

The impact of banking and macroeconomic indicators on the profitability of the banks in the Republic of North Macedonia

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Abstract

The aim of this paper is to investigate the impact of key banking and macroeconomic indicators on the profitability of the banking sector in the Republic of North Macedonia. The study is based on a quantitative approach and uses secondary quarterly data for the period 2010–2024. The study elaborates the conceptual framework of profitability through the three basic indicators: return on assets (ROA), return on equity (ROE) and net interest margin (NIM) as dependent variables. Profitability is analyzed depending on internal bank-specific factors as independent variables, such as capital adequacy (CAR), liquid assets (LA), loan to deposit (LTD), non performing loan (NPL) and macroeconomic variables such as economic growth (GDP) and inflation. Methodologically, the paper is based on a combination of inductive and deductive approaches, whereby general conclusions about the behavior of the banking system are drawn from specific empirical results, and then they are linked to the theoretical models SCP (Structure–Conduct–Performance) and ESH (Efficient Structure Hypothesis). The analysis applies descriptive statistics, Pearson correlation analysis and multiple linear regression. The findings indicate that the hypotheses for liquid assets, loan to deposit, non performing loan and inflation are confirmed like crucial for the stability and efficiency of the banking sector. The regression results indicate that the profitability of banks in the Republic of North Macedonia is largely determined by internal bank-specific structural factors, while macroeconomic variables have a limited and indirect impact. Thus, the paper contributes to a better understanding of the stability and efficiency of the banking sector in small and open economies, offering

a theoretical and practical basis for further research and the advancement of financial stability policies.

Keywords: profitability, banking sector, ROA, ROE, NIM, macroeconomic indicators, Republic of North Macedonia.

1. Introduction

Bank profitability is one of the most important indicators of their stability, efficiency and sustainability in the financial system. Banks are financial intermediaries between entities that have excess funds and those that have a shortage of funds, and banks play a key role in the allocation of capital, supporting economic activity and strengthening economic growth. The ability of banks to generate profits under a controlled level of risk is a fundamental prerequisite for maintaining the confidence of depositors, shareholders and the general public.

Bank profitability is most often measured through three indicators: return on assets (ROA), return on equity (ROE) and net interest margin (NIM). These indicators are basic measurement tools for assessing the efficiency, profitability and risk profile of banks. Profitability will be analyzed as a result of a combination of key internal bank-specific factors, such as capital adequacy (CAR), liquid assets (LA), loans to deposits (LTD), non-performing loans (NPL) and external factors, such as economic growth (GDP) and inflation.

In the period 2010–2024, banking systems at the global and regional levels faced a series of structural and economic shocks – the European sovereign debt crisis, the period of extremely low interest rates, the COVID-19 pandemic, as well as the inflationary and energy crises. These events left significant consequences on the dynamics of profitability, liquidity and risk profile of banks in the wider region, including in the Republic of North Macedonia.

The purpose of this paper is to explain how key banking and macroeconomic indicators affect bank profitability, creating an analytical basis for an empirical analysis of the indicated impact.

2. Literature review

Profitability is the ability of a bank to generate profit through the efficient use of its assets and liabilities. It is an indicator of financial health, competitiveness and long-term sustainability. Profitable banks absorb shocks more easily, provide security for depositors and more easily secure capital for future investments (Short B, 1979).

At its core, bank profitability is based on the theory of financial intermediation, where banks act as intermediaries between savers and borrowers. Banks provide liquidity transformation—converting short-term deposits into long-term loans—while managing risks such as default and interest rate volatility. Profitability is derived from the difference between the interest earned on loans and the interest paid on deposits, known as the net interest margin (NIM) (Daymond & Diving 1983).

Profitability is the result of the way in which banks operate, taking into account the environment in which they operate. Profitability reflects the quality of the bank's management team, shareholder behavior, policies, strategies, efficiency and risk management ability (Soana, 2021). When assessing the economic performance of banks, the environment in which the bank operates, as well as internal and external activities, is always taken into account. To assess profitability, several indicators are used and the data for their calculation are obtained from the banks' financial statements. Return on assets (ROA), return on equity (ROE) and net interest

margin (NIM) are the most used indicators for calculating the profitability of banks (Athanasoglou et al, 2008).

Return on assets (ROA) measures the profit that a bank makes from its total assets. A higher ROA means a more efficient use of resources. Return on assets (ROA) shows the profit earned per unit of assets and reflects the ability of management to use the bank's financial and real investment resources to generate profit. This indicator depends on the bank's policy, management decisions, as well as factors over which they have no control, which are related to economic and state regulation. A note about this indicator is that it does not include off-balance sheet activities, which can also have a significant contribution to profit (Flamini et al, 2009).

Return on equity (ROE) shows how much return shareholders make on their own capital. Return on equity (ROE) shows the effectiveness of the bank's management in using the funds available to it from shareholders and is an indicator of the return that they achieve as a compensation for investing their capital in a particular bank. Return on equity is also related to the ultimate goal of the bank and is an indicator of how successful the management is in maximizing shareholder wealth (Demirgüç-Kunt & Huizinga, 1999).

Net interest margin (NIM) measures the relationship between interest income and expense, and is a primary source of profit for traditional banking. Net interest margin NIM is considered an ex-post measure, because it takes into account interest income and expense. Net interest margin (NIM) reflects the costs of financial intermediation of the bank. Through it, we learn how efficiently a bank is managed and what is the rate of return that interest-bearing assets are achieving. Net interest margin (NIM) is considered an ex-post measure, because it takes into account interest income and expense (Angbazo, 1997).

ALM is a framework for matching banks' assets and liabilities in order to maximize returns and minimize risk. Through the ALM framework, banks ensure alignment between asset and liability ratios, in order to minimize exposure to risks related to liquidity, interest rates, and market volatility. In small and open economies like the Republic of North Macedonia, ALM is particularly important due to the limited capital market and dependence on deposit financing. Liquidity, interest rate risk and credit risk management have a direct impact on ROA, ROE and NIM (Sinkey J, 2002).

In recent years, the Macedonian banking system has demonstrated relative stability, but at the same time faces structural challenges. Short-term deposits dominate, while loans have a longer-term nature, which creates potential mismatches that require careful management through the ALM framework. The National Bank of the Republic of North Macedonia requires banks to apply a systemic approach to managing liquidity and interest rate risk. According to the Decision on Risk Management (2021), banks must have an ALCO committee established that regularly reviews ALM reports, stress test scenarios and liquidity plans (NBRSM, 2021).

Banking i.e. internal indicators are under the direct control of the Bank and represent the main determinants of profitability. The main internal indicators are: capital adequacy (CAR), non-performing loans (NPL) and liquidity (LA, LTD). In contrast to internal indicators, macroeconomic indicators are external indicators, which are not under the direct control of the bank, but have a significant impact on the profitability of banks. The main external indicators include the following indicators: gross domestic product (GDP) and inflation (Athanasoglou, 2008).

The capital adequacy indicator (CAR) represents a protective layer against risks. Higher levels of capital increase stability, can negatively affect ROE due to reduced leverage. CAR is one of the most important regulatory and analytical indicators in banking. It is used to assess the bank's ability to absorb losses and remain financially stable in conditions of economic or market shocks (Berger & Bouwman, 2013). According to Basel III, the minimum CAR should be 8% (baseline threshold), with the addition of an additional capital buffer defined by the regulator (Basel III, 2011). CAR limits the volume of lending. If a bank has a low CAR, it is not allowed to issue new

loans without additional capital. CAR is an indicator of confidence. Banks with a high CAR are considered more reliable and more resilient to crises.

The non-performing loans (NPL) indicator is one of the most important indicators of the quality of banks' loan portfolios and their exposure to credit risk. It is used to assess the financial stability, riskiness and efficiency of credit management. A high share of non-performing loans (NPL) reduces profits through increased impairments and provisions. There is a strong negative relationship between NPL and ROA/ROE (Louzis et al, 2012).

In banking, the indicators liquid assets (LA) and loans to deposits (LTD) are essential for assessing the financial stability, operational efficiency and ability of a bank to meet its obligations. Liquid assets are assets that a bank can quickly and easily convert into cash without significant loss of value. These include: cash, deposits with the central bank, government bonds, short-term market instruments. Liquid assets indicate whether the bank has sufficient funds to cover short-term liabilities (Vodová P, 2013). According to Basel III, banks must maintain sufficient liquid assets to withstand 30-day stress scenarios (Liquidity Coverage Ratio – LCR). A high level of liquid assets reduces the likelihood of a liquidity crisis (Basel III, 2013).

Loans to deposits (LTD) measures the ratio between loans issued and deposits collected. It shows how much of the deposits are used for lending. A high LTD means that the bank is actively using deposits to generate income through loans. An excessively high LTD (>90%) may indicate a risk of insufficient liquidity. Central banks monitor LTD to prevent excessive exposure to credit risk. Liquidity reduces risk, but excessively high liquidity brings low returns. Optimization, not maximization, is needed (Vodová, 2013).

Macroeconomic factors have an indirect but strong impact on profitability, through credit activity, interest rates and market stability. The Gross Domestic Product (GDP) indicator is one of the most important macroeconomic indicators used in banking to analyze the economic environment and assess risks and opportunities for profitability and growth (Athanasoglou et al, 2008). GDP measures the total market value of all final goods and services produced in a country in a given period of time (usually a year or quarter). It is an indicator of economic activity, growth and stability of the economy. In periods of economic growth (high GDP), household and business incomes increase, which improves their ability to repay loans. In recessions (low or negative GDP), the risk of default increases, leading to an increase in non-performing loans (NPL) (Klein, 2013). Banks use GDP as a guide to expand or restrict lending. High GDP signals increased demand for credit and the potential for profitable growth (Demirgüç - Kunt & Huizinga, 1999).

The inflation indicator plays a key role in banking because it directly affects interest rates, the real value of assets and liabilities, lending activity and profitability of banks. It is one of the most important macroeconomic factors that banks and regulators closely monitor (Athanasoglou et al, 2008). Inflation is an increase in the general level of prices of goods and services in the economy over a certain period of time. Commercial banks adjust their lending and deposit interest rates according to inflation expectations. When inflation increases, interest rates usually increase to maintain real returns. Inflation affects the real profits of banks. If interest income does not grow in proportion to inflation, real profitability declines. High inflation can erode the net interest margin (NIM), especially if the bank fails to adjust interest rates in a timely manner (Demirgüç Kunt & Huizinga, 1999). Inflation affects the ability of customers to repay their debts. In conditions of high inflation, the real incomes of households and firms can decrease, which increases the risk of non-performing loans (NPL) (Nkusu, 2011).

Theoretical models related to profitability are: the Structure-Conduct-Performance model (SCP), the Efficient Structure Hypothesis (ESH), the DuPond analysis, and the CAMEL model.

The SCP model explains the relationship between market structure, bank behavior, and profitability. In concentrated banking markets, a few dominant banks are more likely to charge higher interest margins and bank fees, which results in higher profits. Therefore, the SCP suggests that concentration and limited competition lead to consistently higher profitability. The

components of this model are: structure (number of banks, market concentration, barriers to entry, regulations), behavior (interest rate policy, credit selection, marketing, innovation), and performance (profitability (ROA, ROE), efficiency, stability).

The ESH, on the other hand, argues that profitability results from operational efficiency, not market power. According to ESH, banks with lower costs, better technologies, more efficient management, and superior risk management policies naturally achieve higher ROA, ROE, and NIM—regardless of market structure (Berger A, 1995).

The DuPont model decomposes ROE into three components: net profit margin, asset turnover, and financial leverage. This model allows for a detailed analysis of the sources of profitability and is useful for internal assessment of banking efficiency (Soliman M, 2008).

CAMEL is a regulatory framework for assessing the health of banks, based on five components: capital adequacy, asset quality, management quality, profit, and liquidity. It is used by central banks and supervisors to assess the profitability and stability of banks (Dang U, 2011).

Existing literature mostly analyzes the impact of banking and macroeconomic indicators on bank profitability and their results show that non-performing loans (NPL) have a negative impact on profitability, capital adequacy (CAR) and gross domestic product (GDP) have a positive impact. However, there is a scientific gap in the literature on the case of the Republic of North Macedonia, primarily because there are a small number of studies on banking profitability, most analyses are focused on a single bank or a short period of time, and banking and macroeconomic factors are rarely analyzed simultaneously. For this reason, this paper focuses on a comprehensive analysis of the impact of key banking and macroeconomic indicators on the profitability of the banking sector in the Republic of North Macedonia.

3. Concept Model and Hypotheses

The main objective of the research is to examine the impact of the effects of key banking and macroeconomic indicators on the three main indicators of profitability of the banking sector in the Republic of North Macedonia, which are return on assets (ROA), return on equity (ROE) and net interest margin (NIM). The key banking and macroeconomic indicators that will be used in the analysis are: capital adequacy ratio (CAR), liquid assets (LA), loans to deposits (LTD), non-performing loans (NPL), gross domestic product growth (GDP), as well as inflation. Accordingly, the hypotheses that are set are the following:

Hypothesis 1: Higher CAR increases profitability

Hypothesis 2: Higher LA increases profitability

Hypothesis 3: Higher credit exposure i.e. LTD can reduce profitability

Hypothesis 4: Higher NPL can reduce profitability

Hypothesis 5: Higher GDP growth increases profitability

Hypothesis 6: Higher inflation reduces profitability

4. Research Methodology

For the analysis of the management of assets and liabilities of banks in the Republic of Macedonia, key banking and macroeconomic indicators were used in order to determine their impact on profitability indicators. The analysis covers quarterly data from 2010 to Q1 2025 (61 observations). These data are systemic indicators for the banking sector published by the National Bank of the Republic of Macedonia. For the purposes of the analysis, we use the dependent variables ROA, ROE and NIM, as indicators of profitability, while the independent variables that we will use and through which we will determine a certain impact on profitability are:

- **CAR** (Capital Adequacy Ratio).
- **LA** (Liquid Assets).
- **LTD** (Loan to Deposit).
- **NPL** (Non-Performing Loan).
- **GDP** (Gross Domestic Products).
- **Inflation**

In order to confirm or deny the hypotheses set, we used various qualitative, quantitative, and statistical methods. For the purposes of the research, at a first place a descriptive statistical analysis will be conducted, through which the basic characteristics of the data will be presented. Then, we will use Pearson's correlation analysis, which will allow us to see whether an increase in the independent variables will also lead to an increase in the dependent variables, i.e. profitability. In the statistical analysis section, we will use multiple regression, which will allow us to determine whether and to what extent the independent variables affect the dependent variables ROA, ROE and NIM.

In its simplest form, the analytical model can be represented as follows:

$$Y_t = \beta_0 + \beta_1 CAR_t + \beta_2 LA_t + \beta_3 LTD_t + \beta_4 NPL_t + \beta_5 GDP_t + \beta_6 Inflation_t + \varepsilon_t$$

5. Results and Discussion

Qualitative analysis, quantitative analysis and the use of statistical models that allow us to analyze the impact of independent variables (CAR, NPL, LA, LTD, GDP, as well as inflation) on dependent variables (ROA, ROE and NIM), give us the opportunity to confirm or deny the initially set hypotheses. Results of the descriptive analysis, Pearson correlation and statistical multiple regression analysis are presented below.

5.1. Descriptive statistics

The analysis are conducted on annual data for the period 2010– Q1 2025. Return on assets (ROA), return on equity (ROE) and net interest margin (NIM) are used as dependent variables, while capital adequacy (CAR), liquid assets (LA), loan-to-deposit ratio (LTD), non-performing loans (NPL), gross domestic product growth rate (GDP) and inflation rate are used as independent variables.

Table 1 Descriptive data analysis

	N	Minimum	Maksimum	Mean	Std.Deviation
CAR	61	15,2	19	16,91	0,92
LA	61	27,6	33,3	30,82	1,4
LTD	61	81,5	92,3	86,96	2,86
NPL	61	2,3	7,8	5,00	2,04
ROA	61	-0,3	3,1	1,23	0,77
ROE	61	-2,5	28,0	12,08	6,39
NIM	61	2,5	4	3,25	0,38
GDP	61	-15,4	15,4	2,07	3,55

Inflation	61	-1	19,3	3.08	4,2
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The average value of the capital adequacy ratio (CAR) is 16.91%, with a minimum value of 15.2% and a maximum value of 19%, which indicates a certain oscillation in the value, but still the capital position of the banking system during the analyzed period is solid.

The average level of liquid assets (LA) is 30.82%, with a minimum value of 27.6% and a maximum value of 33.3%, which confirms the relatively high liquidity of the sector.

The loan-to-deposit ratio (LTD) has an average value of 86.96%, with a minimum value of 81.5% and a maximum value of 92.3%, which indicates a moderate use of the deposit base for credit activity, with certain oscillations that are understandable given the longer time period of analysis, in which the health Covid crisis, the energy and inflation crises also occurred.

The average rate of non-performing loans (NPL) is 5.00%, with a minimum value of 2.3% and a maximum value of 7.8%, with a gradual downward trend in recent years.

Regarding the dependent variables, the average value of the return on assets (ROA) is 3.1%, with a minimum value of -0.3% and a maximum value of 3.1%, indicating moderate profitability of the banking sector. In the analyzed period, profitability has a significant upward trend, primarily due to the reduction of non-performing loans. Also, profitability grows in conditions of a higher inflation rate due to the increase in the net interest margin.

The average return on equity (ROE) is 12.08%, with a minimum value of -2.5% and a maximum value of 28%, indicating a satisfactory return on equity. It should be particularly noted that the return on capital expressed in percentage terms has been improving significantly since the middle of the analyzed period, primarily due to the reduction in non-performing loans.

The net interest margin (NIM) has an average value of 3.25%, with a minimum value of 2.5% and a maximum value of 4%, indicating a stable ability of banks to generate interest income.

Macroeconomic indicators show an average economic growth (GDP) of 2.07% and an average inflation of 3.08%. The observed minimum and maximum values of GDP (-15.4% to 15.4%) and inflation (-1.0% to 19.3%) indicate the presence of significant economic fluctuations in the analyzed period.

The standard deviation shows that the greatest variability is observed in ROE (6.39), inflation (4.20) and GDP (3.55), indicating greater oscillations in these indicators. On the other hand, CAR (0.92) and NIM (0.38) show relatively low variability, indicating stability of the capital position and interest margin of the banking sector.

5.2. Correlation analysis (Pearson correlation) and Multiple regression analysis by the impact of selected indicators on the profitability

In order to examine the relationship between the variables, Pearson correlation analysis was conducted.

Table 2 Pearson correlation analysis

Hypothesis	Correlation with ROA	Correlation with ROE	Correlation with NIM
H1 (CAR %) – Higher capital adequacy leads to higher profit	0,329	-0,061	-0,040
H2 (LA %) – Higher liquidity leads to higher profit	-0,068	0,019	-0,175

H3 (LTD %) – Higher credit exposure reduce profit	-0,495	-0,075	0,432
H4 (NPL %) – Higher non-performing loans reduce profit	-0,764	-0,215	0,405
H5 (GDP %) – Higher economic growth leads to higher profit	0,019	0,134	0,126
H6 (Inflation %) – Higher inflation reduce profit	0,235	-0,006	-0,317

According to the results of Table 2, we can conclude that the dependent variable ROA is significantly correlated with LTD and NPL. With LTD there is a negative correlation ($r = -0.495$), i.e. with the increase in the amount of loans in relation to deposits, profitability decreases due to the increase in the level of non-performing loans. Also, with the independent variable NPL, it has been determined that there is a significant negative correlation with ROA ($r = -0.764$), i.e. with the increase in non-performing loans, the profitability of banks decreases. With independent variables such as CAR and inflation, it has been determined that the correlation is moderate and the direction of the correlation is low and positive. In other words, the bank's capital and inflation have a moderate impact on the bank's profitability and this impact is not statistically fully confirmed, whereby a more detailed analysis is needed taking into account other variables in order to confirm the dependence. The remaining independent variables LA and GDP are not significant in this analysis.

The dependent variable ROE is not significantly positively correlated with the independent variables that are the subject of analysis. Although we have not been able to scientifically confirm this correlation of the independent variables with ROE, in practice certain variables, such as CAR, have a significant impact on profitability, because with the increase in capital adequacy, the percentage of the ROE indicator decreases, assuming that loans are at the same level.

Pearson's correlation for NIM indicates that there is a significant correlation with independent variables such as LTD, NPL and moderate correlation with inflation. For LTD and NPL, this correlation is positive ($r = 0.432$, $r = 0.405$, respectively). Accordingly, greater lending activity and larger non-performing loans lead to higher NIM. This may seem contradictory that an increase in non-performing loans can lead to an increase in NIM, but loans with higher risk (those that may later become NPL) are approved at higher interest rates and generate higher interest income. For inflation, the correlation is negative ($r = -0.317$), which implies that higher inflation leads to lower NIM. For the remaining independent variables such as CAR and LA, no significant correlation has been established, i.e. the increase in capital adequacy and liquid assets cannot be associated with the increase in NIM, i.e. the net interest margin.

Table 3 Results from statistical significance of the model for ROA, ROE and NIM

<i>Regression Statistics</i>	<i>ROA</i>	<i>ROE</i>	<i>NIM</i>
Multiple R	0,854	0,412	0,658
R Square	0,729	0,169	0,433

Adjusted R Square	0,699	0,077	0,370
Standard Error	0,422	12,637	0,300
Observations	61	61	61

According to Table 3, Multiple R (0.854) represents the classical correlation that exists between ROA as a dependent variable, with the other independent variables CAR, LA, LTD, NPL, GDP and inflation. This value indicates a very strong positive relationship, that is, that the independent variables have an impact on ROA as a dependent variable.

R Square (0.729) is the coefficient of determination and shows that 72.9% of the variation in ROA can be explained by the presence of the independent variables CAR, LA, LTD, NPL, GDP and inflation. Adjusted R Square (0.699) the obtained result indicates that even after implementing other independent variables, the research will not be disrupted and that the model is stable. Observations (61) shows the number of observations used in the analysis. For the dependent variable ROE, Multiple R is 0.412, R Square is 0.169, from which it can be concluded that a small number of the variations in ROE can be explained by this model. For the remaining dependent variable NIM, Multiple R is 0.658, which means that about 65.8% of the variation in NIM can be explained by the above independent indicators.

Table 4 Results of multiple regression analysis for ROA, ROE and NIM

<i>ROA</i>	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-28,396	6,618	-4,291	0,000	-41,664	-15,127
CAR%	0,140	0,085	1,650	0,105	-0,030	0,309
LA%	0,253	0,063	3,996	0,000	0,126	0,380
LTD%	0,260	0,053	4,859	0,000	0,153	0,367
NPL%	-0,607	0,067	-9,021	0,000	-0,741	-0,472
GDP%	0,008	0,016	0,494	0,623	-0,024	0,040
Inflation%	-0,036	0,017	-2,179	0,034	-0,070	-0,003
<i>ROE</i>	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-283,300	198,083	-1,430	0,158	-680,433	113,834
CAR%	-1,408	2,531	-0,556	0,580	-6,484	3,667
LA%	3,183	1,894	1,680	0,099	-0,615	6,980
LTD%	2,864	1,601	1,789	0,079	-0,346	6,074
NPL%	-5,591	2,013	-2,778	0,008	-9,626	-1,556
GDP%	0,444	0,475	0,935	0,354	-0,508	1,397
Inflation%	-0,293	0,501	-0,585	0,561	-1,298	0,712
<i>NIM</i>	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-3,410	4,709	-0,724	0,472	-12,851	6,030
CAR%	0,224	0,060	3,717	0,000	0,103	0,344

LA%	-0,064	0,045	-1,422	0,161	-0,154	0,026
LTD%	0,055	0,038	1,451	0,153	-0,021	0,132
NPL%	0,032	0,048	0,674	0,503	-0,064	0,128
GDP%	0,008	0,011	0,730	0,468	-0,014	0,031
Inflation%	-0,043	0,012	-3,634	0,001	-0,067	-0,019

According to the results obtained in Table 4, from the regression analysis for ROA we can conclude the following; The CAR coefficient is not statistically significant ($\beta = 0.140$; $t = 1.650$; $p = 0.105$), which indicates that the increase in capital adequacy is not associated with higher profitability (ROA). The LA indicator shows a significant relationship with ROA ($\beta = 0.253$; $t = 3.996$; $p = 0.000$), which means that increased liquidity leads to an increase in the profitability of the bank. A bank that maintains a reasonable level of liquid assets can quickly take advantage of market opportunities and invest these funds when an opportunity arises, which positively affects ROA. The LTD ratio is also statistically significant ($\beta = 0.260$; $t = 4.859$; $p = 0.000$). This means that higher credit engagement has a positive effect on profitability. NPLs have a negative and statistically significant effect on ROA ($\beta = -0.607$; $t = -9.021$; $p = 0.000$). This is in line with economic logic, whereby an increased volume of non-performing loans increases risk and reduces income. Banks with a high NPL ratio usually have increased provisioning costs, which reduces their profitability. The economic activity indicator GDP has a positive, but insignificant effect on ROA. This shows that economic growth does not always lead to better profitability for banks, perhaps due to time lags or other structural factors. Inflation has a negative and statistically significant relationship with ROA ($\beta = -0.036$; $t = -2.179$; $p = 0.033$). Higher inflation can erode real returns and lead to instability, i.e. a decrease in profitability. In this case, although the hypothesis is statistically confirmed, the economic value of the coefficient is quite small. In practical analysis, both statistical and economic (coefficients) significance are usually considered as two dimensions. If the statistically confirmed significance is also confirmed by economic significance, then we have the absolutely most desirable situation in economic analysis.

The regression analysis for ROE shows us that the coefficient for CAR is not statistically significant ($\beta = -1.408$; $t = -0.556$; $p = 0.580$), which indicates that an increase in capital adequacy is not associated with higher profitability. The LA indicator shows a limited relationship with ROE at a statistical significance level of 10% ($\beta = 3.183$; $t = 1.680$; $p = 0.099$), which means that increased liquidity leads to a limited increase in the bank's profitability. The LTD ratio shows limited statistical significance ($\beta = 2.864$; $t = 1.789$; $p = 0.079$). This means that higher credit engagement affects profitability, but to a limited extent. NPLs have a negative and statistically significant effect on ROE ($\beta = -5.591$; $t = -2.778$; $p = 0.008$). This is in line with economic logic, whereby an increased volume of non-performing loans increases risk and reduces income. The economic activity indicator GDP has a positive but insignificant effect on ROE and inflation also has no statistically significant relationship with ROE.

Regarding NIM, according to the results of the regression analysis, we can conclude that the coefficient for CAR is positive and statistically significant ($\beta = 0.224$; $t = 3.717$; $p = 0.000$), which indicates that the increase in capital adequacy is associated with higher profitability (NIM). The LA indicator does not show a significant relationship with NIM ($\beta = -0.064$; $t = -1.422$; $p = 0.161$) which means that increased liquidity does not lead to an increase in the profitability of the bank. The LTD ratio, as well as NPL, do not have a statistically significant effect on NIM. The economic activity indicator GDP has a positive, but insignificant effect on NIM. This shows that economic growth does not always lead to better profitability for banks, perhaps due to time lags or other structural factors. Inflation has a negative and statistically significant relationship with NIM

($\beta = -0.043$; $t = -3.634$; $p = 0.001$). Higher inflation can erode real returns and lead to volatility, i.e., reduced profitability.

Table 5 General results for hypotheses for ROA, ROE and NIM

Indicator	ROA	ROE	NIM
1. CAR	-	-	+
2. LA	+	-	-
3. LTD	+	-	-
4. NPL	+	+	-
5. GDP	-	-	-
6. Инфлација	+	-	+

+ means the hypothesis is confirmed

- means the hypothesis is not confirmed

According to the data in Table 5, from the overall analysis we can confidently confirm Hypotheses 2,3,4 and 6 in relation to the dependent variable ROA. Statistical analyses confirmed that there is a high correlation between LA, LTD, NPL and inflation with ROA. The results obtained indicate a positive correlation.

In the analysis of bank profitability measured through ROE and NIM, the results are generally negative, with the exception of the CAR, NPL and inflation indicators. For the ROE indicator, five hypotheses out of a total of six are rejected due to their statistical insignificance. Also, for the NIM indicator, four hypotheses out of a total of six are rejected. From this we can conclude that additional analysis is needed using other independent variables such as interest rates, cost efficiency, etc. in order to determine the components that affect the dependent variables ROE and NIM, through which we measure profitability.

5.3. Practical Implications

The findings of this study have important practical implications for bank management, regulatory authorities and policymakers in the Republic of North Macedonia and other emerging banking markets. By identifying the key bank-specific and macroeconomic determinants of profitability, the research provides valuable insights into the factors that contribute to the sustainable performance of the banking sector. For bank managers, the results emphasize the importance of maintaining adequate capital buffers, ensuring optimal liquidity levels, and continuously improving asset quality through effective credit risk management practices. The identified relationship between non-performing loans and profitability highlights the need for prudent lending policies and enhanced monitoring of credit portfolios, particularly during periods of economic uncertainty. Furthermore, understanding the impact of liquidity and capital adequacy on profitability can assist banks in achieving a more efficient balance between risk and return. From a regulatory perspective, the study offers empirical evidence that can support the development of supervisory policies aimed at strengthening financial stability while preserving the profitability of financial institutions. The findings may assist the central bank and other regulatory bodies in evaluating the effectiveness of existing prudential requirements and in designing appropriate macroprudential measures during periods of economic stress. In addition, the analysis of macroeconomic variables such as GDP growth and inflation provides policymakers with a better understanding of how changes in the economic environment affect banking sector performance.

This knowledge can contribute to more informed monetary and fiscal policy decisions, particularly in small and open economies such as North Macedonia. The study also serves as a useful reference for investors, financial analysts, and other stakeholders by offering a comprehensive assessment of the drivers of bank profitability over an extended period. Ultimately, the practical implications of this research extend beyond academic contribution, providing evidence-based recommendations that may support more resilient banking operations, improved risk management practices, and a stable and profitable banking sector capable of supporting long-term economic growth and financial development.

Conclusion

This study examined the impact of key bank-specific and macroeconomic determinants on the profitability of the banking sector in the Republic of North Macedonia during the period 2010 – Q1 2025. The analysis was based on three profitability indicators, namely return on assets (ROA), return on equity (ROE), and net interest margin (NIM), while capital adequacy (CAR), liquidity (LA), loans to deposits ratio (LTD), non-performing loans (NPL), GDP growth, and inflation were employed as explanatory variables. By combining descriptive statistics, Pearson correlation analysis, and multiple regression analysis, the study provided a comprehensive assessment of the factors influencing bank profitability in a small and open economy.

The descriptive analysis revealed that the banking sector maintained a strong capital position and high liquidity throughout the observed period. The average capital adequacy ratio exceeded regulatory requirements, while liquidity indicators demonstrated a stable funding structure and prudent risk management practices. Profitability indicators exhibited satisfactory performance, with positive average values of ROA, ROE, and NIM. At the same time, macroeconomic variables such as GDP growth and inflation displayed greater variability, reflecting the effects of economic cycles, the COVID-19 pandemic, and the subsequent inflationary pressures experienced in recent years.

The Pearson correlation analysis provided initial evidence regarding the relationships among the variables. The results indicated a positive association between profitability and capital adequacy, as well as between profitability and economic growth. Conversely, non-performing loans showed a negative relationship with ROA and ROE, confirming the importance of credit risk management for banking performance. Inflation exhibited mixed effects, suggesting that its influence on profitability depends on the ability of banks to adjust interest rates and maintain net interest margins. Although correlation analysis identified significant relationships among several variables, it was insufficient to determine causal effects, thereby necessitating the application of multiple regression analysis.

The multiple regression results offered a deeper understanding of the determinants of profitability. The findings suggest that bank-specific factors play a more important role in explaining profitability than macroeconomic variables. In particular, asset quality, capital adequacy, and liquidity management emerged as critical determinants of financial performance. Non-performing loans were found to exert a negative impact on profitability, while adequate capitalization contributed positively to the resilience and stability of banks. Macroeconomic variables, especially GDP growth and inflation, influenced profitability indirectly and with varying intensity across the different profitability measures. Overall, the regression models confirmed that profitability is shaped by a combination of internal managerial decisions and external economic conditions.

In conclusion, the study demonstrates that the profitability of the North Macedonian banking sector is primarily driven by sound risk management, strong capitalization, and effective liquidity management. The findings contribute to the existing literature by simultaneously examining ROA, ROE, and NIM over an extended period that includes major economic shocks such as the global

financial aftermath, the COVID-19 crisis, and the recent inflationary episode. The results provide valuable implications for bank managers, regulators, and policymakers seeking to strengthen financial stability and ensure sustainable profitability in the banking sector. Future research may expand the analysis by incorporating additional variables, bank-level data, or comparative studies with other countries in the region.

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