated response of the deposit interest rate on the deposits with a maturity of up to one year from non-financial corporations to the change in 3M Euribor in successive time periods. The dotted line in Figure 3 represents the new long-term equilibrium, provided that additional shocks do not occur after the initial one.

Finally, the estimated speed of adjustment to the long-term equilibrium is faster for the deposit interest rates on household deposits in the dinar interest rate pass-through than in the euro interest rate pass-through. That is to say, those deposits whose interest rate adjustment is related to the euro interest rate pass-through need between six and ten months to achieve the final pass-through. Also, the variations in the time required to achieve the long-term equilibrium for the household deposits of different maturities are smaller in the euro interest rate pass-through than in the dinar interest rate pass-through. On the other hand, in the case of the interest rates on the deposits of non-financial corporations, the performances are on average more aligned between the two interest

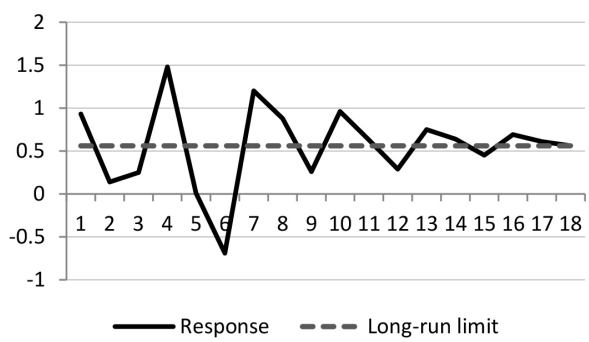

Figure 3 The cumulative dynamic multiplier

Source: Authors

rate pass-through processes, although it should be noted that the speed of adjustment for the euro deposits with a maturity of up to one year is several times faster than the speed of adjustment of the same deposits denominated in dinars.

The long-term constant, which expresses the time-invariable factors, is significant in all 12 cointegration relationships depicting the euro interest rate pass-through, which is a strikingly better result compared to the significance of this parameter with the dinar interest rate pass-through.

The interest rates on non-financial corporations' deposits tend to respond more quickly in comparison to the households' deposits at the lower end of the term structure of the deposit interest rates (up to one year) in both pass-through processes.

In order to contextualize the empirical results obtained in this paper, the comparable empirical findings and the estimated coefficients from the selected papers were reviewed.

B. Égert and R. MacDonald (2009) report that, in the empirical studies they analyzed, the average long-term pass-through for short-term deposits and long-term deposits equaled 0.72 and 0.69, respectively. C. Kwapil and J. Scharler (2010) explore the pass-through process in the euro area and the US. They provide estimates for the long-term pass-through in the euro area for savings deposits with a maturity of up to three months, savings deposits with a maturity of over three months, and term deposits with a maturity of up to two years: 0.27, 0.60, and 0.66, respectively. The estimated long-term pass-through coefficients in the US are higher. For instance, for the Time Certificate of Deposit for deposits with a maturity of one month, the Time Certificate of Deposit for deposits with a maturity of three months and for deposits with a maturity of one year, the coefficients are 1.04, 1.01, and 0.74, respectively. In the US, the long-term pass-through is close to unity and decreases with reference to the deposit maturity. In the euro area, the long-term pass-through is below unity and increases with the deposit tenor. The weighted average long-term pass-through is more than twice higher in the US than in the euro area, 0.74 to 0.32, respectively.

A recent study by Deutsche Bundesbank (2023) dealt with the pass-through to the interest rates aggregated across households and non-financial corporations in the euro area and in Germany. For the euro area, the long-term pass-through was not significant for overnight deposits and term deposits, so the cointegrating relationship between the retail interest rates and the market interest rates did not appear to exist at all. The situation differs for the savings deposits, where the estimated long-term pass-through was 0.60. In Germany, the respective long-term pass-through for the overnight deposits, the savings deposits and the term deposits was 0.50, 0.65, and 0.85, respectively, confirming the bias of the long-term coefficient rising with deposits' maturity extension, which is the argument that has already been discussed. The fact that the bank deposits of a longer maturity were in fierce competition with the other longer-term investment alternatives may be a possible reason for this.

R. Ferstl, B. Graf and C. Kwapil (2023) examined the cointegrating relationship among overnight deposits and time deposits in the euro area and in Austria. As is the case with the empirical results of this paper, they investigated the long-term equilibrium relationship separately for the deposits of households and the deposits of non-financial corporations. They did not validate the cointegrating relationship for the households' deposits in the euro area. Only for the time deposits of households in Austria, the long-term pass-through was significant, with the value 0.83. The long-term pass-through for the time deposits of non-financial corporations in the euro area was 0.79, and for the overnight and time deposits of non-financial corporations in Austria, it was 1.15 and 0.88, respectively.

F. Verheyen (2013) used EONIA as a proxy for the ECB's key policy rate. His results show that the pass-through in the euro area decreases with the rising maturity of deposits, and for deposits with a maturity of up to one year, the pass-through exceeds the proportional and is larger than unity. These findings are at odds with the results of precedent research studies.

It makes sense to compare the results of the euro interest rate pass-through in Serbia with the empirical findings of the aforementioned papers. The results obtained in this paper pertaining to the deposits with a maturity of up to one year and the deposits with a maturity of over one and up to two years comply with the long-term coefficient estimated in Deutsche Bundesbank (2023) for the savings deposits in the euro area and in Germany and C. Kwapil and J. Scharler (2010) for the savings deposits with a maturity of over three months. H. Sander and S. Kleimeier (2004) provide two long-term pass-throughs for time deposits (0.57 and 0.6), dependent on the utilized estimation time frame. In addition, T. Messer and F. Niepmann (2023) estimate the long-term pass-through of the term deposits in the euro area for households (0.56) and for non-financial corporations (0.53). D. Byrne and S. Foster (2023) reveal their long-term pass-through estimates for the term deposits of households and non-financial corporations (0.60 and 0.71, respectively).

Based on the estimates of the long-term pass-through, no noticeable difference seems to exist between the deposit interest rate pass-through in the euro area and the interest rate pass-through to euro deposits in Serbia.

However, when the speed of adjustment is concerned, the analysis carried out in this paper shows that it is markedly faster in the interest rate pass-through to euro deposits in Serbia than in the euro area, bearing in mind the results of Deutsche Bundesbank (2023) and R. Ferstl *et al* (2023) since it is in all the cases below one year.

CONCLUSION

This paper aims to analyze how the pass-through process advances in two separate pass-through channels in a country with two currencies in effective use (a dual currency monetary system): the domestic interest rate pass-through and the cross-border (imported) interest rate pass-through. This research study was limited to deposit interest rates.

When banks operate in an environment abundant in excess reserves (as is the case in Serbia, where the NBS squeezes out excess liquidity through repo and other open market operations, banks may have a weak incentive to attract deposits and hence deposit rates become sluggish.

The analysis of the domestic interest rate pass-through carried out in this paper shows that the cointegrating relationship among the retail deposit rates and the money market rates is confirmed on the vast majority of the tested relationships. The poor evidence of the short-term pass-through is perceived to underscore a sluggish instantaneous movement of the dinar deposit rates following the change in the domestic money market rate. The long-term pass-through varies in a range lying below unity, so the pass-through from the money market rate to retail rates is incomplete. Interest rates approach their long-term cointegrating equilibrium at a relatively rapid pace.

The insights into the features of the imported (cross-border) interest rate pass-through show the even stronger evidence of the cointegrating relationships across the interest rates. These results contrast with the results reported by I. Moder (2023), where the low level of the cointegrating relationships was found for Serbia. The imported interest rate pass-through very closely mimics the interest rate pass-through in the euro area in all the relevant criteria (the long-term pass-through, the immediate pass-through, and the speed of adjustment). In light of Serbia's prospective accession to the euro area in a foreseeable future, this may be a favorable fact.

The results obtained in this study show that, in the case of Serbia, both pass-through channels are in regular operation. For the time being, the monetary policy stances in Serbia and in the euro area have been highly synchronized; as a result, the two active pass-through channels have posed neither a problem nor a challenge for monetary management in Serbia.

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