Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 5, 195-207
2026
Publisher: Learning Gate
DOI: 10.55214/2576-8484.v10i5.12878

Factors affecting financial performance of commercial banks listed on the Vietnamese stock market

Thi Viet Thach Tran[1], Ngoc Anh Vu[1], Viet Anh Nguyen[1*]
[1]Faculty of Banking and Insurance, Academy of Finance, Hanoi, Vietnam; tranvietthach@hvtc.edu.vn (T.V.T.T.), vungocanh@hvtc.edu.vn (N.A.V.), nguyenvietanh@hvtc.edu.vn (V.A.N.).

Abstract: Financial performance of banks not only reflects the health of banks but also affects the stability and development of the financial system of each country. Many previous studies have researched the factors affecting the financial performance of banks at different time periods and contexts. This article focuses on identifying the factors affecting the financial performance of commercial banks listed on the Vietnamese Stock Market in the period of 2016-2024. Based on data collected from the audited financial statements of the 20 largest listed commercial banks (measured by total assets) on the Vietnamese stock market, the study developed a quantitative research model with 179 observations from the 20 selected banks. By using the Stata software, the study selected the Feasible Generalized Least Squares Model (FGLS). The empirical results indicated that capital adequacy, operational efficiency, and economic growth impacted the financial performance of the listed commercial banks in Vietnam. The findings suggested that, to enhance financial performance, commercial banks should increase their capital and improve operational efficiency. The research results also confirmed that a period of high and stable economic growth contributes positively to the improvement of banks' financial performance.

Keywords: *Bank's financial performance, Bank's profitability, Capital adequacy, Economic growth, Listed bank in Vietnam Operational efficiency.*

1. Introduction

Financial performance plays an important role for an enterprise. It reflects banks' capacity to manage and utilize financial resources to generate profit. An enterprise with strong financial performance demonstrates a robust financial position and is capable of achieving sustainable long-term development. Conversely, a firm with weak financial performance reflects inefficient business operations and weak financial capacity. Such enterprises commonly face declining profitability, incur losses, and may even be at risk of bankruptcy.

A commercial bank is a special type of enterprise; banks within the same system are closely interconnected, and banking operations strongly influence the supply and circulation of capital within the economy. Therefore, a bank's financial performance not only determines its own stable, sustainable development but also impacts the stability of the overall banking system and the national economy. A bank with good financial performance demonstrates strong profitability, adequate capital, sound liquidity, and effective risk control. Such banks will gain the trust of depositors, easily mobilize capital at a reasonable cost, thereby creating opportunities to expand business operations, enhance their reputation, and achieve long-term stable development. Conversely, if a bank has weak financial performance, it has low profitability and a high risk of eroding depositor confidence, difficulties in capital mobilization, increased costs, and reduced profit. A prolonged process of deterioration can lead to losses, loss of liquidity, and even bankruptcy, thus causing negative impacts on the banking system and the broader economy. Therefore, identifying the factors affecting a bank's financial performance

History: Received: 13 March 2026; Revised: 20 April 2026; Accepted: 24 April 2026; Published: 13 May 2026
* Correspondence: nguyenvietanh@hvtc.edu.vn

significantly contributes to correctly recognizing the influencing factors and the degree of their impact on financial performance, helping commercial banks and policymakers formulate strategies to improve financial performance.

The objective of this study is to identify the factors affecting the financial performance of commercial banks listed on the Vietnamese stock market during the 2016–2024 period, thereby proposing solutions to enhance these banks' financial performance in the future.

2. Literature Review and Hypotheses

2.1. Financial Performance

Financial performance reflects the operating results achieved by an organization over a specific period [1]. For commercial banks, financial performance is understood as the extent to which a bank utilizes its assets to generate profit and increase shareholder value, thereby indicating overall financial efficiency over a period [2].

Based on a commonly adopted approach, banks' financial performance is measured through accounting-based profitability ratios such as Return on Assets (ROA), Return on Equity (ROE), and Net Interest Margin (NIM) [3]. This approach is simple, practical, and suitable for emerging markets, where data is available from financial statements. Some scholars adopt a broader perspective, considering financial performance as a multidimensional construct comprising capital adequacy, asset quality, management efficiency, earnings, liquidity, and market risk sensitivity, collectively known as the CAMELS framework [4]. These studies often employ advanced techniques such as Data Envelopment Analysis (DEA) or Stochastic Frontier Analysis (SFA) to evaluate efficiency in both technical and cost dimensions, though these methods require detailed and consistent data [5].

In the context of Vietnam, banking data is mainly published in annual financial reports, making accounting profitability indicators the most feasible. ROA (Return on Assets) is selected as the main dependent variable because it effectively reflects asset efficiency in generating profits and is less influenced by capital structure or financial leverage [6, 7]. ROA also facilitates comparison across banks of different sizes and ownership structures [8-10].

2.2. Factors Affecting a Bank's Financial Performance

A bank's financial performance is influenced by both internal (bank-specific) and external (macroeconomic) factors. Internal factors reflect operational characteristics, management efficiency, and financial structure, while macroeconomic factors describe the broader economic environment and market conditions in which banks operate.

2.2.1. Non-performing Loans (NPL)

The ratio of NPL is a key indicator of credit risk and asset quality. A high NPL ratio increases provisioning costs, reduces net interest income, and impacts financial performance [8]. Previous studies demonstrated a statistically significant negative relationship between NPL and profitability [3, 4, 11]. According to credit risk theory, as NPL increases, the capacity for capital recovery declines, and risk management costs rise, thereby lowering profitability [7, 12]. Similarly, the study by Ngo and Trinh [13], using Bayesian regression, identified NPL as the strongest negative determinant among financial risk variables. Therefore, NPL serves as a direct indicator of asset quality and credit management capacity; a higher NPL ratio implies lower profitability. Consequently, this study includes NPL as an independent variable representing credit risk, with an expected negative (–) effect on ROA.

H_1: The NPL ratio negatively affects the ROA of commercial banks.

2.2.2. Capital-to-Total Assets Ratio (CAP)

The capital-to-total assets ratio (CAP) indicates a bank's financial independence and risk management. A higher capital ratio supports liquidity, decreases reliance on external funding, and enhances market confidence [6]. Empirical research shows a positive correlation between CAP and

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 5: 195-207, 2026
DOI: 10.55214/2576-8484.v10i5.12878

ROA, implying that well-capitalized banks are better at absorbing losses during market fluctuations [8, 11]. Some research in Vietnam supported this finding, emphasizing the regulatory role of capital size in improving profitability [3, 13]. International studies also agreed on this positive link [12, 14]. Therefore, CAP is expected to have a positive (+) effect on ROA.

H_2: The capital-to-total assets ratio positively affects the ROA of commercial banks.

2.2.3. Loan-to-Deposit Ratio (LDR)

The loan-to-deposit ratio (LDR) measures how efficiently a bank utilizes deposits for lending activities. A high LDR reflects aggressive lending but may increase liquidity risk [15]. Prior studies by Athanasoglou et al. [6] and Dietrich and Wanzenried [7] indicated that LDR could affect ROA in both directions: a moderate LDR increases efficiency, whereas an excessive LDR (>80%) increases liquidity imbalance and reduces profitability [11, 16]. Other studies identified a nonlinear relationship between LDR and ROA, suggesting an optimal threshold [10, 17]. In Vietnam, some studies found that rapid credit expansion relative to deposits led to a statistically significant negative impact [3, 13]. Therefore, LDR is expected to negatively affect ROA.

H_3: The LDR has a negative impact on the ROA of commercial banks.

2.2.4. Cost-to-Income Ratio (CIR)

The cost-to-income ratio (CIR) measures operational efficiency by indicating how much cost is incurred to generate one unit of income. A low CIR reflects effective cost management and operational efficiency [6]. According to efficiency theory, higher costs reduce net profit and negatively affect ROA [7]. Many empirical findings show a negative relationship between CIR and profitability [8, 10, 11]. Some prior studies confirmed this, considering CIR an important determinant of internal management efficiency [4, 13]. Therefore, CIR is expected to have a negative (–) effect on ROA.

H_4: The cost-to-income ratio negatively affects the ROA of commercial banks.

2.2.5. Age of Bank (AgeB)

The age of a bank (AgeB) represents its experience, resource accumulation, and market reputation. This variable is calculated by the number of years since the bank was established to the year of observation [6, 7].

It is assumed that long-established organizations often gain a competitive advantage through accumulated experience in risk management, customer relations, and operational efficiency [18]. Banks with longer lifespans generally understand credit markets better, manage risks more effectively, and maintain more stable profits, leading to improved financial performance. However, some studies suggest that older banks might be less flexible and innovative, which could hinder efficiency in competitive environments [7, 15].

Overall, most studies suggest a positive and statistically significant relationship between bank age and financial performance [4, 17, 19]. Therefore, AgeB is included to capture operational experience and accumulated capacity, with an expected positive (+) effect on ROA.

H_5: Bank age positively and significantly affects the ROA of commercial banks.

2.2.6. Inflation (INF)

Inflation (INF) is a key macroeconomic factor that affects banks' financial performance through funding costs, interest margins, and credit risk [9, 20]. Moderate inflation allows flexible interest rate adjustments, but high or strongly fluctuating inflation raises funding costs and reduces profitability [6, 7]. Many empirical studies show a statistically significant negative effect of inflation on ROA [3, 10, 19]. Conversely, some studies suggest that expected inflation might have a short-term positive effect [17, 21]. In emerging economies, high inflation typically increases risk and reduces credit efficiency [12, 14]. Therefore, INF is expected to exert a negative (–) influence on ROA.

H_6: Inflation has a statistically significant negative impact on the ROA of commercial banks.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 5: 195-207, 2026
DOI: 10.55214/2576-8484.v10i5.12878

2.2.7. Gross Domestic Product Growth (GDP)

Economic growth (GDP) reflects the overall health of the economy and positively influences banking performance. When GDP rises, credit demand, repayment capacity, and service revenues increase, enhancing profitability [6, 22]. During economic growth, ROA and ROE improve because interest income grows faster than funding costs [23]. Many studies indicate a positive and significant relationship between GDP and ROA [7, 15, 17]. In Vietnam, research findings support these results [3, 13]. Therefore, GDP is expected to have a positive (+) effect on ROA.

H_7: Economic growth positively and significantly affects the ROA of commercial banks.

3. Methodology

3.1. Research Data

To identify the factors affecting the financial performance of the listed commercial banks in Vietnam, the study constructed a dataset from the audited financial statements of 20 Vietnamese listed banks from 2016 to 2024. The financial statements were collected from the banks' websites, prepared according to Vietnamese Accounting Standards and compliant with current auditing regulations, ensuring the consistency and reliability of the financial information. The research period of 2016-2024 was chosen because it represents a phase of relatively stable development for Vietnamese banks following the comprehensive restructuring period (2011-2015) implemented under the policies of the Government and the State Bank of Vietnam. The selected banks include 18 banks listed on HOSE (The Ho Chi Minh Stock Exchange) and 2 banks listed on HNX (The Hanoi Stock Exchange), which are banks with the largest asset sizes on the Vietnamese stock exchanges, thereby ensuring the representativeness of the research sample.

3.2. Research Model

The study employed a panel data model with eight observed variables. The dependent variable is financial performance, measured by the ratio of return on total assets (ROA). Independent variables include the non-performing loans ratio (NPL), capital to total assets ratio (CAP), loan-to-deposit ratio (LDR), cost-to-income ratio (CIR), age of the bank (AgeB), inflation rate (INF), and economic growth rate (GDP).

The research equation is as follows:

$$ROA_{it} = \beta_0 + \beta_1.NPL_{it} + \beta_2.CAP_{it} + \beta_3.LDR_{it} + \beta_4.CIR_{it} + \beta_5.AgeB_{it} + \beta_6.INF_t + \beta_7.GDP_t + \varepsilon_{it}$$

In which:

i represents the bank i of the 20 sampled banks.

t denotes the observation year within the 2016–2024 period.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 5: 195-207, 2026
DOI: 10.55214/2576-8484.v10i5.12878

Table 1.
Measurement of Variables.

Variable symbols	Variable names	Measurement	Explanation
Dependent variables			
ROA_{it}	Ratio of return on total assets	Return /Total assets	Reflecting the profitability ratio on the total assets of bank i at time t
Independent variables			
NPL_{it}	Non – performing loans ratio	Non – performing loans/Total outstanding loans	Non – performing loans ratio of bank i at time t
CAP_{it}	Capital to total assets ratio	Total capital/ Total assets	Capital to total assets ratio of bank i at time t
LDR_{it}	Loan- to- deposit ratio	Total outstanding loans /Total deposits	Loan-to-deposit ratio of bank i at time t
CIR_{it}	Cost-to-income ratio	Operating cost /Operating income	Operating cost to operating income ratio of bank i at time t
$AgeB_{it}$	Age of Bank	Log (observation year -foundation year)	Natural logarithm of the age of bank i
INF_t	Inflation rate	The Consumer Price Index (CPI) published by the National Statistics Office of Vietnam	Inflation rate of Vietnam at time t
GDP_t	Economic growth rate	Gross Domestic Product (GDP) growth rate published by the National Statistics Office of Vietnam	Economic growth rate at time t
ε_{it}			Random error

3.3. Scale Test

Table 2.
Descriptive Statistics.

Variable	Obs.	Mean	Std. dev	Min.	Max.
ROA	180	0.0116365	0.0090106	-0.043355	0.0641719
NPL	180	0.0205274	0.0296107	0.0047367	0.2975734
CAP	180	0.0820422	0.0284276	0.0378444	0.1729143
LDR	180	0.7552286	0.0910549	0.4288521	0.9561082
CIR	179	0.4425036	0.166152	0.1165304	10.726938
AgeB	180	10.405427	0.2029473	0.69897	10.826075
INF	180	0.0306889	0.0053585	0.0184	0.0363
GDP	180	0.0586333	0.0183554	0.0258	0.0802

Table 1 shows that ROA has a mean value of 1.16%, which is relatively high, with a standard deviation of 0.009 and a range from -4.34% to 6.42%, indicating significant differences in financial performance across banks, including cases where some banks reported negative after-tax profits.

The NPL ratio recorded an average of 2.05%, with a large standard deviation of 2.96%, and a maximum value exceeding 29.75%. The wide dispersion indicates substantial differences in credit quality among banks.

CAP has a mean value of 8.2%, ranging from 3.78% to 17.29%, reflecting notable differences in capital adequacy across banks.

LDR averaged 75.5%, which is relatively high, with a standard deviation of 9.1%. The values range from 42.89% to 95.61%, showing a moderate level of liquidity risk variation among observed banks.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 5: 195-207, 2026
DOI: 10.55214/2576-8484.v10i5.12878

CIR has a mean of 44.3%, with a wide dispersion from 11.65% to 172.69%, illustrating substantial variation in operational efficiency across the sample banks.

AgeB, which has been log-transformed to reduce skewness, averages approximately 1.41 in log terms, equivalent to about 25 years of operation, reflecting a diverse distribution in the ages of banks in the sample.

With regard to macroeconomic variables, both INF and GDP exhibit low volatility, with averages of 3.07% and 5.86%, respectively. These variables show a relatively stable economic environment during the study period.

4. Research Results

To determine the factors influencing the financial performance of commercial banks listed on the Vietnamese stock market, this study constructed a regression model and used Stata 17 software for model estimation. To ensure the accuracy and reliability of the research results, after model estimation, the study conducted tests for multicollinearity, autocorrelation, and heteroskedasticity and applied adjustments to ensure that the research results do not violate any econometric assumptions.

4.1. OLS Model

Before selecting the appropriate model for panel data, the Pooled Ordinary Least Squares (OLS) regression was used as an initial reference to examine the relationship between independent variables and the dependent variable, ROA.

Table 3.
Pooled OLS Model.
Linear regression

ROA	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]
NPL	0.03454	0.0179	1.93	0.05532*	-0.00079	0.06987
CAP	0.12777	0.01448	8.83	0***	0.09919	0.15635
LDR	0.00324	0.00462	0.70	0.4833	-0.00587	0.01235
CIR	-0.02738	0.0035	-7.83	0***	-0.03429	-0.02048
AgeB	-0.00423	0.00201	-2.11	0.03629**	-0.0082	-0.00027
INF	-0.06417	0.08284	-0.77	0.43959	-0.22769	0.09934
GDP	-0.00044	0.02414	-0.02	0.98549	-0.04809	0.04721
Constant	0.01837	0.0057	3.22	0.00151***	0.00712	0.02962

Mean dependent var	0.01194	SD dependent var	0.00804
R-squared	0.63614	number of observations	179
F-test	42.70881	Prob > F	0.00000
Akaike crit. (AIC)	-1384.96005	Bayesian crit. (BIC)	-1359.46096

Note: *** p<0.01, ** p<0.05, * p<0.1

The Ordinary Least Squares (OLS) regression results show that the model is statistically significant overall, with F-test = 42.71 and a p-value of 0.0000. The coefficient of determination is 0.6361, suggesting that approximately 63.61% of the variation in ROA is explained by the independent variables included in the model. Several variables, such as CAP and CIR, are statistically significant at the 1% level. However, macroeconomic variables like INF and GDP do not exhibit statistically significant effects in the OLS specification.

Therefore, the Fixed Effects Model (FEM) is the appropriate choice in this case to ensure accuracy and unbiasedness in estimating the relationship between financial factors and the operational performance of listed commercial banks in Vietnam.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 5: 195-207, 2026
DOI: 10.55214/2576-8484.v10i5.12878

4.2. FEM Model

Table 4.
Fixed Effects Model

ROA	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]
NPL	0.02304	0.01969	1.17	0.24388	-0.01587	0.06195
CAP	0.07718	0.02705	2.85	0.00493***	0.02374	0.13063
LDR	0.01052	0.00715	1.47	0.14344	-0.00361	0.02464
CIR	-0.02079	0.00462	-4.50	0.00001***	-0.02992	-0.01166
AgeB	0.01077	0.00894	1.21	0.22985	-0.00688	0.02843
INF	-0.10191	0.07415	-1.37	0.17136	-0.24841	0.04459
GDP	0.00448	0.02154	0.21	0.83563	-0.03808	0.04703
Constant	-0.00587	0.01181	-0.50	0.61949	-0.0292	0.01745

Mean dependent var	0.01194	SD dependent var	0.00804
R-squared	0.44315	number of observations	179
F-test	17.28061	Prob > F	0.00000
Akaike crit. (AIC)	-1454.03946	Bayesian crit. (BIC)	-1428.54037

Note: *** *p<.01*, ** *p<.05*, * *p<.1*
F test that all u_i=0: F(19, 152) = 3.77 Prob > F = 0.0000

The Fixed Effects Model (FEM) demonstrates strong explanatory power, with an F-statistic of 17.28 ($p < 0.01$) and a within R-squared of 0.4432. Moreover, the F-test for the joint significance of the individual effects yields a test statistic of $F(19, 152) = 3.77$, $p < 0.01$, rejecting the null hypothesis that all bank-specific effects are equal to zero. This strongly supports the presence of unobserved heterogeneity and validates the appropriateness of the FEM over the Pooled OLS model.

4.3. REM Model

Table 5.
REM Model.

Random Effects Model

ROA	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]
NPL	0.03181	0.01799	1.77	0.07701*	-0.00345	0.06707
CAP	0.11608	0.019	6.11	0***	0.07884	0.15332
LDR	0.0086	0.00537	1.60	0.10937	-0.00193	0.01912
CIR	-0.0246	0.00378	-6.51	0***	-0.03201	-0.0172
AgeB	-0.00299	0.00317	-0.94	0.34578	-0.0092	0.00322
INF	-0.07211	0.0738	-0.98	0.32856	-0.21676	0.07255
GDP	-0.00131	0.02151	-0.06	0.95148	-0.04347	0.04085
Constant	0.01266	0.00655	1.93	0.05331*	-0.00018	0.02549

Mean dependent var	0.01194	SD dependent var	0.00804
Overall r-squared	0.63116	number of observations	179
Chi-square	187.87875	Prob > chi2	0.00000
R-squared within	0.42832	R-squared between	0.80596

Note: *** *p<0.01*, ** *p<0.05*, * *p<0.1*.

The results from the REM indicate that the model is statistically significant overall, with a Wald chi-squared statistic of 187.88 and a p-value below 0.01. The overall R-squared reaches 0.6312, which is comparable to that of the OLS model and higher than the within R-squared of the FEM.

However, this does not necessarily imply that REM is the more appropriate model, as the critical assumption of independence between the random effects and the explanatory variables must be empirically tested.

4.4. Hausman Test

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 5: 195-207, 2026
DOI: 10.55214/2576-8484.v10i5.12878

4.4.1. Hypothesis Testing for Model Selection

H0: There is no correlation between the explanatory variables and the unobserved individual effects (choose REM).

H1: There is a correlation between the explanatory variables and the unobserved individual effects (choose FEM).

Table 6.
Hausman Specification Test for Model Selection between FEM and REM.

Hausman (1978) specification test	
	Coef.
Chi-square test value	10.87207
P-value	0.1443

The results of the Hausman specification test show that the chi-squared statistic is $\chi^2(7) = 10.87$, with a p-value of 0.1443.

Given that the p-value exceeds the 0.05 significance level, there is insufficient evidence to reject the null hypothesis that the difference between the estimators of FEM and REM is not statistically significant. As a result, the Random Effects Model is considered more appropriate in this case, as it provides more efficient estimates and does not violate the underlying assumptions of the model.

4.5. Correlation Matrix Test

Table 7.
Correlation Matrix.

	ROA	**NPL**	**CAP**	**LDR**	**CIR**	**AgeB**	**INF**	**GDP**
ROA	1.0000							
NPL	-0.2309	1.0000						
CAP	0.6522	-0.0431	1.0000					
LDR	0.2970	-0.1553	0.1359	1.0000				
CIR	-0.6470	0.5708	-0.3642	-0.4363	1.0000			
AgeB	0.1166	-0.0461	0.0565	0.2620	-0.3440	1.0000		
INF	-0.0712	0.0439	-0.0028	0.0516	0.0553	0.0202	1.0000	
GDP	-0.0721	0.0526	-0.0154	0.0125	0.0893	-0.0314	0.5460	1.0000

Table 6 shows ROA exhibiting a strong positive correlation with CAP (r = 0.6522), suggesting that banks with higher capital adequacy ratios tend to achieve better financial performance.

Conversely, ROA is negatively correlated with CIR (r = -0.6470), consistent with the expectation that higher operating costs are associated with reduced profitability.

The correlations between ROA and other variables, such as NPL (r = -0.2309), LDR (r = 0.2970), and AgeB (r = 0.1166), are relatively weak, while ROA shows no meaningful correlation with macroeconomic indicators like INF and GDP.

The intercorrelations among independent variables are mostly in the low to moderate range. Moreover, INF and GDP exhibit a moderate correlation (r = 0.5460), which is commonly observed in macroeconomic dynamics.

All other variable pairs have correlation coefficients below 0.6, indicating no clear evidence of serious multicollinearity within the model.

4.6. Model Diagnostic Tests

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 5: 195-207, 2026
DOI: 10.55214/2576-8484.v10i5.12878

*4.6.1. *) Multicollinearity Test.*

Table 8.
Variance Inflation Factor (VIF) Results.

Variable	VIF	1/VIF
CIR	2.46	0.406652
NPL	1.65	0.604814
GDP	1.43	0.697528
INF	1.43	0.697592
LDR	1.28	0.780075
CAP	1.23	0.811850
AgeB	1.21	0.824070
Mean VIF	1.53	

Table 7 shows that all variables have VIF values below 2.5. The highest VIF is observed for the variable CIR (2.46), and the mean VIF is 1.53.

According to commonly accepted thresholds, where VIF values above 10 indicate a high risk of multicollinearity and values above 5 warrant caution, these results do not indicate any serious multicollinearity concerns.

Therefore, it can be concluded that the independent variables included in the model are statistically distinguishable, with no evidence of high linear correlation that could adversely affect the estimation results.

*4.6.2. *) Autocorrelation Test*

Table 9.
Autocorrelation Test Results.

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
F(1, 19) = 17.667
Prob > F = 0.0005

The Wooldridge test for autocorrelation in panel data is used to detect the presence of first-order serial correlation in residuals.

The null hypothesis (H_0) assumes that there is no first-order autocorrelation.

The test yields a test statistic of $F(1, 19) = 17.667$ with a p-value of 0.0005.

Given that the p-value is below the 0.05 significance level, the null hypothesis is rejected. This indicates that first-order autocorrelation exists in the residuals, suggesting a violation of the classical assumption of no serial correlation in the model.

*4.6.3. *) Heteroskedasticity Test*

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 5: 195-207, 2026
DOI: 10.55214/2576-8484.v10i5.12878

Table 10.
Heteroskedasticity Test Results.

White's test			
H0: Homoskedasticity			
Ha: Unrestricted heteroskedasticity			
chi2(35) = 103.25			
Prob > chi2 = 0.0000			
Cameron & Trivedi's decomposition of the IM-test			
Source	**Chi2**	**df**	**P**
Heteroskedascity	103.26	35	0.0000
Skewness	13.14	7	0.0687
Kurtosis	1.20	1	0.2726
Total	117.60	43	0.0000

The heteroskedasticity test yields a Chi-squared statistic of 103.26 with 35 degrees of freedom and a p-value of 0.0000.

Table 4.8 also illustrates that the heteroskedasticity component is the primary contributor to the rejection of the null hypothesis (p = 0.0000). Based on these results, the null hypothesis of homoskedasticity is rejected, indicating the presence of heteroskedasticity in the regression model.

Furthermore, given that the model is also subject to first-order autocorrelation and heteroskedasticity, this study adopts the Feasible Generalized Least Squares (FGLS) method, which simultaneously corrects both issues and ensures the efficiency and reliability of the estimated coefficients.

4.7. Estimation with Feasible Generalized Least Squares (FGLS)

Table 11.
FGLS Estimates with corrections for Serial Correlation and Heteroskedasticity Cross-sectional time-series FGLS regression

ROA	**Coef.**	**St.Err.**	**t-value**	**p-value**	**[95% Conf**	**Interval]**
NPL	-0.00392	0.00945	-0.41	0.67833	-0.02244	0.0146
CAP	0.13945	0.01377	10.13	0***	0.11246	0.16643
LDR	-0.00185	0.00293	-0.63	0.52695	-0.00759	0.00388
CIR	-0.01683	0.00192	-8.79	0***	-0.02059	-0.01308
AgeB	-0.00012	0.00148	-0.08	0.93614	-0.00301	0.00278
INF	0.00701	0.02216	0.32	0.75167	-0.03642	0.05045
GDP	0.02033	0.00668	3.04	0.00235***	0.00723	0.03343
Constant	0.00681	0.00337	2.02	0.04328**	0.00021	0.01341

Mean dependent var	0.01194	SD dependent var	0.00804
number of observations	179	Chi-square	263.89043

Note: *** p<0.01, ** p<0.05, * p<0.1.

According to Table 10, CAP has a positive and highly significant effect on bank financial performance (ROA), with a coefficient of 0.1394 (p < 0.01).

Conversely, CIR exerts a significant negative impact, with a coefficient of -0.0168 (p < 0.01).

In addition, GDP shows a positive, statistically significant relationship with ROA (p < 0.01), indicating macroeconomic expansion enhances bank profitability.

Other variables, including NPL, LDR, AgeB, and INF, do not exhibit statistical significance at the 10% level. However, the signs of their estimated coefficients are broadly consistent with theoretical expectations, in some cases positive for CAP and negative for CIR.

Overall, the FGLS model appears to be more effective in addressing the econometric issues present in the panel data structure, including autocorrelation and heteroskedasticity. It provides more reliable

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 5: 195-207, 2026
DOI: 10.55214/2576-8484.v10i5.12878

and efficient estimates. The key determinants of bank financial performance during the study period are identified as capital adequacy (CAP), operational efficiency (CIR), and macroeconomic growth (GDP).

Accordingly, the final specification of the estimated regression model is expressed as:

$$ROA_{it} = \beta_0 + \beta_1 CAP_{it} + \beta_2 CIR_{it} + \beta_3 GDP_t + \epsilon_{it}$$

Substituting the estimated coefficients, the model becomes:

$$ROA_{it} = 0.0068 + 0.1394 CAP_{it} - 0.0168 CIR_{it} + 0.0203 GDP_t + \varepsilon_{it}$$

5. Discussion and Recommendations

5.1. Discussion

The results from the FGLS model indicate that among the independent variables included, three variables have a significant and statistically relevant impact on the FP of listed commercial banks on the Vietnamese stock market, as represented by ROA. These variables are CAP, CIR, and GDP.

Specifically, CAP has a coefficient of $\beta = 0.1394$ ($p < 0.01$), indicating a strong positive relationship between capital adequacy and ROA. This finding suggests that banks maintaining higher levels of equity capital tend to be more resilient to risks, thereby creating a more stable foundation for profitability. This result supports *H2: The capital-to-total assets ratio positively affects the ROA of commercial banks.*

Meanwhile, CIR is negatively associated with ROA, with an estimated coefficient of $\beta = -0.0168$ ($p < 0.01$). This implies that higher operating costs, relative to income, are linked to lower profitability. The result is consistent with theoretical expectations and highlights the importance of cost efficiency in improving bank performance, which aligns with H4: The cost-to-income ratio negatively affects the ROA of commercial banks.

GDP shows a significant positive impact, with a coefficient of $\beta = 0.0203$ ($p < 0.01$). This indicates that during periods of strong economic expansion, bank profitability improves. The result reflects the sensitivity of ROA to macroeconomic conditions, supporting the argument that a growing economy facilitates lending and investment activities. This finding supports *H7: Economic growth positively and significantly affects the ROA of commercial banks.*

In contrast, the remaining variables in the model, NPL, LDR, AgeB, and INF, are found to be statistically insignificant. This suggests that, within the context of the research sample and study period, these factors do not exhibit a clear impact on ROA.

5.2. Recommendations

The research results have identified three factors affecting the financial performance of listed commercial banks in Vietnam. The strongest impact comes from CAP, suggesting that banks ensuring a high capital level relative to total assets enhance their financial performance. GDP is the second most influential factor, indicating that strong economic growth facilitates banks' improvement, which also means that an economic slowdown or recession will negatively impact banks' financial performance. CIR has a significant impact on financial performance, showing that improving operational efficiency can enhance banks' financial performance.

Based on these findings, the following solutions are suggested to improve the financial performance of listed commercial banks in Vietnam:

First, banks should increase their capital to enhance the risk buffer, particularly in a volatile business environment. Commercial banks need to have a proactive plan for capital increases in accordance with their business strategy to ensure that the rate of capital growth is higher than the rate of total asset growth, thereby improving financial performance.

Second, banks should improve the management of operating expenses to ensure that the rate of increase in operating costs consistently remains lower than the rate of growth in operating income, thereby preventing operating costs from eroding the bank's profit. Banks need to upgrade technology and accelerate digital transformation. This will provide the necessary foundation for restructuring their

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 5: 195-207, 2026
DOI: 10.55214/2576-8484.v10i5.12878

management systems and operational networks, leading to a sustainable reduction in operating costs. Furthermore, by capitalizing on technology investments, banks should leverage technological advantages to increase income through the development of digital banking services, focusing particularly on non-credit services to expand and diversify income sustainably.

Third, banks should strengthen risk control to limit negative impacts from economic slowdowns or recessions on their business activities. This involves proactively analyzing and assessing the macroeconomic environment to effectively adjust their business operations. Banks should exercise greater prudence in business expansion and implement stricter risk controls during periods of slowing economic growth or recession. This action helps banks minimize the negative impacts of the macroeconomic environment on their financial performance. Conversely, during periods of high and stable economic growth, banks should consider expanding their operations to capitalize on favorable conditions for improving financial performance.

6. Conclusion

This article investigates the factors affecting the financial performance of listed commercial banks on the Vietnamese Stock Market. Using 179 observations from 20 listed banks on Vietnam's two stock exchanges (HOSE and HNX), the article constructed an econometric model with 7 independent variables (Non-performing Loans ratio; Capital to total assets ratio; Loan-to-deposit ratio; Cost to income ratio; Bank's Age; Inflation rate and Economic growth rate), and the dependent variable is the ratio of return on total assets. The research findings indicate that three factors have a statistically significant impact on the financial performance of listed commercial banks during the 2016–2024 period: the capital-to-total assets ratio (CAP), the cost-to-income ratio (CIR), and the economic growth rate (GDP). These findings show that increasing equity capital, controlling operating costs, and enhancing the prudence of business operations during economic downturns are meaningful solutions for improving the financial performance of listed banks in Vietnam today.

Institutional Review Board Statement:

Formal approval from an Institutional Review Board was not required under the policies of the Academy of Finance, Vietnam. Informed consent was obtained from all participants, and all data were anonymized to ensure participant confidentiality.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

Copyright:

References

[1] D. Fatihudin, "How measuring financial performance," *International Journal of Civil Engineering and Technology*, vol. 9, no. 6, pp. 553-557, 2018.

[2] S. Muhammed, G. Desalegn, and P. Emese, "Effect of capital structure on the financial performance of Ethiopian commercial banks," *Risks*, vol. 12, no. 4, p. 69, 2024. https://doi.org/10.3390/risks12040069

[3] H. Nguyen, "Credit risk and financial performance of commercial banks: Evidence from Vietnam," *arXiv preprint arXiv:2304.08217*, 2023. https://doi.org/10.48550/arXiv.2304.08217

[4] N. K. Quoc Trung, "Determinants of bank performance in Vietnamese commercial banks: An application of the camels model," *Cogent Business & Management*, vol. 8, no. 1, p. 1979443, 2021. https://doi.org/10.1080/23311975.2021.1979443

[5] S. Fries, D. Neven, and P. Seabright, "Bank performance in transition economies," 2002.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 5: 195-207, 2026
DOI: 10.55214/2576-8484.v10i5.12878

[6] P. P. Athanasoglou, S. N. Brissimis, and M. D. Delis, "Bank-specific, industry-specific and macroeconomic determinants of bank profitability," *Journal of international financial Markets, Institutions and Money*, vol. 18, no. 2, pp. 121-136, 2008. https://doi.org/10.1016/j.intfin.2006.07.001

[7] A. Dietrich and G. Wanzenried, "Determinants of bank profitability before and during the crisis: Evidence from Switzerland," *Journal of International Financial Markets, Institutions and Money*, vol. 21, no. 3, pp. 307-327, 2011. https://doi.org/10.1016/j.intfin.2010.11.002

[8] A. Anbar and D. Alper, "Bank specific and macroeconomic determinants of commercial bank profitability: Empirical evidence from Turkey," *Business and Economics Research Journal*, vol. 2, no. 2, pp. 139-152, 2011.

[9] P. Molyneux and J. Thornton, "Determinants of European bank profitability: A note," *Journal of Banking & Finance*, vol. 16, no. 6, pp. 1173-1178, 1992. https://doi.org/10.1016/0378-4266(92)90065-8

[10] F. Sufian and M. S. Habibullah, "Does economic freedom fosters banks' performance? Panel evidence from Malaysia," *Journal of Contemporary Accounting & Economics*, vol. 6, no. 2, pp. 77-91, 2010. https://doi.org/10.1016/j.jcae.2010.09.003

[11] V. O. Ongore and G. B. Kusa, "Determinants of financial performance of commercial banks in Kenya," *International Journal of Economics and Financial Issues*, vol. 3, no. 1, pp. 237-252, 2013.

[12] E. Jaouad and O. Lahsen, "Factors affecting bank performance: Empirical evidence from Morocco," *European Scientific Journal*, vol. 14, no. 34, pp. 255-267, 2018.

[13] H. K. Ngo and H. T. T. Trinh, "The impact of financial risks on bank performance: Evidence from Bayesian analysis in Vietnam's commercial banks," *Discover Sustainability*, vol. 6, no. 1, p. 515, 2025. https://doi.org/10.1007/s43621-025-01246-1

[14] P. M. Shrestha, "Determinants of financial performance of Nepalese commercial banks: Evidence from panel data approach," *NRB Economic Review*, vol. 32, no. 2, pp. 45-59, 2020. https://doi.org/10.3126/nrber.v32i2.35300

[15] K. Kosmidou, "The determinants of banks' profits in Greece during the period of EU financial integration," *Managerial Finance*, vol. 34, no. 3, p. 146, 2008. https://doi.org/10.1108/03074350810848036

[16] T. Aburime, "Determinants of bank profitability: Macroeconomic evidence from Nigeria," *Available at SSRN 1231064*, 2008.

[17] A. Trujillo-Ponce, "What determines the profitability of banks? Evidence from Spain," *Accounting & finance*, vol. 53, no. 2, pp. 561-586, 2013. https://doi.org/10.1111/j.1467-629X.2011.00466.x

[18] A. Coad, A. Segarra, and M. Teruel, "Like milk or wine: Does firm performance improve with age?," *Structural Change and Economic Dynamics*, vol. 24, pp. 173-189, 2013. https://doi.org/10.1016/j.strueco.2012.07.002

[19] Y. Tan and C. Floros, "Bank profitability and GDP growth in China: A note," *Journal of Chinese Economic and Business Studies*, vol. 10, no. 3, pp. 267-273, 2012. https://doi.org/10.1080/14765284.2012.703541

[20] P. Perry, "Do banks gain or lose from inflation?," *Journal of Retail Banking*, vol. 14, no. 2, pp. 25-31, 1992.

[21] V. Flamini, C. A. McDonald, and L. B. Schumacher, "The determinants of commercial bank profitability in Sub-Saharan Africa," 2009.

[22] A. Demirgüç-Kunt and H. Huizinga, "Determinants of commercial bank interest margins and profitability: Some international evidence," *The World Bank Economic Review*, vol. 13, no. 2, pp. 379-408, 1999. https://doi.org/10.1093/wber/13.2.379

[23] J. A. Bikker and H. Hu, "Cyclical patterns in profits, provisioning and lending of banks and procyclicality of the new Basel capital requirements," *PSL Quarterly Review*, vol. 55, no. 221, pp. 143–175, 2002.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 5: 195-207, 2026
DOI: 10.55214/2576-8484.v10i5.12878