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THE IMPACT OF LIQUIDITY CREATION ON THE STABILITY AND PROFITABILITY OF BANKS: A CASE STUDY OF VIETNAM

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ABSTRACT

Liquidity creation is a core and essential function of banks that affects their profitability and stability. This study measures the liquidity creation of Vietnamese banks during the period 2014–2023 using the comprehensive measurement approach developed by Berger and Bouwman (2009). Furthermore, the results indicate that banks that create more liquidity tend to be less stable and less profitable. The study also finds that changes in bank capital play a moderating role, weakening the impact of liquidity creation on bank stability. Based on the findings, the study emphasizes the importance of aligning bank liquidity creation with regulatory standards to enhance financial stability. In particular, banks should comply with the Basel III framework, especially the Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR), which are designed to limit excessive liquidity creation and reduce systemic risk. These standards require banks to maintain a sustainable structure of assets and liabilities and hold sufficient high-quality liquid assets. Given that Basel III regulations are more comprehensive and complex than previous frameworks, the successful implementation in Vietnam will require not only the commitment and capacity of individual banks, but also clear and specific guidance from the State Bank of Vietnam to ensure consistency and effectiveness in practice.

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1. Introduction

A stable and efficient banking system is essential to the functioning of businesses, contributing significantly to the development and growth of the economy. One of the main functions that is important for the stability and profitability of banks is liquidity creation. Banks' liquidity creation helps to convert highly liquid liabilities into illiquid assets on the balance sheet (Bryant, 1980; Diamond & Dybvig, 1983). On the other hand, liquidity will also be created off-balance sheet when banks issue loan commitments and standby letters of credit (Kashyap et al., 2002). However, high liquidity creation can increase the probability of bankruptcy and lead to bank instability (Fungáčová et al., 2021). An interesting question arises: Why do banks that create liquidity take risks associated with creating liquidity? This was demonstrated during the 2008 global financial crisis on the serious consequences of lack of liquidity affecting the stability of the banking system (Ben Lahouel et al., 2022). Excessive liquidity creation and ineffective liquidity risk management created systemic risk, the liquidity crisis led to the collapse of major financial institutions and caused widespread negative impacts on the global economy. The contagion effect of the crisis prompted governments, regulators and policymakers of countries to change monetary and fiscal policies, strengthen regulations to improve the resilience of banks and reduce banking risks (Barth et al., 2013). One of the regulations is Basel III, proposed by the Basel Committee on Banking Supervision to monitor and manage liquidity risk appropriately, help banks cope with difficult situations and promote resilience.

It was the global financial crisis that sparked interest in the impact of liquidity on bank stability. Poor liquidity management is a source of bank vulnerability and insolvency (Berger and Bouwman, 2017). The "Liquidity Shortage Hypothesis" (LSH) suggests that bank failures are caused by banks having difficulty in paying off deposits, leading to a shortage of liquidity and increasing the risk of bank failure (Diamond & Rajan, 2001). In addition, the "High Liquidity Creation Hypothesis" (HLCH) suggests that banks' liquidity creation above a certain threshold may increase the probability of bank failure (Fungáčová et al., 2021). However, these hypotheses have not been tested by many studies and studies on the impact of liquidity creation on bank stability still provide conflicting results. Some studies find that liquidity creation enhances stability by facilitating economic transactions and capital flows (Zheng et al., 2019; Gupta & Kashiramka, 2024). Low liquidity creation may reduce dependence on short-term funding but can restrict credit supply and increase the risk of failure or economic recession (Bernanke, 1983; Peek & Rosengren, 2000; Hahm et al., 2013). Conversely, other evidence shows that liquidity creation undermines financial stability (Maroun & Fromentin, 2024). However, most of this evidence is drawn from a limited set of countries—the United States (Zheng et al., 2019), Russia (Fungacova et al., 2021), India (Gupta and Kashiramka, 2020), Lebanon (Maroun and Fromentin, 2024), Asia Pacific (Gupta and Kashiramka, 2024) — and few studies directly examine the effects of liquidity creation on profitability and stability. While some researchers argue that higher liquidity creation raises profitability and bank value (Duan & Niu, 2020; Berger & Bouwman, 2009), others find negative performance effects (Goddard et al., 2010; Tran et al., 2016). This limited and contradictory empirical base, particularly in emerging economies, reveals a clear research gap: the true direction and magnitude of liquidity creation's impact on bank profitability and stability remain unresolved and require further empirical investigation.

According to the report sent to the National Assembly Economic Committee at the end of April 2023, four Vietnamese banks are under special control, including three "zero dong" banks (Vietnam Construction Bank, Ocean Commercial Bank, Global Petroleum Commercial Bank) and Dong A Joint Stock Commercial Bank, which must implement the compulsory transfer policy (Tieu Phong, 2023). SCB Bank is also under special control from the end of 2022 and is likely to have to restructure. The appearance of banks under special control due to the risk of insolvency and "zero dong" banks due to business losses and negative equity has shown the instability of banks and the high possibility of bankruptcy if there is no restructuring or compulsory transfer by the State Bank. In addition, the liquidity risk of banks tends to increase when banks depend on short-term market capital, banks have to increase high capital mobilization costs to maintain deposits and short-term interbank loans (Ha Tam, 2024). The question is whether liquidity creation affects the stability and profitability of banks. To answer this question, the author studied the impact of liquidity creation on both the profitability and stability of Vietnamese banks in the period 2014-2023. The study also analyzed the impact of capital changes on the relationship between liquidity creation and bank stability to consider whether bank capital plays a moderating role in this relationship. Based on the analysis results, the study made comments and proposed policy implications to increase stability and improve the profitability of banks, helping banks operate more effectively and sustainably.

2. Theoretical basis

The global financial crisis of 2007-2009 first drew widespread attention to how banks' maturity transformation and aggressive liquidity creation could magnify systemic risk and trigger instability. In response, researchers intensified efforts to measure liquidity creation (LC) and understand its effects. Seminal contributions such as Berger and Bouwman (2009) provided comprehensive on- and off-balance-sheet metrics that have since become standard. Building on these measures, subsequent studies investigated LC's impact on profitability (e.g., Sahyouni & Wang, 2018; Duan & Niu, 2020) and financial stability, though results remain mixed and are still concentrated in advanced economies (Fungáčová et al., 2015; Vazquez & Federico, 2015).

Empirical work on bank liquidity creation (LC) has evolved along three main lines: (i) developing LC measurement frameworks (e.g., Berger & Bouwman, 2009); (ii) examining LC's effect on profitability, where evidence from the U.S. and Europe remains mixed (Sahyouni & Wang, 2018; Duan & Niu, 2020); and (iii) assessing LC's impact on financial stability, with inconsistent results and limited focus on emerging markets (Vazquez & Federico, 2015).

These studies are anchored in several foundational hypotheses: Weak Fundamental Hypothesis (Fungáčová et al., 2021), which attributes bank failure to poor fundamentals such as low asset quality or thin capital; Liquidity Shortage Hypothesis (Calomiris, 2007), which links failure to sudden depositor runs and maturity mismatches even when fundamentals are sound; and High Liquidity Creation Hypothesis (Fungáčová et al., 2021), which argues that excessive LC itself raises default risk as banks hold fewer liquid assets and face fire-sale pressures. Related capital-liquidity theories offer contrasting views: the Financial Fragility-Crowding-Out effect (Diamond & Rajan, 2000, 2001) suggests higher capital reduces LC by displacing deposits, whereas the Risk-Absorption Hypothesis holds that strong capital enables greater LC.

Together, these research trends and theoretical perspectives provide the rationale

for analyzing how liquidity creation influences both bank profitability and stability, and how bank capital conditions these relationships, particularly in emerging-market settings.

2.1. Liquidity creation and bank stability

Liquidity creation is considered a core activity of banks, helping transactions between economic entities to be more convenient, capital flows are moved more effectively, thereby positively affecting the stability of banks, helping banks to minimize risks (Zheng et al., 2019; Gupta & Kashiramka, 2020, 2024; Vuong et al., 2023). Low liquidity creation helps banks reduce their dependence on short-term liabilities and short-term deposits, thereby reducing the risk of mass withdrawals by customers, but it also faces a reduction in access to short-term capital, making it more difficult for banks to respond to unexpected market fluctuations, leading to an increased risk of failure (Hahm et al., 2013; Fungáčová et al., 2021). When banks create less liquidity, it tends to reduce the supply of credit to businesses and individuals, leading to a decrease in banking efficiency and an increase in the likelihood of bankruptcy, causing an economic recession (Bernanke, 1983; Peek & Rosengren, 2000).

On the other hand, Maroun and Fromentin (2024) pointed out that liquidity creation has a negative impact on the financial stability of banks. Banks that create more liquidity will have to hold illiquid assets while providing liquidity to customers, increasing the bank's risk level due to the mismatch in liquidity of assets and liabilities, thereby increasing the possibility of high losses when banks have to sell illiquid assets to meet customers' repayment needs, especially when depositors create a wave of withdrawals (Diamond & Rajan, 2001; Calomiris, 2007). "Weak Fundamental Hypothesis" (WFH) implies that bank failures are caused by weak fundamentals (Meyer & Pifer, 1970; Rolnick & Weber, 1984; Fungáčová et al., 2021), high liquidity creation may mask underlying bank problems such as low loan quality, declining capital ratios, and depleted earnings reflecting underlying bank health and providing an early warning of bank failure. According to the "Liquidity Shortage Hypothesis" (LSH), bank failures arise from liability risk due to irrational depositor withdrawals that reduce the bank's ability to meet withdrawal demands, leading to increased liquidity shortages and increased likelihood of bank failure (Calomiris, 2007). The "High liquidity creation hypothesis" (HLCH) developed and tested by Fungáčová et al. (2021) suggests that liquidity creation by banks above a certain threshold can be counterproductive by increasing the probability of bank failure, even causing bank failure and reducing the overall liquidity in the economy. At very high levels of liquidity creation, banks will lack liquid assets capable of meeting depositor withdrawal demands and will therefore have to sell off illiquid assets, leading to an increased probability of bankruptcy (Allen & Gale, 2004). It is the lack of liquidity arising from liquidity creation that causes bank insolvency (Berger & Bouwman, 2017). Excessive liquidity conversion will increase the probability of financial failure of banks (Diamond & Rajan, 2001; Vazquez & Federico, 2015). Therefore, hypothesis H1 is proposed as follows:

Hypothesis H1: Liquidity creation has a negative impact on bank stability.

2.2. Liquidity creation and bank profitability

Liquidity creation helps banks earn income from converting low-liquidity assets into high-liquidity liabilities or from issuing loan commitments and standby letters of credit. Liquidity creation increases net surplus and has a positive impact on bank value (Berger & Bouwman, 2009), reduces the bank's illiquidity risk, reduces the probability of default, reduces financial costs and generates higher profits (Bordeleau & Graham, 2010),

and increases bank profitability (Duan & Niu, 2020). However, liquidity creation also poses risks when banks have to sell off assets when they encounter difficulties or when they have to fulfill their obligations with loans (Diamond & Dybvig, 1983; Tirole, 2011), which affects the efficiency of banks (Molyneux & Thornton, 1992; Goddard et al., 2010). In addition, when banks create high liquidity, the possibility of bank bankruptcy also increases (Fungáčová et al., 2021), thereby increasing the inefficiency in the cost of bank operations (DeYoung, 2003; Fungáčová et al., 2021), which reduces the profitability of banks. Agreeing with the study of Tran et al. (2016) that creating high liquidity will increase liquidity risk, which may force banks to sell assets at low prices to meet payment needs, or pay higher interest rates to raise capital, increasing operating costs and reducing profits, reducing the bank's profitability. Hypothesis H2 is proposed as follows:

Hypothesis H2: Liquidity creation has a negative impact on bank profitability.

2.3. Bank Capital, Liquidity Creation and Bank Stability

The "Financial Fragility-Crowding Out Hypothesis" (FFCH) suggests that increasing capital may make banks more stable but hinder their ability to create liquidity (Diamond & Rajan, 2000, 2001), and that increasing capital will crowd out deposits, which are the main source of liquidity creation, thus reducing the bank's ability to create liquidity (Gorton & Winton, 2000). Conversely, the "Risk Absorption Hypothesis" (RAH) suggests that high capital can increase banks' ability to create liquidity. This hypothesis argues that the more liquidity a bank creates, the greater the risk and extent of loss when the bank is forced to liquidate illiquid assets to meet customer withdrawal demands, so liquidity creation increases bank risk (Allen & Santomero, 1998; Allen & Gale, 2004), while bank capital has the ability to absorb risk and enhance the bank's risk tolerance (Bhattacharya & Thakor 1993; Coval & Thakor 2005), so higher capital allows banks to create more liquidity. Empirical studies have shown that the effects of bank capital and liquidity creation can be positive (Tran et al., 2016), negative (Horváth et al., 2014; Fu et al., 2016), or positive or negative depending on the size of the bank (Distinguin et al., 2013). Zheng et al. (2019) examined the combined role of capital and liquidity creation in influencing bank failure risk. The study found that the negative relationship between liquidity creation and bank failure risk is weakened by changes in bank capital. This result supports the view that capital helps banks increase their ability to create liquidity and cope with liquidity risks caused by bank liquidity creation. Based on the above hypotheses and empirical studies, hypothesis H3 is proposed as follows:

Hypothesis H3: Bank capital has an impact on the relationship between liquidity creation and bank stability.

3. Model and Methodology

3.1. Research Data

The study uses balanced panel data from 29 Vietnamese commercial banks, including 4 state-owned and 25 joint-stock commercial banks. Foreign-owned and joint-venture banks are excluded because their capital structures and operational mechanisms differ from domestic banks and may not fully reflect the Vietnamese banking environment. Banks that were merged or acquired during this period are also excluded to ensure continuous data availability, with only the post-M&A banks and non-M&A banks included. The 10-year period from 2014 to 2023 is chosen to provide sufficient and reliable data from audited financial statements while capturing significant developments and regulatory changes in the Vietnamese

banking sector. Descriptive trends over this period indicate notable fluctuations in liquidity creation, bank stability, and profitability. For instance, liquidity creation from both fat and non-fat assets shows periods of increase and decrease, sometimes moving inversely relative to profitability and stability. These patterns highlight a potential trade-off between liquidity creation and bank performance, making this period particularly relevant for analyzing the impact of liquidity on stability and profitability. Research data is collected from audited financial statements of banks and all variables are winsorized at 1% and 99% to minimize the impact of outliers on statistical analysis and avoid possible measurement errors. Annual GDP growth rates are collected from the World Bank database in the period 2014-2023.

3.2. Research model and research methodology

The research model is developed based on the studies by Tran et al. (2016) and Zheng et al. (2019):

$$STA_{i,t} = LC_{i,t} + \Delta CAP_{i,t} + LC_{i,t} * \Delta CAP_{i,t} + CAP_{i,t} + SIZE_{i,t} + NIM_{i,t} + CI_{i,t} + DIV_{i,t} + GDP_t \quad (1)$$

$$ROE_{i,t} = LC_{i,t} + \Delta CAP_{i,t} + SIZE_{i,t} + CI_{i,t} + DIV_{i,t} + LOAN_{i,t} + GDP_t \quad (2)$$

Model (1) tests H1 and H3, examining the effect of liquidity creation on bank stability and the moderating role of capital.

Model (2) tests H2, focusing on bank profitability.

Bank stability (Model 1) is measured by the natural logarithm of the Z-score, calculated as

$$Z\text{-}score = \frac{ROA + \frac{Equity}{Total\ assets}}{Standard\ deviation\ of\ ROA} \quad (3)$$

following Boyd and Graham (1986) and Laeven and Levine (2009). A higher Z-score indicates lower risk and greater stability. The standard deviation of ROA is computed for the entire study period (Laeven & Levine, 2009; Houston et al., 2010). The natural logarithm of the Z-score is used to reduce scale differences across banks and limit the influence of outliers (Laeven & Levine, 2009).

Bank profitability (Model 2) is measured by return on equity (ROE), defined as net income divided by average equity.

Liquidity creation variables include LCcatfat and LCcatnonfat, proposed by Berger and Bouwman (2009) and widely applied in many recent studies such as Zheng et al., (2019), Gupta and Kashiramka (2020), Vuong et al. (2023). LCcatfat considers liquidity creation including off-balance sheet indicators, while LCcatnonfat excludes off-balance sheet (OBS) indicators.

LC_{catfat} = [0.5*(illiquid assets + liquid liabilities + liquid OBS) + 0*(semi-liquid assets + semi-liquid liabilities + semi-liquid OBS) - 0.5*(liquid assets + illiquid liabilities + equity + illiquid OBS)]/ total assets

$LC_{catnonfat}$ = [0.5*(illiquid assets + liquid liabilities) + 0 * (semi-liquid assets + illiquid liabilities) – 0.5 * (liquid assets + illiquid liabilities + equity)]/ total assets

To clarify how liquidity creation is measured, Table 1 presents the classification of banking activities by their liquidity level.

Table 1. Classification of liquidity of banking activities

Liquid assets	*Semi-liquid assets*	*Illiquid assets*
Cash and deposits at the State Bank	Lending to credit institutions	Corporate loans
Deposits at credit institutions	Personal loans	Long-term investments
Types of securities		Other assets
Illiquid liabilities	*Semi-liquid liabilities*	*Liquid liabilities*
Other debts	Term deposits	Demand deposits
Equity	Other loans	Tradeable debts
Liquid OBS	*Semi-liquid OBS*	*Illiquid OBS*
Derivative securities	Other OBS Items	Loan Guarantees
		Commitments in Letter of Credit Operations

To assess the moderating role of bank capital changes on the relationship between liquidity creation and bank stability, bank capital changes at year t are measured according to Zheng et al. (2019):

$$\Delta CAP_t = CAP_t - CAP_{t-1} \quad (4)$$

with CAP measured as the ratio of equity to total assets.

Control variables (SIZE, NIM, CI, DIV, LOAN, GDP) follow prior studies (e.g., Duan & Niu, 2020; Tran et al., 2016; Zheng et al., 2019) to account for bank size, core earnings power, cost efficiency, diversification, and macroeconomic conditions.

Table 2 presents variable definitions, measurements, and key references following prior studies.

Table 2. Definition of variables in the research model

Variables	**Definition and measurement**	**References**
Stability, profitability and liquidity creation		
STA	bank stability, measured by ZSCORE	
ZSCORE	ln(Z-score) with Z-score as the standard deviation of ROA	Boyd and Graham (1986)
ROE	bank profitability, measured by return on equity ROE. ROE = Net income / Average equity	Tran et al. (2016)
LC	liquidity generation, measured by LC_{Catfat} và $LC_{Catnonfat}$	Berger and Bouwman (2009)
LC_{Catfat}	liquidity generation by category and including off-balance sheet activities	
$LC_{Catnonfat}$	liquidity generation by category and excluding off-balance sheet activities	
Bank-level variables		
CAP	capital ratio, measured as equity/total assets	Zheng et al. (2019)
ΔCAP	change in capital ratio, measured as CAP_t - CAP_{t-1}	Zheng et al. (2019)
SIZE	bank size, measured as ln(total assets)	Tran et al. (2016)

Variables	Definition and measurement	References
NIM	net interest margin, NIM = net interest income / average interest-earning assets	Zheng et al. (2019)
CI	cost-to-income ratio, measured as operating expenses/operating income	Zheng et al. (2019)
DIV	income diversification, measured as non-interest income/total income	Zheng et al. (2019)
LOAN	bank specialization in traditional lending activities, measured as total loans/total assets	Duan and Niu (2020)
Macro variables		
GDP	GDP growth rate	Gupta and Kashiramka, (2020); Tran et al. (2016)

The study used the pooled OLS regression models, fixed effects model (FEM) and random effects model (REM) to estimate the above research models. Pooled OLS provides a baseline estimate under the assumption of homoscedastic and uncorrelated errors, and is particularly suitable for small sample sizes like the 29 Vietnamese commercial banks in this study. The fixed effects model (FEM) is applied to control for unobserved, time-invariant bank-specific characteristics that could influence the dependent variables, ensuring that differences across banks do not bias the results. The random effects model (REM) assumes these bank-specific effects are random and uncorrelated with explanatory variables, allowing broader generalization of findings beyond the sampled banks.

The combination of these methods, along with diagnostic and robustness checks, ensures the reliability of the results. For pooled OLS, the study conducted the Breusch-Pagan test for homoscedasticity, the Durbin-Watson test for autocorrelation, and variance inflation factor (VIF) analysis for multicollinearity. FEM validity was tested using the Modified Wald Test for heteroscedasticity, and robust standard errors were applied to address potential heteroscedasticity or autocorrelation. For REM, the Breusch-Pagan Lagrangian multiplier test was used to compare pooled OLS and REM, while the Hausman test determined the most suitable model for the research data. This methodological approach ensures that the final estimates accurately capture the dynamics between liquidity creation, stability, and profitability in Vietnamese commercial banks.

4. Research results

4.1. Descriptive statistics and correlation matrix

The mean values of LCcatfat and LCcatnonfat are 14.39% and 9.7%, respectively, indicating that a significant portion of liquidity is generated off-balance sheet *(see Appendix 1 online)*. In addition, the high standard deviation along with the large variation in the minimum (-6.27%) and maximum (54.28%) values of LCcatfat indicate that there is a huge difference in liquidity creation activities among banks in Vietnam. The CAP capital ratio also shows a huge difference among banks when the average CAP ratio is at 8.38%, the highest is 18.45% while the lowest is only about 4.2%, which may raise concerns about the safety of the banking system.

All independent variables' correlation coefficients are below 0.7, indicating a

low likelihood of multicollinearity among independent variables in the models *(see Appendix 3 online)*. Additionally, the VIF values for all independent variables in the models are less than 2; therefore, multicollinearity is not a significant concern in this study.

4.2. Trends in Key Variables

Appendix 2 *(see Appendix 2 online)* illustrates the trends of liquidity creation, bank stability, and profitability over the period 2014-2023. Figure 1 shows liquidity creation from fat assets, including off-balance sheet (OBS) items, while Figure 2 presents liquidity creation from non-fat assets, excluding OBS. Figure 3 depicts bank stability measured by Z-score, and Figure 4 illustrates profitability measured by ROE.

From the visual patterns, it is clear that liquidity creation from both fat and non-fat assets tends to move inversely relative to Z-score and ROE. For instance, in 2018-2019, Lccatfat decreased from 0.166 to 0.140, whereas ROE continued to rise from 0.117 to 0.131, and Z-score remained relatively stable. Overall, higher levels of liquidity creation do not appear to correspond directly to higher profitability or greater stability.

These four figures collectively highlight a potential trade-off between liquidity creation and bank performance, showing that periods of higher liquidity creation, particularly from OBS, may coincide with lower stability and lower profitability. This descriptive analysis of the charts sets the stage for further investigation using regression analysis to determine the causal impact of liquidity on bank stability and profitability.

4.3. Analysis of Research Results

Impact of Liquidity Creation on Bank Stability and the Moderating Role of Capital

The research findings indicate that LCcatfat has a negative impact on bank stability, meaning that higher bank liquidity creation leads to less stability and increased risk. Specifically, Model (1) in Table 3 shows that a 1% increase in LCcatfat reduces ZSCORE by 16% at a 5% significance level. This result is consistent with the study by Fungáčová et al. (2021), supporting the "High Liquidity Creation Hypothesis". This negative effect could be due to banks with high liquidity creation lacking sufficient liquid assets to meet depositors' withdrawal demands, thus forcing them to sell off illiquid assets, which increases the probability of bankruptcy (Allen and Gale, 2004). Moreover, liquidity transformation can exacerbate a bank's financial fragility (Diamond and Rajan, 2001). Furthermore, the significant changes in Vietnamese banks' off-balance sheet liquidity creation activities over the years may have made it more challenging for banks to manage liquidity creation, potentially affecting their stability.

Comparing with other emerging economies, our findings align with Fungáčová et al. (2021) for Russian banks, where high liquidity creation increased bank risk, but differ from Gupta and Kashiramka (2020), who found a positive relationship between liquidity creation and stability in Indian banks. This contrast suggests that contextual factors such as regulatory frameworks, bank size, and capital levels may play a decisive role in how liquidity creation affects stability.

Table 3. Regression results of liquidity creation on bank stability

Variable	ZSCORE			
	(1)	(2)	(3)	(4)
LCcatfat	-0.3040**	-0.3040**		
LCcatnonfat			-0.3146**	-0.3238*

Variable	ZSCORE			
	(1)	(2)	(3)	(4)
ΔCAP	-0.0438	-0.0407	-0.0439	-0.2758
ΔCAP*LCcatfat		-0.0189		9.7296*
CAP	100.0642***	10.0646***	9.7467***	9.7497***
SIZE	0.0022	0.0022	-0.0059	-0.0065
NIM	5.6082***	5.6075***	50.4679***	6.5477***
CI	-0.0781**	-0.0781**	-0.0932**	-0.0819**
DIV	0.1703***	0.1703***	0.1702***	0.1646***
GDP	-0.0125	-0.0126	0.0108	0.0297
_cons	2.2014***	2.2015***	2.3797***	2.3510***
Hausman test	0.0015	0.0029	0.0008	0.0023
Prob > F	0.0000	0.0000	0.0000	0.0000

Note: *The FEM estimation results are described in the table.*

Models (1) and (2) with liquidity creation variable LCcatfat; models (3) and (4) with liquidity creation variable LCcatnonfat. Z-score is the dependent variable for all models.

****, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.*

LCcatnonfat also has a negative impact on banking stability. The coefficient of LCcatnonfat in model (3) is -0.3146 with a significance level of 5%, indicating that a 1% increase in LCcatnonfat will have an impact on reducing ZSCORE by about 31.46%. Once again, this result further strengthens the "High Liquidity Creation Hypothesis" and is similar to the study of Vazquez and Federico (2015), and Fungáčová et al. (2021). Regarding the moderating role of changes in bank capital, the coefficient of ΔCAP*LCcatnonfat is not statistically significant, however, the study found a positive coefficient of ΔCAP*LCcatnonfat with a significance level of 10% (model 4), indicating that changes in bank capital ΔCAP moderate the impact of LCcatnonfat on ZSCORE. This result shows that the moderator variable weakens the negative relationship between LCcatnonfat and ZSCORE. In other words, the negative impact of liquidity creation on bank stability will be reduced as the change in bank capital increases. This result supports the "Risk Absorption Hypothesis" which argues that the more liquidity a bank creates, the more risk and loss it will face when the bank is forced to liquidate illiquid assets to meet the withdrawal demand of customers, so liquidity creation increases bank risk (Allen and Santomero, 1998; Allen and Gale, 2004), while bank capital has the ability to absorb risk and enhance the bank's risk tolerance, so when the change in capital increases, it can absorb risk, helping to reduce the impact of liquidity creation on bank stability. Thus, the regression coefficients of the moderator variables in the models with ZSCORE are similar in sign, however, the regression results only found statistical significance in the moderating role of ΔCAP on the relationship LCcatnonfat – ZSCORE. Furthermore, the bank capital ratio CAP is statistically significant and positively related to ZSCORE, implying that increasing the capital ratio is related to the stability of the bank and reducing the risk of bankruptcy.

In addition, our findings on the moderating role of capital are conceptually consistent with Zheng et al. (2019), who show that in U.S.

banks, higher capital strengthens the banks' ability to absorb risks arising from liquidity creation. Although the context differs between a developed and an emerging economy, the underlying mechanism—that capital serves as a buffer against liquidity-induced instability—remains similar. In contrast, Gupta and Kashiramka (2020) report that in India, the interaction of LC and capital fails to yield any statistically and economically significant results, indicating that capital does not effectively moderate the effect of liquidity creation on bank stability. This contrast highlights the particular importance of capital buffers in the Vietnamese context, where regulatory frameworks, bank size, and the scale of liquidity transformation activities amplify the moderating role of capital in mitigating liquidity-related risks.

Impact of liquidity creation on the financial performance of banks

The regression results show that liquidity creation measured by LCcatfat or LCcatnonfat has a negative impact on the financial performance of banks (see Table 4). This result is consistent with Tran et al. (2016) for U.S. banks, who argue that higher liquidity creation increases liquidity risk, forcing banks to sell assets at lower prices or pay higher funding costs, thereby reducing profitability. In contrast, Duan and Niu (2020) find that liquidity creation is generally associated with higher profitability in U.S. banks, both during normal times and financial crises, and they also highlight that the effect may vary depending on market conditions and bank characteristics.

In the context of Vietnamese banks, our findings show that overall liquidity creation has a negative impact on financial performance. This suggests that, in Vietnam, excessive liquidity creation may increase operational and funding costs, thereby reducing profitability, even without distinguishing between on- and off-balance sheet activities. These results underline the importance of carefully managing liquidity creation to maintain financial stability while optimizing bank performance.

Table 4. Regression results of creating liquidity

Variable	ROE	
	(5)	(6)
LCcatfat	-0.1561**	
LCcatnonfat		-0.2105**
ΔCAP	0.6975**	0.7360**
SIZE	0.0435**	0.0293***
LOAN	0.1744*	0.1424*
CI	-0.1835***	-0.2070***
DIV	-0.0031	-0.0037
GDP	0.1528	0.1198
_cons	-0.7145**	-0.4122**
Hausman test	0.0357	0.0654
Prob > F	0.0000	0.0000

Note: *FEM estimation results for model (5) and REM for model (6). Liquidity creation is measured by Lccatfat in model (5) and Lccatnonfat in model (6).*

****, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.*

5. Conclusion and policy implications

5.1. Conclusion

Liquidity creation is considered a factor that contributes to increasing the profitability of banks but also causes great risks and increases the risk of collapse of the banking system. The global financial crisis of 2008 showed that liquidity shortages and weak fundamentals lead to bank failures. This study analyzed the impact of liquidity creation on financial stability and efficiency in the context of commercial banks in Vietnam during the period 2014 - 2023 and examined whether or not the level of capital change has a moderating role on the relationship between liquidity creation and the stability of banks in the context of an emerging country like Vietnam.

The results show that liquidity creation has a negative impact on both the stability and financial efficiency of banks. In addition, the study also found some evidence of the moderating effect of capital changes on the liquidity creation-bank stability relationship.

5.2. Policy implications

This section discusses the policy implications derived from the study's findings. Each recommendation is grounded in empirical results on the impact of liquidity creation on bank stability and profitability, the moderating role of bank capital, and the effects of depositor behavior on liquidity risk.

First, banks need to comply with strict liquidity regulations according to Basel III regulations, specifically complying with the liquidity coverage ratio (LCR) and net stable funding ratio (NSFR) to limit the ability of banks to create unnecessary liquidity. This recommendation is based on our finding that excessive liquidity creation negatively affects bank stability, highlighting the importance of adhering to liquidity standards to prevent potential instability. Basel III regulations are a new management framework proposed by the Basel Committee on Banking Supervision (BCBS) to overcome the limitations of Basel I and II and strengthen the management of capital and liquidity risks of banks, thereby improving banks' ability to respond and prevent large losses before financial crises, reducing bankruptcy risks. Basel III standards require banks to hold more liquid assets and maintain a sustainable maturity structure of assets and liabilities, which limits the bank's ability to create liquidity (Berger and Sedunov, 2017). Currently, most banks in Vietnam have implemented Basel II well according to the direction of the State Bank (Minh Khue, 2024). However, the implementation of liquidity and capital management according to Basel III standards in the current period still depends on the safety goals, financial capacity and resources of each bank. In addition, the regulations in Basel III standards are quite complicated and can be approached in many different ways, which will cause difficulties and confusion for banks in the process of implementing management according to this standard. For example, banks could set internal limits on liquidity creation relative to LCR targets, and perform stress tests to anticipate liquidity shortfalls under extreme scenarios. They could also establish early warning indicators to detect unusual deposit withdrawals and adjust funding strategies accordingly. In addition, banks might provide periodic training to risk management staff to ensure proper monitoring and timely response to potential liquidity shocks. Therefore, to achieve the goal of safety for the banking system, the State Bank needs to develop and issue specific documents guiding the implementation of Basel III in the coming time, especially the liquidity coverage ratio (LCR) and the net stable funding ratio (NSFR). In addition, in the Vietnamese context, the implementation of Basel III should consider differences in bank size, operational capacity,

and technical expertise. Small and medium-sized banks may require phased adoption and additional technical support to comply effectively with liquidity requirements. Furthermore, limited market depth and liquidity in Vietnam necessitate practical guidance tailored to domestic banks.

Second, policymakers such as the State Bank need to develop specific, reasonable, and feasible policies and roadmaps to improve capital safety standards and capital adequacy ratios, thereby encouraging banks to accelerate capital quality improvement, enhance operational restructuring, and strengthen management capacity. These policies could include setting phased targets for CAR increases, issuing clear guidelines for banks on capital allocation and operational restructuring, providing technical support and advisory services, and establishing periodic reporting and monitoring mechanisms to track banks' progress. Regulators could also introduce incentives for banks that meet or exceed capital targets and early intervention measures for banks falling short, ensuring a proactive approach to maintaining financial stability and reducing systemic risk. This approach is directly supported by our research findings, which show that higher capital levels help absorb the risks associated with liquidity creation, thereby enhancing bank stability. According to research results, capital is a risk-absorbing buffer that helps reduce the negative impact of liquidity creation on bank stability. Therefore, increasing bank capital is an essential factor to help banks reduce liquidity risks and ensure greater stability. Currently, the State Bank is seeking comments on the Draft Circular regulating the capital adequacy ratio for commercial banks and foreign bank branches with a proposed roadmap to increase the minimum capital adequacy ratio (CAR) to 10.5% by 2033. The plan to increase the minimum CAR from 8% or higher in each period according to current regulations to 10.5% by 2033 may pose challenges for many banks in implementing this roadmap. Therefore, the State Bank and experts in the banking and financial sectors need to provide support policies and advise on solutions to help banks reasonably adjust lending rates to sectors with high credit risk coefficients, further promote the strategy of restructuring operations, and improve management capacity to increase capital, or implement plans to sell shares to foreign investors or merge with other banks to increase capital and ensure the capital safety ratio (CAR) for banks that have not met the minimum CAR ratio. Furthermore, policy makers and financial experts need to analyze the current legal difficulties and problems of commercial banks when increasing charter capital to promptly and reasonably adjust regulations to create favorable conditions for these banks to increase charter capital, ensuring compliance with capital safety standards. Specifically for Vietnam, differentiated CAR requirements and tailored support based on bank size and risk profile can help banks meet international standards while accounting for domestic constraints. Incentives for banks exceeding targets and phased implementation plans for smaller banks would support stability and gradual compliance.

Third, commercial banks need to proactively implement a policy of publicizing information clearly, transparently, periodically and suddenly about the bank's operating situation. This is supported by our results indicating that customer withdrawals due to asymmetric information can amplify liquidity risks, thus proactive disclosure can help maintain depositor confidence and stability. The instability of banks related to liquidity creation can be due to the objective cause of customers' unreasonable withdrawal of deposits. In the face of external shocks, the withdrawal behavior of irrational and uninformed depositors can create a mass withdrawal effect by customers,

reducing the bank's ability to meet withdrawal demands, leading to increased liquidity shortages and an increased possibility of bankruptcy. For example, banks could publish monthly liquidity reports, alert customers to any unusual withdrawal trends, and provide clear guidance on deposit insurance coverage. Specifically, banks can provide key liquidity ratios such as LCR and NSFR, highlight any significant changes in deposit or withdrawal patterns, and explain deposit insurance coverage limits and procedures. These reports can be distributed via official websites, mobile banking applications, or email newsletters to ensure timely and widespread dissemination. By proactively informing customers, banks can reduce panic withdrawals, improve depositor confidence, and enhance the overall stability of the banking system. Therefore, proactively disclosing such information helps increase customer confidence, helps depositors feel secure and confident, and improves information transparency about the financial situation and operating situation of banks, thereby minimizing the risk of asymmetric information. In the Vietnamese context, banks should continue to ensure transparency in their reporting while focusing on financial literacy campaigns to help depositors understand liquidity risks and reduce panic withdrawals. Despite reports already being published in both Vietnamese and English, targeted educational initiatives can further improve depositor awareness and confidence, reflecting the emerging market characteristics of Vietnam.

5.3. Limitations of the study and future research directions

The study still has some limitations as follows:

First, the study only focuses on one emerging market, Vietnam, so in the future, studies can be expanded to many emerging countries to see more generally the impact of liquidity creation in emerging economies.

Second, the study only considers financial performance based on a measure of ROE, so the next research direction can consider the impact of liquidity creation on the operational efficiency or cost efficiency of banks.

Third, this study only examines the moderating role of capital in the relationship between liquidity creation and bank stability. Future research could expand the analysis to include other potential moderators—such as corporate governance, ownership structure, or ESG factors—to provide deeper insights into how liquidity creation influences both bank stability and profitability.

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