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## EVALUATING THE BANK PROFITABILITY IN EUROIZED ECONOMIES

### ABSTRACT

*Financial euroization is a significant phenomenon in developing countries. The key financial institutions for macroeconomic stability in these countries are the banks. Conversion of most of the financial assets and liabilities into foreign currency creates a currency mismatch between the assets and liabilities in domestic and foreign currency. Banks in the role of intermediaries between depositors and borrowers face the risks of accepting foreign currency deposits and placing foreign currency loans. With this, financial euroization can impact the performance of banks. The paper's main objective is to analyze the impacts of euroization on the performance of banks in North Macedonia, Serbia, and Bosnia and Herzegovina for the period from 2010 to 2020. For performance measure, we use bank profitability. The paper uses a pre-set empirical model, in which the dependent variable is ROA (annual data for the return on assets - as a variable for measuring the profitability of banks) and a set of independent variables, including the degree of euroization. The results suggest that the model is robust, and the variables are statistically significant. In conclusion, this outcome can be ascribed to the segmentation of the bank credit portfolio in credit denominated in domestic versus foreign currency credit denomination. Moreover, the degree of euroization proved to be statistically significant for predicting the performance of banks, hence is high bank management decision-making information.*

**Keywords:** *Euroization, Bank Performance, Deposit Euroization, Credit Euroization, Regression Analysis.*

**JEL:** *F31, G21*

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## **1. INTRODUCTION**

The banking sector is key to any national economy, providing financial services to individuals, businesses, and governments and contributing to economic growth and development (Kashyap, Rajan, & Stein, 2002). Ensuring the profitability of banks is also essential for maintaining the stability and sustainability of the national financial system (Altunbaş, Gambacorta, & Marqués-Ibáñez, 2010). However, in many developing countries, including those in the Balkans, the issue of dollarization/euroization poses significant challenges to the banking sector's profitability and stability.

Dollarization/euroization refers to the widespread use of foreign currency denomination, mainly the US dollar/euros, in a country's economy, including bank deposits, loans, transactions, and other financial assets. This trend is particularly prevalent in countries with high inflation rates, unstable local currencies, and limited access to foreign exchange markets (Mishkin, 2000). In such countries, dollarization can significantly affect the banking sector's profitability, liquidity, and risk management practices (Cottarelli and Dell'Araccia, 2002).

This paper aims to analyze the determinants and challenges of profitability in an ambient high level of euroization in the banking sector of three Balkan countries: Serbia, Bosnia and Herzegovina, and N. Macedonia. We conducted a panel data analysis for 2010-2020, examining the relationship between banking profitability, euroization, and other relevant macroeconomic factors.

The rest of the paper is organized as follows: Section 1 discusses the literature review on the bank profitability aspects, highlighting the sector's importance for economic growth and development. This section focuses on the significance of banking profitability and its implications for the financial system's stability. Section 2 provides an overview of the determinants and challenges of euroization in the banking sector, representing the trends in the analyzed period in the selected countries. Finally, Section 3 presents the results of the panel data analysis for the three Balkan countries, and section 4 discusses the main findings and policy implications.

## **2. LITERATURE REVIEW**

Bank profitability is a widely analyzed topic among academic researchers. Since banks as financial institutions have the most significant role in the economic growth of both weak economies and developing countries, they mainly serve as intermediaries between national savings and lending support to investment projects in the country. Moreover, according to several pieces of research conducted on the role of banks in developing countries, which are not the subject of this research, banking profitability contributes significantly to the growth and development of the

country. For example, Berger's (1995), was closely followed by Levine's (1997) research and many others.

Banks' profitability, in general, is reflected in the difference between the interest that the bank pays for keeping deposits of households and legal entities and the interest that it charges for the placed loans. Earlier studies of bank profitability usually highlight bank-specific determinants, such as operating expenses, net interest income, capital, overheads, and specific macroeconomic variables, such as GDP per capita or economic growth. Berger (1995) is among the first to empirically analyze bank performance and profitability in the United States. Using annual data between 1983 and 1989 for each insured commercial bank in the United States, he estimates the capital adequacy ratio, the rate of return on capital, and several control variables to investigate the relationship with retained earnings in banking. Several studies have used the ROA and ROE models to measure bank profitability, such as those by Oviatt and Rose (1987) and Batten, Hogan, and Szilagyi (2010). The DuPont Model is another commonly used model for measuring bank profitability, as it breaks down ROE into three components: net profit margin, asset turnover, and equity multiplier (Shin and Soenen, 1998). Additional studies have used this model to analyze the components of bank profitability, such as the study by Molyneux, Thornton, and Lloyd-Williams (1996).

Harker and Zenios (2000) note that performance measurement was more effortless in the “old-fashioned” economies; however, conventional productivity measures are challenging to calculate with the development of new products and services that the banking sector offers. Several aspects and indicators are used to measure banking performance in the literature. Performance in these studies is evaluated by: (1) profitability indicators; (2) quality of loans, and (3) credit growth. Additionally, since the first currency crisis, the literature referring to the relationship between Euroization and banking performance in terms of profitability increased.

The first study that analyzes the relationship between Euroization and bank performance is by Quispe-Agnoli and Whisler (2006). According to the results obtained from the regression analysis, dollarization positively impacts the quality of loans. On the other hand, it has a negative impact on the banks' liquidity rate. Moreover, it was determined that dollarization has no statistically significant effect on profitability.

Kutan, Ozsoz, and Rengifo (2012) analyze the relationship between deposit dollarization and bank profitability. According to their research, they conclude that the dollarization rate has no significant impact on bank profitability. On the other hand, dollarization rates from previous periods significantly affect bank profitability. In addition, the results showed that deposit dollarization affects bank profitability with a time lag.

Omet, Hadhoud, and Abdel-Halim (2015) assess the effects of foreign currency deposits on the performance of Jordanian banks in terms of profitability. According to their research, foreign currency deposits positively affect the rate of return on assets. Caglayan and Talavera (2016) investigate the impact of credit dollarization on the liquidity and profitability of Turkish banks. According to the results, banks reduce liquid assets while increasing lending in foreign currency. Furthermore, the offer of foreign currency credits, deposit dollarization, and total liabilities in foreign currency does not significantly affect liquidity management.

Kutan et al. (2010) evaluated the effects of deposit dollarisation on bank profitability in Latin America. They found that it positively impacts bank profitability in countries with a low level of inflation, as it reduces foreign exchange risk for banks. However, in countries with high inflation, deposit dollarisation hurts bank profitability due to the high cost of dollar funding. Other studies have found ununited results. A study by Eijffinger and Goderis (2012) found that dollarisation reduces bank profitability, as it limits the ability of banks to adjust their interest rates to match fluctuations in their cost of funds. This finding was supported by a study by Abuka and Chege (2015), who found that dollarisation negatively affects bank profitability in Kenya. On the other hand, a study by Bhatia and Gupta (2017) found that dollarisation positively impacts bank profitability in developing countries, providing a stable funding source for banks.

Tunay and Tunay (2022) examined the effects of the dollarization problem in Turkey on banks' profitability-based performance. They found that the extent of dollarization in the Turkish economy negatively affects bank profitability. Sena and Şendeniz-Yüncü (2022) also analyzed the effects of dollarization on bank performance in Turkey. They found that dollarization hurts bank profitability, increasing banks' foreign exchange risk exposure. Similarly, Işık (2019) investigated the impact of dollarization on bank performance in Turkey and found that a higher degree of dollarization harms bank profitability, as it reduces banks' ability to adjust their interest rates in response to changes in the market. Aktaş and Aydınlik (2022) examined Turkey's regional differences and determinants of dollarization. They found that dollarization significantly negatively affects banks' profitability in the highly dollarized regions of the country. In contrast, Vera-Gilces et al. (2020) examined banking profitability in Ecuador. This emerging country is highly dollarized and found that the impact of dollarization on bank profitability is complex and depends on various factors, including the specific characteristics of the banking system.

Overall, the literature suggests that the impact of dollarization on bank profitability is negative, as it increases banks' foreign exchange risk exposure and limits their ability to adjust their interest rates to match changes in their cost of funds. However,

the impact may depend on the specific characteristics of the banking system and the degree of dollarization in the country.

### **3. EUROIZATION IN SELECTED COUNTRIES – DATA SET**

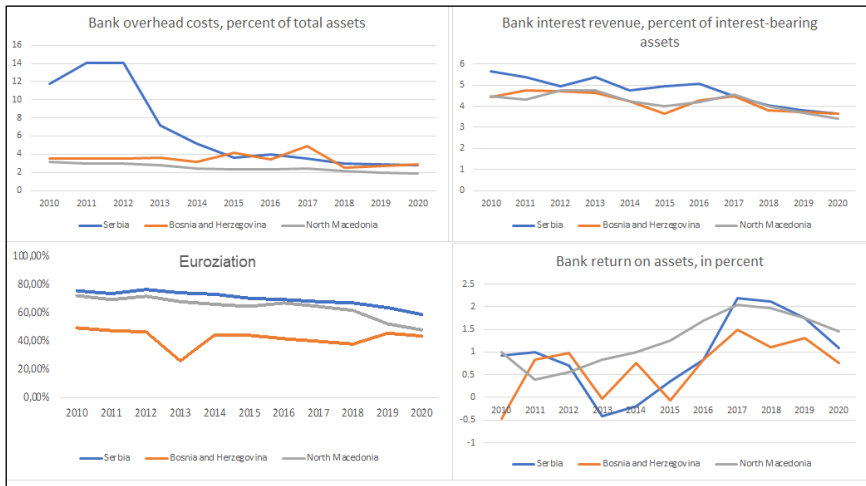
Understanding the relationship between euroization and bank performance is an empirical problem. Concerning measuring the performance of banks, there may be many indicators, such as net interest income and market share. Still, these measures are often directly related to the bank's profitability. A commonly used measure of bank performance is net bank profit. We could translate profitability as return on equity – ROE, return on assets – ROA, and net interest margin – NIM. (Asiedu, 2016) (Alexandru, 2018).

The rate of return on capital is a financial indicator that reflects the profit earned to the shareholders' capital, that is, what is the return on capital of the company's owners. Commercial banks' income statements report earnings before and after taxes. Another good measure of bank performance is the ratio of pre-tax profit to equity. When doing a cross-country study, it's best to use pre-tax income, as has been done in some of the past studies and research we've mentioned, which were cross-country, primarily because of the different tax rates in each country. The rate of return on funds is also a financial indicator that tells the bank's ability to generate income by using the company's funds, that is, how efficiently the bank uses funds to generate income. Net interest margin measures the difference between interest income and the amount the bank pays in interest to its depositors relative to assets (Gul, 2011). The higher the values of the three indicators, the higher the bank's profit.

Banking (internal) and macroeconomic (external) factors are the two groups that drive the performance of banks. Internal factors are the individual characteristics of banks that may influence banking performance. The management's internal decisions mainly influence these factors. External factors are factors that arise from sectors or countries and are usually beyond the control of banks. Their influence on the profitability of banks is spread equally.

In this section, we will look at the banking and macroeconomic indicators for the countries included in the analysis, which are characterized as euroized countries.

**Figure 1.** Selected data for the banking sector in Serbia, North Macedonia, and Bosnia and Herzegovina



**Source:** Bank individual reports in selected countries

Regarding the banking variables for profitability assessment, we can summarize the following:

- ROA (Return on Assets-ROA) calculated for the sample of representative banks from each country shows a slight upward trend since the analyzed period began. Overall, during the analyzed period, the Macedonian banks generated the highest profit to their assets. However, from 2017 till 2019, the highest ROA ratios are evident for Serbian banks. At the end of the analyzed period, Macedonian banks achieved the highest indicator - 1.42%, followed by Serbian banks - 1.23%, while Bosnian banks have the weakest use of funds when generating profit, i.e., 0.75%.
- The net interest income to the total assets has a decreasing trend in the three countries, with the best result achieved again by the Serbian banks, with 3.73%, then the Bosnian banks with 3.24% and, finally, the Macedonian banks with 3, 20%.
- Non-interest income to total assets shows a decreasing trend, the highest among Bosnian banks with 1.26%, then among Serbian banks with 1.1%, and Macedonian banks realize 1%.
- Overhead costs to total assets show a decreasing trend, while it is desired that this indicator is in this direction and with as little value as possible, it is the highest in Bosnian banks at 2.71%, then in Serbian banks at 2.68% and finally, among Macedonians 2.09%.
- In terms of credit activity, the trend is increasing except for 2020 in North Macedonia and Serbia, while it is decreasing in Bosnia and Herzegovina. In

terms of the currency structure of lending, it is predominantly in foreign currency. However, foreign currency lending recorded a slight decline as a share of total lending in North Macedonia and Serbia, while in Bosnia and Herzegovina, we have the opposite situation - lending in domestic currency dominated, in the last two years, there has been a leveling off on the participation of lending in domestic currency and foreign currency.

- The deposit base mainly consists of foreign currency deposits, with a decrease in their participation in the total deposits during the period in North Macedonia and Serbia, while in Bosnia and Herzegovina, the participation of deposits in domestic currency is significant.

#### 4. PERFORMANCE OF BANKS IN CONDITIONS OF EUROIZATION – METHODOLOGY

##### 4.1. MODEL SPECIFICATION

In our research, we follow an empirical model based on the analysis of Berger (1995), Demirguc Kunt and Huicinga (1999), and Quispe Agnoli and Whistler (2006). To analyze the effects of euroization on pre-tax profits, we use data for developing countries characterized as highly euroized – North Macedonia, Serbia, and Bosnia and Herzegovina, from 2010 to 2020. We use individual bank reports data for the countries listed for banking variables. The decision to use selected examples from banks from the listed countries is due to the lack of some key data in the statistical reports of the central banks of some countries. The database with the data from the banks was created for this study. It was formed according to the data presented in the balance sheets of different national statistics offices (Central banks and Ministry of finances).

The estimated model is represented as:

$$roa_{it} = \alpha_i + \theta_i bank_{it} + \beta_i macro_{it} + \gamma_i eur_{it} + \epsilon_{it} \quad (1)$$

where  $profit_{it}$  is the dependent variable – bank profitability measured by ROA at commercial and savings banks that accepted foreign currency deposits in the country, with fixed time effects;  $\theta_i bank_{it}$  is a matrix of characteristics for the banking system in the country;  $macro_{it}$  represents the macroeconomic variables;  $eur_{it}$  is the euroization rate measured by the rate of foreign currency deposits in the banking system to total deposits, and  $e_{it}$  is zero.

In the section on bank profitability control variables, we follow the empirical literature on the determinants of bank profitability, including Demirguc Kunt and Huicinga (1999), De Nicolo (2005), and Quispe Agnoli and Whistler (2006). Specific banking and country-specific macroeconomic variables are considered when evaluating the banking profitability level in each country.

The following control variables are used for the banking system:

- net interest income as a percentage of total bank funds (this measure is expected to positively affect banking profitability. Namely, as banks increase the loans as part of their assets, their profitability should increase as long as the loans are in good condition);
- bank non-interest income as a percentage of total funds (earned by banks through non-interest-bearing activities, such as membership, commissions, or investment activities. We expect this indicator to have a positive effect on banking profitability);
- overhead costs as a percentage of total funds and average loan interest rates (give us an understanding of banking operational costs and PROFITABILITY and should be inversely related to profitability. However, we expect them to have a negative effect on bank profitability).

Among the macroeconomic variables, the following are used:

- GDP per capita coefficient should have a small but significant effect on banking performance. The growth is measured as an annual change in the parish per capita and should closely monitor the sign of the per capita GDP variable. We expect this variable to have a positive effect on bank profits.
- The inflation rate is expected to have a negative effect on profitability, that is, suppressive effects on bank profits.
- profitability, that is, suppressive effects on bank profits.

The rate of euroization is the key variable that we are interested in, specifically for how it affects bank profits. We include it because of the role of currency deposits in creating currency matches. Additionally, we expect average interest rates on lending to positively affect the performance of banks because they are the price they charge for selling loans.

We use the Panel Data method to estimate the coefficients according to the data specification. Panel data methodology is a widely-used approach in economics and social sciences research for analyzing the behavior of individual entities over time (Arellano & Bover, 1995; Wooldridge, 2010). Panel data models combine time-series and cross-sectional data, allowing for the identification of both time-invariant and time-varying factors that affect the outcome variable. The fixed effects approach in panel data estimation controls for unobserved heterogeneity among entities and provides a way to estimate the impact of time-varying variables while controlling for individual effects (Hsiao, 2014). Additionally, using panel data techniques can increase the precision and power of statistical analysis by allowing for larger sample sizes and greater variability in the data (Baltagi, 2008). Overall, panel data



methodology offers a powerful tool for empirical research that can provide insights into economic and social phenomena dynamics.

#### 4.2. TEST RESULTS

For the analyzed sample of 24 banks originating from North Macedonia, Serbia, and Bosnia and Herzegovina, a table with descriptive statistics has been prepared, from which we can draw the following conclusions for the variables. The data on the variable are presented together for all three countries due to the estimation technique used. The authors use panel data with fixed effects. Panel data analysis allows examining variable changes over time and the differences between individuals or groups. In this case, the dependent variable is bank ROA.

**Table 1.** *Descriptive statistics*

	ROA	NI/ TA	NRI/ TF	OH/ TA	AIR	GDPpC	GDPpC %	INF	EURZ
<b>Mean</b>	0.0113	0.0339	0.01120	0.0254	0.0755	4844.529	0.0178	0.0205	0.5876
<b>Standard error</b>	0.0013	0.0008	0.0002	0.0007	0.0042	134.8539	0.0171	0.0047	0.0236
<b>Median</b>	0.0114	0.0344	0.0111	0.068	0.0721	4873.019	0.0371	0.0150	0.6443
<b>Mode</b>	#N/A	#N/A	#N/A	#N/A	0.0798	#N/A	#N/A	-0.003	0.6443
<b>Standard deviation</b>	0.0075	0.0048	0.0016	0.0044	0.0241	774.6768	0.09822	0.0274	0.1359
<b>Sample variance</b>	5.74E-05	2.37E-05	2.6E-06	1.97E-05	0.0005	600124.2	0.00965	0.0007	0.0184
<b>Kurtosis</b>	0.4104	-0.1961	0.6312	-0.6544	0.4164	-0.4432	1.1784	3.1461	-0.8281
<b>Skewness</b>	-0.6384	0.0510	-0.4218	-0.3711	1.0352	0.0331	-0.7719	1.5983	-0.5589
<b>Range</b>	0.0342	0.0200	0.0072	0.0177	0.0821	3054.065	0.4809	0.1278	0.5039
<b>Minimum</b>	-0.0092	0.0246	0.0069	0.0155	0.0463	3459.245	-0.2543	0.0158	0.2598
<b>Maximum</b>	0.0250	0.0447	0.0152	0.0332	0.1285	6513.31	0.2266	0.1120	0.7638
<b>Sum</b>	0.3744	1.1217	0.3698	0.8407	2.4935	159869.4	0.5888	0.6765	19.3932
<b>Count</b>	240								

**Source:** *Author's calculations*

- ROA, on average, for the sample, is 1.13%, and the median value is 1.14%. We can conclude that the data is almost uniform by comparing the mean and median. The indicator ranges from a maximum level of 2.50% to a minimum level of -0.9%. The deviation of the values from the average value of the indicator is 0.7%.
- On average, net interest income to the total funds in the sample is at the level of 3.39%, while the median value is at the level of 3.44%. Here too, there is a large uniformity in the data distribution. The indicator is within the maximum value of 4.47% and the minimum value of 2.46%. The deviation from the example is at the level of 0.4%.

- Non-interest income to total funds averages 1.12%, and the median value is 1.11%. There is uniformity in the distribution of the data in the example. The indicator is within the maximum value of 1.42% and the minimum value of 0.6%. The deviations from the example are at a level of 0.1%.
- Overhead costs to the total funds are, on average, 2.54% for the sample, and the median value is 2.68%, whereby there is much less equality in the data distribution. The indicator moves within the maximum value of 3.32% and the minimum value of 1.55%. The deviations from the example are at the level of 0.4%.
- The average interest rates for lending are 7.55%, the median is 7.21%, and there is much less uniformity in the data distribution. This variable is within the maximum value of 12.85% and the minimum value of 4.63%. The deviations from the example are at the level of 2.41%.
- GDP per capita averages 4.845 euros, and the median value is 4.873 euros. The maximum value of GDP per capita is 6.514 euros, while the minimum value is 3.460 euros. Annual GDP growth per capita averaged 1.78%. The average value is 3.71%, and there is a large disparity in the data distribution around averages. The annual growth is within the maximum of 22.6% to a minimum of -25.4%. The deviations from the example are at the level of 9.82%.
- Inflation is, on average, 2.05%. The average value is 1.5%, and we conclude that there is greater inequality in the data distribution. The movement is within the minimum of minus 1.58% and the maximum level of 11.20%. The deviations from the sample are 2.74%.
- The degree of euroization is 58.76% on average, the median value is 64.43%. The degree of euroization ranges from a minimum level of 25.98% to a maximum level of 76.38%, with a deviation of 13.5%.

Following the descriptive statistics, the correlation matrix suggests that: The dependent variable return on assets shows a positive and strong correlation with GDP per capita (0.56), a positive and weak correlation with inflation and euroization, and the growth of GDP per capita, while the relationship with the banking variables is negative. Net interest income to total funds is highly correlated with average lending interest rates (0.85), overhead costs to total funds (0.65), inflation rates (0.60), the degree of euroization (0.47), and non-interest income to total funds with (0.42). And it is not correlated with GDP per capita and GDP per capita growth. Non-interest income to total funds shows a positive and high correlation with overhead costs to total funds. Overhead costs show a high correlation with average lending rates. Average interest rates are highly correlated with inflation and euroization variables. GDP per capita is correlated with the growth of GDP per capita. Inflation is correlated with Euroization.

**Table 2.** *Correlating matrix*

	ROA	NII/TA	NRI/TF	OH/TA	AIR	GDPpC	GDPpC %	INF	EURZ
ROA	1								
NII/TA	-0.0823	1							
NRI/TF	-0.2489	0.4253	1						
OH/TA	-0.5472	0.6543	0.7221	1					
AIR	-0.1383	0.8517	0.3280	0.6045	1				
GDPpC	0.5628	-0.0085	-0.3289	-0.3106	-0.0719	1			
GDPpC %	0.2336	-0.0376	-0.0290	-0.1203	-0.1659	0.3346	1		
INF	0.1892	0.6284	0.0772	0.3316	0.7802	0.2744	0.1261	1	
EURZ	0.2307	0.4693	-0.2972	0.0533	0.5826	0.1270	-0.0695	0.5634	1

**Source:** *Author's calculations*

The analysis estimates two different models. First, we conduct a test for all variables described above, and after we conclude which ones are not statistically significant, we test the second model with significant variables only. After estimating the panel data regression model, various diagnostic tests were conducted to evaluate the model's goodness of fit and validity. The results of these tests indicate that the model performs well and meets the necessary assumptions. The Breusch-Pagan Lagrange multiplier test for panel heteroscedasticity indicates no significant evidence of heteroscedasticity in the model. The Durbin-Watson test for autocorrelation in the residuals reveals no significant autocorrelation in the model, indicating that the residuals are not serially correlated. The Hausman test for random versus fixed effects suggests that the fixed effects model is preferred, indicating unobserved heterogeneity across entities. Overall, these results provide confidence in the validity of the panel data regression model and suggest that it provides a good fit for the data.

**Table 3.** *Model statistic*

<b>Regression Statistics – MODEL 1</b>		<b>Regression Statistics – MODEL 2</b>	
<b>Multiple R</b>	0.87008	<b>Multiple R</b>	0.85344
<b>R Square</b>	0.75703	<b>R Square</b>	0.72836
<b>Adjusted R Square</b>	0.67605	<b>Adjusted R Square</b>	0.66568
<b>Standard Error</b>	0.00431	<b>Standard Error</b>	0.00438
<b>Observations</b>	240	<b>Observations</b>	240

**Source:** *Author's calculations*

From the analysis, it can be concluded that both Model 1 and Model 2 show a strong relationship between the selected independent variables and the dependent variable ROA, as indicated by the high correlation coefficient values of 0.87 and 0.85, respectively. The coefficient of determination or the significance of the tested model,

which represents the percentage of variation in the dependent variable explained by the independent variables R square, is also relatively high for both models, with values of 75.70% and 72.84%, respectively. However, it is worth noting that the adjusted coefficient of determination is lower than the coefficient of determination for both models, indicating that the independent variables may not explain some variations in the dependent variable. Finally, the standard error is low, indicating that the data points are relatively close to the regression line, suggesting that the models fit the data well.

**Table 4.. Results of the analysis**

Independent variable	MODEL 1				MODEL 2			
	Coefficient	Std. Error	t-Statistic	p-value	Coefficient	Std. Error	t-Statistic	p-value
Constant	0.0068	0.0056	1.2207	0.2236	0.1395	0.0200	5.1417	0.0815
NNI/TA	0.056	0.0044	0.0348	0.9722	N/A			
NRI/TF	3.37	0.1309	3.259	0.0149	3.51	0.153	2.2288	0.0013
OH/TA	-1.66	0.0571	13.2555	0.0269	-1.54	0.068	9.9119	0.0000
AIR	-0.22	0.0003	-0.7392	0.4606	N/A			
GDPpC	2.85	0.2256	4.8534	0.0815	N/A			
GDPpc%	0.007	0.3527	3.4837	0.0006	0.009	0.0200	5.157	0.0002
INF	0.135	0.0762	6.232	0.0551	0.156	0.2850	0.7605	0.3566
EURZ	0.023	0.0088	2.1142	0.0357	0.026	0.0682	4.8534	0.0567

**Source:** Author's calculations

According to the analysis of the coefficients obtained from Model 1, it can be concluded that the model is designed to predict ROA based on various independent variables. Analyzing the statistical significance of each independent variable is essential in determining its impact on the dependent variable. According to the analysis in this model, the net interest income relative to total assets, average interest rate, and GDP per capita in absolute amounts are statistically insignificant with high p-values. In contrast, the non-interest income to total funds, overhead costs to total funds, GDP per capita in % change, inflation rate, and euroization rate were statistically significant.

These variables had a low p-value, indicating a high level of statistical significance. The model predicts that ROA will increase by 3.37 units for each unit increase in non-interest income to total funds. ROA will decrease by 1.66 units for each unit increase in overhead costs to total funds. The income will increase by 0.007 units for each unit increase in GDP growth per capita, and the return on funds will increase by 0.135 units for each unit increase in the inflation rate. Finally, revenue will increase by 0.023 units for each unit increase in the euroization rate.

Following the results and the significance of Model 1, the analysis continues with other model specifications (model 2), where only the statistically significant variables from model 1 were included. Regarding the analysis of the coefficients in

Model 2, we can conclude that this model specification confirms the significance of four out of five variables. This model explains the increase in non-interest income to total funds by one unit, leading to an increase in the return on funds by 3.51 units. This variable is statistically significant and has increased in significance compared to the previous model. An increase in overhead costs to total funds by one unit leads to a decrease in the return on funds by 1.54 units, and this variable has also increased in significance. The increase in GDP per capita growth leads to a 0,009 unit increase in revenue, and this variable remains statistically significant for predicting the dependent variable.

On the other hand, inflation appears to be statistically insignificant, as it has increased its p-value. Finally, euroization has increased in statistical significance, and for each unit increase in euroization, there is an increase in the ROA by 0.026 units. Overall, these coefficients provide valuable insights into how changes in each independent variable affect the dependent variables and can be used to make informed decisions for predicting revenue and return on funds in future scenarios.

## **5. DISCUSSION**

The three countries show more significant macroeconomic similarity in the direction of movement of some variables: inflation, real GDP growth, and GDP movements per capita. In terms of credit and deposit activity, we noticed a similarity in the trends of North Macedonia and Serbia, in contrast to Bosnia and Herzegovina, which showed a greater inclination towards the domestic currency in terms of lending and saving, which is a significant part from the rigidity of the monetary regime that has been applied for a long time - currency board. Of course, this country's significantly lower level of Euroization also results from this. Regarding the banking variables for evaluating the banks' profitability, we noticed greater uniformity in the movement trends in the three countries.

Empirically tested, the model shows that non-interest income had a positive impact on bank profitability, and overhead costs had a negative effect on bank profitability. The opposite of our expectation was that the average lending interest rates appeared to have a negative impact on bank profitability, which we can explain by the reduced preference for borrowing in periods of higher interest rates. Euroization was statistically significant in predicting return on assets, positively impacting bank profitability.

The explanation for the significance of euroization in the model for predicting bank profitability could be seen through the differences in interest rates between foreign and domestic currency deposits as a key cost for the banks. It is important to note that our model does not include mandatory reserve rates, which are also a cost for banks. They are allocated with different rates for different types of deposits

depending on the term and currency structure. Furthermore, the part of foreign currency deposits placed as domestic currency loans represents a more profitable asset than foreign currency loans placed from foreign currency deposits.

The results are in line with several previous studies. Beginning with the latest from Naumovska and Jovanovski (2022), where net interest income, operating costs, and fee income influence banks' profitability. These variables significantly impact banks' profitability, as indicated by the estimated coefficients of the panel data model. Also, the importance of dollarization/euroization when explaining the banks' ROA is proven to be significant in the studies from Mihaljek, D., & Klau, M. (2001), Sulstarova, A., & Kofol, C. (2014), or Karimzada, M., & Ahmad, R. (2018).

## **CONCLUSION**

Euroization has been an important topic of discussion in the finance and banking sectors, particularly in countries that have adopted the euro as their currency. Our analysis showed that euroization has a statistically significant positive impact on the profitability of funds. This finding suggests that a higher level of euroization can contribute to higher profitability for financial institutions operating in countries that use the euro. However, it is important to note that euroization has risks, particularly regarding exposure to foreign exchange rate fluctuations and macroeconomic instability. Therefore, financial institutions should consider the benefits and risks of euroization before deciding on their currency exposure. Nonetheless, our analysis highlights the potential benefits that euroization can bring to financial institutions, particularly in improving profitability, and underscores the need for further research.

Based on the analysis of the two regression models, we can conclude that several independent variables significantly impact the dependent variables of ROA. The first model showed that for each unit increase in net interest income relative to total assets. However, this variable was statistically insignificant according to the P-value analysis.

The second model showed that the non-interest income to total funds variable increased in statistical significance compared to the previous model. An increase in overhead costs to total funds has also increased in relevance. GDP per capita has a significant positive impact on revenue. Inflation, however, appears to be statistically insignificant. Finally, euroization has grown in statistical significance.

The coefficients of determination (R Square) for both models were high. These values indicate that a significant portion of the dependent variables can be explained with the help of the independent variables we selected in the models.

These results provide valuable insights for predicting revenue and return on funds in future scenarios and can be used to make informed decisions in the financial

industry. However, further research may be necessary to determine the validity and reliability of these findings in different contexts and situations.

Future analysis should capture the inherent credit risk due to the high participation of foreign currency bank assets. Additionally, one should differentiate the credit euroization between retail and corporate loans for the differences in non-performing loans and interest rate differentials as a source for banks' profit. Sometimes analysis for specific countries or different bank groups' national financial systems may give insights into characteristics not observed when doing group analysis.

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## PROCJENA PROFITABILNOSTI BANKE U EVROIZOVANIM EKONOMIJAMA

### SAŽETAK

*Evroizacija je bila značajna tema razgovora u finansijskom i bankarskom sektoru, posebno u zemljama koje su usvojile evro kao svoju valutu. Naša analiza je pokazala da euroizacija ima statistički značajan pozitivan uticaj na profitabilnost fondova. Ovaj nalaz sugerira da viši nivo euroizacije može doprinijeti većoj profitabilnosti finansijskih institucija koje posluju u zemljama koje koriste euro. Međutim, važno je napomenuti da euroizacija nosi rizike, posebno u pogledu izloženosti fluktuacijama deviznog kursa i makroekonomske nestabilnosti. Stoga, finansijske institucije treba da razmotre koristi i rizike eurizacije prije nego što odluče o svojoj valutnoj izloženosti. Ipak, naša analiza naglašava potencijalne koristi koje euroizacija može donijeti finansijskim institucijama, posebno u poboljšanju profitabilnosti, i naglašava potrebu za daljim istraživanjem. Na osnovu analize dva regresiona modela, možemo zaključiti da nekoliko nezavisnih varijabli značajno utiče na zavisne varijable ROA. Prvi model je pokazao da se za svaku jedinicu povećava neto prihod od kamata u odnosu na ukupnu aktivu. Međutim, ova varijabla je prema analizi P-vrijednosti bila statistički beznačajna. Drugi model je pokazao da je varijabla nekamatnih prihoda prema ukupnim sredstvima povećala statističku značajnost u odnosu na prethodni model. Povećanje opštih troškova u odnosu na ukupna sredstva takođe je značajno povećano. BDP po glavi stanovnika ima značajan pozitivan uticaj na prihode. Međutim, čini se da je inflacija statistički beznačajna. Konačno, euroizacija je dobila statistički značaj. Koeficijenti determinacije (R kvadrat) za oba modela su bili visoki. Ove vrijednosti ukazuju da se značajan dio zavisnih varijabli može objasniti uz pomoć nezavisnih varijabli koje smo odabrali u modelima. Ovi rezultati pružaju vrijedne uvide za predviđanje prihoda i povrata sredstava u budućim scenarijima i mogu se koristiti za donošenje informiranih odluka u finansijskoj industriji. Međutim, mogu biti potrebna dalja istraživanja kako bi se utvrdila valjanost i pouzdanost ovih nalaza u različitim kontekstima i situacijama.*

**Ključne riječi:** Euroizacija, uspješnost banke, euroizacija depozita, kreditna euroizacija, regresiona analiza.

**JEL:** F31, G21