

DETERMINANTS OF BANKING PERFORMANCE IN ROMANIA: AN EMPIRICAL STUDY

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Abstract

The performance of the banking system is a key factor in the development of the national economy, serving as an essential pillar of sustainable economic stability. This research conducts a detailed examination of the factors affecting the performance of commercial banks in Romania, during the 2010–2024 period. Methodologically, the proposed econometric model analyzes the relationship between banking performance indicators (such as ROA, ROE, and NIM) and selected independent variables, grouped, according to the specialized literature, into bank-specific, industry-specific, and macroeconomic factors. The empirical findings reveal that the performance of the Romanian banking system is statistically significantly influenced by the non-performing loan ratio, capital adequacy, cost-to-income ratio, the size of the bank and of the banking sector, banking concentration, economic growth, and the real interest rate. These conclusions may have practical implications for the development of effective strategies aimed at enhancing institutional performance. Future research could expand the analysis by comparing bank performance in different economic contexts or by integrating additional factors such as digitalization and financial sustainability.

Keywords: *banking performance; bank-specific factors; industry-specific factors; macroeconomic factors; regression model; Romania.*

JEL Classification: G21; E44.

1. INTRODUCTION

Banks play a crucial role in harnessing economic stability, influencing both economic growth and the level of trust in the financial system. Against the backdrop of instability generated by the most recent macroeconomic risks, increasingly stringent regulations, and rapid technological advances, the analysis of banking performance becomes essential for both financial institutions and regulatory authorities. The latest financial crises have highlighted the need for

advanced mechanisms to monitor banking efficiency and intensified concerns regarding the sustainability and profitability of the banking sector.

The necessity of addressing this topic is justified also by the complexity of the factors influencing banking performance. It does not depend solely on internal managerial decisions, but also on macroeconomic and industry-specific factors. Thus, identifying and analyzing the main determinants of banking performance will provide a broad perspective on how banks can optimize their operational strategies. This paper contributes to the ongoing academic debate on how sound economic policies and sustainable financial practices can support stability and inclusive growth within the European Union.

The motivation for choosing this topic derives from the strategic importance of the banking sector in Romania and from the need to understand how it can effectively respond to economic challenges. Moreover, although there is extensive international literature on banking performance, a detailed analysis applied to the Romanian context is essential for formulating policies and management strategies adapted to the local market. The results of this research can assist both commercial banks in optimizing their performance and regulatory authorities in developing policies that support a stable and efficient banking system.

The main research questions this study aims to answer are:

- *What are the key determinants of banking performance in Romania?*
- *What influence do bank-specific, industry-specific, and macroeconomic factors have on the profitability of Romanian commercial banks?*

The purpose of this research is to identify and analyze the determinants of banking performance using an econometric model applied to an extensive dataset. This study will highlight the relationships between the selected variables and banking performance, expressed through ROA and ROE, providing a solid foundation for banking strategy recommendations.

To achieve this objective, the paper is structured as follows: the first section addresses the theoretical framework of banking performance, presenting the main concepts and models used in the literature. The second section is dedicated to the analysis of relevant variables considered in determining their impact on banking performance, classifying them into three categories: *bank-specific*, *industry-specific*, and *macroeconomic factors*. The third section presents the methodology and data description. The fourth section highlights the results obtained from the model, while the final section is dedicated to conclusions.

2. BANKING PERFORMANCE: A BRIEF LITERATURE REVIEW

The extensive specialized literature highlights a considerable academic interest in the study of banking performance, reflected in a significant number of empirical research studies. These studies have primarily aimed at investigating and identifying the determinants that directly or indirectly influence the financial performance of banking institutions.

Although numerous studies on the topic cover a variety of countries or groups of countries, it is noteworthy that most empirical research conducted so far has focused mainly on developed economies and, to a lesser extent, on emerging economies. This is largely due to the high availability of data in developed countries, well-established economic infrastructure, and the academic interest these markets attract. In addition, as Cărauşu (2016) also mentioned, Central and Eastern European countries are a particular category of emerging markets due to the specific economic, institutional and legal environment they operate in, which can be attributed to the radical changes imposed by the transition from planned economy to market economy.

Ciobanu and Pascaru (2018) classify the determinants of banking performance into bank-specific or internal factors, and industry-specific, macroeconomic, or external factors. Other sources classify these determinants using the terminology of endogenous and exogenous factors. In this regard, Lopotenco (2017) mentions that endogenous factors are decision-making variables specific to each bank or to the banking system as a whole, while exogenous factors are largely formed by variables describing the conditions of the environment in which banks operate, which are beyond their control.

Specialized studies on banking performance have employed a wide range of dependent and independent variables to analyze the determinants of bank efficiency and profitability. For example, in the study by Ciobanu and Pascaru (2018), the authors used three dependent variables, namely Return on Assets (ROA), Return on Equity (ROE), and Net Interest Margin (NIM), alongside seven independent variables: capital adequacy, cost-to-income ratio, non-performing loans, liquidity risk, the Herfindahl-Hirschman index, annual inflation rate, and GDP. Demirgüç-Kunt and Huizinga (1999) included, in addition to these variables, reserves, tax rates, size of the banking sector, market capitalization, number of banks, degree of concentration, total assets, and the corruption index. Another notable example is Bourke's (1989) study, which used independent variables such as personnel expenses, capital ratio, liquidity ratio, government ownership, interest rate, and inflation rate.

Most of the studies addressing banking profitability employ linear regression models to estimate and evaluate the impact of various factors on performance, with results proving significant in explaining profits. A relevant example is the study by Goddard *et al.* (2004), which conducted extensive research on the profitability of European banks. The estimation technique used in the study by Demirgüç-Kunt and Huizinga (1999) was weighted least squares, with the weight being the inverse of the number of banks in a given country in a given year. This weighting corrects for the considerable variation in the number of banks included in the analyzed sample across countries. Roman and Şargu (2013) note that one of the most effective and widely recognized methods in banking performance analysis is the CAMELS rating system. According to them, the results obtained through this system highlight the strengths and weaknesses of the analyzed banks,

underlining the need to strengthen efforts aimed at improving banking performance. Another methodological approach is that of Liargovas and Repousis (2011), who used both the event study methodology and the operational performance methodology.

Although the existing literature provides a comprehensive approach to the topic, an important limitation lies in the predominantly general character of the research, without placing sufficient emphasis on regional or sectoral particularities. There is a significant lack of detailed studies that capture the specificity of local markets or emerging economies. At the same time, the impact of recent changes, such as technological innovations, recent economic crises, or shifts in consumer behavior, has not been explored in depth.

This empirical study aims to provide additional and updated evidence regarding the determinants of banking performance in Romania, extending the analysis up to 2024. Unlike previous research, it employs a different dataset, in terms of the country analyzed, the time period, and the variables included in the model. Moreover, the paper focuses on how these factors influence banking performance, considering the contradictory findings in the existing literature.

3. DATA AND METHODOLOGY

As mentioned earlier, analyzing banking performance is of particular importance for the sustainable development and financial stability of credit institutions. In this regard, one has to establish which are the determinant factors that interfere with banking performance. Hence, our focus is to identify and analyze the *main determinants of banking performance* in Romania during the 2010–2024 period. Relevant events within this period include the Covid-19 pandemic crisis, which began at the end of 2019, and the military conflict that broke out in 2022 between the Russian Federation and Ukraine, both generating a climate of uncertainty and economic instability.

In the process we use annual data collected from official sources such as the databases of the International Monetary Fund, the European Central Bank, the National Bank of Romania (NBR), the World Bank, and the annual reports of the 10 commercial banks included in the study, ensuring the validity and consistency of the obtained results. Consulting multiple databases was necessary due to the diversity of variables included in the analysis and the limitations of some sources regarding the availability of recent data.

The banks were selected according to their market share, in order to ensure the relevance and representativeness of the study (at a national level). Thus, the analysis was conducted on a sample consisting of the main commercial banks in Romania, namely: Banca Transilvania, BCR, CEC Bank, BRD Groupe Soci  t   G  n  rale, ING Bank, Raiffeisen Bank, UniCredit Bank, Exim Banca Rom  neasc  , Alpha Bank, and Garanti BBVA, which together account for approximately 90% of the total market share.

The study used 12 variables, of which: 2 are the dependent variables, through which the performance of the banking system is measured, while the other 10 are the independent variables reflecting a wide range of determinant factors.

Most of the established studies have used a series of specific indicators to measure different dimensions of banking performance. The indicators recognized as fundamental benchmarks for analyzing profitability and efficiency in the banking sector are ROA (Return on Assets), which reflects the banking system's ability to generate profit, and ROE (Return on Equity), which measures shareholders' return on equity and provides insight into the efficiency of using shareholders' funds. Athanasoglou *et al.* (2008) used these dependent variables in their study, highlighting their relevance in the context of banking performance analysis. Consequently, this research will use both dependent variables alternately, providing a detailed perspective on the mechanisms through which they are influenced by the explanatory factors included in the model.

The analysis of the *independent variables* focuses on three categories of factors: bank-specific, industry-specific, and macroeconomic.

Regarding the bank-specific factors, five variables considered relevant for this study were selected:

- *Capital adequacy (CA)* reflects the institution's ability to absorb losses and support risk exposure. A higher level of capital adequacy is usually associated with superior banking performance. A study that reflects this positive relationship is that of Kosmidou *et al.* (2005), which concluded that better-capitalized banks are significantly less likely to fail. Abbas and Ali (2022) also reveal in their study that capital ratio positively influences the banks profitability.
- *Non-performing loans ratio (NPL)* expresses the proportion of loans with significant payment delays in total loans, providing an assessment of asset quality and the credit risk assumed by the bank. According to Kosumi and Zharku (2024), a higher NPL ratio is most commonly associated with lower banking performance.
- *Bank size (SIZE)* is usually measured using the logarithm of total assets. This indicator is amongst the most debated in literature. Balteş and Rodean (2016) argue that bank size has only a minor impact on performance. Goddard *et al.* (2004) argue that larger banks may improve performance due to economies of scale. However, Berger and Humphrey (1997) suggest that large banks could be less efficient, being burdened by higher operating costs and bureaucracy.
- *Market share (MS)* represents the percentage of an industry's total assets held by a credit institution. A larger market share suggests a dominant market position, which can provide competitive advantages such as economies of scale and greater capacity to attract clients. Studies such as Goddard *et al.* (2004) argue that banks with significant market share can

achieve higher ROA due to access to a broad portfolio of products and services, as well as better market positioning. However, it is important to note that, in some circumstances, this indicator does not guarantee higher performance. Banks seeking to expand market share rapidly may sacrifice profit margins, negatively impacting profitability.

- *Cost-to-income ratio (CIR)* reflects the operational efficiency of the banking institution. A lower level of this indicator is associated with higher managerial efficiency. This is supported by studies such as Mastilo *et al.* (2024), which suggest that efficient cost management directly contributes to improving ROA.

At the regional level, the competitive environment and the structure of the banking market can influence the performance of credit institutions. In the category of industry-specific factors, three variables were included:

- *Banking concentration (CR5)* measures the combined share of assets held by the top five banks in the system. This indicator reflects the degree of concentration and potential oligopoly effects on the efficiency and stability of the sector. Ciobanu and Pascaru (2018) noted that as system concentration increases, banks are negatively affected through decreased profits. In contrast, Pasiouras and Kosmidou (2007) argue that banking market concentration does not have a direct and uniform impact on profitability, as its influence depends on several exogenous factors such as financial regulations and macroeconomic conditions.
- *Number of credit institutions (NB)* provides insight into the degree of fragmentation of the banking sector. A higher number of participants may stimulate competition but can also lead to lower performance due to competitive pressures and costs associated with maintaining a fragmented market.
- *Banking sector size (BSSIZE)* refers to the total assets of all financial institutions in a given market. Studies such as Demirgüç-Kunt and Levine (2001) suggest that large banking sectors with extensive assets can optimize capital use and improve ROA through more efficient management of costs and risks. On the other hand, large banking sectors may also pose significant challenges. Kosumi and Zharku (2024) found a negative relationship between banking sector size and banking performance.

As for the macroeconomic factors, two control variables were introduced:

- *Economic growth (GDP)* is measured by the annual growth rate of real GDP and reflects the dynamics of economic activity. In their study, Demirgüç-Kunt and Huizinga (1999) found that as the banking system expands relative to the size of the economy, competition among banks increases, leading to lower interest margins and, consequently, lower profitability. On the other hand, Ciobanu and Pascaru (2018) highlighted that GDP growth may have a positive impact on banking performance, as it contributes to improving borrowers' incomes and reduces default risk.

- *Real interest rate (RINR)* influences investment behavior and credit demand. In their study, Pasiouras and Kosmidou (2007) found that interest rates affect bank profitability differently depending on the type of banks and the geographical regions in which they operate. Their study revealed that, in general, banks in more developed economies tend to benefit more from higher interest rate environments, as they have greater capacity to adjust lending rates and maximize profit margins. Conversely, banks in emerging economies may be negatively affected by high interest rates.

An overview of the variables included in the research, along with their description, is presented in Table 1.

Table 1. Description of variables

Variables	Symbol and unit of measurement	Calculation method	Expected impact	Data sources
Dependent variables				
Return on Assets	ROA (%)	Net Profit / Total Assets		Annual reports of commercial banks
Return on Equity	ROE (%)	Net Profit / Equity		
Independent variables				
Bank-specific factors				
Capital Adequacy	CA (%)	Equity / Total Assets	+	Annual reports of commercial banks
Non-performing Loans Ratio	NPL (%)	Non-performing Loans / Total Loans	–	
Bank Size	SIZE (mil. lei)	Total Net Assets of the Bank	+/–	
Market Share	MS (%)	Bank Assets / Total Banking System Assets	+/–	
Cost-to-Income Ratio	CIR (%)	Operating Costs / Operating Income	–	
Industry-specific factors				
Banking Concentration	CR5 (%)	Total Assets Held by the Five Largest Banks	+/–	ECB Datasets
Number of Credit Institutions	NB (banks)	Number of Credit Institutions in the System	+/–	NBR Annual Reports
Banking Sector Size	BSSIZE (mil. lei)	Total Assets of the Entire Banking System	+/–	
Macroeconomic factors				
Economic Growth	GDP (%)	Annual GDP Growth Rate	+	IMF Datasets
Real Interest Rate	RINR (%)	Nominal Interest Rate – Inflation Rate	+/–	World Bank, Global Financial Development

Source: author's own elaboration based on the specialized literature

This research adopts a methodological approach based on quantitative analysis techniques. In this context, research tools such as explanatory tables and econometric models built on multiple linear regression are employed. Thus, in order to highlight the evolution of banking performance for commercial banks in Romania and its determining factors, the following general linear regression econometric model is used:

$$y_{i,t} = a_0 + \beta_1 X_{1i,t} + \beta_2 X_{2i,t} + \beta_3 X_{3i,t} + \varepsilon_{i,t} \quad (1)$$

where: y = the dependent variables ROA or ROE for bank i in year t ;

X_1 = vector of bank-specific factors;

X_2 = vector of industry-specific factors;

X_3 = vector of macroeconomic factors;

ε = error term;

β_i = matrix of the coefficients of the explanatory variables.

Starting from the theoretical relationship established between the dependent variable and the set of explanatory variables included in the analysis, and considering the research objectives, the following general linear regression econometric model can be formulated:

$$ROA(ROE)_{i,t} = \alpha + \beta_1 CA_{i,t} + \beta_2 NPL_{i,t} + \beta_3 MS_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 CIR_{i,t} + \beta_6 CR5_{i,t} + \beta_7 NB_{i,t} + \beta_8 BSSIZE_{i,t} + \beta_9 INF_{i,t} + \beta_{10} GDP_{i,t} + \beta_{11} RINR_{i,t} + \varepsilon_{i,t} \quad (2)$$

The empirical analysis was conducted using the EViews software. The econometric model was estimated by applying the Estimated Generalized Least Squares (EGLS) method, chosen for its ability to correct potential issues of heteroskedasticity and autocorrelation of errors across observational units. This method is particularly suitable in the context of unbalanced panel data analysis.

4. EMPIRICAL RESULTS AND DISCUSSION

This section presents and analyzes the results obtained from the estimation of the econometric model constructed. The interpretation of the estimated coefficients is carried out both from a statistical and an economic perspective, being correlated with the specific context of the Romanian banking system and with relevant conclusions from the existing literature.

Tables 2 and 3 present the estimation results for the regression model, with ROA and ROE as dependent variables. The analysis reveals that, for both model specifications, most of the explanatory variables are statistically significant. These include the non-performing loans ratio, the cost-to-income ratio, bank size, banking concentration, the number of banking institutions, economic growth, and the real interest rate.

Moreover, the *Prob (F-statistic)* value equals 0 in both models, confirming the overall statistical significance of the regression. Thus, ROA and ROE, as measures of banking performance, are consistently and meaningfully explained

by the variables included in the model, strengthening the validity of the conclusions derived from the empirical analysis.

The difference between *R-squared* and *Adjusted R-squared* reflects the correction for the number of variables included in the model. While *R-squared* measures the proportion of variation explained, the adjusted form provides a more rigorous estimate by penalizing irrelevant variables. The small differences between the two indicate a well-specified model, without overfitting.

Table 2. Empirical results using ROA as the dependent variable

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NPL	-0.078596	0.018708	-4.201202	0.0000
CA	-0.007730	0.004637	-1.667074	0.0978
CIR	-0.020935	0.003710	-5.642276	0.0000
SIZE	1.39E-05	5.04E-06	2.745941	0.0068
MS	-0.067938	0.033520	-2.026790	0.0446
CR5	-0.114076	0.059046	-1.931990	0.0554
NB	-0.208401	0.097455	-2.138440	0.0342
BSSIZE	-2.09E-06	6.64E-07	-3.150432	0.0020
GDP	0.050787	0.017066	2.975857	0.0034
RINR	0.080653	0.045755	1.762739	0.0801
C	18.04593	6.768480	2.666172	0.0086
Weighted Statistics				
R-squared	0.527160	Mean dependent var	1.472130	
Adjusted R-squared	0.493143	S.D. dependent var	1.423529	
S.E. of regression	0.831357	Akaike info criterion	2.130464	
Sum squared resid	96.07036	Schwarz criterion	2.351244	
Log likelihood	-148.7848	Hannan-Quinn criter.	2.220160	
F-statistic	15.49685	Durbin-Watson stat	1.037944	
Prob(F-statistic)	0.000000			

Source: author's own calculations performed in EViews

Table 3. Empirical results using ROE as the dependent variable

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NPL	-0.575144	0.173078	-3.323031	0.0011
CA	-0.043104	0.045233	-0.952945	0.3423
CIR	-0.102875	0.031042	-3.314049	0.0012
SIZE	0.000116	4.19E-05	2.772589	0.0063
MS	-0.155178	0.284763	-0.544938	0.5867
CR5	-1.288641	0.460716	-2.797042	0.0059
NB	-2.005260	0.710765	-2.821269	0.0055
BSSIZE	-7.80E-06	5.32E-06	-1.467046	0.1446
GDP	0.429806	0.126914	3.386607	0.0009
RINR	0.575022	0.347147	1.656423	0.0999
C	167.0721	50.39162	3.315474	0.0012
Weighted Statistics				
R-squared	0.642527	Mean dependent var	19.39530	
Adjusted R-squared	0.616810	S.D. dependent var	21.27792	
S.E. of regression	9.258634	Akaike info criterion	6.452625	
Sum squared resid	11915.40	Schwarz criterion	6.673405	
Log likelihood	-472.9469	Hannan-Quinn criter.	6.542321	
F-statistic	24.98407	Durbin-Watson stat	1.135901	
Prob(F-statistic)	0.000000			

Source: author's own calculations performed in EViews

The results reveal a statistically significant negative relationship between the level of NPL level and both of the financial performance indicators, ROA and ROE. Thus, a higher NPL ratio reflects the deterioration of the portfolio quality and entails additional provisioning, which reduces net income and, implicitly, profitability indicators (ROA and ROE). The administrative and recovery costs associated with these non-productive assets further diminish profitability. At the same time, investors' negative perception of credit risk may increase financing costs and affect the institution's market value, thereby limiting access to resources and lending capacity. In the specific context of the Romanian banking system, where economic volatility significantly influences banking activity, rigorous credit risk management becomes essential.

A surprising result of this study is the negative relationship (statistically significant) between CA and ROA. Although a high solvency level is generally associated with greater protection against financial risks, in practice it may translate into inefficient use of capital. Romanian commercial banks, which maintain equity levels significantly above the minimum regulatory requirements, tend to be more conservative in allocating resources to profit-generating assets. In the Romanian economic context, characterized by moderate growth and intense competition, such an approach limits the appetite for risk that could yield higher returns. However, this variable proved insignificant for ROE.

The analysis also revealed a negative relationship (statistically significant) between CIR, on the one hand, and ROA and ROE, on the other hand. This relationship suggests that an increase in the operational efficiency ratio is associated with a decline in the profitability of assets and equity. High operating costs relative to the income generated may result from excessive administrative expenses, inefficient technological systems, or business models that fail to fully capitalize on revenue potential.

The SIZE indicator is one of the controversial indicators influencing banking performance. In this analysis, it seems that there is a positive relationship between bank size and ROA and ROE, suggesting that larger banks tend to record higher profitability of assets and equity. A key mechanism explaining this relationship is economies of scale, whereby larger banks can benefit from lower unit costs and invest more consistently in technology, advanced IT systems, and process optimization. In addition, larger banks have a more diversified portfolio of loans and income sources, enhancing their profit-generating capacity.

Another interesting result of the study is the negative relationship (also statistically significant) between MS and ROA (a relationship not seen with ROE). This finding suggests that as a bank increases its market share, the efficiency of asset usage (ROA) declines. One explanation is that expanding market share may result from aggressive competitive strategies, often involving price reductions, promotional offers, or substantial investments in marketing and expansion. While

these measures can lead to rapid growth and attract a large customer base, they may negatively affect operational efficiency.

A further statistically significant negative relationship was identified between banking concentration (CR5) and both the financial performance indicators. This result indicates that as concentration increases, operational efficiency and bank profitability tend to decline. In highly concentrated markets, dominant banks may face less pressure to improve internal processes and optimize costs, benefiting from a degree of competitive protection, which translates into weaker performance.

The analysis also revealed a negative relationship between the number of banking institutions and the performance indicators. One explanation for this result is linked to intensified competition within the banking system. When more institutions are present, competition intensifies, potentially leading to lower profit margins. Thus, banks reduce interest rates on loans and other financial services to attract or retain customers. Moreover, strategies adopted in a crowded banking environment may be more conservative, as each institution seeks to ensure stability in the market, limiting opportunities for improved financial performance.

For the size of the Romanian banking sector (BSSIZE), the research also revealed a negative relationship with ROA ($p < 0.01$), while the link with ROE is statistically insignificant. This may be explained by the fact that in an expanded environment, intensified competition or portfolio diversification does not occur uniformly, leading to operational inefficiencies.

As for the control variables, the results of the study also highlight a positive relationship (statistically significant), as expected, between economic growth (GDP) and both measures of financial performance. One explanation for this relationship is that an expanding economic environment generates increased demand for lending, investment activities, and business expansion. Under such conditions, banks benefit from enhanced opportunities to finance profitable projects, which translates into better asset utilization and optimization of equity structure. There is also a positive relationship between the real interest rate (RINR) and profitability indicators. This relationship indicates that as the real interest rate increases, the profitability of assets and equity tends to improve. This link can be explained by the fact that higher real interest rates enable banks to earn greater income from lending activities.

5. CONCLUSIONS

The research results highlight the complexity of the relationship between banking performance and bank-specific, industry-specific, and macroeconomic factors, revealing the interactions that govern the functioning of the Romanian banking system.

This analysis is in line with the existing literature on the topic and reveals that the variables with a significant positive influence on banking performance are bank size, economic growth, and the real interest rate. These results suggest that

larger banks can benefit from economies of scale, an expanding economy stimulates credit demand, and a higher level of the real interest rate can support bank profitability through increased profit margins. On the other hand, the variables that seem to exert a negative influence on banking performance are the non-performing loans ratio, capital adequacy, cost-to-income ratio, market share, banking concentration, the number of banks, and the size of the banking sector.

From a theoretical perspective, the study contributes to strengthening the literature on banking performance in emerging economies, providing additional evidence that supports both classical hypotheses and less intuitive but relevant relationships for the regional context. From a practical standpoint, the conclusions may serve as a foundation for strategic decisions by both bank managers and regulatory authorities.

During the course of the study, certain limitations emerged, such as the partial availability of financial data, which imposed restrictions on sample size, the difficulty of including qualitative variables or institutional factors that are hard to quantify, as well as the inherent limitations of the econometric model used, which cannot fully capture the effects of exogenous shocks or institution-specific characteristics.

This research may serve as a starting point for future studies on banking performance and financial stability. Possible avenues for further exploration include analyzing the impact of digitalization on banking profitability, as well as extending the analysis to other emerging economies in the region, in order to capture differences across various banking systems.

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Annexes

Table A1 - Descriptive statistics of the variables

	ROA	ROE	NPL	CA	CIR	SIZE	MS	CR5	NB	BSSIZE	GDP	RINR
Mean	1.010388	8.174251	8.911133	24.31900	60.32707	41250.12	8.076086	58.91333	36.20000	501246.7	2.750000	2.865133
Median	1.044676	8.919890	6.200000	20.40500	52.32500	31566.00	7.874281	59.50000	35.00000	427792.6	3.200000	2.262000
Maximum	5.102571	39.51911	29.20000	81.20000	120.8900	184264.0	20.89935	63.80000	42.00000	881673.5	8.200000	9.000000
Minimum	-4.454156	-51.45082	1.550000	12.00000	35.00000	3826.000	1.014350	52.70000	32.00000	341946.3	-3.900000	-3.867000
Std. Dev.	1.040363	11.21810	6.948770	15.72287	18.92634	31689.39	5.010899	3.774138	3.421213	171263.1	3.178728	3.903847
Skewness	-0.847745	-2.019896	1.035051	2.513440	1.138873	1.486641	0.604110	-0.295939	0.343453	1.002486	-0.717346	0.024461
Kurtosis	8.774618	12.39616	3.009639	8.596681	3.544891	6.175638	2.737161	1.503620	1.636210	2.657034	3.170136	1.913612
Jarque-Bera	226.3806	653.7984	26.78385	351.6091	34.28144	118.2818	9.555505	16.18046	14.57351	25.85962	13.04554	7.391445
Probability	0.000000	0.000000	0.000002	0.000000	0.000000	0.000000	0.008415	0.000307	0.000685	0.000002	0.001470	0.024830
Sum	151.5582	1226.138	1336.670	3647.850	9049.060	6187518.	1211.413	8837.000	5430.000	75187009	412.5000	429.7700
Sum Sq. Dev.	161.2710	18751.03	7194.524	36834.10	53372.72	1.50E+11	3741.258	2122.373	1744.000	4.37E+12	1505.542	2270.763
Observations	150	150	150	150	150	150	150	150	150	150	150	150

Source: author's own calculations performed in EViews

Table A2 - The correlation matrix of the variables

Correlation t-Statistic Probability	ROA	ROE	NPL	CA	CIR	SIZE	MS	CR5	NB	BSSIZE	GDP	RINR
ROA	1.000000 ----- -----											
ROE	0.804934 16.50328 0.0000	1.000000 ----- -----										
NPL	-0.442368 -6.000709 0.0000	-0.510939 -7.230947 0.0000	1.000000 ----- -----									
CA	-0.077162 -0.941524 0.3480	-0.070384 -0.858389 0.3921	-0.159165 -1.961324 0.0517	1.000000 ----- -----								
CIR	-0.409152 -5.455058 0.0000	-0.280418 -3.554027 0.0005	0.099995 1.222617 0.0009	0.197002 2.444543 0.0157	1.000000 ----- -----							
SIZE	0.321544 4.131143 0.0001	0.422906 5.677576 0.0000	-0.269197 -3.400451 0.0000	-0.194253 -2.409076 0.0172	-0.498448 -6.994747 0.0000	1.000000 ----- -----						
MS	0.182633 2.259833 0.0253	0.260048 3.276347 0.0013	0.077309 0.943329 0.3471	-0.293964 -3.741542 0.0003	-0.535487 -7.713603 0.0000	0.851152 19.72632 0.0000	1.000000 ----- -----					
CR5	0.383785 5.056127 0.0000	0.461525 6.329078 0.0000	-0.741134 -13.42993 0.0000	-0.116580 -1.427996 0.1554	-0.150999 -1.858291 0.0651	0.437593 5.920493 0.0000	0.113447 1.389115 0.1669	1.000000 ----- -----				
NB	-0.402063 -5.342119 0.0000	-0.478122 -6.622617 0.0000	0.709672 12.25427 0.0000	0.111061 1.359521 0.1760	0.140906 1.731471 0.0855	-0.449933 -6.129101 0.0000	-0.114551 -1.402802 0.1628	-0.961273 -42.43277 0.0000	1.000000 ----- -----			
BSSIZE	0.285925 3.629967 0.0004	0.381060 5.014103 0.0000	-0.657621 -10.61965 0.0000	-0.071043 -0.866461 0.3876	-0.157768 -1.943675 0.0538	0.527928 7.562223 0.0000	0.100350 1.226998 0.2218	0.799549 16.19532 0.0000	-0.822994 -17.62551 0.0000	1.000000 ----- -----		
GDP	0.163547 2.016794 0.0455	0.111585 1.366023 0.1740	-0.080113 -0.977359 0.3298	-0.079656 -0.972151 0.3326	0.020713 0.252042 0.8014	0.025941 0.315697 0.7527	0.026621 0.323979 0.7464	0.234579 2.935685 0.0039	-0.281969 -3.575378 0.0005	0.028772 0.350175 0.7267	1.000000 ----- -----	
RINR	-0.387983 -5.121176 0.0000	-0.457529 -6.259689 0.0000	0.722864 12.72668 0.0000	0.117858 1.443871 0.1509	0.137420 1.687799 0.0936	-0.412236 -5.504546 0.0000	-0.106774 -1.306432 0.1934	-0.879900 -22.52813 0.0000	0.940131 33.55839 0.0000	-0.749924 -13.79121 0.0000	-0.362504 -4.731907 0.0000	1.000000 ----- -----

Source: author's own calculations performed in EViews