FACTORS AFFECTING NON-PERFORMING LOANS IN VIETNAMESE JOINT-STOCK COMMERCIAL BANKS

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Abstract: ***The study examines the determinants of non-performing loans in Vietnamese joint-stock commercial banks over the period 2014-2024, using data collected from banks' financial statements. The GLS estimation results indicate that LLR and INF positively affect non-performing loans, whereas SIZE, ROE, LGR, GDP, and UNF exhibit negative effects. Among these variables, SIZE, ROE, LLR, GDP, INF, and UNF are statistically significant, while LGR is only significant at the 10% level and EXI is not statistically significant. The study also provides several managerial implications to help joint-stock commercial banks enhance scale, profitability efficiency, and credit risk control, along with policy recommendations for the State Bank of Vietnam in macroeconomic management to stabilize the banking system.***

• Keywords: *non-performing loans; bank-specific determinants; macroeconomic factors; GLS.*

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1. Introduction

In recent years, non-performing loans have attracted increasing scholarly and policy attention due to their implications for banking stability and macroeconomic resilience. In particular, amid increasing global economic volatility and intense competition, default risk is not only a concern for managers but also poses significant challenges to banks, investors, business partners, and the macroeconomy. In banking operations, non-performing loans (NPLs) are consistently regarded as a critical risk factor, directly affecting financial safety, business performance, and the sustainability of the banking system (Phan Thị Linh, 2024).

According to information asymmetry theory (Akerlof, 1970), the party possessing more information in a transaction gains an advantage, which leads to adverse selection and the accumulation of non-performing loans within banks. In addition, the capital management hypothesis suggests that banks with higher equity capital tend to adopt more prudent lending practices and stronger risk monitoring. Adequate capital helps mitigate non-performing loans, whereas weak capitalization forces banks to assume higher risk levels (Kanapiyanova et al., 2023; Andersen et al., 2024).

In Vietnam, despite notable improvements in credit risk management, non-performing loan ratios remain highly volatile, particularly during periods of economic distress such as the 2008 global financial crisis, the banking restructuring phase from 2011 to 2015, and the shock caused by the COVID-19 pandemic. Non-performing loans not only reflect credit quality and risk management capacity at the individual bank level but also generate spillover effects across the entire economy, influencing investor confidence, capital mobilization capacity, and national financial stability. According to the State Bank of Vietnam (2025), the sector-wide NPL ratio stood at approximately 4.3% as of January 2025. Previously, by the end of July 2024, this ratio reached 4.75%, higher than in 2023. Moreover, domestic and global macroeconomic developments, including inflation, exchange rate fluctuations, credit growth, and supply chain disruptions, have imposed considerable pressure on banks' credit risk management capabilities (Quỳnh Trang, 2025). Rising non-performing loan ratios not only constrain firms' access to capital but also pose potential threats to national financial stability (Quỳnh Trang, 2025).

Therefore, identifying bank-specific and macroeconomic determinants of non-performing loans is a pressing issue with both theoretical significance and practical relevance for policymaking and banking management. The remainder of this paper is organized as follows: Section 2 presents the theoretical framework and research hypotheses; Section 3 describes the model, data, and methodology;

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Section 4 reports and discusses the empirical results; and Section 5 provides policy implications.

2. Theoretical Framework and Research Hypotheses

2.1. Overview of Non-Performing Loans

Concept of Non-Performing Loans

According to IMF (2005), non-performing loans are loans for which borrowers fail to fulfill principal or interest payment obligations for 90 days or more, or loans for which future repayment is assessed as uncertain. According to BCBS (2017), when a loan is overdue for more than 90 days or when a bank considers that the borrower is unlikely to fully repay the debt without realizing collateral, such loans are classified as non-performing.

In Vietnam, pursuant to Circular No. 31/2024/TT-NHNN dated July 1, 2024 on asset classification, provisioning, utilization of risk provisions, and risk handling in the operations of credit institutions, non-performing loans are defined as debts classified under Group 3 (substandard loans), Group 4 (doubtful loans), and Group 5 (potential loss loans). Accordingly, in this study, non-performing loans are understood based on the definitions of IMF, BCBS, and the State Bank of Vietnam, and are identified and differentiated by repayment duration and repayment capacity. Therefore, non-performing loans include Group 3 (substandard loans), Group 4 (doubtful loans), and Group 5 (potential loss loans).

Indicators for Measuring Non-Performing Loans

According to Nguyễn Thanh Phương & Đặng Thị Lan Phương (2024), non-performing loans comprise Group 3 to Group 5 debts, and banks' credit risk levels are assessed through the ratio of total non-performing loans to total outstanding loans. In this measure, total non-performing loans represent the sum of Group 3 to Group 5 debts, while total outstanding loans include debts from Group 1 to Group 5

According to Decree No. 86/2024/NĐ-CP, non-performing loans are also measured through the loan loss provision ratio. This ratio reflects the amount that credit institutions set aside to provision for potential risks associated with loans, aiming to compensate for possible losses when borrowers are unable to repay due to bankruptcy. Credit provisions are calculated based on borrowers' outstanding principal balances and are classified into two types: specific provisions for individual risky loans and general provisions for unidentified risks. Provisioning rates increase when banks' loan portfolios exhibit higher risk levels.

According to BCBS (2017), non-performing loans are also evaluated through the NPL ratio, which is an important instrument under Basel II, helping banks maintain financial stability and enhance resilience against credit risk. This indicator excludes non-performing loans already "insured" by provisions, implying that banks retain the capacity to absorb losses associated with such non-performing loans.

2.2.2. Credit Risk Theory

Credit risk theory (Merton, 1974) posits that banks incur losses when borrowers fail to repay their obligations on time; default probability depends on the value of borrowers' assets. Consequently, excessive credit expansion or poor risk management increases non-performing loans and reduces operational efficiency. Credit risk is considered a core risk faced by banks (Merton, 1974) and can be described as a financial option, whereby default probability depends on the value of borrowers' assets. Empirical evidence indicates that credit risk is significantly influenced by macroeconomic factors (Kolapo et al., 2012).

In this study, credit risk theory is employed to explain borrowers' inability to repay principal and interest on time, thereby generating losses for banks and increasing non-performing loans. NPLs rise when banks excessively expand credit or adopt weak risk management practices, leading to declining profitability and operational efficiency. Conversely, increasing the share of non-interest income, diversifying loan portfolios, and implementing strict risk management help control NPLs and stabilize profits. In Vietnam, Basel II, Basel III, and Circular No. 41/2016/TT-NHNN have been implemented to strengthen governance capacity and credit risk control.

2.2.3. Business Cycle Theory

Business cycle theory explains cyclical economic fluctuations, including expansion, peak, recession, and recovery phases. According to Schumpeter (1939), these cycles arise naturally from innovation, investment, and adjustment within economic systems. During economic expansion, corporate revenues and profits increase, leading to lower NPLs. Conversely, during recessions, many firms experience financial distress due to declining income and rising unemployment, resulting in increased non-performing loans and defaults.

In this study, business cycle theory is used to explain how economic fluctuations affect customers' financial capacity through changes in income, employment, and output. These changes influence borrowers' repayment ability and consequently affect banks' credit quality.

2.2.4. Economies of Scale Theory

According to economies of scale theory, as a firm's or bank's operational size increases, average costs per unit of product or service tend to decline due to more efficient utilization of resources, technology, and costs. Panzar and Willig (1981) define economies of scale as a condition whereby firms expand production scale to reduce long-run average costs through more efficient technologies and management processes, labor specialization, or the allocation of fixed costs over larger output volumes.

In banking, large banks possess advantages in portfolio diversification and risk management investment, thereby contributing to reductions in non-performing loans, whereas smaller banks face greater difficulties in risk diversification and are more prone to higher NPL levels (Athanasoglou et al., 2008). In this study, economies of scale theory is applied to explain the impact of operational scale on cost optimization capacity, loan portfolio diversification, and investment capability in risk management systems.

2.2. Review of Previous Studies

Numerous studies have examined non-performing loans; however, determinants of NPLs can generally be classified into two main groups: (i) bank-specific factors and (ii) macroeconomic factors. Table 1 presents a synthesis of prior empirical findings on the impacts and directional effects of individual determinants on non-performing loans.

Table 1. Summary of Determinants of Non-Performing Loans from Previous Studies

No.	Factor	Effect		Source
		+	-	
1	Bank size (SIZE)	+		Nguyễn Ngọc Tân et al. (2021); Võ Minh Long et al. (2020)
			-	Bùi Đan Thanh & Nguyễn Ngọc Huyền (2022)
2	Return on equity (ROE)		-	
3	Loan loss provisions (LLR)	+		
4	Credit growth (LGR)	+		
			-	Kjosevski et al. (2019); Võ Minh Long et al. (2020)
5	Economic growth rate (GDP)		-	Kjosevski et al. (2019); Nguyen Minh Phương et al., (2025)
		+		Bùi Đan Thanh và Nguyễn Ngọc Huyền (2022)
6	Inflation (INF)	+		Bùi Đan Thanh và Nguyễn Ngọc Huyền (2022);
			-	Kjosevski et al. (2019); Võ Minh Long et al. (2020)
7	Exchange rate (EXI)	+		Kjosevski et al. (2019); Bùi Đan Thanh và Nguyễn Ngọc Huyền (2022);
8	Unemployment rate (UNF)		-	Nguyen Minh Phương et al., (2025)
		+		Kjosevski et al. (2019)
9	Interest rate	+		Võ Minh Long et al. (2020);
11	Lagged non-performing loans	+		Bùi Đan Thanh và Nguyễn Ngọc Huyền (2022); Võ Minh Long et al. (2020)
12	Return on assets (ROA)		-	Kjosevski et al. (2019); Võ Minh Long et al. (2020)
13	Capital adequacy ratio (CAR)	+		Kjosevski et al. (2019)
14	Capital structure	+		Võ Minh Long et al. (2020)
15	Leverage	+		
16	Number of borrowers	+		Nguyễn Ngọc Tân et al. (2021)
17	Total assets	+		
18	Debt-to-equity ratio	+		

Source: Authors

The literature review indicates that most previous studies primarily focus on the effects of macroeconomic factors such as inflation, GDP growth, and exchange rates on banks' non-performing loans, while the roles of micro-level factors including profitability, credit growth, and bank size have not been adequately examined in the context of Vietnam's implementation of Basel II and transition toward Basel III. At the same time, very few studies have updated their datasets through 2024, a period characterized by global inflationary pressures and monetary policy adjustments by the State Bank of Vietnam, which have introduced new dynamics. Therefore, this study extends the dataset through 2024 and simultaneously incorporates both microeconomic and macroeconomic factors to provide updated empirical evidence on the determinants of non-performing loans in Vietnamese joint-stock commercial banks.

3. Model and Research Methodology

Research Model

Based on the theoretical framework presented in Section 2.2 and the review of prior studies in Section 2.3, this study develops a quantitative model grounded in theory and previous empirical research, including Phan Thị Linh (2024), Nguyễn Thanh Phương & Đặng Thị Lan Phương (2024), Nguyen Minh Phương et al., (2025). The proposed research model is specified as follows:

$$NPL_{it} = + *SIZE_{it} + *ROE_{it} + * LLR_{it} + *LGR_{it} + *GDP_{t} + * INF_{t} + *UNF_{t} + *EXI_{t} + _{it} \quad (2.5)$$

Where: i denotes bank , denotes year , and is the error term

NPL (Non-performing loan ratio) is calculated as total non-performing loans divided by total outstanding loans, multiplied by 100% . SIZE is measured as the natural logarithm of total assets (ln(Total Assets)). ROE (Profitability) is defined as earnings after tax (EAT) divided by equity. LLR (Loan loss provisions) is calculated as loan loss provision expense divided by total outstanding loans. LGR is measured as the annual growth rate of total loans. GDP is measured as the annual GDP growth rate (%). INF is measured as the annual inflation rate (CPI, %). EXI is measured as the annual percentage change in the exchange rate. UNF (Unemployment rate) is defined as (number of unemployed individuals divided by the labor force) expressed as a percentage.

Research Methodology

To identify the determinants of non-performing loans in joint-stock commercial banks, this study employs a quantitative research approach using STATA

17. Following descriptive statistical analysis, correlation matrix analysis, and multicollinearity diagnostics, satisfactory results were obtained. The study estimates three regression models: OLS, FEM, and REM. To select the most appropriate model, F-tests, Breusch-Pagan tests, and Hausman tests are conducted on the regression results of OLS, FEM, and REM.

If heteroskedasticity and autocorrelation are detected in the selected model, after testing for endogeneity and confirming the absence of endogeneity using the Wu-Hausman test, the GLS method is applied to address heteroskedasticity and autocorrelation (Nguyễn Thị Ánh Hoa, 2021). The dataset comprises 27 banks with transparent and complete financial disclosures, yielding 297 observations over the period from 2014 to 2024.

4. Empirical Results

Descriptive statistics: Descriptive statistics for the period 2014-2024 indicate that the non-performing loan ratio (NPL) has a mean value of 0.022 (SD = 0.024), ranging from 0.02 to 0.298, reflecting differences in credit risk management capacity across banks. Although the average NPL ratio is relatively low (2.2%), the maximum value reaches 29.8%, indicating the presence of extreme observations. Therefore, outlier diagnostics are conducted and a 1% winsorization procedure is applied to mitigate the influence of extreme values on the estimation results. The post-winsorization dataset does not exhibit abnormal values, ensuring the reliability of subsequent regression analysis.

Bank size (SIZE) records an average of 32.82 with a standard deviation of 1.155, suggesting moderate variation in bank size. ROE averages 0.102 (SD = 0.089), fluctuating from −0.842 to 0.264, indicating substantial disparities in profitability performance. The negative values of ROE reflect periods of financial distress or restructuring among certain banks. The average loan loss provision ratio (LLR) is 0.013, showing that banks maintain relatively stable provisioning levels. Credit growth (LGR) averages 0.183, with wide variation from −0.113 to 0.653, reflecting differences in business strategies. GDP growth remains relatively stable at approximately 6% on average, inflation (INF) is low and stable, while the exchange rate (EXI) exhibits minor fluctuations, indicating effective macroeconomic management. The unemployment rate (UNF) is low and stable. These descriptive statistics provide initial insights into the distribution and variability of the variables and form the basis for subsequent econometric analysis.

Correlation analysis: Correlation coefficients among the independent variables are all below 0.8, suggesting no strong pairwise correlations. Multicollinearity is further examined using the variance inflation factor (VIF) in the subsequent analysis. (Gujarati, 2021).

Multicollinearity analysis: Variance inflation factor (VIF) values for all variables range from 1.03 to 5.54, with the highest VIF observed for UNF (5.54) and the lowest for LGR (1.03), while the mean VIF equals 2.5, all below the threshold of 10. This indicates that the model does not suffer from serious multicollinearity, as the independent variables do not exhibit excessively high linear relationships with each other (Gujarati, 2021).

Model selection among OLS, FEM, and REM: After estimating the OLS, FEM, and REM models, the study applies F-tests, Breusch-Pagan tests, and Hausman tests (Gujarati, 2021) to determine the most appropriate specification. The results reported in Table 2 indicate that REM is the most suitable model for this dataset.

Table 2. Results of F-test, Breusch-Pagan Test, and Hausman Test

F-test	Breusch-Pagan Test	Hausman Test
H0: OLS model is appropriate H1: FEM model is appropriate	H0: OLS model is appropriate H1: REM model is appropriate	H0: FEM model is appropriate H1: REM model is appropriate
Prob > F = 0.0003	chibar2(01) = 16.29 Prob > chibar2 = 0.0000	Prob > chi2 = 0.9182
Conclusion: Since Prob > F = 0.0003 < 5%, H0 is rejected and H1 is accepted. The FEM model is appropriate.	Conclusion: Since Prob > chibar2 = 0.0000 < 5%, H0 is rejected and H1 is accepted. The REM model is appropriate.	Conclusion: Since Prob > chi2 = 0.9182 > 5%, H0 is accepted and H1 is rejected. The REM model is appropriate.

Source: Results generated from Stata 17

Heteroskedasticity test: The test results show chi-square = 16.29 with Prob > chi2 = 0.0000, which is below the 5% significance level. This indicates that the selected model exhibits heteroskedasticity (Gujarati, 2021).

Autocorrelation test: The test results report an F-statistic of F(1, 26) = 28.865 with Prob > F = 0.0000, which is lower than the 0.05 significance level (0.0000 < 0.05). This confirms the presence of autocorrelation in the model (Gujarati, 2021).

Endogeneity test: The study applies the Wu-Hausman test to assess the potential presence of endogeneity in the model (Gujarati, 2021). The Wu-Hausman test results show p-values of 0.0799, 0.0471, 0.5657, 0.9763, 0.7308, 0.9718, 0.9598, and 0.4832 for SIZE, ROE, LLR, LGR, GDP, INF, EXI, and UNF, respectively. Notably, the p-value for ROE is below the 5% significance level, suggesting that endogeneity may not be completely ruled out for this variable. Hence, the endogeneity issue should be interpreted cautiously rather than being fully dismissed..

However, since the model exhibits autocorrelation in the residuals and heteroskedasticity, the GLS method is employed to correct these model deficiencies (Table 3).

Table 3. GLS Results

Variable	Coefficient	Standard Error	P-value
SIZE	-0.003***	0.001	0.000
ROE	-0.041***	0.008	0.000
LLR	1.098***	0.115	0.000
LGR	-0.006*	0.004	0.085
GDP	-0.092**	0.032	0.005
INF	0.118***	0.029	0.000
EXI	0.013	0.017	0.428
UNF	-0.470***	0.147	0.001
Constant	0.009	0.166	0.958

Source: Results generated from Stata 17

The results indicate that SIZE and ROE exert negative effects on NPLs. These findings support economies of scale theory (Panzar & Willig, 1981) and credit risk theory (Nguyễn Ngọc Tân et al., 2021, Võ Minh Long et al., 2020, Bùi Đan Thanh and Nguyễn Ngọc Huyền., 2022). In contrast, LLR is positively associated with NPLs, whereas LGR exhibits a negative relationship, in line with Laeven & Majnoni (2003), although contrary to Kjosevski et al. (2019). Within the macroeconomic group, GDP and UNF exert negative effects on NPLs, whereas INF has a positive and statistically significant impact. EXI carries a positive coefficient, but its effect is not statistically significant. These findings suggest that credit risk is influenced by both bank-specific and macroeconomic factors. The negative coefficient of unemployment is contrary to conventional expectations. One possible explanation is that the official unemployment rate in Vietnam may not fully capture underemployment or informal labor market pressures. Therefore, this result should be interpreted with caution and may reflect measurement limitations rather than a straightforward causal relationship.

5. Managerial Implications

For Joint-Stock Commercial Banks

The empirical results suggest that joint-stock commercial banks should focus on sustainable scale expansion (SIZE) through increases in charter capital, technological investment, and network development in order to enhance financial capacity, diversify risk, and improve operational efficiency. At the same time, improving ROE should be prioritized by optimizing capital structure, controlling costs, enhancing lending efficiency, and increasing non-interest income to strengthen resources for credit risk management.

The positive association between LLR and NPLs likely reflects the fact that banks increase provisioning in response to deteriorating credit quality. Thus, LLR should be interpreted primarily as a signal of rising credit risk rather than a direct causal driver of higher NPLs. Credit growth should also follow a selective approach, prioritizing customers with strong financial capacity, conducting rigorous cash-flow appraisal, and applying internal credit rating systems. In addition, banks should proactively develop response scenarios for GDP downturns, adjust credit policies in line with inflation fluctuations, and simultaneously restructure debt and support vulnerable customer groups when unemployment rises.

For the State Bank of Vietnam (SBV)

At the macro level, the SBV should coordinate with the Government to promote stable economic growth in order to support the debt repayment capacity of firms and households, while developing economic cycle forecasting tools for the banking system. Under inflationary pressure, the SBV needs to flexibly conduct monetary policy, control interest rate levels, and allocate credit quotas appropriately, alongside issuing regulations that encourage stress assessment of borrowers. Although unemployment is generally expected to worsen borrowers' repayment capacity, the estimated coefficient in this study is negative. This unexpected result suggests that the relationship between labor market conditions and NPLs in Vietnam may be more complex, and therefore policy implications related to unemployment should be interpreted cautiously.

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