How funding liquidity influences bank lending: Empirical evidence from Vietnam

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Abstract

This paper investigates the impact of funding liquidity on bank lending at 26 Vietnamese commercial banks in the period 2003–2023. Our paper uses panel data regression methods combined with endogeneity tests and robustness tests to produce consistent research results. The econometric methods used in the paper include multiple fixed-effects regression, the generalized method of moments (GMM), Prais-Winsten regression, Newey-West regression, and two-way clustering regression. Accordingly, the empirical results indicate that funding liquidity has a negative impact on Vietnamese commercial banks' loan growth. In particular, the results from the quantile regression model show that the negative impact of funding liquidity on bank lending becomes stronger for banks with higher loan growth. Furthermore, factors such as bank size, capitalization, and the cost-to-income ratio also have a negative impact on bank lending, whereas income diversification enhances banks' capacity to provide loans. Based on empirical research, this article also proposes some solutions to help Vietnamese commercial banks lend more safely and effectively, including: (i) improving funding liquidity management strategies to minimize negative impacts on lending activities; (ii) encouraging banks to diversify their income rather than relying solely on credit activities; (iii) enhancing banks' ability to manage costs and control their size. Investors, managers, and policymakers can all benefit from our conclusions and ramifications.

1. Introduction

Banks play an essential role in the economy, as they act as intermediaries between depositors and borrowers, ensuring the efficient circulation and allocation of financial resources (Molyneux, Casu, & Girardone, 2006). The 2008 global financial crisis emphasized that a robust financial system must not only mobilize capital efficiently but also sustain adequate liquidity to ensure safety against economic fluctuations. Banks lacking sufficient liquidity face a higher risk of insolvency, potentially resulting in serious consequences for both a nation's financial system and the global economy (Hui, Genberg, & Chung, 2011). Hugonnier and Morellec (2017) also concluded that inefficient regulation, high levels of debt, and insufficient liquidity buffers were the main causes of the global financial crisis, followed by the collapse of many large banks around the world. In addition, when the capital market dries up, banks face funding liquidity problems (Tran, 2020) leading to a reduction in banks' lending capacity, thereby affecting the real economy (De Haan & van den End, 2013).

The Vietnamese banking system is currently experiencing rapid development, characterized by high growth and expansion (Le, Duong, & Le, 2020). Nevertheless, this expansion also presents considerable obstacles in the

realm of risk management, particularly liquidity risk. However, according to Dahir, Mahat, Razak, and Bany-Ariffin (2019) maintaining high liquidity levels leaves banks with fewer available funds, thereby reducing lending activity. Meanwhile, Vietnam, a country with a bank-based economy, still relies heavily on bank credit as its primary source of capital due to the lack of a diverse and vibrant capital market (Tran, 2022). Alternative capital mobilization channels, including the stock market, bonds, and other financial instruments, remain constrained in both scale and liquidity, necessitating that most enterprises and economic entities depend on bank loans to sustain operations and enhance production. Therefore, prioritizing the maintenance and expansion of commercial bank lending is crucial for the economy's health. As a result, banks' obligation to maintain an adequate level of liquidity for financial security while facilitating loan provision for economic advancement has emerged as a significant concern. The necessity to reconcile these two objectives underlines the urgency of the research. This becomes even more urgent in the current context, with uncertainties arising from macroeconomic factors such as pandemics, wars, or political conflicts also requiring managers to be more cautious in managing liquidity to guard against potential shocks. The study investigates the impact of funding liquidity on lending activities and contributes to making recommendations to harmonize the economy's financial safety requirements and credit needs. Furthermore, the specific impact of capital liquidity and bank credit has not yet reached consensus among studies, and there is still a lack of research on the case of Vietnamese commercial banks.

Using a panel data regression model and an unbalanced annual panel dataset of 26 Vietnamese commercial banks from 2003 to 2023, this paper investigates the impact of funding liquidity on the lending of Vietnamese commercial banks. Apart from the introduction, we organize the rest of the article as follows: Section 2 provides a literature review regarding the influence of funding liquidity on bank lending; Section 3 outlines the research methodology; and Section 4 encapsulates the principal findings and discussions. Section 5 presents the conclusions and managerial implications.

2. Literature Review

2.1. Funding Liquidity

Both the liabilities and assets sides of the balance sheet frequently relate to bank liquidity, with funding liquidity being one of the primary concerns on the liability side (Ananou, Chronopoulos, Tarazi, & Wilson, 2021). Drehmann and Nikolaou (2013) define bank funding liquidity as the ability of a bank to meet its payment obligations in a timely manner. Meanwhile, funding liquidity risk is the inability of a bank to make payments when they fall due (International Monetary Fund, 2008). In this scenario, the bank must swiftly sell assets to generate cash, leading to a reduction in the bank's capital. Furthermore, Vento and La Ganga (2009) argue that liquidity refers to a bank's ability to maintain a continuous balance between cash inflows and outflows over time, whereas liquidity risk refers to the risk that a bank will have difficulty maintaining a stable and sufficient cash flow to meet its financial obligations on time or will have to accept high costs to obtain liquidity. Thus, liquidity is the ability of a bank to meet its payment obligations in a timely manner. The ability to maintain a balance between cash inflows and outflows is a crucial factor in managing a bank's liquidity.

Many scholars have proposed measures to measure bank funding liquidity and risk. Al-Khouri (2012) calculates the Liquidity Transformation Gap (LTGAP), a measure of funding liquidity, based on the maturity difference between short-term deposits and long-term loans. Drehmann and Nikolaou (2013) determine funding liquidity risk by observing banks' auction behaviour, specifically the volume of bids at prices higher than the expected margin rate. Meanwhile, Khan, Scheule, and Wu (2017) and Tran (2020) use the following formula to measure the funding liquidity of banks:

$$\text{Funding liquidity} = \frac{Total\ deposits}{Total\ assets}$$

According to Acharya and Naqvi (2012) the amount of deposits is the main factor that determines how much reserve a bank has. The higher the amount of bank reserves, the greater the ability to fulfill payment obligations, and thus the higher the bank's liquidity (Tran, 2020). In other words, the higher the ratio of total deposits to total assets, the greater the liquidity in the bank.

2.2. Bank Lending

Bank credit is an important element of financial development, contributing to economic growth (Miyajima, 2020). According to Aripin, Wibowo, and Ariyanti (2024) bank credit is a financial instrument provided by banking institutions to customers or other parties in the form of lending money or providing credit under certain conditions, and the borrowed capital must be repaid with interest within an agreed-upon period of time. Agreeing with this view, Romānova (2012) introduced the concept of bank lending as the activity of providing capital from banks to businesses or individuals in the form of loans. This activity plays an important role in promoting economic growth, supporting technological innovation, and influencing the economic cycle (Minsky, 1999). Werner (2009) classified loans based on their nature and purpose, proposing three main types of loans: production loans, consumption loans, and speculative loans. Accordingly, only production loans (e.g., loans for enterprises in the real economic sector) promote economic growth because they help increase added value. Consumer loans, such as those for personal consumption, contribute to economic growth, but they do so through inflation rather than adding value. Speculative loans, on the other hand, lead to asset inflation and do not stimulate the country's economic growth (Werner, 2009). Many scholars have emphasized the importance of bank lending, especially during times of crisis. Reinhart and Rogoff (2011) argued that the expansion of bank lending often precedes crises. Among them, Jonung, Kiander, and Vartia (2008) considered the experience of the

Nordic countries in the early 1990s and pointed out that bank lending accompanied by simultaneous crises in the real estate market was considered one of the main causes of the crises. As a result, balanced lending is the driving force behind economic growth, whereas excessive lending expansion can lead to economic overload as well as instability (Rousseau & Wachtel, 2011). Therefore, banks lend money to individuals or businesses, requiring them to repay the loans with interest within a predetermined timeframe. In addition, bank lending plays an important role in promoting economic growth and supporting technological innovation.

2.3. Impact of Funding Liquidity on Bank Lending

The impact of funding liquidity on bank lending activities has received much attention from scholars; however, there is no consensus on the research results.

On the one hand, Acharya and Naqvi (2012) argued that funding liquidity has a positive impact on bank lending. Accordingly, when bank funding liquidity is high, bank managers tend to take more risks, which makes it easier for them to provide loans, even at higher risk levels, leading to growth in credit. Similarly, Khan et al. (2017) contended that a high level of funding liquidity in banks signifies a higher level of deposits within financial institutions, thereby providing a sense of protection from deposit insurance and preventing immediate capital shortages. As a result, banks lend more actively at low interest rates, which can increase risky assets and boost liquidity creation. Aripin et al. (2024) also found empirical evidence of a positive relationship between liquidity and bank lending in Indonesia. Accordingly, high liquidity levels promote bank credit growth in Indonesia. Specifically, when banks have sufficient liquidity to finance, they are able to provide more loans to individuals, businesses, and the government, which promotes investment and consumption activities and supports economic growth. Furthermore, monetary policy, banking regulations, and financial market development all play an important role in creating a favourable environment for liquidity and thereby promoting bank lending growth. The positive relationship between funding liquidity and bank lending is also confirmed by Nguyen and Nguyen (2022) who confirm the positive relationship between funding liquidity and bank lending using a dataset from Vietnamese banks. Specifically, in Vietnam, funding liquidity helps banks ensure sufficient capital to meet the borrowing needs of the economy. The important role of banks in providing financing to support economic growth encourages them to maintain credit expansion strategies instead of hoarding capital, despite their relatively low capital levels.

Dahir et al. (2019) present a counterargument grounded in the regulatory liquidity perspective, which posits that banks must sustain an adequate liquidity level to mitigate potential liquidity issues. When banks hold more liquidity, they have less money to lend, which leads to a reduction in lending. This means that the higher the liquidity, the lower the lending activity in banks. From there, Dahir et al. (2019) provided empirical evidence of an inverse relationship between liquidity and bank lending using a dataset of banks in BRICS countries (Brazil, Russia, India, China, and South Africa). In addition, King (2013) has argued that if banks have to pay higher deposit interest rates to improve liquidity, they will incur increased costs. To compensate for these costs, banks may increase lending rates, which may reduce the demand for borrowing as borrowing costs become more expensive for customers. Hence, efforts to attract more deposits may result in lower borrowing demand. Tran (2020) uses data from the United States and concludes that funding liquidity and bank lending have a negative correlation. As a result, banks that rely more on stable funding sources, such as deposits, tend to reduce loan growth, which is more pronounced for large banks and in the pre-crisis period. This may be because banks become more cautious and accumulate more liquid assets to protect themselves from potential liquidity shocks rather than expanding new lending. Furthermore, during a crisis, depositors become more cautious, and bank supervision increases, which may lead banks to focus on maintaining liquidity to reduce the risk of bank runs rather than on credit growth (Diamond & Rajan, 2001). Because of the pressure to maintain liquidity, banks are less willing to lend. Similarly, Cornett, McNutt, Strahan, and Tehranian (2011) argue that during a financial crisis, banks holding more illiquid assets increase their liquid assets and reduce lending. This occurs because banks need to ensure liquidity to cope with volatile markets and high liquidity risk. Banks experience a reduction in their ability to extend new credit due to liquidity pressures and the requirement to hold more liquid assets. In India, Shaikh, Tunio, and Dagar (2023) also presented regression model results showing an inverse relationship between funding liquidity and bank lending. According to this, when banks maintain high levels of liquidity to manage risks, they have less capital available for lending. Furthermore, increasing deposit interest rates to attract more liquidity raises costs, leading banks to raise lending rates, which reduces borrowing demand. Furthermore, the Basel III regulations, which focus on maintaining liquidity ratios, further limit banks' lending capacity.

3. Methodology
3.1. Data

Our paper uses an unbalanced annual panel dataset of 26 Vietnamese commercial banks in the period from 2003 to 2023. The dataset is collected from the Widata database. In addition, Stata 17 software is used to conduct a quantitative analysis of the impact of funding liquidity on bank lending in Vietnam. To avoid biased estimation results due to outliers, the data is winsorized at the 1st and 99th percentile levels.

3.2. Model Specification

To conduct a quantitative analysis of the impact of funding liquidity on bank lending, referring to the research of Tran (2020); Widarjono, Wijayanti, and Suharto (2022) and Nguyen, Pham, Phan, Alam, and Tran (2024) this paper proposes the following equation:

$$LG_{it} = \beta_0 + \beta_1 FL_{it} + \beta_2 Size_{it} + \beta_3 Capital_{it} + \beta_4 CIR_{it} + \beta_5 IDIV_{it} + \delta_t + \theta_t + \varepsilon_{it}$$

Where LG (loan growth) illustrates the loan growth of the current year in comparison to the previous year. The alternative dependent variable is NLG (net loan growth), which presents the net loan growth of the current year compared to the previous year (net loan is calculated as the difference between total loan and loan loss provision). According to Tran (2020) the ratio of deposits to total assets determines FL (funding liquidity), which in turn provides bank funding liquidity. The ratio of equity to total assets measures capital. The cost-to-income ratio, or CIR, indicates how well the bank is able to control expenses. Pham and Nguyen (2023) proposed the following formula to represent the level of income diversification of Vietnamese commercial banks:

$$IDIV = 1 - \left[\left(\frac{II}{Income}\right)^2 + \left(\frac{IS}{Income}\right)^2 + \left(\frac{IGF}{Income}\right)^2 + \left(\frac{ITS}{Income}\right)^2 + \left(\frac{IIS}{Income}\right)^2 + \left(\frac{IO}{Income}\right)^2 + \left(\frac{IC}{Income}\right)^2\right]$$

in which: Total income of Vietnamese commercial banks (Income) is made up of seven components, including: (1) II is interest income; (ii) IS is income from service activities; (iii) IGF is income from gold and foreign exchange trading; (iv) ITS is income from trading in trading securities; (v) IIS is income from trading in investment securities; (vi) IO is income from other activities; and (vii) IC is income from capital contributions and share purchases. The higher the IDIV, the better the bank's ability to diversify income. β_0 is the intercept, β_i (i = 1, 2, 3, 4, 5) are the coefficients of the respective independent variables to be estimated, and ε is the error term. We add bank (δi) and year fixed effects (θt) to account for time-variant differences among years and time-invariant differences among banks. i and t denote the ith bank in year t.

This paper uses a multiple fixed effects model with bank and time fixed effects to investigate the impact of funding liquidity on bank lending in Vietnam. We include these fixed effects because unobservable but time-invariant bank characteristics, such as bank culture and management, may explain bank lending. By controlling for these fixed effects, we can accurately estimate the effect of funding liquidity on banks' lending by mitigating the unobservable and time-invariant bank features. In addition, the paper uses the two-step GMM method to handle endogeneity. This method is also advantageous when used for short-term estimations, such as the data used in the study (Blundell & Bond, 1998). Several econometric tests are also used in the paper. These include the Prais-Winsten regression to look at the possibility of serial correlation, the Newey-West regression to get estimates that are consistent with autocorrelation and heteroskedasticity, and two-way clustering to account for both cross-sectional correlation and serial correlation (Petersen, 2008). Finally, following the study of Nguyen, Tran, and Nguyen (2024) this paper uses the quantile regression method to assess the impact of funding liquidity on Vietnamese commercial banks' lending according to quantiles of loan growth.

4. Does Funding Liquidity Affect Bank Lending?

4.1. Descriptive Statistics

Table 1 presents the descriptive statistical results of the study. Accordingly, the annual loan growth of Vietnamese commercial banks (LG) fluctuates between -0.313 and 11.317, with an average value of 0.321 and a standard deviation of 0.777. Meanwhile, the average total deposit-to-total-asset ratio (FL) is 0.627 with a standard deviation of 0.129. The minimum and maximum values of FL are 0.185 and 0.894, respectively.

Table 1. Descriptive statistics.

Variable	Observations	Mean	Standard deviation	Min.	Max.
LG	440	0.321	0.777	-0.313	11.317
NLG	440	0.320	0.775	-0.317	11.327
FL	466	0.627	0.129	0.185	0.894
Size	466	32.059	1.498	26.655	35.372
Capital	466	0.103	0.057	0.038	0.463
CIR	461	0.671	4.000	0.162	86.302
IDIV	343	0.286	0.134	0.010	0.646

The correlation coefficient is a statistical index used to assess the level of linear relationship between two independent variables. Based on the results in Table 2, the correlation coefficients of the variables are all lower than 80%, so the independent variables are all lowly correlated and suitable for regression (Hair, Black, Babin, Anderson, & Tatham, 2006; Judge, Griffiths, Hill, Lütkepohl, & Lee, 1991).

Table 2. Correlation matrix.

Variables	FL	Size	Capital	CIR	IDIV
FL	1.000				
Size	0.252	1.000			
Capital	−0.331	−0.562	1.000		
CIR	−0.174	−0.081	−0.034	1.000	
IDIV	−0.103	0.342	0.040	0.055	1.000

4.2. Empirical Results

Table 3 shows our main results. In Model 1, we start by including only FL and fixed effects in the regression to assess the unique impact of funding liquidity on loan growth. According to the results shown in Model 1, funding liquidity has a negative impact on the lending growth of Vietnamese commercial banks and is statistically significant at the 1% level, implying that banks would reduce their lending in case a significant amount of their funding derives from depositors. Our result is similar to the findings of Cornett et al. (2011); Tran (2020) and Shaikh et al. (2023). Accordingly, banks need to maintain a high level of funding liquidity to manage potential liquidity risks (Dahir et al., 2019). However, maintaining a high level of liquidity will reduce the source of funding for loans, thereby limiting the lending ability. In addition, banks that rely heavily on funding from deposits often become more cautious, focusing on accumulating liquid assets to protect against potential liquidity shocks instead of expanding their lending portfolios (Tran, 2020). Moreover, in challenging times, banks must prioritize maintaining liquidity and limiting credit expansion to reduce the risk of bank runs, as depositors become more cautious and banking oversight intensifies (Diamond & Rajan, 2001).

To test the results of Model 1, we added control variables to the regression model in Model 2. The results show that FL still has a negative impact on LG and is statistically significant at the 10% level. For the control variables, the results show that there is a negative correlation between bank size and bank lending, which is statistically significant at the 1% level. Due to their important role in the economy, large banks are often subject to stricter supervision, leading to higher requirements for maintaining liquidity to ensure the stability and safety of the financial system. However, maintaining high liquidity also means reducing the amount of money available for credit, thereby reducing the bank's lending capacity (Bonner, Lelyveld, & Zymek, 2015). Furthermore, according to Stein (2002) small banks, thanks to their simple organizational structure, have an advantage in generating soft information, which helps them excel in providing relationship lending. Secondly, a higher equity-to-total-assets ratio is associated with a statistically significant reduction in bank lending activities at the 5% level. This result is consistent with the findings of Vale (2011) in a study of banks in Norway. Accordingly, equity has a significantly higher cost compared to debt, as it reduces the tax shield on debt, thereby increasing the bank's Weighted Average Cost of Capital (WACC) and decreasing retained earnings (Modigliani & Miller, 1958). As a result, the amount of capital available for lending decreases, limiting bank lending activity. In addition, the cost-to-income ratio has a negative impact on bank lending, which is statistically significant at the 1% level. As a result, a higher CIR implies that the bank is operating inefficiently and has difficulty controlling costs or increasing income, leading to reduced profitability and weakening lending capacity. Meanwhile, the research results show that there is a positive correlation between income diversification and bank lending, which is statistically significant at the 10% level. When banks diversify their income sources, they reduce their dependence on traditional sources of income, such as interest income, and instead create many other income streams from service fees, investments, or non-credit activities. Consequently, banks have a more stable source of income, reduce risks, and increase their resilience to economic fluctuations (Kinini, Ocharo, & Kariuki, 2023). With a solid financial base, banks can confidently expand lending activities, as they have more diverse resources to offset the risks from loans, thereby promoting more lending.

Table 3. Empirical results.

Variables	Baseline (1)	Additional variables (2)	GMM (3)	Prais-Winsten (4)	Newey-West (5)
L.LG			−0.227*** (0.032)		
FL	−0.657*** (0.144)	−0.289** (0.120)	−0.804*** (0.215)	−0.165* (0.150)	−0.289** (0.127)
Size		−0.096*** (0.024)	−0.157*** (0.031)	−0.106*** (0.035)	−0.096*** (0.029)
Capital		−1.594** (0.702)	−0.957** (0.479)	−1.599** (0.683)	−1.594*** (0.598)
CIR		−0.453*** (0.149)	−0.879*** (0.145)	−0.499*** (0.164)	−0.453*** (0.147)
IDIV		0.272* (0.142)	0.205* (0.108)	0.347** (0.176)	0.272* (0.154)
Constant	0.693*** (0.098)	3.819*** (0.856)	6.387*** (1.018)	4.073*** (1.205)	3.819*** (1.027)

Note: Robust standard errors are in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively. All financial variables are winsorized at 1% level on the top and bottom of the distribution.

Endogeneity is a common problem in panel data regression and will distort the model estimates (Pham & Nguyen, 2023; Schultz, Tan, & Walsh, 2010). Therefore, we employ the Generalized Method of Moments (GMM) model (Model 3) to address the endogeneity issue. The results in Model 3 firmly consolidate the main research results of the paper. Additionally, the paper employs the Prais-Winsten regression method to mitigate the autocorrelation phenomenon (Model 4), the Newey-West regression method to generate consistent estimates during autocorrelation, and the potential for heteroscedasticity (Model 5). The results of all three models are similar to those of the baseline model, confirming the existence of an inverse relationship between funding liquidity and loan growth for Vietnamese commercial banks. Hence, the research results have high reliability and consistency among different econometric methods.

4.3. Robustness Tests

To solidify the research results, this paper uses an alternative dependent variable, net loan growth (NLG), to represent bank lending. Table 4 demonstrates that while funding liquidity, bank size, capitalization, and cost-to-income ratio all have negative effects on bank lending, income diversification has a positive effect. These results further reinforce our main research findings, which indicate that banks will decrease lending activities as funding liquidity increases.

Table 4. Empirical results with alternative dependent variable.

Variables	LG	NLG
FL	–0.289** (0.120)	–0.287** (0.119)
Size	–0.096*** (0.024)	–0.095*** (0.024)
Capital	–1.594** (0.702)	–1.592** (0.697)
CIR	–0.453*** (0.149)	–0.450*** (0.148)
IDIV	0.272* (0.142)	0.272* (0.141)
Constant	3.819*** (0.856)	3.805*** (0.851)

Note: Robust standard errors are in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% level, respectively. All financial variables are winsorized at 1% level on top and bottom of the distribution.

4.4. Quantile Regression

Following Nguyen et al. (2024) we use quantile regression to examine whether the correlation between funding liquidity and bank lending varies across the lending quantiles of q = {0.10, 0.30, 0.50, 0.70, 0.90}. In the previous sections, we used the conventional inference method (i.e., ordinary least squares) by assuming that the impact of funding liquidity on bank lending is homogeneous at the average behaviour of the sample. Nevertheless, when heterogeneity is suspected within a sample, employing standard OLS may not consistently yield robust empirical results. Therefore, quantile regression allows us to assess the impact of funding liquidity on bank lending at each quantile of the dependent variable, thereby providing a more detailed view of this relationship.

Table 5 demonstrates that the impact of funding liquidity on bank lending is uniformly negative and increases significantly in magnitude as quantiles increase. This result suggests that funding liquidity has a more negative impact on banks with a higher loan growth rate. Additionally, banks with low credit growth minimize the negative impact of bank size, capitalization, and cost-to-income ratio. Conversely, banks with higher lending levels will be able to maximize the positive impact of income diversification. Basically, the quantile regression analysis results show that the baseline results were correct. They also show that the negative effects of funding liquidity seem to get worse as bank lending increases.

Table 5. Quantile regression results.

	Q10th	Q30th	Q50th	Q70th	Q90th
FL	–0.095	–0.169	–0.238*	–0.353**	–0.584***
SIZE	0.007	–0.032**	–0.069***	–0.129***	–0.252***
Capital	–0.640**	–1.002***	–1.345***	–1.905**	–3.043**
CIR	–0.194*	–0.292***	–0.385***	–0.537***	–0.846***
IDIV	–0.011	0.097	0.198	0.364*	0.701*

Note: Robust standard errors are in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% level, respectively. All financial variables are winsorized at 1% level on top and bottom of the distribution.

5. Conclusion, Recommendations, and Limitations

Based on an unbalanced annual panel dataset of 26 Vietnamese commercial banks from 2003 to 2023, and using appropriate quantitative analysis methods, this paper reveals a negative impact of funding liquidity on the lending of Vietnamese commercial banks, particularly for those with higher loan growth. Additionally, factors

such as bank size, capitalization, and cost-to-income ratio also have a negative impact on bank lending. In contrast, income diversification helps banks improve their ability to provide loans. These findings enrich the literature on funding liquidity and bank lending, as well as have useful implications for policymakers.

The study's findings have several policy implications. First, banks need to improve their funding liquidity management strategies to minimize negative impacts on lending activities. Maintaining a reasonable level of liquidity without reducing the ability to provide credit is essential. Accordingly, banks should apply effective liquidity management methods to balance between maintaining adequate liquidity and lending capacity to simultaneously meet the two goals of financial safety and operational efficiency. Second, there should be policies that encourage banks to expand income sources other than loans, such as service fees or investment activities. Income diversification not only improves the ability to provide loans but also reduces the dependence on funding from deposits, thereby improving banks' financial stability. Thirdly, banks must review and adjust their expansion strategies, manage the equity-to-total-assets ratio, and ensure that expansion does not reduce lending efficiency while optimizing the equity ratio to support credit operations. In addition, banks should focus on reducing costs for total income by optimizing operating processes in order to enhance lending capacity and competitiveness. Last but not least, regulators need to adjust policies and regulations to ensure that banks have sufficient resources to maintain lending activities without affecting liquidity or creating financial risks. These recommendations aim to improve the operational efficiency of commercial banks and support the sustainable development of the financial system.

Despite the important contributions, our paper still has the following limitations: Firstly, we have only assessed the impact of banks' characteristics (including funding liquidity, bank size, capitalization, cost management, and income diversification) on bank lending. The model does not include macroeconomic variables like economic growth, inflation, or the impact of crises like the 2008 financial crisis and the COVID-19 pandemic. Secondly, our study only gathered data from 26 out of the 35 Vietnamese commercial banks, as some are in the process of restructuring and do not disclose this information in their financial reports. Therefore, in future studies, we will add more macroeconomic variables and try to update as much data as possible from Vietnamese commercial banks to analyse bank lending in a more complete manner.

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