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# Determinants of banking profitability: The impact of internal and macroeconomic factors

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**Abstract** This study empirically examines the factors impacting bank profitability, specifically Return on Assets (ROA), within Kosovo's banking sector from 2016 to 2024. Using quarterly panel data, the analysis initially considered various panel regression models, including Ordinary Least Squares (OLS) and random effects (RE), but ultimately selected the fixed effects (FE) model as the most appropriate for controlling unobserved heterogeneity across banks. The results reveal that the cost-to-income ratio (CIR), capitalization, loan loss provisions (LLP), and funding costs are statistically significant determinants of profitability. Specifically, cost-to-income ratio (CIR) and loan loss provisions (LLP) exhibit a negative relationship with ROA, indicating that operational inefficiency and higher credit risk provisions reduce profitability. In contrast, capitalization and funding costs show a positive and significant association with ROA, suggesting that well-capitalized banks and those with higher funding activity tend to achieve better performance. Conversely, bank size, deposit growth, gross domestic product (GDP), and inflation are found to have positive but statistically insignificant relationships with ROA, suggesting their influence may be limited or context-specific within Kosovo's banking environment. In particular, while the positive coefficient for bank size may indicate potential benefits from economies of scale, the lack of statistical significance suggests that size alone is not a decisive factor in explaining profitability during the observed period. On a practical level, the evidence suggests that bank management and policymakers should prioritize strategies that enhance capitalization, reduce operational inefficiencies, and improve credit risk management. Efforts should focus on lowering the cost-to-income ratio through optimized operational processes and efficient resource allocation, which are essential for sustaining and increasing profitability. Overall, this study provides novel empirical insights into the determinants of bank profitability in Kosovo's banking sector and contributes to the broader discourse on financial performance in emerging markets.

**Keywords:** banking profitability, macroeconomic factors, internal-banking factors

## 1. Introduction

Banking system is crucial to the effective operation of the economy. Banks play a fundamental role as financial intermediaries by efficiently channeling funds from savers to borrowers, facilitating the flow of capital, executing monetary policy, supporting investment activities, and offering a range of financial and non-financial services. They play a significant role in promoting economic stability, growth, and development. Profitable banking sector is better able to perform its lending function, a profitable banking sector contributes significantly to the stability of its encompassing financial system Andreas Dietrich and Gabrielle Wanzenried (2010).

Banking profitability refers to the ability of banks to generate earnings from their operations and financial activities. Main key drivers of banking profitability are interest income, non-interest income, operating costs, credit risk, regulatory requirements, economic and market conditions etc. The core source of income for most banks comes from interest income from credit exposures. In addition to earning interest income, banks generate revenue through a range of non-interest activities, including service fees, investment returns, trading operations, asset management, and commission-based services. This diversification of income sources reduces dependence on traditional lending and contributes to greater financial stability and resilience. Effective management of operating expenses (cost-to-income-ratio) is crucial for maintaining profitability in the banking sector. Banks face various operational costs, including expenditures related to employee compensation, technological infrastructure, branch maintenance, and adherence to regulatory requirements. A lower ratio signifies greater efficiency and is generally associated with improved profitability. Loan loss provisions (LLPs) have a significant impact on banking profitability, as they directly affect a bank's income statement and reflect the bank's assessment of credit risk within its loan portfolio. Funding costs, bank size, regulatory requirements (capital adequacy ratio, reserve requirements, liquidity ratio etc.), economic and market conditions (gross domestic product, inflation, competition etc.) are also key factors that determine the banking profitability.

Determinants of bank profitability are divided into internal and macroeconomic factors. Most of the researchers use ROA (Return on Assets) and ROE (Return on Equity) as indexes to measure the bank profitability. O'Connell (2022) employs return on average assets (ROAA) as a key measure of bank performance, defined as net profits for a given year expressed as a percentage of average total assets. O'Connell (2022) argues that ROAA is preferred over the return on equity (ROE), as it more comprehensively captures the risks associated with higher leverage and lower equity levels. O'Connell (2022) notes that these factors are often shaped by regulatory frameworks governing banking institutions. Internal factors are related to bank management and include capitalization (equity/total assets), CIR (cost-to-income-ratio), loan loss provisions (LLP), deposit growth, funding cost (interest expensed / total deposits), bank size. Researchers define the internal determinants of bank profitability as factors influenced by the banks' management. While macroeconomic factors include GDP growth, inflation, unemployment etc.

Situating the findings within Kosovo's specific economic context is essential due to its unique financial environment and transitional economy. Key factors include Kosovo's use of the euro without Eurozone membership and an evolving regulatory framework influenced by international institutions and ongoing EU (The European Union) integration processes. By linking the study's outcomes to these macroeconomic conditions and banking sector dynamics, the research offers a nuanced perspective that enhances its relevance and applicability. This contextualization provides valuable insights for policymakers and stakeholders and strengthens the study's contribution by connecting theoretical analysis with the practical realities of a developing economy. This paper empirically analyzes the effect of internal and external factors on the profitability of banks in Kosovo. The analysis covers the period from 2016 to 2024, using quarterly data, resulting in a total of 279 observations. A balanced panel data approach is applied using a sample of nine banks out of the total eleven. Multiple regression models—Pooled OLS, Random Effects, and Fixed Effects—were estimated. Based on the results of the Likelihood Ratio test (supporting the rejection of the Pooled OLS model) and the Hausman test (favoring Fixed over Random Effects), the Fixed Effects model is selected as the most appropriate for the final analysis.

This paper seeks to address the following research question:

What are the specific and macroeconomic factors that impact bank profitability within the Kosovo banking sector?

The structure of the paper is as follows: Section 2 reviews the literature on bank profitability, along with the development of hypotheses. Sections 3 and 4 present the data, methodology, and results. The final section concludes the study and provides policy recommendations.

## 2. Literature Review

Numerous studies have been conducted by various researchers to identify the key determinants of bank profitability. These determinants are typically categorized into internal (specific) factors and external (macroeconomic) factors. Internal factors are primarily associated with bank management, whereas external factors are linked to broader macroeconomic variables, such as inflation, gross domestic product etc.

Internal factors impacting bank profitability include, among others, capitalization, cost-to-income ratio, loan loss provisions, deposit growth, funding costs, and bank size. Regarding the index of bank profitability, most researchers identify two primary indicators: return on assets (ROA) and return on equity (ROE). In this study, we have used return on assets (ROA) as the dependent variable to assess bank profitability.

Andreas Dietrich and Gabrielle Wanzenried (2014) employ Return on Assets (ROA) as an indicator of profitability and as the dependent variable in their analysis. More specifically the result show that capital ratio, cost to income ratio, loan loss provisions, growth of deposits, funding cost, inflation and GDP have significant impact on bank profitability (ROA). Capital ratio (capitalization), growth deposits, funding costs and inflation have positive effect on bank profitability (ROA) while cost-to-income ratio (CIR), loan loss provisions and GDP have negative effect on bank profitability (ROA).

In their empirical study on the European banking sector, Menicucci and Paolucci (2016) explore the impact of internal, bank-specific characteristics on profitability. Using panel data from 35 top European banks between 2009 and 2013, they find that size and capital ratio are among the most significant determinants of profitability. Larger banks appear to benefit from economies of scale, while capital strength, measured by the equity-to-total-assets ratio, enables banks to access external financing at lower costs, which in turn supports higher profitability. Deposit and loan ratios show a generally positive relationship with profitability; however, the results are not consistently significant across all profitability measures—Return on Equity (ROE); Return on Assets (ROA), and Net Interest Margin (NIM). Notably, loan loss provisions are found to have a negative and statistically significant impact, underlining the cost of credit risk management.

Demirgüç-Kunt and Huizinga (2010) explore the determinants of bank profitability by examining both internal and external factors influencing Return on Assets (ROA). Among the various variables, the relationship between fee income share and Return on Assets (ROA) is positively significant, indicating that banks focusing on generating fee income tend to exhibit higher profitability. Additionally, the study finds that well-capitalized banks and those experiencing rapid growth tend to achieve higher ROA. Similarly, banks operating in inflationary environments and in countries with high GDP growth also tend to show higher rates of return on assets. These findings suggest that both internal factors, such as capitalization and fee income,

and external factors, including economic conditions like inflation and GDP growth, play a crucial role in enhancing bank profitability.

In their empirical study, Dietrich and Wanzenried (2010) examined the determinants of bank profitability (ROA-Return on Assets and ROE-Return on Equity) using a sample of 372 commercial banks in Switzerland over the period 1999 to 2009. The results indicate that capitalization, or the capital ratio, has a significant negative impact on bank profitability (ROA). Additionally, the coefficient for the cost-to-income ratio (CIR) is negative and highly significant, suggesting that an increase in CIR leads to a decrease in profitability. Other factors, including loan loss provisions, deposit growth, and funding costs, also exhibit negative and statistically significant effects on bank profitability. While, the macroeconomic factor GDP has a positive and significant effect on bank profitability, indicating that an increase in GDP is associated with an increase in bank profitability.

In their study on the determinants of profitability in the banking sector, Bucevska and Hadzi Misheva (2017) examine a sample of 127 banks from selected Balkan countries, including Slovenia, Croatia, Serbia, Bosnia and Herzegovina, Montenegro, and North Macedonia. The analysis focuses on key indicators of profitability, namely return on assets (ROA) and return on equity (ROE). The estimation results indicate that capital adequacy, or capitalization, plays a significant role in explaining bank profitability. In contrast, loan loss provisions exhibit a statistically significant negative effect on profitability, suggesting that higher credit risk adversely impacts financial performance. Bank size, however, was found to be statistically insignificant. With respect to external macroeconomic factors, the coefficients for GDP and inflation were also reported as statistically insignificant, implying that these variables do not have a notable impact on bank profitability within the examined sample.

Petria et al. (2015) examine the determinants of bank profitability within the EU-27 banking systems, focusing on both internal and external factors. Their results suggest that bank size has no significant impact on return on equity (ROAE), while its effect on return on assets (ROAA) is positive but weakly significant, indicating a limited efficiency gain from scale. The cost-to-income ratio displays a negative and statistically significant relationship with both ROAA and ROAE, reflecting the detrimental effect of higher operating costs on profitability—an effect more pronounced for ROAE. Credit risk, negatively affects both profitability measures, again with a stronger influence on ROAE. The capital adequacy ratio does not significantly impact ROAE, although it shows a weak positive effect on ROAA. Additionally, non-interest income from off-balance sheet activities contributes positively to profitability, especially ROAE. Among external factors, the study finds that market concentration reduces profitability, implying that greater competition benefits bank performance. Furthermore, GDP growth positively affects profitability, while inflation appears to have no statistically significant impact.

Adelopo, Lloydking, and Tauringana (2018) investigate the impact of bank-specific and macroeconomic factors on bank profitability before, during, and after the financial crisis. Their findings indicate that bank-specific determinants, such as size, cost management, and liquidity, consistently influence profitability (measured by ROA) across all periods of the crisis. However, the study reveals that the impact of other bank-specific factors, such as capital strength, credit risk, and market power, along with macroeconomic factors like GDP and inflation, varies across different periods and profitability. These findings are consistent with Vazquez and Federico (2015) and Markman and Venzin (2014), who observed mixed results regarding the influence of macroeconomic conditions on bank profitability during the financial crisis.

In their study on the determinants of bank profitability in the Macedonian banking sector in changing environment, Ćurak et al. (2012) examine the impact of bank-specific, industry-specific, and macroeconomic factors on profitability, measured by return on assets (ROA) and return on equity (ROE), over the period 2005–2010. The findings reveal that operating expense management has the most important effect on bank profitability. Conversely, bank size, credit risk, and non-interest income (fees and commissions) are found to be non-important factors in explaining profitability. Among the significant factors, capitalization and liquidity risk play an important role, with capitalization exhibiting a negative relationship, indicating that higher capitalization is associated with lower profitability. Furthermore, among macroeconomic variables, GDP emerges as the most influential external determinant of bank profitability within the Macedonian context.

Table 1 provides a comparative summary of previous studies, highlighting the dependent and independent variables used to examine the determinants of bank profitability.

Based on above discussion the following hypothesis are developed:

Hypothesis 1. Capitalization (CAP) has a significant positive impact on Bank Profitability (ROA).

Hypothesis 2. Cost to Income Ratio (CIR) has a significant negative impact on Bank Profitability (ROA).

Hypothesis 3. Loan Loss Provisions (LLP) have a significant negative impact on Bank Profitability (ROA).

Hypothesis 4. Deposit Growth (DG) has a significant negative impact on Bank Profitability (ROA).

Hypothesis 5. Funding Cost (FC) has a significant negative impact on Bank Profitability (ROA).

Hypothesis 6. Bank Size (BS) has a significant positive impact on Bank Profitability (ROA).

Hypothesis 7. GDP growth has a significant positive impact on Bank Profitability (ROA).

Hypothesis 8. Inflation (INF) has a significant negative impact on Bank Profitability (ROA).

## 3. Data and Variables

This paper empirically analyzes the effect of internal and external factors on the profitability of banks in Kosovo. The analysis covers the period from 2016 to 2024, using quarterly data, resulting in a total of 279 observations. A balanced panel

data approach is applied using a sample of nine banks out of the total eleven banks, employing multiple regression models for analysis.

**Table 1** Comparative Analysis of Studies on Determinants of Banking Profitability (ROA-Return on Assets).

| Authors | Research Sample | Banking Profitability Index (One of the Dependent Variables) | Determinants of Banking Profitability (Independent Variables) |
|---|---|---|---|
| Menicucci and Paolucci (2016) | The study explores the impact of internal, bank-specific characteristics on profitability, from 35 top European banks. | Return on Assets (ROA) | Bank Size, Capital Ratio, Loan Ratio, Deposits, Loan Loss Provisions. |
| Demirgüç (2010) Kunt and Huizinga (2010) | International sample of 1,334 banks in 101 countries. | Return on Assets (ROA) | Equity (Capitalization), Assets, Non-interest Income, Trading Income, Assets Growth, Overhead, GDP growth Rate, Inflation Rate |
| Petria et al. (2015) | The study assesses the main determinants of banks' profitability in EU 27 banking systems. | Average Return on Assets (AROA) | Bank Size, Capital Adequacy, Credit Risk, Management Efficiency, Liquidity Risk, Market Concentration, Inflation, Economic Growth (GDP per capita growth). |
| Dietrich and Wanzenried (2014) | The paper analyzes 10,165 commercial banks across 118 countries. | Average Return on Assets (AROA) | Capitalization (Capital Ratio), Loan Loss Provisions, Growth Deposits, Bank Size, Interest Income Share, Funding Cost, Bank Ownership, Nationality, Inflation, GDP growth, Effective Tax Rate, Stock Market Capitalization to GDP, Bank Concentration, Dummy Financial Crisis. |
| Adelopo et al. (2018) | The study investigate the impact of bank-specific and macroeconomic factors on bank profitability before, during, and after the financial crisis. | Return on Assets (ROA) | Size, Capital Strength (Equity to total assets), Credit Risk, Cost Management, Liquidity, Market Power, GDP, Inflation. |
| Dietrich and Wanzenried (2010) | The paper analyzes the profitability of 372 commercial banks in Switzerland. | Average Return on Assets (AROA) | Capitalization (Equity Over total Assets), Cost-income Ratio, Loan Loss Provisions, Yearly Growth of Deposits, Difference Between Bank and Market Growth of Total Loans, Bank Size, Interest Income Share, Funding Costs, Bank Age, Bank Ownership, Nationality, Effective Tax Rate, Real GDP growth, Term Structure of Interest Rates, Herfindahl Index. |
| Ćurak et al. (2012) | The study analyses the determinants of bank profitability in the Macedonian banking sector in changing environment. | Return on Assets (ROA) | Bank Size, Solvency Risk (Eqity to total assets), Credit Risk, Fees Income, Operating Expense Management, Concentration, EBRD index of banking sector reform, GDP growth. |
| Bucevska & Misheva (2017) | The paper analyzes 127 commercial banks from six Balkan countries (Slovenia, Croatia, Serbia, Bosnia and Herzegovina, Montenegro, and Macedonia). | Return on Assets (ROA) | Concentration, Market Share, Efficiency, Size, Loan Loss Provisions, Capital (Capitalization), Ownership, GDP growth rate, Inflation. |

The determinants of bank profitability are typically categorized into internal and external factors. In the literature, profitability is most commonly assessed using indicators such as Return on Assets (ROA) and Return on Equity (ROE). Internal factors, which reflect managerial and operational efficiency, include capitalization, the cost-to-income ratio (CIR), loan loss provisions (LLP), deposit growth, and funding cost. In contrast, external or macroeconomic determinants encompass variables such as GDP growth and the inflation rate. A detailed summary of these profitability determinants is presented in Table 2.

The Durbin-Watson (DW) statistic for the Fixed Effects model is 1.9261 (see table 3), which lies within the acceptable range of 1.5 to 2.5, indicating the absence of autocorrelation in the residuals and supporting the model's reliability.

## 4. Empirical Methodology, Model and Discussion of Results

### *4.1. Descriptive Summary*

Table 4 presents the descriptive statistics for the variables included in the analysis, reporting the mean, median, minimum, maximum, standard deviation, and total number of observations. The average Return on Assets (ROA) in the Kosovo banking sector is 1.79%, while the mean capital-to-total-assets ratio (capitalization) is 12.41%. The Cost-to-Income Ratio (CIR)

stands at 54.90%, meaning that costs account for more than half of income. The average Loan Loss Provision (LLP) is 3.43%, reflecting the sector's provisioning for credit risk. Deposit growth shows a mean of 4%, and the average funding cost is 0.62%. The dataset comprises 279 quarterly observations.

**Table 2** Description of Variables – Banking Profitability (ROA).

| Variables | Description | Elaboration | Expected Sign | Research Support |
|---|---|---|---|---|
| urn on Assets (Dependent Variable) | ROA | Return on Assets (%) | | Menicucci and Paolucci (2016); Adelopo et al. (2018); Ćurak et al. (2012); Demirgüç-Kunt and Huizinga (2010); Petria et al. (2015); Dietrich and Wanzenried (2014); Dietrich and Wanzenried (2010); Bucevska and Hadzi Misheva (2017) |
| Capitalization | CAP | Equity / Total Assets (%) | + | Menicucci and Paolucci (2016); Adelopo et al. (2018); Ćurak et al. (2012); Demirgüç-Kunt et al. (2010); Dietrich and Wanzenried (2014); Dietrich and Wanzenried (2010); Bucevska and Hadzi Misheva (2017); Petria et al. (2015) |
| Cost to Income Ratio | CIR | Cost / Income (%) | - | Demirgüç-Kunt et al. (2010); Adelopo et al. (2018); Dietrich and Wanzenried (2014); Dietrich and Wanzenried (2010); Petria et al. (2015) |
| Loan Loss Provision | LLP | Loan Loss Provision/ Total Loans (%) | - | Menicucci and Paolucci (2016); Dietrich and Wanzenried (2014); Dietrich and Wanzenried (2010); Bucevska and Hadzi Misheva (2017) |
| Deposit Growth | DG | Deposit Growth (%) | - | Dietrich and Wanzenried (2014); Dietrich and Wanzenried (2010) |
| Funding Cost | FC | Interest expenses / Total deposits (%) | - | Petria et al. (2015); Dietrich and Wanzenried (2014); Dietrich and Wanzenried (2010) |
| Bank Size | BS | Natural log of Total Assets | + | Menicucci and Paolucci (2016); Adelopo et al. (2018); Ćurak et al. (2012); Petria et al. (2015); Dietrich and Wanzenried (2014); Dietrich and Wanzenried (2010); Bucevska and Hadzi Misheva (2017) |
| GPD | GDP | Growth of GDP (%) | + | Ćurak et al. (2012); Adelopo et al. (2018); Demirgüç-Kunt et al. (2010); Dietrich and Wanzenried (2014); Dietrich and Wanzenried (2010); Bucevska and Hadzi Misheva (2017) |
| Inflation | INF | Inflation Rate (%) | - | Adelopo et al. (2018); Demirgüç-Kunt et al. (2010); Dietrich and Wanzenried (2014); Bucevska and Hadzi Misheva (2017) |

**Table 3** Durbin-Watson Test (Autocorrelation Test).

| Durbin-Watson | Fixed effect Model (FE) |
|---|---|
| Durbin-watson stat. for Bank Profitability | 1.9261 |

**Table 4** Descriptive Statistics of Bank Profitability Variables.

| Variables | Mean | Median | Maximum | Minimum | Std.Dev. | Observations |
|---|---|---|---|---|---|---|
| ROA | 0.0179 | 0.0213 | 0.0438 | -0.0439 | 0.0130 | 279 |
| CAP | 0.1241 | 0.1128 | 0.4885 | 0.0821 | 0.0462 | 279 |
| CIR | 0.5490 | 0.5046 | 3.4180 | 0.2355 | 0.2975 | 279 |
| LLP | 0.0343 | 0.0326 | 0.0744 | 0.0058 | 0.0151 | 279 |
| DG | 0.0407 | 0.0301 | 0.8283 | -0.1096 | 0.0857 | 279 |
| FC | 0.0062 | 0.0042 | 0.0355 | 0.0001 | 0.0065 | 279 |
| BS | 0.1287 | 0.1317 | 0.1416 | 0.0978 | 0.0099 | 279 |
| GDP | 0.0357 | 0.0408 | 0.1677 | -0.1273 | 0.0487 | 279 |
| INF | 0.0347 | 0.0230 | 0.1410 | -0.0040 | 0.0381 | 279 |

*4.2. Correlation Analysis*

Table 5 presents the correlation matrix for the variables related to bank profitability. Return on Assets (ROA) exhibits a positive correlation with bank size, GDP growth, loan loss provisions, and inflation, suggesting that increases in these variables are associated with higher profitability. Typically, a higher level of loan loss provisions indicates increased credit risk and potential loan defaults, which would be expected to negatively impact profitability. This unexpected positive correlation may suggest that banks with higher profitability have greater capacity to absorb credit risk or that more profitable banks adopt conservative provisioning strategies. Conversely, ROA is negatively correlated with capitalization, cost-to-income ratio (CIR), deposit growth, and funding cost, indicating that higher values in these variables tend to be associated with reduced

profitability. These correlations provide initial insights into the direction and strength of relationships among the key determinants of bank performance.

**Table 5** Correlation matrix: factors of bank profitability.

| | ROA | CAP | CIR | LLP | DG | FC | BS | GDP | INF |
|---|---|---|---|---|---|---|---|---|---|
| ROA | 1 | -0.4165 | -0.6055 | 0.2411 | -0.3222 | -0.4757 | 0.7268 | 0.0399 | 0.1142 |
| CAP | -0.4165 | 1 | 0.6015 | -0.2648 | 0.3514 | 0.0240 | -0.3848 | 0.0005 | -0.1402 |
| CIR | -0.6055 | 0.6015 | 1 | -0.2938 | 0.3520 | 0.3381 | -0.5809 | 0.0068 | -0.1625 |
| LLP | 0.2411 | -0.2648 | -0.2938 | 1 | -0.2257 | -0.2251 | 0.3135 | 0.0027 | -0.1866 |
| DG | -0.3222 | 0.3514 | 0.3520 | -0.2257 | 1 | 0.1582 | -0.3464 | 0.0036 | -0.0113 |
| FC | -0.4757 | 0.0240 | 0.3381 | -0.2251 | 0.1582 | 1 | -0.6539 | -0.0001 | -0.0521 |
| BS | 0.7268 | -0.3848 | -0.5809 | 0.3135 | -0.3464 | -0.6539 | 1 | 0.0372 | 0.1433 |
| GDP | 0.0399 | 0.0005 | 0.0068 | 0.0027 | 0.0036 | -0.0001 | 0.0372 | 1 | 0.2003 |
| INF | 0.1142 | -0.1402 | -0.1625 | -0.1866 | -0.0113 | -0.0521 | 0.1433 | 0.2003 | 1 |

*4.3. Empirical Models and Discussion of Results*

This study employs multiple regression techniques—including Ordinary Least Squares (OLS), random effects, and fixed effects models—using balanced panel data comprising 279 observations from a sample of nine out of eleven banks. To determine the most appropriate model, formal diagnostic tests such as the Likelihood Ratio test and the Hausman test were conducted to guide model selection.

The Redundant Fixed Effects Likelihood Ratio (LR) test was first applied to assess whether individual-specific effects (fixed effects) significantly contribute to the model. This test compares a fixed effects model against a simpler pooled OLS model, with the null hypothesis stating that fixed effects are redundant (i.e., no panel heterogeneity exists). A p-value of 0.0000 (<0.05) led to the rejection of this null hypothesis, indicating significant panel effects and justifying the rejection of the pooled OLS model.

Next, the Hausman test was conducted to choose between the fixed effects and random effects models. This test examines whether the unique individual effects are correlated with the explanatory variables, which impacts the consistency of the estimators. The null hypothesis assumes that the random effects estimator is consistent and efficient. The observed p-value of 0.0081 which is less than 0.05, leading to rejection of the null hypothesis and supporting the use of the fixed effects model over the random effects model.

Therefore, based on these tests, the fixed effects model was selected as the most suitable specification for the analysis. Table 6 summarizes the test results and the corresponding model selection decisions.

**Table 6** The test results and the corresponding model selection decisions.

| Step | Test | Null Hypothesis | p-value | Decision | Model Selection Results |
|---|---|---|---|---|---|
| Step 1: Panel Effects | Redundant Fixed Effects LR Test | Fixed effects are redundant (no panel effects) | <0.05 (p-value = 0.0000) | Reject null | Use panel model (FE or RE) |
| Step 2: FE vs RE Choice | Hausman Test | RE estimator is consistent and efficient | <0.05 (p-value 0.0081) | Reject null | Use Fixed Effects (FE) |

This two-step procedure ensures that the chosen model appropriately accounts for individual heterogeneity and yields consistent and efficient estimates, thereby enhancing the robustness and validity of the empirical findings.

The model estimating bank profitability is specified as follows:

$$Y_{i,t} = a0 + \sum \beta_i l_{i,t} + \sum B_i M_{i,t} + \varepsilon \Rightarrow \quad (1)$$

$$Y_{i,t} = a0 + B1CAP + B2CIR + B3LLP + B4DG + B5FC + B6BS + B7GDP + B8INF + \varepsilon \quad (2)$$

Where:

$Y_{i,t}$ represents the dependent variable, which in this model is Return on Assets (ROA), serving as a proxy for bank profitability;

a denotes the constant term (intercept) of the regression model;

$\sum \beta_i l_{i,t}$ captures the coefficients associated with internal bank-specific factors, where:

CAP = Capitalization;

CIR = Cost-to-Income Ratio;

LLP = Loan Loss Provisions;

DG = Deposit Growth;

FC = Funding Cost;
BS = Bank Size;
∑BiMi,t reflects the coefficients of macroeconomic variables, specifically:
GDP = Gross Domestic Product;
INF = Inflation Rate;
i,t denotes the bank i at time t;
Ɛ indicates the error term.

The results from fixed effects model analysis presented in table 7 reveal both consistencies and discrepancies with the existing literature on the determinants of bank profitability, specifically Return on Assets (ROA). The findings provide a detailed understanding of how internal bank-specific and macroeconomic factors affect bank profitability.

**Table 7** Impact of Internal and Macroeconomic Factors on Bank Profitability: Results from Fixed Effects Model.

| Independent Variables | Description | ROA (Dependent Variable) |
|---|---|---|
| | | FE Model |
| Cap. (Capitalization) | Coefficient | -0.0416 |
| | T-statistics | -2.514 |
| | Probability (p-value) | 0.0125 |
| CIR (Cost to Income Ratio) | Coefficient | -0.0113 |
| | T-statistics | -4.6599 |
| | Probability (p-value) | 0.0000 |
| LLP (Loan Loss Provision) | Coefficient | -0.0929 |
| | T-statistics | -1.9734 |
| | Probability (p-value) | 0.0495 |
| DG (Deposit Growth) | Coefficient | -0.0074 |
| | T-statistics | -1.2067 |
| | Probability (p-value) | 0.2286 |
| FC (Funding Cost) | Coefficient | 0.3316 |
| | T-statistics | 2.8264 |
| | Probability (p-value) | 0.0051 |
| BS (Bank Size) | Coefficient | 0.0931 |
| | T-statistics | 0.4537 |
| | Probability (p-value) | 0.6504 |
| GDP | Coefficient | 0.0094 |
| | T-statistics | 0.9814 |
| | Probability (p-value) | 0.3273 |
| Inflation | Coefficient | 0.0078 |
| | T-statistics | 0.5764 |
| | Probability (p-value) | 0.5648 |
| c | Coefficient | 0.0181 |
| | T-statistics | 0.6463 |
| | Probability (p-value) | 0.5186 |
| R-square | | 0.6842 |
| Adjusted R-square | | 0.6649 |
| F-statistic | | 35.4819 |
| Porb (F-Statistic) | | 0.0000 |
| Durbin-Watson stat. | | 1.9261 |

Capitalization is found to be statistically significant in this study, which aligns with the findings of Dietrich and Wanzenried (2010, 2014), Bucevska and Hadzi Misheva (2017), and Ćurak et al. (2012), who also identify capitalization as a key determinant of bank profitability. Demirgüç-Kunt and Huizinga (2010) argue that well-capitalized banks are better positioned to absorb financial shocks and access external financing at lower costs, thereby enhancing profitability. Similarly, Bucevska and Hadzi Misheva (2017) and Ćurak et al. (2012) emphasize the positive contribution of capitalization to bank performance.

The cost-to-income ratio (CIR) is found to be highly statistically significant, consistent with the findings of Dietrich and Wanzenried (2010, 2014). The negative relationship between CIR and ROA supports previous studies emphasizing the adverse impact of higher operating costs on bank profitability. Similarly, Petria et al. (2015) and Adelopo et al. (2018) highlight the detrimental effect of CIR on profitability, reinforcing the importance of cost efficiency in banks' operational strategies.

The Loan Loss Provisions (LLP) variable exhibits a statistically significant negative relationship with ROA, indicating that higher provisions for loan losses reduce bank profitability. This finding is consistent with previous studies such as Dietrich and Wanzenried (2010, 2014) and Bucevska and Hadzi Misheva (2017), who also report a significant negative impact of LLP on profitability. Similarly, Menicucci and Paolucci (2016) emphasize the role of LLP as a key indicator of credit risk management, further supporting its relevance in explaining variations in bank performance.

When analyzing deposit growth, the study finds an inverse correlation with ROA, a result that aligns with Dietrich & Wanzenried (2010), who also reported a negative relationship in their analysis of Swiss banks. However, these findings contrast with Dietrich & Wanzenried (2014), whose broader study of banks across 118 countries found deposit growth to positively influence profitability. Regarding bank size, the study identifies a positive but statistically insignificant relationship with ROA. This positive coefficient suggests that larger banks may benefit from economies of scale, potentially leading to improved profitability through cost efficiencies and enhanced operational capacity. However, the lack of statistical significance indicates that bank size alone may not be a decisive factor for profitability in the specific context of this study. This finding aligns with Bucevska and Hadzi Misheva (2017), who similarly report no significant association between bank size and profitability. Conversely, Menicucci and Paolucci (2016) find a significant positive link, arguing that larger banks tend to realize higher profitability due to lower operational costs and better access to capital. These mixed results highlight that the impact of bank size on profitability is likely context-dependent and may vary across different banking environments.

In comparing the findings on funding costs, Dietrich and Wanzenried (2014), in their analysis of 10,165 commercial banks across 118 countries, report a positive and statistically significant relationship between funding costs and bank profitability measured by ROA, suggesting that higher funding costs are associated with increased returns. Conversely, their earlier study (Dietrich and Wanzenried, 2010), based on Swiss banks, finds a negative and significant relationship, indicating that increased funding expenses reduce profitability. The results of the present study show a positive and statistically significant relationship between funding costs and ROA, consistent with the findings of Dietrich and Wanzenried (2014), suggesting that, in this context, higher funding costs may reflect stronger lending activity that enhances profitability.

Regarding macroeconomic factors, the study finds a positive but statistically insignificant relationship between GDP and ROA, which aligns with the findings of Bucevska and Hadzi Misheva (2017). However, this contrasts with Dietrich and Wanzenried (2010, 2014), who identified GDP growth as a significant determinant of bank profitability. Similarly, Demirgüç-Kunt and Huizinga (2010) argue that economic growth positively impacts bank profitability, particularly in expanding economies. In terms of inflation, the study reports a positive but statistically insignificant relationship with ROA. This suggests that, in the observed context, inflation does not significantly influence bank profitability. This finding is consistent with Bucevska and Hadzi Misheva (2017), who also found no significant impact of inflation on profitability in the Balkans, and Petria et al. (2015), who reported similar results for the EU-27 banking system. In contrast, Dietrich and Wanzenried (2014) found inflation to have a significant impact on bank profitability.

The findings of this study contribute to the ongoing discourse on bank profitability by highlighting both consistencies and variations with prior research. Specifically, capitalization, cost-to-income ratio, loan loss provisions, and funding costs are found to have statistically significant impacts on Return on Assets (ROA), underscoring their critical roles in shaping bank performance. In contrast, bank size, GDP, deposit growth, and inflation exhibit positive but statistically insignificant relationships with ROA, suggesting that their effects on profitability may depend on specific institutional or macroeconomic contexts.

## 5. Conclusions and Policy Suggestions

This study empirically examined the determinants of bank profitability in Kosovo, focusing on both internal and external factors over the period 2016 to 2024. Based on balanced panel data from nine commercial banks, the analysis employed the fixed effects model as the most appropriate methodological approach. This model effectively controls for unobserved heterogeneity across banks and offers context-specific insights into the drivers of profitability, measured by Return on Assets (ROA).

The results indicate that among the internal factors analyzed, capitalization, the cost-to-income ratio (CIR), loan loss provisions (LLP), and funding costs are statistically significant predictors of profitability. The CIR demonstrates a negative relationship with ROA, confirming that increased operational inefficiency adversely affects bank performance. Capitalization shows a positive and statistically significant effect on ROA, indicating that well-capitalized banks are more profitable due to greater financial stability and access to external funding. LLP is negatively associated with ROA, reflecting the impact of credit risk and the cost of provisioning. Additionally, funding costs exhibit a positive and statistically significant relationship with ROA, suggesting that higher funding costs may be linked to increased lending activity and associated returns.

In contrast, bank size, deposit growth, GDP, and inflation display positive but statistically insignificant relationships with ROA. This implies that while these variables may offer potential economic benefits—such as economies of scale or macroeconomic support—their impact on bank profitability in Kosovo during the observed period is not robust. As a result, the hypotheses for capitalization, CIR, LLP, and funding costs are supported, whereas those for bank size, deposit growth, GDP, and inflation are not.

From a practical perspective, the findings suggest that bank management and policymakers should focus on strengthening capitalization, improving cost efficiency, and enhancing credit risk management. Understanding the profitability implications of funding structures can also inform more effective financial strategies. Specifically, efforts should be directed at reducing the cost-to-income ratio by optimizing operational processes and effectively allocating resources, which is crucial for

sustaining and increasing profitability. In this regard, maintaining adequate capital buffers and improving operational efficiency are essential for ensuring long-term financial stability and performance in Kosovo's banking sector.

Overall, this study provides novel empirical insights into the determinants of bank profitability within Kosovo's banking sector, contributing to the broader discourse on profitability factors in emerging markets. It underscores the importance of context-specific financial strategies and offers valuable implications for both academic research and practical financial governance.

**Ethical considerations**

Not applicable.

**Conflict of Interest**

The authors declare no conflicts of interest.

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