DETERMINANTS OF CREDIT GROWTH IN VIETNAMESE COMMERCIAL BANKS

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Abstract: ***This study examines the internal bank-specific and macroeconomic determinants of credit growth in Vietnamese commercial banks over the period 2018-2023. Given the central role of bank credit in supporting economic growth, identifying the key drivers of lending expansion is of particular importance in emerging economies. Using panel data from Vietnamese commercial banks, the study employs Pooled OLS, Fixed Effects, Random Effects, and Generalized Least Squares (GLS) estimations to ensure robust empirical results. The findings indicate that deposit growth and the loan-to-deposit ratio have a positive and statistically significant impact on credit growth, while bank size and capital adequacy are negatively associated with lending expansion, reflecting more conservative strategies adopted by larger and well-capitalized banks. In addition, GDP growth supports credit expansion, whereas inflation constrains lending activity. Overall, the results highlight the importance of funding capacity, balance sheet conditions, and macroeconomic factors in shaping credit growth dynamics in Vietnam, offering policy-relevant implications for banking management and monetary authorities.***

• Keywords: *credit growth; commercial banks; Vietnam; panel data analysis.*

Date of receipt: 26th Feb., 2026
Date of receipt revision: 13th Mar., 2026
Date of delivery revision: 07th Mar., 2026
Date of approval: 27th Mar., 2026
DOI: https://doi.org/10.71374/jfar.v26.i2.34

1. Introduction

Existing empirical studies identify two broad groups of factors influencing bank credit growth: internal bank-specific characteristics and macroeconomic conditions. Bank-specific factors commonly examined include deposit growth, capital adequacy, bank size, profitability, liquidity indicators, and asset quality, while macroeconomic variables typically include GDP growth and inflation. Nevertheless, prior research reports mixed and sometimes contradictory findings regarding the direction and magnitude of these effects, reflecting differences in institutional contexts, economic cycles, and methodological approaches. Moreover, many studies focus on either internal or macroeconomic determinants in isolation, limiting the ability to capture the combined effects shaping credit growth dynamics.

Against this background, this study investigates the determinants of credit growth in Vietnamese commercial banks by jointly examining internal bank-specific factors and macroeconomic conditions over the period 2018-2023. Using panel data regression techniques, including Fixed Effects, Random Effects, and Generalized Least Squares (GLS) estimations, the study aims to identify key drivers of credit expansion while addressing common econometric issues associated with panel data. By providing updated empirical evidence from Vietnam, this research contributes to the literature on bank credit growth in emerging markets and offers policy-relevant implications for banking management and monetary authorities seeking to promote sustainable credit expansion while preserving financial stability.

2. Literature review

The determinants of bank credit growth have been extensively examined in the banking and financial economics literature. Credit growth is shaped by both banks' internal financial conditions and broader macroeconomic dynamics, as emphasized in the credit supply and credit cycle frameworks (Bernanke & Gertler, 1989; Kiyotaki & Moore, 1997). Accordingly, existing empirical studies generally classify the drivers of credit growth into two main groups: internal bank-specific factors and macroeconomic conditions.

2.1. Internal bank-specific determinants of credit growth

Internal characteristics of banks are widely recognized as key drivers of lending behavior. Among these, funding capacity and liquidity conditions are consistently found to exert a strong influence on credit growth. Deposit growth and liquidity-related indicators, such as the loan-to-deposit ratio (LDR), reflect a bank's ability to mobilize resources and transform deposits into loans. Empirical evidence from Vietnam and other emerging economies suggests that higher deposit growth enhances lending capacity

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and supports credit expansion (Nguyen et al., 2020a; Nguyen, 2021a; Norawati et al., 2022). Similarly, LDR is often found to be positively associated with credit growth, although excessively high levels may raise liquidity risk and constrain future lending (Chun & Ardaaragchaa, 2024).

Bank size and capital adequacy represent another important group of internal determinants. Larger banks may benefit from economies of scale and broader market access; however, several empirical studies indicate that large institutions tend to adopt more conservative lending strategies due to stricter regulatory oversight and stronger risk management requirements (Nguyen, 2019; Nguyen et al., 2020a). In line with the credit supply framework, higher capital adequacy strengthens banks' balance sheets but may also reduce leverage and limit short-term credit expansion (Bernanke & Gertler, 1989). Empirical findings on the impact of capital ratios on credit growth remain mixed, with evidence of negative or statistically insignificant effects depending on institutional context (Nguyen et al., 2020b; Chun & Ardaaragchaa, 2024).

Profitability indicators, commonly measured by return on assets (ROA) or return on equity (ROE), are also frequently incorporated into credit growth models. More profitable banks are generally expected to expand lending to exploit growth opportunities and enhance returns. Empirical evidence from Vietnamese commercial banks supports a positive association between profitability and credit growth, although the magnitude and significance of this relationship vary across model specifications (Nguyen, 2021b; Nguyen et al., 2020b). These mixed results suggest that profitability interacts with other internal characteristics, such as bank size and capital structure, rather than acting as an independent driver of credit expansion.

Asset quality, particularly the non-performing loan (NPL) ratio, is widely viewed as a key constraint on credit growth. High NPL levels weaken banks' balance sheets, increase provisioning costs, and encourage more restrictive lending policies. This mechanism is consistent with the agency cost and balance sheet channel, whereby deteriorating asset quality limits banks' ability and willingness to supply credit (Bernanke & Gertler, 1989). Empirical studies document a negative relationship between NPLs and credit growth in both developed and emerging economies (Nkusu, 2011; Chun & Ardaaragchaa, 2024), although the effect may be statistically insignificant when NPL ratios remain at manageable levels.

2.2. Macroeconomic determinants of credit growth

In addition to bank-specific factors, macroeconomic conditions play a crucial role in shaping credit growth dynamics. Economic growth, typically proxied by GDP growth, is widely regarded as a key driver of bank lending. According to the credit cycle theory, periods of economic expansion are associated with rising asset values and borrower net worth, which stimulate credit demand and reinforce lending growth (Kiyotaki & Moore, 1997). Empirical evidence from Vietnam and other emerging economies confirms a positive relationship between GDP growth and credit expansion (Nguyen et al., 2020a; Nguyen et al., 2020b).

Inflation represents another important macroeconomic factor influencing credit growth. Its effect on bank lending is theoretically ambiguous; however, in emerging economies, high inflation often increases uncertainty, weakens purchasing power, and raises credit risk. Consequently, banks tend to adopt more cautious lending behavior during inflationary periods. Empirical studies generally report a negative impact of inflation on credit growth, particularly under tighter monetary policy conditions (Nguyen, 2019; Reinhart & Rogoff, 2010).

2.3. Research gap

Although the existing literature provides valuable insights into the determinants of credit growth, several limitations remain. Empirical findings on key variables such as bank size, capital adequacy, and inflation are often inconsistent, reflecting differences in institutional settings and economic conditions. Many studies examine internal bank-specific factors and macroeconomic variables separately, rather than within an integrated analytical framework. Evidence from Vietnam remains fragmented and largely based on earlier data periods, despite significant changes in the banking system and macroeconomic environment in recent years.

To address these gaps, the present study adopts a comprehensive approach by jointly examining internal bank-specific characteristics and macroeconomic conditions in explaining credit growth in Vietnamese commercial banks over the period 2018-2023. By doing so, the study aims to provide updated empirical evidence and contribute to a more coherent understanding of credit growth dynamics in a transitional banking system.

3. Model and Methodology

3.1. Research Model and Hypotheses

Based on established theories on bank lending behavior and empirical evidence from emerging economies, this study examines the determinants of

credit growth in Vietnamese commercial banks by jointly considering internal bank-specific factors and macroeconomic conditions. The empirical model is specified as follows:

$$CGit = \beta 0 + \beta 1DGit + \beta 2SIZEit + \beta 3CAPit + \beta 4ROAit + \beta 5LDRit + \beta 6NPLit + \beta 7GDPit + \beta 8INFit + \varepsilon it$$

Where:

CGit: Credit growth rate of bank i in year t.

DGit: Deposit growth rate of bank i in year t.

CAPit: Equity-to-total-assets ratio of bank i in year t.

ROAit: Return on assets of bank i in year t.

LDRit: Loan-to-deposit ratio of bank i in year t, reflecting the use of mobilized funds for lending.

SIZEit: Bank size of bank i in year t, typically measured by the natural logarithm of total assets.

NPLit: Non-performing loan ratio of bank i in year t.

GDPit: National GDP growth rate in year t.

INFit: National inflation rate in year t.

εit: Random error term.

Deposit Growth (DG): Deposit growth reflects a bank's ability to mobilize stable funding sources, thereby enhancing its lending capacity and supporting credit expansion. From a credit supply perspective, higher deposit growth relaxes funding constraints and enables banks to extend more loans.

H1: Deposit growth has a positive impact on credit growth in Vietnamese commercial banks.

Bank Size (SIZE): Bank size, commonly measured by the natural logarithm of total assets, reflects the scale and scope of banking operations. While larger banks may benefit from economies of scale and broader market access. As a result, bank size may be negatively associated with credit growth in emerging banking systems (Nguyen, 2019; Nguyen et al., 2020a).

H2: Bank size negatively affects credit growth in Vietnamese commercial banks.

Capital Ratio (CAP): The capital-to-assets ratio represents a bank's financial strength and capacity to absorb risks. According to the credit supply and agency cost framework, higher capital adequacy improves balance sheet resilience but may also limit leverage and constrain short-term lending growth (Bernanke & Gertler, 1989).

H3: Capital ratio has a negative impact on credit growth in Vietnamese commercial banks.

Return on Assets (ROA): Return on assets (ROA) reflects a bank's profitability and operational efficiency. More profitable banks are generally expected to expand lending in order to exploit growth opportunities and enhance returns.

H4: ROA positively affects credit growth in Vietnamese commercial banks.

Loan-to-Deposit Ratio (LDR): The loan-to-deposit ratio indicates the extent to which mobilized funds are transformed into loans. A higher LDR reflects more intensive utilization of deposits for lending activities, which is expected to support credit expansion.

H5: LDR has a positive impact on credit growth in Vietnamese commercial banks.

Non-Performing Loans (NPL): The non-performing loan (NPL) ratio is commonly used as an indicator of asset quality and credit risk in banking studies. From a theoretical perspective, higher NPL levels are expected to weaken banks' balance sheets and constrain credit supply through the agency cost and balance sheet channel (Bernanke & Gertler, 1989). However, in the context of this study, the estimated coefficient of NPLs is statistically insignificant in the GLS model and is therefore not discussed further, suggesting that asset quality did not constitute a binding constraint on credit growth during the sample period.

H6: NPLs negatively affect credit growth in Vietnamese commercial banks.

GDP Growth: GDP growth reflects overall economic conditions and credit demand in the economy. According to the credit cycle theory, economic expansion improves borrower net worth and collateral values, thereby stimulating credit demand and reinforcing bank lending growth (Kiyotaki & Moore, 1997).

H7: GDP growth has a positive impact on credit growth in Vietnamese commercial banks.

Inflation: Inflation affects credit growth through multiple channels, including uncertainty, purchasing power, and credit risk. High inflation often raises macroeconomic instability and weakens lending incentives, prompting banks to adopt more cautious credit policies.

H8: Inflation has a negative impact on credit growth in Vietnamese commercial banks.

3.2. Research Methodology

The study employs an unbalanced panel dataset of Vietnamese commercial banks over the period 2018-2023, constructed from banks' financial statements and official macroeconomic statistics. To estimate the model, standard panel data regression techniques are applied. Fixed Effects (FEM) and Random

Effects (REM) models are initially estimated to account for unobserved bank-specific heterogeneity. Model selection tests indicate that the Fixed Effects specification is more appropriate.

To address potential heteroskedasticity and autocorrelation commonly observed in panel data, the Generalized Least Squares (GLS) method is subsequently employed. The GLS estimates are therefore used as the primary basis for interpretation and discussion of the empirical results, as they provide more efficient and robust coefficient estimates.

4. Research results

4.1. Descriptive analysis

Table 1. Descriptive Statistics Results

Variable	Obs	Mean	Std. Dev.	Min	Max
CG	200	0.175	0.102	-0.113	0.667
DG	200	0.147	0.11	-0.105	0.718
SIZE	200	32.956	1.114	30.578	35.372
CAP	200	0.086	0.031	0.041	0.185
ROA	200	0.01	0.007	-0.007	0.032
LDR	200	0.963	0.15	0.554	1.498
NPL	200	0.02	0.025	0.005	0.297
GDP	200	0.057	0.019	0.026	0.081
INF	200	0.03	0.005	0.018	0.035

Source: Computed by the authors using Stata 15

Descriptive analysis was conducted on 200 observations collected from the financial statements of Vietnamese commercial banks. The results indicate that the dependent variable, credit growth (CG), had a mean value of 0.175, ranging from -0.113 to 0.667, reflecting substantial variability across banks. The deposit growth variable (DG) had an average of 0.147, indicating a generally positive but uneven trend.

Control variables such as SIZE (log of total assets), CAP (equity-to-assets ratio), ROA, LDR, and NPL were all within reasonable ranges, reflecting the operational and capital safety characteristics of the banking system. Meanwhile, macroeconomic variables such as GDP and INF exhibited low variation, suggesting a relatively stable economic environment during the study period.

4.2. Correlation analysis

Table 2. Pearson Correlation Results (r)

Variables	1	2	3	4	5	6	7	8	9
(1) CG	1								
(2) DG	0.491	1							
(3) SIZE	0.039	0.081	1						
(4) CAP	-0.107	-0.104	-0.229	1					
(5) ROA	0.185	0.111	0.463	0.429	1				
(6) LDR	0.238	0.016	0.295	0.31	0.608	1			
(7) NPL	-0.074	-0.079	-0.153	-0.028	-0.256	-0.165	1		
(8) GDP	0.064	0.027	-0.082	-0.016	-0.061	-0.042	0.048	1	
(9) INF	-0.076	0.118	-0.026	-0.037	-0.068	-0.071	0.062	0.515	1

Source: Computed by the authors using Stata 15

The Pearson correlation coefficients indicate a positive relationship between credit growth (CG) and deposit growth (DG) (r = 0.491), return on assets (ROA) (r = 0.185), and loan-to-deposit ratio (LDR) (r = 0.238), which is consistent with the hypothesis that these factors promote credit expansion. Conversely, CG exhibits a negative correlation with the capital ratio (CAP) (r = -0.107) and non-performing loans (NPL) (r = -0.074), reflecting a more cautious lending approach in banks facing higher risks or possessing strong capital foundations. No correlation coefficient between independent variables exceeds 0.8, indicating that multicollinearity is not a serious concern in the model.

4.3. Multicollinearity Test

Table 3. Results of the Multicollinearity Test

Variables	VIF	1/VIF
ROA	2.701	0.37
SIZE	1.808	0.553
CAP	1.798	0.556
LDR	1.606	0.622
INF	1.394	0.717
GDP	1.374	0.728
NPL	1.085	0.922
DG	1.071	0.934
Mean VIF	1.605	.

Source: Computed by the authors using Stata 15

The VIF results indicate that all variables have VIF values less than 10, with an average of 1.605. This confirms the absence of significant multicollinearity and ensures the appropriateness of conducting linear regression analysis.Lựa chọn mô hình

4.4. Model Selection

In this study, selecting an appropriate regression model is a crucial step to ensure the accuracy of the estimated results. To determine the most suitable model, two key diagnostic tests are performed: the F-test (comparing Pooled OLS and Fixed Effects Model (FEM)) and the Hausman test (comparing FEM and Random Effects Model (REM)).

Table 4. Model Selection Test Results

Diagnostic Test	Test Statistic	Result
F-test (Pooled OLS và FEM)	Prob > F = 0.0000 < 0.05	FEM
Hausman test (FEM và REM)	Prob > chi2 = 0.0000 < 0.05	FEM

Source: Computed by the authors using Stata 15

Both the F-test and Hausman test yield statistically significant results ($p < 0.05$), leading to the selection of the Fixed Effects Model (FEM) as the most appropriate for analysis.

4.5. Testing for Heteroskedasticity and Autocorrelation

Table 5. Results of Testing for Heteroskedasticity and Autocorrelation

Diagnostic Test	Test Statistic	Result
Heteroskedasticity (Wald)	Prob>chi2 = 0.0000 < 0.05	Presence of heteroskedasticity
Autocorrelation (Wooldrige)	Prob>F= 0.0012 < 0.05	Presence of autocorrelation

Source: Computed by the authors using Stata 15

The results of the Wald and Wooldridge tests respectively indicate the presence of heteroscedasticity and autocorrelation. Therefore, to ensure the efficiency and reliability of the estimates, the GLS method is additionally employed.

4.6. Regression results

Table 6. Summary of the FEM, REM, and GLS regression results

	(FEM)	(REM)	(GLS)
VARIABLES	CG	CG	CG
DG	0.429***	0.435***	0.443***
	(0.0552)	(0.0548)	(0.0421)
SIZE	-0.0885***	-0.0203***	-0.0210***
	(0.0224)	(0.00741)	(0.00499)
CAP	-1.027***	-0.909***	-1.035***
	(0.377)	(0.260)	(0.220)
ROA	-3.910**	2.294*	2.154**
	(1.820)	(1.351)	(0.913)
LDR	0.514***	0.189***	0.173***
	(0.0780)	(0.0513)	(0.0370)
NPL	0.0525	0.0697	-0.0371
	(0.247)	(0.246)	(0.229)
GDP	0.374	0.812**	0.590***
	(0.331)	(0.356)	(0.212)
INF	-3.267***	-3.770***	-2.742***
	(1.145)	(1.283)	(0.746)
Constant	2.737***	0.717***	0.752***
	(0.703)	(0.252)	(0.178)
Observations	200	200	200
R-squared	0.389		
Number of NAME	25	25	25

*Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

Source: Computed by the authors using Stata 15

The regression results from FEM, REM, and GLS show that:

DG has a positive and highly significant effect ($p < 0.01$), confirming the role of deposit growth in credit expansion.

SIZE and CAP have negative effects and are significant at the 1% level, reflecting the cautious stance of large banks or those with strong capital bases.

ROA shows inconsistent signs across models but is statistically significant in REM and GLS, partially supporting the hypothesis about the role of profitability in credit expansion.

LDR has a positive and significant effect in all models ($p < 0.01$), indicating a positive relationship between capital utilization capacity and credit growth.

NPL is statistically insignificant, hence there is insufficient basis to conclude its influence on credit growth.

GDP has a positive and significant effect in REM and GLS, while INF has a negative and significant effect across all three models, showing that credit is influenced by macroeconomic conditions.

5. Discussion of the research findings and Recommendations

5.1. Discussion of the research findings

The empirical results from the FEM, REM, and GLS estimations provide important insights into the determinants of credit growth in Vietnamese commercial banks and are largely consistent with the existing theoretical and empirical literature.

First, deposit growth (DG) exhibits a positive and highly significant impact on credit growth across all model specifications. This finding is strongly aligned with prior empirical evidence from Vietnam and other emerging economies, which emphasizes the central role of funding mobilization in supporting lending activities (Nguyen et al., 2020a; Nguyen, 2021a; Norawati et al., 2022). From a credit supply perspective, higher deposit growth enhances banks' lending capacity by relaxing funding constraints, thereby facilitating credit expansion.

Second, bank size (SIZE) is found to have a negative and statistically significant effect on credit growth. This result is consistent with empirical studies on Vietnamese commercial banks, which suggest that larger institutions tend to adopt more conservative lending strategies due to stricter regulatory oversight and stronger risk management frameworks (Nguyen, 2019; Nguyen et al., 2020a). This behavior is also consistent with the agency cost and balance sheet framework proposed by Bernanke and Gertler (1989), whereby banks with stronger balance sheets may prioritize asset quality over aggressive credit expansion.

Third, the capital adequacy ratio (CAP) shows a negative and highly significant relationship with credit growth. While higher capital levels enhance banks' resilience to shocks, they may simultaneously constrain lending through lower leverage. This finding supports the credit supply argument that well-capitalized banks may pursue more cautious growth strategies, particularly under Basel II and Basel III regulatory requirements (Bernanke & Gertler, 1989; Nguyen et al., 2020b). Similar empirical patterns are also reported by Chun and Ardaaragchaa (2024), although the magnitude of the effect varies across institutional settings.

Fourth, the impact of profitability, measured by return on assets (ROA), exhibits heterogeneous effects across estimation methods. While the FEM results suggest a negative association between profitability and credit growth, the REM and GLS estimates indicate a positive and statistically significant relationship. This pattern is consistent with prior empirical evidence on Vietnamese commercial banks, which shows that the effect of profitability on lending behavior is sensitive

to model specification and unobserved bank-specific characteristics (Nguyen, 2021b; Nguyen et al., 2020b). Importantly, these findings imply that profitability does not exert a uniform influence on credit expansion but instead operates conditionally, interacting with other internal factors such as capital structure, risk appetite, and strategic orientation, rather than acting as an independent driver of credit growth.

Fifth, the loan-to-deposit ratio (LDR) demonstrates a positive and statistically significant effect on credit growth across all models. This finding confirms that more intensive utilization of mobilized funds supports credit expansion, as documented in previous studies on bank lending behavior (Nguyen et al., 2020a; Chun & Ardaaragchaa, 2024). Nevertheless, excessively high LDR levels may increase liquidity risk, highlighting the need for prudent liquidity management.

Seventh, GDP growth exhibits a positive and statistically significant effect on credit growth in the REM and GLS models. This result is consistent with the credit cycle theory of Kiyotaki and Moore (1997), which posits that economic expansion strengthens borrower balance sheets and stimulates credit demand. Empirical evidence from Vietnam similarly confirms the procyclical nature of bank lending (Nguyen et al., 2020a; Nguyen et al., 2020b).

Finally, inflation (INF) shows a negative and statistically significant relationship with credit growth across all models. This finding aligns with macrofinancial instability arguments, which suggest that higher inflation increases uncertainty and credit risk, thereby constraining bank lending (Reinhart & Rogoff, 2010). Empirical studies on Vietnamese banks also document a negative impact of inflation on credit expansion, particularly during periods of tighter monetary conditions (Nguyen, 2019).

5.2. Recommendations

First, given the positive effects of deposit growth and the loan-to-deposit ratio on credit expansion, commercial banks should strengthen capital mobilization while maintaining prudent liquidity management. Diversifying deposit products can enhance funding capacity, but the loan-to-deposit ratio should be kept within safe thresholds to avoid liquidity pressures.

Second, in light of the negative relationship between bank size, capital adequacy, and credit growth, credit strategies should be aligned with banks' scale and capital structure. Large and well-capitalized banks should continue to prioritize asset quality and risk control, while adopting more selective and targeted lending to improve credit efficiency without undermining financial safety.

Third, considering the positive association between profitability and credit growth, enhancing operational efficiency remains essential for sustainable lending expansion. Improving cost management, streamlining lending processes, and strengthening risk-adjusted performance can support banks' capacity to expand credit.

Fourth, given the significant influence of GDP growth and inflation on credit dynamics, banks should closely monitor macroeconomic conditions and regulatory signals. Credit policies should remain flexible across economic cycles, expanding cautiously during periods of strong growth and tightening under inflationary pressures to preserve credit quality and financial stability.

Conclusion

This study empirically confirmed key internal and macroeconomic determinants of credit growth in Vietnamese commercial banks. It highlights the crucial roles of funding capacity, risk management, and the broader economic environment in shaping lending dynamics. The research contributes to the academic understanding of credit expansion in transitional economies and provides practical insights for banking strategy and policymaking.

However, the study's scope is constrained by its specific data period and selected variables. Future research could extend the analysis to longer timeframes, incorporate additional micro- and macroeconomic factors, and explore non-linear relationships or sector-specific effects to offer more granular insights into Vietnam's evolving banking landscape.

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