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Factors influencing the profitability of Vietnamese commercial banks during the 2013-2024 period

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Abstract: This study examines the factors influencing the profitability of Vietnamese commercial banks from 2013 to 2024, a period marked by global financial fluctuations, economic downturns, and the COVID-19 pandemic. The research aims to identify key determinants of bank profitability and propose strategic solutions for financial performance enhancement. Using panel data from nine Vietnamese commercial banks, the study employs various econometric techniques, including Pooled OLS, Fixed Effects Model (FEM), Random Effects Model (REM), and Feasible Generalized Least Squares (FGLS), to ensure robust findings. The results indicate that the equity-to-assets ratio (EAR), GDP growth, and bank size positively impact return on assets (ROA), while non-performing loans (NPL), cost-to-income ratio (CIR), and industry concentration (CR4) negatively affect it. For net interest margin (NIM), GDP growth, EAR, loan-to-deposit ratio (LDR), and COVID-19 have a positive influence, whereas CIR exerts a negative effect. The study provides practical recommendations for Vietnamese commercial banks, including enhancing cost efficiency, strengthening credit risk management, expanding asset size, and adapting to macroeconomic fluctuations. While the research offers valuable insights, future studies should consider additional factors such as digital transformation and international governance standards to provide a more comprehensive analysis.

Keywords: *Credit risk, Financial performance, Macroeconomic factors, NIM, Profitability, ROA, Vietnamese commercial banks.*

1. Introduction

Profitability has always been the primary objective of any business organization, and commercial banks are no exception [1, 2]. Therefore, assessing the profitability of CBs plays a crucial role in determining the stability and development not only of individual banks but also of the banking sector as a whole. In the context of international economic integration, particularly with Vietnam's participation in free trade agreements (FTAs), studying the factors influencing profitability enables commercial banks to identify and adjust controllable factors to enhance their profit margins and global competitiveness.

Between 2013 and 2024, in addition to significant growth, Vietnamese CBs have faced major fluctuations, including the global financial crisis, economic recessions, and, more recently, the impact of the COVID-19 pandemic. These factors have posed considerable challenges for banks, making research on the determinants of profitability particularly essential. Previous studies have not incorporated recent data, leading to findings that may not fully capture the current impact of various factors on Vietnamese banks' profitability. Therefore, this study aims to contribute to the existing body of research by identifying key factors affecting the profitability of Vietnamese commercial banks and proposing solutions to enhance their financial performance. To achieve this objective, three main research questions are addressed: (i) What factors influence the profitability of Vietnamese commercial banks? (ii) To what extent and in what direction do these factors affect profitability? and (iii) What measures can help Vietnamese commercial banks sustainably improve their profitability? Apart from the Introduction,

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Conclusion, References and Appendices, this study is structured into the following sections: Literature Review, Research Methodology, Research Findings, and Result discussion.

2. Literature Review

Literature on this topic is widely prevalent across the globe, employing diverse research samples and methodologies. Notable studies in emerging and developing markets are as follows.

For Chinese banks, Koroleva, et al. [3] found that bank size, credit quality, and liquidity are significant internal factors positively influencing bank profitability. State-owned banks tend to achieve higher profitability than other banks due to their larger size, relatively higher credit ratings, and greater liquidity. On the other hand, external factors, represented by the standardized residuals of GDP, were found to have an adverse impact on bank profitability. Macroeconomic determinants such as GDP and inflation rates were reported by Ngweshemi and Isiksal [4] to have no significant effect on profitability of commercial banks in Tanzania. Their empirical findings suggest that bank-specific factors, which are directly controlled by management, explain profitability more effectively than macroeconomic variables, which lie beyond their direct control. In the case of Indonesia, Hasan, et al. [5] investigated the impact of bank profitability using ROA and ROE as dependent variables. Their findings indicate that several factors, including net interest margin, capital ratio, and liquidity, significantly influence bank profitability. According to Abdulkabir, et al. [6] capital structure and operating costs exhibit an inverse correlation. For the period 2013–2017, Islam and Rana [7] examined the determinants of bank profitability among commercial banks in Bangladesh. They used ROA, ROE, and net interest margin (NIM) as profitability measures. The study found that while income variables and asset quality had a significant positive relationship with ROA, capital strength did not. Additionally, GDP, interest rates, and the inflation rate were found to have no significant effect on bank profitability. Sanyaolu [8] employed a fixed-effects regression model to analyze the determinants of bank profitability in Nigeria from 2008 to 2017. Their results indicated a relationship between inflation and profitability. Besides, Nesrine and Boujelbene [9] examined the determinants of bank profitability in Tunisia and found that liquidity risk, bank assets, stock market capitalization, inflation, and GDP had statistically significant negative effects on profitability. In contrast, capital levels, credit risk, and banking sector concentration were positively associated with profitability. Emre [10] investigated internal bank factors, industry characteristics, and macroeconomic influences on the profitability of 26 commercial banks in Turkey between 2005 and 2010. The study revealed that bank size, credit risk, cost-to-income ratio, the Herfindahl-Hirschman Index (HHI) for deposits, and inflation had statistically significant negative effects on ROA. Wadood, et al. [11] employed the Ordinary Least Squares (OLS) method to analyze the effects of assets, non-performing loans, equity, economic growth, interest rates, and market capitalization on key profitability indicators, including return on assets (ROA), return on equity (ROE), return on capital employed, and net interest margin, examined separately in banks of Pakistan from 2011 to 2016. The empirical findings provide robust evidence that both internal (no-performing loan, interest rates) and external factor (economic growth) significantly impact bank profitability. Davydenko [12] investigated the determinants of bank profitability in Ukraine and found that capital adequacy, GDP, inflation, and exchange rates positively influenced profitability. However, management costs relative to total assets, liquidity, and deposits had negative effects. Additionally, foreign ownership was found to have a significantly negative impact on bank profitability when examined independently. Rahman, et al. [13] examined the performance of 25 banks in Bangladesh from 2006 to 2013, revealing that that both regulatory capital and equity capital, along with loan intensity, have a positive and significant effect on profitability ratio, including ROA, ROE and NIM. In contrast, cost efficiency and off-balance sheet activities negatively and significantly influence bank profitability ratios. The impact of other variables varies depending on the profitability measure used. Specifically, non-interest income, credit risk, and GDP growth are key determinants of NIM, while bank size positively and significantly affects ROA. Besides, inflation has a negative and significant effect on both ROA and ROE. In another research, Osuagwu [14] in an investigation of bank profitability in

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Nigeria, using panel data from 1980 to 2010 incorporating bank-specific factors, industry-related factors and macroeconomic influences, found that only bank-specific factors play a predominant role in determining bank's profitability. Notably, credit risk (non-performing loans), operational efficiency (operating expenses to assets ratio), and capital adequacy significantly impact return on assets (ROA) and return on equity (ROE), while there is no evidence of other factors.

In Vietnam, there are some recent prominent studies including study of Nguyen [15] who employed an Ordinary Least Squares (OLS) regression model with ROA as the dependent variable, incorporating independent variables such as bank size, operating costs, non-performing loan ratio, and other factors to assess the profitability of 24 commercial banks in Vietnam during the 2017–2020 period. The findings indicate that bank size has a positive impact on ROA, whereas operating cost ratio and ownership structure exert negative effects. Another research is of Quỳnh [16] the author applied the Random Effects Model (REM) estimation method and T-test verification on panel data from 25 commercial banks between 2018 and 2021. This study found that operational scale, credit risk, and non-interest income ratio influence bank profitability. However, no significant impact of the COVID-19 pandemic on profitability was observed. Prior to the COVID-19 pandemic, several studies had already examined this topic. Nguyen [17] in a study of 11 Vietnamese commercial banks from 2006 to 2015, found that interest expenses on liabilities and non-interest income positively impact ROA, whereas the NPL ratio has an inverse effect. Furthermore, Hoang and Vu [18] demonstrated that the Net Interest Margin (NIM) of Vietnamese commercial banks between 2008 and 2012 increased with higher operating and management costs as well as inflation, whereas banking sector concentration had an inverse effect. Meanwhile, the study by Nguyen and Do [19] indicated a positive correlation between credit risk and NIM but found no significant difference in NIM between state-owned and joint-stock commercial banks.

Based on the current Vietnamese and international studies, it is evident that limited research has focused on the impact of industry concentration on the profitability of commercial banks. Therefore, the authors have incorporated this factor into their study, alongside the COVID-19 pandemic variable, to comprehensively analyze its effects on Vietnamese commercial banks' profitability. Additionally, both ROA and NIM are utilized to assess profitability from different perspectives, providing a more holistic view of commercial bank performance.

3. Research Methodology

3.1. Data Collection

The research sample consists of data from nine Vietnamese commercial banks with charter capital exceeding 5,000 billion VND (see Appendix) during the 2013–2024 period. The indicators measuring bank profitability are obtained from publicly disclosed financial statements of these commercial banks. Macroeconomic data are collected from the World Bank website (accessible at: https://data.worldbank.org) and the General Statistics Office of Vietnam (accessible at: https://www.gso.gov.vn). A description of the variables is presented in the Table 1.

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Table 1.
Variable description and data source.

Variable name	Variable notation	Variable description	Data source
Returns on assets	ROA	ROA = Profit after taxes/ Average total assets	Banks' financial statements
Net interest margin	NIM	NIM = Net interest income/ Average interest-earning Assets	Banks' financial statements
Non-performing loan ratio	NPL	NPL = Total non-performing loans / Total loans	Banks' financial statements
Cost to income ratio	CIR	CIR = Operating cost/ Operating income	Banks' financial statements
Loan to deposit ratio	LDR	LDR = Total loans/ Total deposits	Banks' financial statements
Market share of State-owned commercial banks	CR4	CR4 = Total assets of state-owned commercial banks in the sample/ Totals assets of commercial banks in the sample	Banks' financial statements
GDP growth	GDP	$GDP = (GDP_t - GDP_{t-1})/ GDP_{t-1}$	World Bank
Inflation rate	INF	$INF = (CPI_t - CPI_{t-1})/ CPI_{t-1}$	General Statistics Office of Vietnam
Equity to total asset ratio	EAR	EAR = Total equity/ Total assets	Banks' financial statements
Loan to asset ratio	LTA	LTA = Total loans/ Total assets	Banks' financial statements
Bank size	Logasset	Logasset = Log (Total assets)	Banks' financial statements
Covid -19	Covid	= 1 for the year among 2020, 2021, 2022 = 0 for other years	

Table 2.
Data description.

Variable	Mean	Standard deviation	Min	Max
ROA	0.0104967	0.0073839	0.0001	0.0358
NIM	0.0325256	0.0130115	0.0055	0.0941
NPL	0.0188116	0.0101637	0.005	0.068
CIR	0.4870826	0.1329771	0.2271	0.8806
LDR	0.6902768	0.1222836	0.254	0.9169319
CR4	0.5566818	0.2220435	0.5125	0.5846
GDP	0.0599273	0.0174461	0.0256	0.0802
INF	0.0320818	0.0139804	0.0063	0.0659
EAR	0.0838021	0.0323875	0.0352	0.2921
LTA	0.6424079	0.1251594	0.1658	1.4614
Logasset	33.10299	1.045251	30.769	35.372
Covid	0.2727273	0.4462848	0	1

The statistics presented in the Table 2 indicate that for the dependent variables ROA and NIM of commercial banks during the 2013–2024 period, the average values are 1.05% and 3.25%, respectively. Notably, the LTA variable exhibits significant variation, with a minimum value of 16.58% and a maximum recorded value of 146.14%. The average size of commercial banks is 33.103, with the largest recorded size being 35.37 and the smallest at 30.769. Regarding macroeconomic variables, GDP and the inflation rate (INF) have average values of 5.99% and 3.2%, respectively, over the period. The statistical results comprehensively outline the key characteristics of each variable under consideration. Overall, most variables exhibit relatively low standard deviations, indicating that the dataset can be reliably used in the regression model.

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3.2. Methodology

The study utilizes panel data with the following models: Pooled OLS, Fixed Effects Model (FEM), Random Effects Model (REM), and Feasible Generalized Least Squares (FGLS). The general research model for bank i in year t is constructed as follows:

$$ROA_{i,t} = \beta_1 + \beta_2 * NPL_{i,t} + \beta_3 * CIR_{i,t} + \beta_4 * LDR_{i,t} + \beta_5 * LTA_{it} + \beta_6 * Logasset_{i,t} + \beta_7 * EAR_{i,t} + \beta_8 * CR4_{i,t} + \beta_9 * GDP_{i,t} + \beta_{10} * INF_{i,t} + \beta_{11} * Covid_{i,t} + e_{i,t} \quad (1)$$

$$NIM_{i,t} = \gamma_1 + \gamma_2 * NPL_{i,t} + \gamma_3 * CIR_{i,t} + \gamma_4 * LDR_{i,t} + \gamma_5 * LTA_{i,t} + \gamma_6 * Logasset_{i,t} + \gamma_7 * EAR_{i,t} + \gamma_8 * CR4_{i,t} + \gamma_9 * GDP_{i,t} + \gamma_{10} * INF_{i,t} + \gamma_{11} * Covid_{i,t} + e_{i,t} \quad (2)$$

Where ROA and NIM are the dependent variables representing the profitability of Vietnamese commercial banks. The independent variables are categorized into two groups: internal factors (including NPL, CIR, LDR, GDP, INF, EAR, and Logasset) and external factors (including CR4, GDP, INF, and Covid). The term e_{it} represents the error term of the model.

Table 3.
Correlation matrix of independent variables.

	NPL	CIR	LDR	CR4	GDP	INF	EAR	LTA	Logasset	Covid
NPL	1.0000									
CIR	0.3060	1.0000								
LDR	-0.1391	-0.4170	1.0000							
CR4	-0.0365	0.3506	-0.2115	1.0000						
GDP	0.0607	0.1925	-0.0959	0.5757	1.0000					
INF	0.3057	0.1571	-0.2400	-0.1707	0.0267	1.0000				
EAR	0.0765	-0.2171	-0.0485	-0.2698	-0.0954	0.0420	1.0000			
LTA	-0.0484	-0.2170	0.6258	-0.1666	-0.0807	-0.1534	0.3223	1.0000		
Logasset	-0.1755	-0.6012	0.5215	-0.2381	-0.1145	-0.1362	-0.2130	0.2123	1.0000	
Covid	-0.2413	-0.3734	0.3039	-0.4647	-0.5309	-0.2070	0.1461	0.2098	0.2385	1.0000

4. Research Findings

The results in the Table 3 indicate that all pairs of independent variables have correlation coefficients below 0.8. According to the benchmark set by Farrar and Glauber [20] this suggests that the model does not suffer from autocorrelation.

In the next step, the authors employ the Variance Inflation Factor (VIF) to determine whether multicollinearity is present in the model, ensuring its suitability for analysis. The results are shown in the Table 4.

Table 4.
Multicollinearity test results.

Variable	VIF	1/VIF
LDR	2.60	0.384622
CIR	2.35	0.425431
Logasset	2.26	0.442297
LTA	2.18	0.457698
CR4	2.06	0.484408
EAR	1.84	0.542800
GDP	1.80	0.555685
Covid	1.78	0.561896
INF	1.29	0.775267
NPL	1.27	0.785759
Mean VIF	1.94	

The Table 4 shows that the average VIF of the variables is 1.94, which is below the threshold of 2, and no variable has a VIF exceeding 10. This indicates that the model does not exhibit signs of

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multicollinearity [21].

In the next step, the authors conduct an F-test to determine the appropriate model selection between Pooled OLS and FEM, with the following hypotheses:

Null hypothesis (H_0): The Pooled OLS model is more appropriate.

Alternative hypothesis (H_1): The FEM model is more appropriate.

The test results for the models of the dependent variables are presented in the Table 5 below.

Table 5.
Model selection test results between pooled OLS and REM.

ROA	Prob > F = 0.0000
NIM	Prob > F = 0.0000

Based on the results of the F-test in the Table 5, for both dependent variables, the probability value (Prob) is 0.0000 < 0.05. This indicates that the null hypothesis (H_0) is rejected at the 5% significance level, suggesting that the FEM model is more appropriate than the Pooled OLS model.

Additionally, the authors employ the Hausman [22] to determine the appropriate model selection between REM and FEM for the dataset in this study, with the following hypotheses:

Null hypothesis (H_0): The REM model is more appropriate.

Alternative hypothesis (H_1): The FEM model is more appropriate.

Table 6.
Model selection test results Between FEM and REM.

Variable	Chi-square value	P- value
ROA	14.59	0.1475
NIM	10.61	0.3885

According to Hausman [22] if the P-value is greater than 0.05, the null hypothesis (H_0) is accepted, and the alternative hypothesis (H_1) is rejected. Based on the Hausman test results in the Table 6, the appropriate model for both dependent variables, ROA and NIM, is the REM model.

The presence of heteroscedasticity can distort regression results and related statistical inferences. To examine this issue, the authors applied the White test to the selected REM model, with the following hypotheses:

Null hypothesis (H_0): The model does not exhibit heteroscedasticity.

Alternative hypothesis (H_1): The model exhibits heteroscedasticity.

Table 7.
Heteroscedasticity test results.

Variable	Chi-square value	P- value
ROA	171.16	0.0000
NIM	495.45	0.0000

From the empirical results in the Table 7, both regression models have a P-value of 0.0000 < 0.05, leading to the rejection of the null hypothesis (H_0). This indicates that the model exhibits heteroscedasticity.

Next, to check the autocorrelation among variables in the REM model, which may lead to errors related to the variance of the estimated coefficients and reduces the accuracy of the model, the authors applied [23] with the following hypotheses:

Null hypothesis (H_0): The model does not exhibit autocorrelation.

Alternative hypothesis (H_1): The model exhibits autocorrelation.

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Table 8.
Autocorrelation Test Results.

Variable	F – test value	P- value
ROA	16.582	0.0005
NIM	13.719	0.0013

From the test results in the Table 8 it can be seen that the P-values for both models are below 0.05. Based on the Wooldridge [23] the null hypothesis (H_0) is rejected, indicating that both models exhibit autocorrelation.

To address the model limitations of heteroscedasticity and autocorrelation as pointed out, the authors applied the Feasible Generalized Least Squares (FGLS) estimation method proposed by Aitken [24] to restructure the REM model for the two variables, ROA and NIM, thereby enhancing the accuracy and reliability of the analysis.

Table 9.
Regression results between ROA and independent variables[1].

ROA	Pooled OLS	FEM	REM	FGLS
NPL	-0.0805*** [-2.63]	-0.111*** [-4.01]	-0.109*** [-3.91]	-0.0839*** [-3.76]
CIR	-0.0312*** [-9.85]	-0.0209*** [-6.60]	-0.0232*** [-7.34]	-0.0172*** [-7.78]
LDR	0.00514 [1.42]	0.000126 [0.03]	0.00246 [0.70]	0.000588 [0.21]
CR4	-0.000442 [-0.02]	0.0302** [1.98]	0.0108 [0.73]	-0.0339*** [-2.58]
GDP	0.0314 [1.49]	0.0121 [0.79]	0.0228 [1.44]	0.0409*** [4.41]
INF	0.0252 [1.13]	0.0662*** [3.93]	0.0495*** [2.89]	0.0170 [1.63]
EAR	0.0973*** [8.44]	0.0887*** [7.18]	0.0860*** [7.17]	0.0784*** [6.34]
LTA	-0.00795** [-2.45]	0.000488 [0.18]	-0.00170 [-0.61]	-0.00318 [-1.12]
Logasset	0.0000372 [0.09]	0.00443*** [6.12]	0.00253*** [4.24]	0.00144*** [3.70]
Covid	0.00201** [2.45]	0.00113* [1.86]	0.00157** [2.52]	0.000546 [1.51]
_cons	0.0164 [0.91]	0.0164 [-5.19]	-0.0772*** [-3.16]	-0.0174 [-1.05]
N R-sq	242 0.679	242 0.744	242	242

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Table 10.
Regression results between NIM and independent variables[3].

NIM	Pooled OLS	FEM	REM	FGLS
NPL	0.250*** [3.50]	-0.0160 [-0.33]	-0.00225 [-0.05]	0.0226 [0.61]
CIR	-0.0549*** [-7.40]	-0.0350*** [-6.23]	-0.0365*** [-6.59]	-0.0256*** [-6.80]
LDR	0.0166* [1.96]	0.0127** [1.98]	0.0125** [2.00]	0.0151*** [3.17]
CR4	0.113*** [2.72]	0.0529* [1.95]	0.0556** [2.12]	0.0139 [0.61]
GDP	0.00106 [0.02]	0.0207 [0.76]	0.0203 [0.74]	0.0439*** [2.87]
INF	0.00153 [0.03]	0.0403 [1.35]	0.0364 [1.23]	0.0104 [0.60]
EAR	0.129*** [4.80]	0.0589*** [2.69]	0.0646*** [3.03]	0.0706*** [3.36]
LTA	-0.00981 [-1.29]	0.00270 [0.56]	0.00156 [0.33]	-0.00376 [-0.81]
Logasset	-0.000314 [-0.34]	0.000981 [0.77]	0.000811 [0.70]	-0.000112 [-0.15]
Covid	0.00157 [0.82]	0.00120 [1.11]	0.00125 [1.17]	0.00186*** [3.21]
_cons	-0.0147 [-0.35]	-0.0303 [-0.59]	-0.0252 [-0.54]	0.0222 [0.72]
N R-sq	242 0.435	242 0.506	242	242

Note: *Corresponds to a 10% significance level
**Corresponds to a 5% significance level
***Corresponds to a 1% significance level.

The regression results in the Table 9 indicate that ROA is influenced by 10 factors, among which 3 have a negative impact (NPL, CIR, CR4), 3 factors have a positive impact (GDP, EAR, Logasset), while the remaining 4 factors do not significantly affect ROA. Similarly, the research model in the Table 10 shows that NIM is influenced by 10 factors, with 5 exhibiting a significant impact. Most of these factors, including LDR, GDP, EAR, and Covid, have a positive effect on NIM, whereas CIR has a negative impact. The remaining 5 factors do not significantly affect this profitability indicator

5. Result Discussion

The quantitative results above highlight several key insights regarding the operations of Vietnamese commercial banks. *First*, the NPL variable has a statistically significant negative relationship with ROA but is not statistically significant for NIM. This can be explained by the fact that an increase in credit risk (RRTD) leads to higher credit risk provisions, along with increased debt management costs due to prolonged delinquent loans, ultimately reducing profitability and causing a decline in ROA. *Second*, the LDR variable has a positive correlation but does not have a significant impact on ROA, whereas it has a statistically significant positive effect on NIM. This suggests a proportional relationship between liquidity risk and expected profitability. A commercial bank that allocates too much mobilized capital for lending may reduce its cash reserves, as it has to cut back on liquidity buffers to increase its outstanding loans. While an increase in outstanding loans enhances interest income, a lower cash reserve heightens liquidity risk. *Third*, the regression results indicate that the CIR variable has an inverse relationship with both ROA and NIM, confirming that higher operating costs negatively affect commercial banks' profitability. *Fourth*, the LTA variable has a negative correlation but does not significantly impact ROA or NIM, which represent bank profitability. This result indicates that an increase in outstanding loans does not necessarily enhance profitability. When banks expand their lending activities, they must simultaneously ensure effective credit quality management to generate interest income. If banks face risks such as borrower defaults, an increase in non-performing loans, or external economic shocks, profitability may decline. *Fifth*, the EAR variable has a positive effect on both ROA and NIM, suggesting that higher equity capital improves bank

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profitability. This aligns with the practical operations of banks, as a higher capital adequacy ratio enhances risk resilience and strengthens financial stability. Moreover, banks with higher capital can safely expand their credit activities, minimizing credit risk and increasing interest-based profitability. Additionally, higher equity capital enhances bank credibility, reducing funding costs and allowing banks to lower interest expenses, thereby increasing NIM. *Sixth*, the effect of the Logasset variable differs between the ROA and NIM models, as it is positively correlated with ROA but does not significantly impact NIM. Larger banks may benefit from greater investment opportunities, improved access to financial resources, and stronger market positioning. Large commercial banks can leverage their scale and capabilities to optimize operations, enhance management efficiency, and build customer trust. Previous research suggests that increasing bank size provides potential diversification advantages [25] leading to enhanced operational efficiency and profitability. However, for NIM, larger asset size may not necessarily translate into improved net interest margins, especially if banks struggle to adjust their lending and deposit interest rate spreads in their favor. Additionally, larger banks may need to increase deposit rates and lower lending rates to maintain market share, which could reduce NIM. *Seventh*, the CR4 variable has a negative correlation with ROA but does not affect NIM. This suggests that while banks with larger market shares may achieve cost efficiencies through economies of scale, ineffective resource management or missed profitability opportunities could negatively impact ROA. *Eighth*, both regression models indicate that the GDP variable has a positive relationship with ROA and NIM. This implies that during economic growth, businesses operate more efficiently, leading to an increased demand for credit from enterprises and individuals, thereby boosting bank profitability. Additionally, economic expansion presents more attractive investment opportunities, allowing banks to allocate capital to higher-yielding loans or expand financial services, ultimately improving ROA and NIM. *Ninth*, regarding the inflation rate (INF) variable, the model results show a positive correlation with both ROA and NIM, but the relationship is not statistically significant. This suggests that there is insufficient evidence to confirm the impact of inflation on bank profitability. *Lastly*, the Covid variable has a statistically significant positive relationship with NIM, indicating clear evidence that COVID-19 had a positive impact on NIM among commercial banks. However, while Covid is positively correlated with ROA, the relationship is not statistically significant. Notably, despite the challenges posed by the pandemic, the banking sector exhibited strong financial performance during 2020–2022. Particularly in 2022, key profitability indicators such as ROA and NIM remained high, suggesting that commercial banks adapted effectively during the COVID-19 period. This intriguing result may be attributed to government policy interventions that supported banks in managing non-performing loans, including debt restructuring and postponing risk provision allocations. These measures alleviated the burden of bad debts, reducing costs for banks and subsequently improving profitability during the pandemic.

Based on the empirical findings, several strategic recommendations can be made to enhance the profitability of Vietnamese commercial banks. To begin with, banks should focus on expanding asset size by investing in operational growth, enhancing technological infrastructure, and diversifying financial products to increase market competitiveness. In addition, strict cost control measures should be implemented to improve efficiency, particularly by optimizing operational expenses and enhancing digital banking services to reduce overhead costs. Moreover, banks need to increase loan balances while simultaneously strengthening credit risk management to mitigate non-performing loans (NPLs), ensuring sustainable profitability. Furthermore, capital-raising strategies should be adopted to expand equity capital, reinforcing financial stability and risk resilience. Finally, banks must analyze and adjust business strategies to remain adaptable to macroeconomic fluctuations, such as GDP growth variations or external shocks like pandemics, allowing them to capitalize on new opportunities and maintain long-term financial stability.

6. Conclusion

In this study, the authors conducted a comprehensive and in-depth analysis of the factors influencing the profitability of commercial banks, using a research sample of nine Vietnamese

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commercial banks during the period from 2013 to 2024. Specifically, for ROA, the variables EAR, GDP, and bank size exhibit a positive impact, whereas NPL, CIR, and CR4 have a negative effect. Regarding NIM, the positively influencing factors include GDP, EAR, LDR, and Covid, while CIR exerts a negative impact. Based on these findings, the authors propose several recommendations to improve the profitability of commercial banks, such as expanding asset size, increasing equity capital, restructuring operating costs, enhancing credit risk management, and analyzing market fluctuations.

Although this study has been conducted with rigorous analysis, certain limitations remain. The research sample consists of only nine domestic commercial banks, excluding foreign commercial banks operating in Vietnam. Additionally, some potentially influential factors, such as the state of digital transformation or the level of adoption of international banking governance standards, have not been considered. As a result, the findings may not provide a fully comprehensive perspective. These limitations present opportunities for future research to further explore this topic in a more holistic manner.

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.

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Appendices: Sample banks.

No.	Bank name
1	Vietnam Joint Stock Commercial Bank for Industry and Trade (VietinBank)
2	Joint Stock Commercial Bank for Investment and Development of Vietnam (BIDV)
3	Joint Stock Commercial Bank for Foreign Trade of Vietnam (VCB)
4	Vietnam Bank for Agriculture and Rural Development (Agribank)
5	Vietnam Prosperity Joint Stock Commercial Bank (VPBank)
6	Military Commercial Joint Stock Bank (MB Bank)
7	Asia Commercial Bank (ACB)
8	Saigon - Hanoi Commercial Joint Stock Bank (SHB)
9	Vietnam Technological and Commercial Joint Stock Bank (Techcombank)

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