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Original Article

DETERMINANTS OF BANK PROFITABILITY IN AN UNCERTAIN ECONOMIC ENVIRONMENT: EVIDENCE FROM SERBIA

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Abstract: *The paper analyzes the determinants of bank profitability in Serbia over the period from 2019 to 2025, with the aim of identifying key internal determinants influencing bank performance, expressed through return on assets. The research is based on data retrieved from banks' financial statements, from which relevant indicators are constructed, including profitability (ROA), capitalization, liquidity, asset structure, and operational efficiency. By applying panel regression models, the study examines the impact of these determinants on the profitability of the banks operating in Serbia. The results of this study indicate a negative significant influence of cost efficiency on the considered banks profitability, while the effects of capitalization and asset structure show a negative but insignificant impact. The research contributes to a better understanding of bank performance under varying levels of economic uncertainty, including periods of crisis and recovery.*

Key words*: bank profitability, bank-specific determinants, panel analysis.*

JEL classification*: G21,C23, L25.*

1. INTRODUCTION

Bank profitability is one of the key indicators of the stability, efficiency and sustainability of the banking system, especially in conditions of increased economic uncertainty and accelerated structural changes. The Serbian banking sector in the last decade has been characterized by processes of consolidation, improvement of the regulatory framework and digital transformation, which further emphasizes the importance of understanding the factors that affect the business performance of banks.

Previous research on bank profitability has included both bank-specific and macroeconomic determinants. In this context, numerous studies (Davis et al., 2022; Le & Ngo, 2020; López-Penabad et al., 2022; Wang, 2023) have analyzed the influence of factors such as economic growth (Akbar, 2012), inflation (Tan & Floros, 2012), and interest rates (Junttila et al., 2021; López-Penabad et al., 2022), along with the internal characteristics of banks. However, starting from the fact that internal factors are to a significant extent under the control of bank management (Chowdhury, 2015), the aim of this paper is to focus the analysis exclusively on bank-specific determinants of profitability. This approach does not diminish the importance of macroeconomic factors, but rather indicates that banks cannot directly influence them, but rather adapt to the given conditions. On the other hand, it is precisely internal factors that represent a key instrument through which banks can actively manage their performance and influence the level of achieved profitability.

A significant determinant that is expected to affect the activities of banks in Serbia in the coming period is the practical implementation and full integration into the SEPA payment system (Single Euro Payments Area). This process represents an important step in the further integration of the domestic banking system into the European financial area and has the potential to significantly affect the volume, structure and the cost of payment transactions. It is expected that the full integration into SEPA will contribute to an increase in the number of non-cash transactions, primarily due to the reduction of costs for end users and greater efficiency of payment transactions.

In accordance with the practice in countries that have already integrated into the SEPA system, an increase in transactions in euros can be expected, whereby a part of payments that were previously carried out through alternative institutions and often more expensive channels would be redirected to banking systems. From the banks' perspective, these changes may have significant implications for the structure of operating income and costs, especially in the area of income from payment service fees, as well as transaction processing costs. In addition, a change in the scope of operational activities is expected, which may affect the overall efficiency of operations in Serbian banks.

In this context, it is of particular importance to analyze the potential impact of SEPA integration on the operating income and costs of banks in Serbia, as well as on their profitability in the near future. Although the existing literature indicates the positive effects of payment system integration on the efficiency of the financial sector, the specific effects in transition countries, such as Serbia, have not yet been empirically investigated, this can be done after a period of operating within the SEPA area and it is expected that researchers will address this matter.

The paper is organized in five sections. After the introduction part, which defines the aim, objective and significance of the research, the second part of the paper provides a review of the relevant literature. This part includes an analysis of previous empirical and theoretical research in the field of determinants of bank profitability, with a special emphasis on bank-specific determinants. The third part of the paper presents the research methodology, defining the data used, variables and econometric model based on panel regression analysis. Special attention is paid to the explanation of the choice of internal determinants of profitability. The fourth part of the paper includes an empirical analysis and presentation of the results, including the interpretation of the obtained econometric estimates and the examination of the impact of individual determinants on the profitability of the banking sector in Serbia in the period from 2019 to 2025. The final part of the paper draws conclusions based on the obtained results, with a discussion of their implications for banking practice. It also points out the limitations of the research and provides recommendations for future research, especially in the context of recent changes in international payments such as integration into the SEPA payment system and their potential impact on bank operations.

2. LITERATURE REVIEW

Bank profitability is one of the central topics in contemporary banking literature, with many empirical studies focused on identifying its determinants. The usual approach involves classifying determinants into bank-specific and macroeconomic determinants. Although both groups of determinants play a significant role, special attention in the literature is paid to internal determinants, since they are under the direct control of bank management and represent a key instrument for improving business performance (Athanasoglou et al., 2008; Dietrich & Wanzenried, 2011). Also, the results of these studies can be used as a practical guideline for bank managers to improve profitability levels.

Bank capitalization, most often measured by the ratio of capital to total assets, has been identified as a significant determinant of profitability. Higher levels of capitalization contribute to greater stability and risk reduction, which positively affects investor and creditor confidence(Athanasoglou et al., 2008; Berger, 1995). However, some authors indicate that excessive capitalization can reduce return on capital due to reduced leverage, which indicates the existence of an optimal level of capital (Dietrich & Wanzenried, 2011).

Liquidity is another important aspect of banking operations that can have a two-way impact on profitability. On the one hand, a higher level of liquidity reduces the risk of illiquidity and increases the bank's resilience to shocks, while on the other hand, holding liquid reserves often implies lower returns (Al-Harbi, 2017; Calcagnini et al., 2022; Chen et al., 2018; Eljelly, 2004; Tran et al., 2016). Empirical results indicate that the relationship between liquidity and profitability depends on the specifics of the banking system and the macroeconomic environment (Dietrich & Wanzenried, 2014; Pasiouras & Kosmidou, 2007). The liquidity in this study is measured as loan to deposit ratio. Lower percentage of this ratio indicates the bank's reliance on its own sources of

finance. This ratio shows the liquidity risk exposures of the bank. The impact of this ratio on banks profitability is divided, some studies (Davis et al., 2022; Korytowski, 2018) report a positive impact, some studies (Petria et al., 2015) have shown a negative impact on the bank's profitability.

The asset structure, especially the share of loans in total assets, is a key source of income for banks. A higher share of loans can lead to higher interest income, i.e. net interest margins and profitability, but at the same time increases exposure to credit risk(Goddard et al., 2004). Therefore, asset structure management (Baselga-Pascual et al., 2015; Blaško & Sinkey, 2006; Saksonova, 2013) is essential for achieving an optimal return-to-risk ratio, and the importance of the ALM comes to significance. About the influence of this determinant are the findings divided. Cost efficiency, most commonly measured by the cost-to-income ratio, has been recognized as one of the most consistent determinants of profitability. Banks with lower operating costs achieve higher levels of profitability. An effective cost management means that the bank has lower levels of this indicator, that improves not only net operating incomes, but also the net income of the banks (Chowdhury, 2015; Marcikic Horvat et al., 2022; Radovanov et al., 2023). European Central Bank reports that operating efficiency and income structure are key determinants for sustainable profitability of European banks, especially in conditions of low interest rates and increased competition. Although there is a broad consensus on the importance of the above factors, research results indicate that the direction and intensity of their impact may differ depending on the time period, institutional framework and level of development of the financial market. For this reason, the analysis of the determinants of profitability in a specific context, such as the Serbian banking sector, is of particular importance, as it allows the identification of determinants that are relevant in given economic conditions and it is valuable for bank managers in order to improve bank profitability levels.

3. METHODOLOGY AND DATA

In order to examine the determinants of bank profitability in Serbia in the period from 2019 to 2025, the paper uses panel regression analysis, which allows for simultaneous observation of the time and interbank dimensions of the data. The dependent variable in the model is bank profitability, measured through return on assets (ROA). The independent variables include key bank-specific determinants, mentioned in the literature review section, which include capitalization (measured as the ratio of capital to total assets), liquidity (measured through the loan-to-deposit ratio), asset structure (share of loans in total assets) and cost efficiency (measured by the cost-to-income ratio). Due to a multicollinearity between the variables LDR and ASSET, a model reduction is performed. The general form of the model can be represented as follows:

$$ROA_{it}=\alpha+\beta_1 CAP_{it}+\beta_2 ASSET_{it}+\beta_3 CIR_{it}+\mu_i+\lambda_t+\varepsilon_{it}$$

where,
i is the bank index, t is the time index (year),
CAP is capitalization,
ASSET is the asset structure,
CIR is cost efficiency,
μ_i individual bank effects,
λ_t time effects,
ε_{it} random error.
Depending on the results of the model specification tests, the appropriate panel analysis model will be selected. This approach allows the identification of the crucial internal determinants that impact on bank profitability, while controlling for unobservable individual characteristics and time shocks, which contributes to greater reliability of the results obtained.

The data used in the study are annual data, collected from reports submitted by banks to the National Bank of Serbia and publicly available on the central bank's website. Based on the data retrieved from the National bank's website the ratio indicators were calculated for each bank for the period from 2019 to 2025. The sample includes the data of all 19 banks operating in Serbia at the time the research was conducted.

Based on theoretical and empirical background in context of the determinants of bank profitability, the following hypotheses are set:

H_1: Bank capitalization has a negative impact on banks' profitability.

The hypothesis is based on the assumption that a higher level of capitalization reduces leverage, which can lead to lower returns on assets. Better capitalized banks take on less risk, and achieve more stable, but potentially lower profitability.

H_2: A higher share of loans to total assets has a positive impact on banks' profitability.

Loans are the primary bank activity and the source of their income, so it is expected that higher lending rates will lead to a higher level of ROA.

H_3: Cost inefficiency has a negative impact on banks' profitability.

A higher cost-to-income ratio indicates greater inefficiency, so a negative relationship with profitability is expected.

4. RESULTS AND DISCUSSION

Descriptive analysis shows that the average profitability of banks, measured by the ROA indicator, is approximately 1.49%, with relatively high variability. Bank capitalization has an average value of 16.5%, which indicates a moderate level of financial stability. The average value of the loan-to-deposit ratio (LDR) is 0.78, which indicates a relatively balanced relationship between lending activity and deposits. The share of loans in total assets is on average about 61%, which confirms that lending activity is the dominant banking activity. The cost-to-income ratio (CIR) has an average value of 29.3%, which indicates a relatively good cost efficiency of banks in the observed period.

Table 1. Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max
ROA	0.0149	0.0141	0.0000	0.0680
CAP	0.1652	0.0723	0.0463	0.6190
LDR	0.7762	0.1670	0.4119	1.4675
Loan/Assets	0.6146	0.1125	0.3511	0.8525
Liquid asset/Total Assets	0.3419	0.1061	0.1039	0.5751
CIR	0.2936	0.1092	0.0247	0.6827

Source: Authors' calculations

The correlation matrix between the variables is given as follows:

Table 2. Correlation matrix

Variable	ROA	CAP	LDR	ASSET	CIR
ROA	1.00	-0.09	-0.01	0.08	-0.28
CAP	-0.09	1.00	0.49	-0.09	-0.18
LDR	-0.01	0.49	1.00	0.77	-0.10
ASSET	0.08	-0.09	0.77	1.00	0.01
CIR	-0.28	-0.18	-0.10	0.01	1.00

Source: Authors' calculations

Correlation analysis indicates a moderate negative correlation between the cost efficiency ratio (CIR) and profitability (ROA), with a coefficient of -0.28, which indicates that a higher level of operational inefficiency leads to a decrease in the profitability of banks. A weak positive relationship was identified between the share of loans in assets and profitability (0.08), which suggests that more intensive lending activity may contribute to a slight increase in profitability. On the other hand, a high positive correlation was observed between the loan-to-deposit ratio and the share of loans in total assets (0.77), which may indicate a potential multicollinearity problem in the econometric model, which led to the exclusion of the LDR variable from the above presented model.

In order to examine the presence of multicollinearity between the independent variables the VIF (Variance Inflation Factor) test was applied.

Table 3. VIF test

Variable	VIF
CAP	1.044
ASSET	1.009
CIR	1.035

The results obtained indicate that the VIF values for all included variables are below the critical limit of 5, which suggests that there is no significant multicollinearity problem in the specified model. These findings confirm that by omitting one of the highly correlated variables the potential multicollinearity problem was successfully eliminated, thus ensuring the reliability of the parameter estimates.

Table 4. Panel regression model

Variable	Coef.	Std.error	Robust SE	z-statistics	p-value
Constant	0.0298**	(0.0107)	(0.0115)	2.59	0.010
CAP	-0.0226	(0.0213)	(0.0228)	-0.99	0.322
ASSET	-0.0015	(0.0138)	(0.0146)	-0.10	0.919
CIR	-0.0349***	(0.0130)	(0.0148)	-2.36	0.018
R^2	0.055				
(n)	19				
(T)	7				
(N) Obs.	133				
Hausman test	RE				
Chi-square	2.9113				
df	3				
p-value	0.4055				
Breusch-Pagan	chisq = 14.172; df = 1, p-value = 0.0001668				

Source: Authors' calculations

The results of the Hausman test indicate that there is no statistically significant correlation between unique error terms and independent variables. Consequently, the null hypothesis is not rejected, implying that individual effects are not correlated with the explanatory variables. Accordingly, the

Random Effects model can be considered more appropriate for further analysis. The results of the panel regression analysis show that capitalization has a negative but insignificant impact on the banks' profitability. The H_1 is not confirmed because there is no significance in the impact. The results obtained indicate a negative relationship between capitalization and bank profitability, which may suggest that a higher level of capital leads to lower returns on total assets. This result is in line with the theoretical approach that indicates the existence of a trade-off relationship between safety and profitability, with more capitalized banks having a lower propensity to take risks and, consequently, lower returns. The share of loans in total assets also shows a negative and statistically insignificant impact on profitability. This indicates that an increase in credit potential is not enough to achieve ROA growth, but rather that this growth is aligned with the credit policy, i.e. the ratio between active and passive interests certainly affects the net margins that banks achieve. The cost-to-income ratio has a statistically significant and negative impact on bank profitability, as expected so only H_3 is confirmed. This indicates that reducing operating costs is the key determinant in improving bank performance.

CONCLUSION

The results of our analysis indicate that among the bank-specific determinants cost management has a key role in determining the profitability of banks in Serbia in the observed period from 2019 to 2025. Among the analyzed variables, cost efficiency stands out as the only and most significant determinant, which confirms that the quality of operational management is essential for achieving profitability. Also as earlier mentioned, the integration of the SEPA in Serbian banking sector, has according to the results of this study, potential to be a leading determinant of banks profitability, throughout the reduction of operational costs of the banks. The negative impact of credit activity indicates that bank certainly undertake higher levels of credit risk by increasing the credit portfolio which affects the bank incomes. Besides that, the net interest margin and the interest rate policy play an important role determining the profit levels in banks. Capitalization, although significant from the aspect of stability, does not show a significant impact on profitability, which may indicate a relatively stable and regulated banking system in which the increase of capital to asset ratio indicates that the level of risk undertaken by the banks increases. Results of this study suggest for bank managers to focus on operational efficiency, through operational cost optimization. From a regulatory perspective, it is important to continue with policies that foster the stability of the banking system, while at the same time enabling innovation in the financial sector. In this context, integration into the SEPA payment system could have a significant impact on the future operations of banks, through increased transaction volumes, changes in the structure of income and reduction of the operational costs.

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