

# Factors Affecting the Profitability of Commercial Banks in Vietnam

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**ABSTRACT:** This study aims to analyze the factors influencing the Return on Assets (ROA) of commercial banks in Vietnam during the period 2019–2024. The research data is collected from the financial statements of banks and macroeconomic data sources. A panel data model is employed to examine the relationship between ROA and independent variables, including the Cost-to-Income Ratio (CIR), Capital Adequacy Ratio (CAR), Loan-to-Deposit Ratio (LDR), Net Interest Margin (NIM), Total Operating Expenses (GTOE), Equity-to-Deposit Ratio (ETDR), and macroeconomic factors such as Gross Domestic Product (GDP) and Inflation (INF). The findings provide empirical evidence on the extent to which each factor affects the banks' profitability, thereby proposing policy recommendations to enhance the operational efficiency of Vietnam's commercial banking system.

**KEYWORDS** - Return on Assets (ROA), commercial banks, panel data, CIR, CAR, LDR, NIM, GTOE, ETDR, GDP, inflation

## I. INTRODUCTION

In the context of increasingly fierce competition, measuring the financial performance of commercial banks is a critical process to evaluate profitability, risk management, and sustainable development. Profitability ratios, particularly Return on Assets (ROA) and Return on Equity (ROE), are considered key indicators reflecting the operational efficiency and financial health of banks. These metrics not only demonstrate the ability to generate profits from assets and equity but also reflect the banks' management capabilities, adaptability, and competitiveness in the market (Athanasoglou et al., 2008).

According to the State Bank of Vietnam's Report (2023), the total pre-tax profit of the commercial banking system reached approximately VND 264,000 billion, a 7.6% increase compared to 2022. However, this growth was uneven across banks. Large banks such as Vietcombank, Techcombank, and MBBank maintained ROE above 20%, while many smaller or restructuring banks achieved ROE below 10%, with some even recording profit declines. Similarly, the industry's average ROA was around 1.2%, and ROE averaged 15% in 2023, highlighting significant disparities in asset and capital utilization efficiency, particularly between state-owned and private commercial banks. This disparity reflects differences in management capabilities, business models, and adaptability to economic fluctuations, underscoring the urgent need for operational model reforms and improved resource utilization efficiency (Nguyen Thi Men, 2021).

Challenges from the COVID-19 pandemic and global economic volatility have posed numerous difficulties for Vietnam's banking sector, including rising funding costs, declining credit demand, and deteriorating asset quality. According to FiinGroup's Report (2023), the non-performing loan (NPL) ratio rose to 2.91% by the end of 2023, compared to 1.49% in 2020, directly impacting provisioning costs and profitability. Additionally, competition from fintech companies, compliance with Basel II and Basel III standards, and the pressure of digital transformation have forced banks to restructure to maintain and enhance profitability. A study by Ernst & Young (2022) indicates that 67% of bank executives

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in the Asia-Pacific region believe long-term profitability depends on transforming business models through technology, cost optimization, and enhanced risk management. Macroeconomic factors, such as the State Bank of Vietnam's interest rate policies, economic growth rates, and industry competition, also significantly influence financial performance. For instance, the reduction in policy rates in 2023 led to a decline in Net Interest Margin (NIM) for many banks, such as ACB, where NIM dropped from 4.0% (2022) to 3.4% (2023), resulting in a 7% decrease in profit after tax compared to the previous year.

Numerous studies have identified factors affecting ROA and ROE, including internal factors such as bank size, operating costs, asset quality, and Capital Adequacy Ratio (CAR), as well as macroeconomic factors like GDP growth, inflation, and monetary policies (Athanasoglou et al., 2008). In Vietnam, a study by Nguyen Thi Men (2021) on 28 banks during 2015–2020 found that the NPL ratio, Cost-to-Income Ratio (CIR), asset size, and equity significantly impacted ROA and ROE. However, most prior studies either focused on individual factors or used data before 2020, failing to fully capture recent developments such as the impact of COVID-19, monetary policy changes, and digital transformation trends. Therefore, this study aims to provide an updated analysis, integrating both internal and macroeconomic factors, using data from 2019–2024, to offer a comprehensive view of the factors affecting the profitability of commercial banks in Vietnam.

This study is grounded in financial efficiency theory, with ROA used as a core indicator to assess bank performance. Based on prior studies and the practical context of Vietnam's banking sector, the following hypotheses are proposed:

**H1:** The Cost-to-Income Ratio (CIR) has a negative impact on the Return on Assets (ROA) of commercial banks in Vietnam. The CIR reflects the efficiency of cost management in banks. A higher CIR negatively affects ROA, emphasizing the importance of cost control in enhancing profitability (Le Thi Luot et al., 2019).

**H2:** The Capital Adequacy Ratio (CAR) has a significant impact on the Return on Assets (ROA) of commercial banks in Vietnam (the direction of impact may be positive or negative). A high CAR enhances a bank's ability to withstand risks and boosts credibility and business opportunities but may reduce capital utilization efficiency, affecting ROA (Berger, 1995). CAR's impact on ROA is ambiguous, balancing risk reduction with potential limitations on capital efficiency (Tran Thi Thuy Ha & Nguyen Thi Hong Nhung, 2020).

**H3:** The Loan-to-Deposit Ratio (LDR) has a significant impact on the Return on Assets (ROA) of commercial banks in Vietnam (the direction of impact may be positive or negative). LDR reflects the extent to which mobilized capital is used to generate income from lending activities. Studies on liquidity management and operational efficiency in Vietnamese commercial banks suggest that LDR may have an inconsistent impact on ROA (Nguyen Van Tien et al., 2021). A high LDR may yield higher interest income but also poses liquidity risks and higher funding costs. **H4:** The Net Interest Margin (NIM) has a positive impact on the Return on Assets (ROA) of commercial banks in Vietnam. A high NIM enhances ROA by optimizing income from lending activities (Demirgüç-Kunt & Huizinga, 1999). NIM has a significant positive impact on the ROA of Vietnamese commercial banks. Optimizing lending and managing funding costs are key strategies for improving profitability (Nguyen Thi Lan et al., 2021).

**H5:** Total Operating Expenses (GTOE) have a negative impact on the Return on Assets (ROA) of commercial banks in Vietnam. GTOE represents the core operating costs of banks. Effective cost management is critical, as GTOE negatively impacts bank profitability (Nguyen Thi Thuy Hang & Tran Thi Hai Ly, 2017).

**H6:** The Effective Tax Rate (ETDR) has a negative impact on the Return on Assets (ROA) of commercial banks in Vietnam. The Effective Tax Rate (ETDR) indicates the proportion of income tax banks pay relative to pre-tax profits. ETDR has a statistically significant negative impact on after-tax profits. A high tax burden reduces banks' net profits (Pham Thi Bich Ngoc, 2020).

**H7:** Gross Domestic Product (GDP) has a positive impact on the Return on Assets (ROA) of commercial banks in Vietnam. GDP reflects the economy's health and positively affects bank profitability (Tran Van Binh, 2018). Strong GDP growth creates favorable conditions for business operations and enhances bank profitability. **H8:** Inflation (INF) has a significant impact on the Return on Assets (ROA) of commercial banks in Vietnam (the direction of impact may be positive or negative). Inflation affects costs, asset values, and economic behavior, impacting bank operations. Inflation's impact on ROA is ambiguous, varying by period, reflecting a complex relationship with bank profitability (Pham Thu Huong, 2020).

II. RESESEACH METHODOLOGY

2.1. Research Approach

This study employs a quantitative approach using panel data to analyze the factors affecting the Return on Assets (ROA) of commercial banks in Vietnam. Panel data regression models, including Ordinary Least Squares (OLS), Fixed Effects Model (FEM), Random Effects Model (REM), and Generalized Least Squares (GLS), are applied to test hypotheses regarding the impact of internal factors (asset size, Cost-to-Income Ratio - CIR, Non-Performing Loan Ratio - NPL, Capital Adequacy Ratio - CAR) and macroeconomic factors (GDP growth, inflation) on ROA. The GLS model is selected as the primary tool to address heteroskedasticity, ensuring reliable estimation results. Variables are defined and measured according to international financial standards, such as ROA calculated as profit after tax divided by average total assets, to ensure scientific rigor, practicality, and comparability with international studies. The analysis is conducted using STATA 15.1, a powerful tool for statistical data processing and analysis, ensuring accuracy and efficiency throughout the research process.

2.2. Research Sample

The study focuses on commercial banks listed on the Vietnam stock market, with a sample of 29 banks over the period 2019–2024. This timeframe is chosen to reflect the impact of significant economic events, including the COVID-19 pandemic, monetary policy changes, and key financial developments in Vietnam. Data is collected from audited financial statements, annual reports of the banks, and reputable macroeconomic sources such as the State Bank of Vietnam and FiinpPro. The dataset includes financial indicators such as ROA, NPL, CIR, CAR, and macroeconomic variables like GDP growth and inflation, compiled into structured panel data for analysis. The dataset comprises 174 observations from the financial statements of 29 commercial banks in Vietnam during 2019–2024, providing a robust foundation for evaluating the factors affecting the profitability of commercial banks in a volatile economic context.

2.3. Variables in the Research Model (Continued)

Based on theoretical foundations and prior studies, the research model focuses on identifying internal and macroeconomic factors affecting the Return on Assets (ROA) of commercial banks in Vietnam. ROA is selected as the dependent variable because it is a key indicator reflecting the efficiency of asset utilization for profit generation, consistent with studies by Nguyen Thi Phuong Thao et al. (2018) and Tran Thi Thu Huong (2019). The independent variables include CIR, CAR, LDR, NIM, GTOE, ETDR, GDP, and INF, which are expected to have either positive or negative impacts on ROA.

The research model is constructed as follows:  $ROA_i = \beta_0 + \beta_1 CIR_i + \beta_2 CAR_i + \beta_3 LDR_i + \beta_4 NIM_i + \beta_5 GTOE_i + \beta_6 ETDR_i + \beta_7 GDP_i + \beta_8 INF_i + \epsilon_i$

Where:

- **ROA<sub>i</sub>**: Return on Assets of observation i.
- **CIR<sub>i</sub>, CAR<sub>i</sub>, LDR<sub>i</sub>, NIM<sub>i</sub>, GTOE<sub>i</sub>, ETDR<sub>i</sub>, GDP<sub>i</sub>, INF<sub>i</sub>**: Values of the corresponding independent variables for observation i.
- **β<sub>0</sub>**: Intercept.
- **β<sub>1</sub>, β<sub>2</sub>, ..., β<sub>8</sub>**: Regression coefficients, indicating the magnitude and direction of the impact of each independent variable on ROA.
- **ε<sub>i</sub>**: Random error term.

Variable	Measurement
ROA	$\frac{\text{Profit after tax}}{\text{Average total assets}}$
CIR	$\frac{\text{Operating costs}}{\text{Total operating income}}$
CAR	$\frac{\text{Equity}}{\text{Risk-adjusted assets}}$

LDR	$\frac{\text{Customer loan balance}}{\text{Total customer deposits}}$
GTOE	Total operating expenses in financial statements
ETDR	$\frac{\text{Total income tax expense}}{\text{Profit before tax}} \times 100\%$
GDP	% GDP growth year by year
INF	% CPI change year over year

Table 2.1: Descriptive Statistics of Variables

2.4. Data Collection and Processing

Before analysis, the data was processed in Excel to clean, verify completeness, remove missing or anomalous values, and standardize the variables to ensure consistency. The study uses ROA as the dependent variable to represent the bank’s profitability. The independent variables include the Cost-to-Income Ratio (CIR), Capital Adequacy Ratio (CAR), Loan-to-Deposit Ratio (LDR), Total Operating Expenses (GTOE), Effective Tax Rate (ETDR), Gross Domestic Product (GDP), and Inflation Rate (INF). After conducting descriptive statistics, testing, and estimation using the Pooled OLS, Fixed Effects Model (FEM), Random Effects Model (REM), and Feasible Generalized Least Squares (FGLS) models on STATA 17, the research team determined that the FGLS model is the most suitable for analyzing the relationship between the variables.

III. RESULTS AND DISCUSSION

3.1. Descriptive Statistics

Based on calculations performed using STATA 17, the descriptive statistics include the dependent variable ROA and the independent variables (CIR, CAR, LDR, NIM, GTOE, ETDR, GDP, INF). The results show that ROA has an average value of 1.46% with a standard deviation of 1.53%, indicating significant variation in profitability across banks. The CIR has an average of 44.08% and a standard deviation of 27.05%, with a wide range of fluctuation (-230.36% to 172.25%), highlighting substantial differences in cost management. Negative CIR values are anomalous, potentially due to operating losses or data errors.

3.2. Correlation Analysis

The research team conducted a correlation analysis to examine the relationships between quantitative variables, using STATA 17 to generate a correlation coefficient matrix (Table 4.2). The results indicate that the pairwise correlation coefficients between independent variables are all below 0.8, which is not high enough to cause multicollinearity in the model. This approach is based on the theory of Hoàng Trọng and Chu Nguyễn Mộng Ngọc (2008) regarding the detection of multicollinearity through Variance Inflation Factor (VIF) or correlation matrices.

3.3. Regression Analysis Three methods commonly used in regression analysis for panel data are the Pooled Ordinary Least Squares (Pooled OLS) model, the Fixed Effects Model (FEM), and the Random Effects Model (REM). The purpose of employing these three methods is to estimate the model, select the most appropriate regression model with statistical significance, and ensure the reliability of the research results.

The OLS regression results indicate that CIR (-0.0146714, p-value=0.003) and CAR (-0.1398976, p-value=0.042) have a statistically significant negative impact on ROA, while NIM (0.4768328, p-value=0.000) has a strong positive impact. The variables LDR, ETDR, GDP, and INF are not statistically significant (p-value > 0.05). The model has an R-squared value of 0.2197, explaining 21.97% of the variation in ROA, with 172 observations and overall statistical significance (Prob > F = 0.0000).

The REM model results show that NIM (coefficient = 0.3504847, z-value = 2.86, p-value = 0.004), GDP (coefficient = 0.0004857, z-value = 2.06, p-value = 0.039), and INF (coefficient = -0.4049808, z-value = -2.31, p-value = 0.021) have statistically significant impacts on ROA at the 1% and 5% significance levels, respectively. NIM and GDP have positive

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effects, while INF has a negative effect. The variables CIR, CAR, LDR, GTOE, and ETDR are not statistically significant (p-value > 0.05). The REM model has an R-squared value of 0.2803, explaining 28.03% of the variation in ROA, with Prob > chi2 = 0.0016, confirming overall statistical significance.

The FEM model indicates that inflation (INF) has a statistically significant negative impact on ROA, while NIM and GDP have positive impacts but are not significant at the 5% level. The variables CIR, CAR, LDR, GTOE, and ETDR show no significant linear relationship with ROA. The FEM model is statistically significant overall (F-test), with an R-squared value of 0.1896, explaining 18.96% of the variation in ROA over time.

### 3.4. Model Selection

After performing regression analyses using the OLS, FEM, and REM models, the research team conducted tests to compare the suitability of these models and select the optimal one.

Inspection	P-value	Method is selected
Dependent variable ROA		
Hausman	0.8413	REM is more suitable than FEM

(Source: author calculated by software STATA 17)

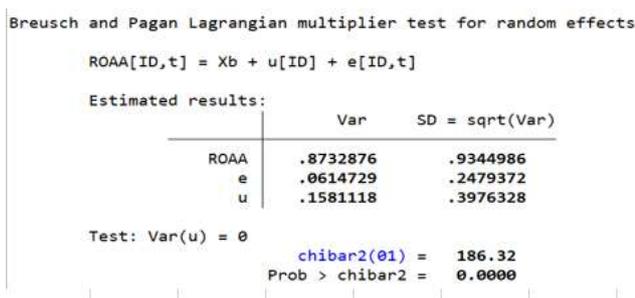
**Table 1: Results of Model Testing and Selection**

For the model with the dependent variable ROA, the Hausman test yields a p-value = 0.8413, which is greater than 5%, thus accepting the null hypothesis (H0). This indicates that the REM model is more appropriate than the FEM model. Based on the test results, it can be concluded that the REM model is selected as the most suitable model for the study with the dependent variable ROA.

(1) Selection between OLS and REM using the Breusch-Pagan test with the hypotheses:

**H0:** The OLS model is appropriate.

**H1:** The REM model is appropriate. To select the appropriate model between OLS and REM, the research team conducted the Breusch-Pagan test.



(Source: author calculated by software STATA 17)

**Figure 1: Breusch-Pagan Test Results**

The results from Figure 1 show that the value of Prob > chibar2 = 0.0000 (less than 0.05). This indicates that the REM model is more suitable for the study than the Pooled OLS model. The null hypothesis H1 is accepted.

### 3.5. Additional Model Diagnostics

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When analyzing panel data, issues such as heteroskedasticity and autocorrelation are common, which can lead to biased and unreliable research results. Testing for autocorrelation using the Wooldridge test with the hypotheses:

**H0:** There is no autocorrelation.

**H1:** Autocorrelation is present.

For the ROA model, the test for heteroskedasticity shows a p-value = 0.000 <  $\alpha$  = 5%. Therefore, the null hypothesis H0 is rejected, concluding that the model exhibits heteroskedasticity. The Wooldridge test yields a p-value = 0.8413 >  $\alpha$  = 5%, indicating that the null hypothesis H1 is accepted. In other words, the model does not exhibit autocorrelation among the residuals. The Generalized Least Squares (GLS) estimation method is used to address the issue of heteroskedasticity in the model. The purpose of using this method is to correct the model and provide more accurate results.

**3.6. Research Results** After identifying the defects in the research model, the authors employed the Generalized Least Squares (GLS) method to address potential biases in the regression results caused by model imperfections (Wooldridge J. M., 2015). Since the model exhibits heteroskedasticity, the GLS regression results, which correct for this issue, are presented by the research team with the following descriptive statistical outcomes:

Independent variable	Dependent variable ROA
	GLS
CIR	-0.0120** [-4.89]
CAR	-0.0685** [-2.09]
LDR	-0.00774** [-1.91]
NIM	0.451*** [10.87]
GTOE	-0.00624** [-2.05]
ETDR	0.0716*** [2.80]
GDP	0.000180* [1.69]
INF	-0.0741 [-0.95]
Constant	0.671 [1.35]

(Source: author calculated by software STATA 17)

**Figure 2: GLS Regression Results Addressing Heteroskedasticity**

The equation for the factors affecting profitability:

$$ROA = 0.671 - 0.0120CIR - 0.0685CAR - 0.0077LDR + 0.451NIM - 0.0062GTOE + 0.0716ETDR + 0.00018GDP - 0.0741INF$$

The regression results show that Net Interest Margin (NIM) has the strongest positive impact on ROA (coefficient = 0.451,  $p < 0.01$ ), emphasizing the critical role of managing interest rate spreads in enhancing profitability. The Equity-to-Deposit Ratio (ETDR) also has a positive and highly statistically significant impact ( $p < 0.01$ ), indicating the importance of efficiently utilizing income from deposits. Conversely, the Capital Adequacy Ratio (CAR), Cost-to-Income Ratio (CIR), and Total

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Operating Expenses (GTOE) have negative impacts, statistically significant at the 5% level ( $p < 0.05$ ), while the Loan-to-Deposit Ratio (LDR) has a weaker negative impact ( $p < 0.1$ ), highlighting the importance of cost control and capital balance. Regarding macroeconomic factors, Gross Domestic Product (GDP) has a positive impact, statistically significant at the 10% level ( $p < 0.1$ ), indicating that economic growth supports profitability, but Inflation (INF) is not statistically significant. The study suggests that optimizing NIM, improving the efficiency of mobilized capital, controlling costs, and balancing capital adequacy are key factors in enhancing the ROA of Vietnamese commercial banks.

### IV. CONCLUSION

This study analyzes the factors affecting the Return on Assets (ROA) of 29 Vietnamese commercial banks during the period 2019–2024, using the Random Effects Model (REM) and Generalized Least Squares (GLS) techniques. The results indicate that NIM and ETDR have positive and highly statistically significant impacts on ROA, while CIR, CAR, and GTOE have negative impacts, emphasizing the importance of cost management and interest rate spread optimization. LDR has a negative but less pronounced impact, GDP has a slight positive effect, and INF is not statistically significant. These findings provide theoretical and practical foundations for improving banks' financial performance.

Banks should optimize NIM through improved credit management and interest rate strategies, enhance ETDR by efficiently allocating capital, and control costs (CIR, GTOE) through digital transformation. Maintaining an appropriate CAR and leveraging GDP growth to expand market presence will also help improve ROA. Investment in technology and big data is essential to enhance competitiveness.

The study is limited to 29 banks, excluding smaller banks or non-banking institutions, and does not consider non-financial factors such as governance or customer satisfaction. The impact of monetary and fiscal policies was not fully evaluated. The use of REM and GLS models did not incorporate advanced methods like Generalized Method of Moments (GMM), limiting the ability to establish causal relationships.

Future research should expand the sample size, extend the observation period, and incorporate non-financial factors such as governance, technology, and ESG (Environmental, Social, Governance) criteria. Analyzing the impact of monetary and fiscal policies and applying advanced models like GMM, Dynamic Panel, or machine learning will enhance accuracy. Comparing different bank groups (state-owned, private, large, small) will provide greater practical value.

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