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Factors Influencing the Liquidity of Listed Joint-Stock Commercial Banks on the Vietnamese Stock Market

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Abstract

This paper explores the factors influencing the liquidity of listed joint-stock commercial banks on the Vietnamese stock market during the period from 2015 to 2022. The analytical data for this paper was collected from the financial reports of 20 listed joint-stock commercial banks on the Vietnamese stock market. The study employs least squares regression, random effects models, and fixed effects models to achieve its research objectives. The results indicate that bank size, equity ratio, profitability, non-performing loan ratio, loan-to-deposit ratio, cost ratio, and GDP growth rate are significant factors affecting the liquidity of listed joint-stock commercial banks in Vietnam. Based on these findings, several policy implications are proposed for joint-stock commercial banks and the State Bank of Vietnam.

Classification: G12, G21, E51, H55.

Keywords: *Liquidity Risk, Commercial Banks, Stock Market, Random Effects Model (REM), Fixed Effects Model (FEM).*

Introduction

As financial intermediaries, commercial banks play a crucial role in channeling idle capital from households to individuals and organizations in need of funds. Therefore, commercial banks can be seen as vital instruments supporting the development and stability of each economy. Accordingly, commercial banks attract idle capital from the public through fundraising activities, subsequently disbursing these funds to individuals and organizations that require them. Thus, the operations of banks are connected to most sectors and components of the economy. Consequently, any instability within banks will impact the entire economy. Therefore, maintaining a stable health status for the commercial banking system in each country is essential for ensuring sustainable economic development.

However, in their business operations, banks face various risks, including credit risk, market risk, liquidity risk, and interest rate risk. Among these, liquidity risk is particularly significant, as it not only profoundly affects the safety of the banks themselves but also impacts the functioning of the entire financial system of the country (Diep & Lam, 2015). When commercial banks frequently encounter liquidity deficits or surpluses, it can undermine their credibility in the market, thus reducing their ability to raise capital and profitability. More critically, banks may face situations where depositors withdraw funds en masse while available capital is insufficient (Diep & Lam, 2015).

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This indicates that when liquidity risk occurs, it not only directly affects the operational efficiency of banks but also leads to instability in the economy. Due to the unique characteristics and cascading effects within the banking system, liquidity plays a particularly important role for commercial banks (Viet & Vinh, 2019). However, Van (2021) reports that in Vietnam, despite significant reforms and gradual improvements in the banking system, liquidity risk has not received adequate attention. Many banks face liquidity challenges, negatively impacting the money market. As a result, costs in production and business increase, diminishing the operational efficiency of enterprises within the economy. Consequently, the debt repayment capacity of borrowers at banks declines, leading to an increase in credit risk. Moreover, several financial scandals in Vietnam, particularly the embezzlement cases at Saigon Joint Stock Commercial Bank, have eroded public trust in banks. This further heightens the risk of liquidity crises in the banking sector.

For these reasons, the study "Factors Influencing the Liquidity of Listed Joint-Stock Commercial Banks on the Vietnamese Stock Market" needs to be conducted.

Literature Review

Foreign Studies

The liquidity of banks has been studied across various economies worldwide. Specifically, Singh & Sharma (2016) and Bhati et al. (2019) conducted research in the Indian market. Bhati et al. (2019) examined the period from 2006 to 2016 and demonstrated the relationship between the discount rate, interest rates, reserve ratios, liquidity ratios, foreign reserves, exchange rates, consumer price index (CPI), GDP growth, equity ratios, bank size, and bank liquidity. Singh & Sharma (2016) focused on the period from 2000 to 2013, identifying factors influencing bank liquidity, including profitability ratios, bank size, loan ratios, equity ratios, inflation, and GDP growth.

In addition, studies on the Chinese market were conducted by Liulu & Qiujing (2021) and Wei (2017). Wei (2017) examined the period from 2007 to 2015, evidencing the impact of non-performing loan ratios and equity ratios on bank liquidity. Liulu & Qiujing (2021) focused on the period from 2010 to 2019, asserting that bank size, equity ratios, profitability ratios, cost efficiency, and the consumer price index are influential factors affecting bank liquidity.

Moreover, other financial markets globally have attracted researchers' attention regarding bank liquidity. Ahmet & Melek (2022) studied Turkish commercial banks, identifying the effects of equity ratios, current asset ratios, fixed asset ratios, loan ratios, marginal interest income, non-performing loan ratios, bank size, and exchange rates on bank liquidity. Angela & Alina (2015) explored countries in Eastern and Central Europe, indicating that bank liquidity is affected by deposit interest rates, profitability ratios, and bank size. Pavla (2013) examined Hungary, demonstrating correlations between equity ratios, bank size, GDP growth, inflation rates, lending rates, interest rate spreads, and bank liquidity. Munteanu (2012) investigated Romanian banks, noting that bank liquidity is influenced by equity ratios, risk ratios, interbank asset ratios, interest expense ratios, cost efficiency, and total risk.

Domestic Studies

In Vietnam, numerous studies have addressed the liquidity of commercial banks. Dat (2019) researched the period from 2008 to 2017, identifying factors affecting the liquidity of Vietnamese commercial banks, including bank size, loan ratios, and profitability ratios. Hong

(2015) studied the period from 2006 to 2011, demonstrating that equity ratios, loan ratios, profitability ratios, and non-performing loan ratios influence the liquidity of Vietnamese commercial banks. Similarly, Diep and Lam (2015) investigated the period from 2006 to 2013, establishing that the liquidity of Vietnamese commercial banks is affected by bank size, loan ratios, and equity ratios.

Thuan and Tuyet (2021) studied the period from 2013 to 2019, proving that bank size, liquidity reserve ratios, interbank borrowing ratios, equity ratios, and loan ratios impact the liquidity of Vietnamese commercial banks. Van (2021) examined the period from 2012 to 2019, asserting that factors influencing the liquidity of commercial banks include bank size, equity ratios, profitability ratios, liquid asset ratios, loan ratios, and cost efficiency.

Additionally, Hanh and Vy (2019) researched the period from 2008 to 2017, demonstrating that factors such as bank size, equity ratios, loan ratios, profitability ratios, external funding ratios, GDP growth rates, and inflation rates affect the liquidity of commercial banks in Vietnam. Hang et al. (2022) studied the liquidity of Vietnamese commercial banks from 2005 to 2019, identifying influencing factors such as GDP growth rates, loan ratios, repayment capacity ratios, short-term funding ratios, and long-term lending ratios, alongside bank size, profitability ratios, and non-performing loan ratios.

Vinh and Dung (2020) investigated the period from 2009 to 2018, suggesting that credit growth, deposit ratios, profitability ratios, bank size, credit risk provision ratios, total asset income ratios, income-expense ratios, non-interest income ratios, and stock listings impact the liquidity of Vietnamese commercial banks. Diem and Lanh (2021) studied the period from 2007 to 2020, identifying the effects of bank size, equity ratios, profitability ratios, loan ratios, GDP growth, and inflation on the liquidity of Vietnamese commercial banks.

Hoang and Loan (2021) examined the period from 2010 to 2020, identifying prior year liquidity, bank size, non-performing loan ratios, profitability ratios, loan ratios, GDP growth, inflation, and bank mergers as influential factors on the liquidity of Vietnamese commercial banks. Pham (2021) researched the period from 2015 to 2019, demonstrating the influence of bank size, equity ratios, profitability ratios, non-performing loan ratios, loan ratios, and GDP growth on the liquidity of Vietnamese commercial banks. Thong and Tien (2014) studied the period from 2002 to 2012 and identified factors affecting the liquidity of Vietnamese commercial banks, including loan ratios, equity ratios, bank size, GDP growth, and inflation.

The empirical studies reveal insights into the factors influencing bank liquidity, but a coherent theoretical foundation is often lacking. However, Hong (2015) built upon theories such as the theory of adaptability, expected income theory, signaling theory, and the too-big-to-fail theory to identify aspects influencing liquidity. Therefore, this study will also incorporate these theories while additionally considering the hierarchy theory to provide further justification for the proposed research model.

Research Method

Data Collection Method

The data analyzed in this thesis primarily consists of secondary data collected from the financial statements of commercial banks and the General Statistics Office during the period from 2015 to 2022. Currently, there are 20 listed commercial banks on the Vietnamese stock market (18 listed on the Ho Chi Minh City Stock Exchange and 2 listed on the Hanoi Stock Exchange). Therefore, in this study, the author collected data from these 20 banks. The specific details are presented in Table 3.1 as follows:

Information	Sources	Website
Total Asset	Financial report	https://finance.vietstock.vn/
Liquidity Asset	Financial report	https://finance.vietstock.vn/
Equity	Financial report	https://finance.vietstock.vn/
After Tax Profit	Financial report	https://finance.vietstock.vn/
Debt	Financial report	https://finance.vietstock.vn/
Total Loans	Financial report	https://finance.vietstock.vn/
Fundraising	Financial report	https://finance.vietstock.vn/
Operational Cost	Financial report	https://finance.vietstock.vn/
Revenue	Financial report	https://finance.vietstock.vn/
GDP growth rate	General Statistics Organization	https://www.gso.gov.vn/
Inflation rate	General Statistics Organization	https://www.gso.gov.vn/

Table 3.1: Sources of Secondary Information

Source: Collection from author

The information, including Total Assets, Liquid Assets, Equity, After-tax Profit, Non-performing Loans, Outstanding Debt, Fundraising, Operating Expenses, and Revenue, has been collected from the financial statements of banks available on the website: Vietstock Finance. Macroeconomic data such as GDP growth rate and inflation rate have been sourced from the General Statistics Office at the website: GSO.

Methodology

The research employs the Fixed Effect Model, the Random Effect Model, and the Pooled Ordinary Least Squares (Pooled OLS) regression to achieve its objectives. The Hausman test is utilized to choose between the Random Effect Model and the Fixed Effect Model, while the Breusch-Pagan Lagrangian test is applied to select between Pooled OLS and the Random Effect Model. The regression equation is formulated as follows:

$$.LIQ_{it} = \beta_0 + \beta_1*SIZE_{it} + \beta_2*CAP_{it} + \beta_3*ROA_{it} + \beta_4*NPL_{it} + \beta_5*LOAN_{it} + \beta_6*COST_{it} + \beta_7*GDP_t + \beta_8*INF_t$$

Where LIQ represents the dependent variable indicating the liquidity of listed commercial banks on the Vietnamese stock market. SIZE, CAP, ROA, NPL, LOAN, COST, GDP, and INF are the independent variables

Results and Discussions

Current State of Liquidity in Listed Commercial Banks on the Vietnamese Stock Market

Year	Observations	Mean	SD	Min	Max
2015	20	14,149	6,525	4,554	29,046
2016	20	13,281	5,052	5,214	24,543
2017	20	14,597	5,673	4,502	32,521
2018	20	14,021	4,799	5,126	25,499
2019	20	14,823	4,389	6,896	24,366
2020	20	13,297	4,488	6,829	23,911
2021	20	15,053	4,644	5,516	23,682
2022	20	15,843	4,461	7,675	24,169

Source: Data processed using Stata software, 2024

Table 4.1 illustrates the liquidity of listed commercial banks in Vietnam from 2015 to 2022. The statistical results indicate that the liquidity of listed commercial banks on the Vietnamese stock market has shown an increasing trend from 2015 to 2022. Specifically, the average liquidity ratio of 20 listed commercial banks in 2015 was 14.149%; in 2016, it was 13.281%; in 2017, 14.597%; in 2018, 14.021%; in 2019, 14.823%; in 2020, 13.297%; in 2021, 15.053%; and in 2022, 15.843%.

In reality, banks must make a trade-off between income and liquidity, as a higher liquidity ratio implies a contraction in the bank's lending activities. This reduction in income leads to decreased operational efficiency for the bank.

Table 4.2 presents the statistical results regarding the liquidity of each listed commercial bank on the Vietnamese stock market from 2015 to 2022. Of the 20 banks, 18 have an average liquidity ratio exceeding 10% during this period, while 2 banks (Saigon Thuong Tin Commercial Joint Stock Bank and Vietnam Prosperity Joint Stock Commercial Bank) have liquidity ratios below 9%.

Table 4.2: Current State of Liquidity of Commercial Banks from 2015 to 2022, Structured by Bank

Unit: %

Bank	2015	2016	2017	2018	2019	2020	2021	2022	Average
ACB	8,705	7,195	7,776	10,804	12,307	12,430	16,992	17,782	11,749
BAB	4,554	9,360	15,376	12,160	12,591	11,732	10,242	10,399	10,802
BID	11,234	10,501	12,973	12,552	13,669	9,697	12,343	16,332	12,413
CTG	10,648	11,929	12,259	13,803	13,101	12,679	12,016	15,661	12,762

EIB	10,084	10,921	13,929	18,224	20,428	23,911	18,413	18,242	16,769
HDB	15,222	15,041	13,360	18,471	13,584	17,189	18,749	15,217	15,854
LPB	7,240	15,604	14,798	7,440	9,650	9,993	12,122	13,814	11,333
MBB	17,226	15,014	19,760	15,827	13,702	13,797	12,766	10,478	14,821
MSB	14,569	11,853	12,516	19,913	17,292	11,904	18,669	20,833	15,944
NAB	22,400	10,167	11,620	17,552	16,683	12,885	15,599	15,173	15,260
NVB	17,665	19,457	16,797	11,824	19,903	15,583	7,333	17,577	15,767
OCB	15,475	12,732	16,770	15,409	17,162	14,033	14,722	12,709	14,877
SHB	17,623	14,596	13,532	10,986	12,492	11,553	15,863	14,531	13,897
SSB	21,876	17,693	17,098	15,564	19,010	16,718	22,898	24,169	19,378
STB	5,579	5,214	4,502	5,126	7,392	7,335	5,516	7,675	6,042
TCB	10,518	11,510	13,653	15,179	14,596	9,762	13,891	14,100	12,901
TPB	29,046	24,543	21,053	16,424	18,511	11,643	23,682	20,625	20,691
VCB	23,690	22,708	32,521	25,499	24,366	23,842	18,823	23,406	24,357
VIB	10,085	13,417	12,081	8,614	13,121	12,417	17,575	18,547	13,232
VPB	9,539	6,163	9,561	9,049	6,896	6,829	12,844	9,597	8,810

Source: Data processed using Stata software, 2024

Factors Influencing the Liquidity of Listed Commercial Banks on the Vietnamese Stock Market

Data Analysis Statistics

According to the statistical results shown in Table 4.3, the average size of the banks is 8.04, with a standard deviation of 0.398. The bank size ranges from a minimum value of 7.550 to a maximum value of 9.326. The equity ratio, denoted as CAP, is calculated as the ratio of equity to total assets of the bank. Thus, the equity ratio indicates the percentage of the bank's equity in relation to its total assets. The statistical results indicate that the average equity ratio is 8.019%, with a standard deviation of 2.762%. The equity ratio ranges from a minimum of 4.062% to a maximum of 16.973%.

Variable	Unit	Obs	Mean	SD	Min	Max
SIZE		160	8,403	0,398	7,550	9,326
CAP	%	160	8,019	2,762	4,062	16,973
ROA	%	160	1,060	0,746	0,000	3,238
NPL	%	160	2,703	4,265	0,043	24,688
LOAN	%	160	61,140	9,384	26,354	78,806
COST	%	160	6,737	1,673	1,372	13,430
GDP	%	160	6,343	2,781	1,570	9,990
INF	%	160	2,671	0,932	0,630	3,540

Table 4.3: Statistics The Analyzed Data

Source: Data processed using Stata software, 2024

The return on assets (ROA) is calculated as the ratio of after-tax profit to the total assets of the bank. This variable reflects the effectiveness of the bank's business operations. The statistical results in Table 4.3 indicate that the average ROA for commercial banks during the period from 2015 to 2022 is 1.060%, with a standard deviation of 0.746%. The ROA ranges from a minimum of 0.000% to a maximum of 3.238%.

The non-performing loan ratio (NPL) is calculated as the ratio of non-performing loans (loans classified as groups 3, 4, or 5) to the total outstanding loans of the bank. This ratio demonstrates the bank's ability to manage credit risk within its lending activities. According to Table 4.3, the average NPL ratio for commercial banks is 2.703%, with a standard deviation of 4.265%. The NPL ratio ranges from a minimum of 0.043% to a maximum of 24.688%.

The loan-to-asset ratio (LOAN) is determined by the ratio of outstanding loans to total assets of the bank. This variable indicates the bank's lending capacity. The statistical results in Table 4.3 reveal that the average loan-to-asset ratio for commercial banks is 61.140%, with a standard deviation of 9.384%. The LOAN ratio ranges from a minimum of 26.354% to a maximum of 78.806%.

The cost ratio (COST) is calculated as the ratio of total operating expenses to total assets of the bank. This variable reflects the bank's cost control in its operations. According to Table 4.3, the average cost ratio for commercial banks is 6.737%, with a standard deviation of 1.673%. The COST ratio ranges from a minimum of 1.372% to a maximum of 13.430%.

The GDP growth rate, denoted as GDP, represents the growth rate of the economy as published by the General Statistics Office. The statistical results in Table 4.3 indicate that the average GDP growth rate in Vietnam from 2015 to 2022 is 6.343%, with a standard deviation of 2.781%. This growth rate ranges from a minimum of 1.570% to a maximum of 9.990%.

The inflation rate, denoted as INF, reflects the inflation rate in Vietnam over the years from 2015 to 2022. According to Table 4.3, the average inflation rate in Vietnam during this period is 2.671%, with a standard deviation of 0.932%. The inflation rate ranges from a minimum of 0.630% to a maximum of 3.540%.

Ordinary Least Squares Regression

Ordinary Least Squares (OLS) regression, along with Fixed Effect and Random Effect models,

are the methods employed to identify the factors influencing the liquidity of listed commercial banks on the Vietnamese stock market.

Variables	Coefficients	T	Sig.
SIZE	1,102	1,14	0,256
CAP	-0,197	-1,14	0,256
ROA	1,684	2,62	0,010
NPL	0,170	2,29	0,023
LOAN	-0,190	-4,52	0,000
COST	-1,427	-6,92	0,000
GDP	0,089	0,79	0,434
INF	0,167	0,47	0,636
Constants	24,681	3,16	0,002
Observations			160
Tested			0,000

Table 4.4 Presents the Results of the OLS Regression Estimation

Source: Data processed using Stata software, 2024

The results indicate that the goodness-of-fit statistic for the Ordinary Least Squares (OLS) regression is 0.000, which is less than 0.05, thus satisfying the condition for model fit. Furthermore, the OLS regression estimation reveals that the return on assets, non-performing loan ratio, loan ratio, and cost ratio are significant factors influencing the liquidity of listed commercial banks on the Vietnamese stock market.

Fixed Effect Model

Table 4.5 presents the estimation results for the Fixed Effect Model. According to these results, the goodness-of-fit statistic for the Fixed Effect Model is 0.000, which is also less than 0.05, thereby confirming the adequacy of the regression results.

Variables	Coefficient	T	Sig.
SIZE	3,333	1,32	0,189
CAP	-0,303	-1,71	0,090
ROA	2,236	2,58	0,011
NPL	-0,150	-1,18	0,238
LOAN	-0,266	-4,30	0,000
COST	-1,203	-3,82	0,000
GDP	0,149	1,75	0,083
INF	-0,017	-0,06	0,952
Constants	10,343	0,51	0,609
Observations			160
Tested			0,000

Table 4.5: Results of the Fixed Effect Model

Source: Data processed using Stata software, 2024

Moreover, the estimation results from the Random Effect Model indicate that five factors influence the liquidity of listed commercial banks on the Vietnamese stock market: the equity ratio, return on assets, loan ratio, cost ratio, and GDP growth rate. However, the study could not determine the impact of bank size, non-performing loan ratio, and inflation rate on the liquidity of these banks.

Random Effect Model

Table 4.6 presents the estimation results for the Random Effect Model. The results indicate that the goodness-of-fit statistic for the model is 0.000, which is less than 0.05, thus satisfying the conditions for regression analysis. Furthermore, the estimation results from the Random Effect Model confirm that the equity ratio, return on assets, loan ratio, and cost ratio significantly affect the liquidity of listed commercial banks on the Vietnamese stock market. Conversely, the factors of bank size, non-performing loan ratio, GDP growth rate, and inflation rate have not yet been identified as having an impact on bank liquidity.

Variables	Coefficient	Z	Sig.
SIZE	2,073	1,24	0,214
CAP	-0,293	-1,75	0,080
ROA	2,327	3,31	0,001
NPL	-0,035	-0,33	0,742
LOAN	-0,245	-4,55	0,000
COST	-1,262	-4,68	0,000
GDP	0,126	1,54	0,124
INF	0,038	0,14	0,887
Constants	19,502	1,47	0,142
Observations			160
Tested			0,000

Table 4.6: Results of the Random Effect Model

Source: Data processed using Stata software, 2024

Adjusted Model

The examination of multicollinearity, autocorrelation, and heteroscedasticity indicates that the regression model does not violate the multicollinearity assumption; however, it does violate the assumptions of autocorrelation and heteroscedasticity. Therefore, adjustments are necessary to enhance the efficiency of the regression estimation results. In this study, the author addresses these violations through the Feasible Generalized Least Squares (FGLS) estimation method. The estimation results of the adjusted model are presented in Table 4.7.

The results indicate that the goodness-of-fit statistic for the FGLS model is 0.000, which is less than 0.05, demonstrating that the regression model meets the conditions for model fit. Additionally, the statistical significance of each independent variable shows that bank size,

equity ratio, return on assets, non-performing loan ratio, loan ratio, cost ratio, and GDP growth rate significantly influence the liquidity of listed commercial banks on the Vietnamese stock market. However, this study could not determine the impact of the inflation rate on the liquidity of these banks.

Variables	Coefficient	z	Sig.
SIZE	1,887	2,08	0,037
CAP	-0,409	-2,62	0,009
ROA	2,200	3,80	0,000
NPL	0,216	2,63	0,008
LOAN	-0,259	-6,34	0,000
COST	-1,233	-6,28	0,000
GDP	0,154	2,31	0,021
INF	-0,084	-0,38	0,701
Constants	21,916	3,10	0,002
Observations			160
Tested			0,000

Table 4.7: Results of the Adjusted Model

Source: Data processed using Stata software, 2024

Hypothesis Testing Results

In proposing the research model, the author formulated eight hypotheses, expecting that these eight factors would influence the liquidity of listed commercial banks on the Vietnamese stock market. These factors include: bank size, equity ratio, return on assets, non-performing loan ratio, loan ratio, cost ratio, GDP growth rate, and inflation rate. However, the regression results indicate that only seven research hypotheses are accepted, reflecting the influence of bank size, equity ratio, return on assets, non-performing loan ratio, loan ratio, cost ratio, and GDP growth rate on the liquidity of listed commercial banks on the Vietnamese stock market.

Variable	Hypothesis	Coefficient	Expected	Hypothesis test
SIZE	H_1	$1,887^{**}$	+	Accepted
CAP	H_2	$-0,409^{***}$	+	NA
ROA	H_3	$2,200^{***}$	+	Accepted
NPL	H_4	$0,216^{***}$	-	NA
LOAN	H_5	$-0,259^{***}$	-	Accepted
COST	H_6	$-1,233^{***}$	-	Accepted
GDP	H_7	$0,154^{**}$	-	NA
INF	H_8	$-0,084^{ns}$	+	Rejected

Table 4.8: Hypothesis Testing Results

Note: ***Statistical significance level of 1%; Statistical significance level of 5%; ns: Not statistically significant.
Source: Adjusted model results.

According to the hypothesis testing results presented in Table 4.8, bank size is a positively correlated factor affecting the liquidity of listed commercial banks on the Vietnamese stock market. With a coefficient of 1.887 at a 5% significance level, it can be concluded that larger total assets increase the liquidity of banks. This direction of impact aligns with the author's expectations, as the author anticipated this factor would enhance bank liquidity in proposing the research model. Therefore, hypothesis H1 is accepted. This finding is consistent with studies by Viet and Vinh (2019), Diem & Lanh (2021), and Diep & Lam (2015).

Secondly, the equity ratio negatively affects the liquidity of listed commercial banks in Vietnam from 2015 to 2022. The coefficient of -0.409 at a 1% significance level indicates that a higher equity ratio decreases the liquidity of these banks. This finding contradicts the author's expectations, as the author initially anticipated a positive correlation between equity ratio and liquidity. Equity can be viewed as a safety cushion for banks against operational risks, including liquidity risk (Thuan & Tuyet, 2021). However, the results are contrary to expectations and support the "too big to fail" theory, as well as the research by Nhung et al. (2023).

Thirdly, the return on assets (ROA) is positively correlated with the liquidity of listed commercial banks in Vietnam. With a coefficient of 2.200 at a 1% significance level, this is the strongest factor positively influencing bank liquidity. Thus, a higher ROA corresponds to increased liquidity. Hypothesis H3 is accepted. This finding further reinforces the conclusions of the pecking order theory and is consistent with several other empirical studies, such as those by Hang et al. (2022), Nguyen et al. (2021), Pham (2021), Diem & Lanh (2021).

Fourthly, the non-performing loan (NPL) ratio positively impacts the liquidity of listed commercial banks in Vietnam from 2015 to 2022. With a coefficient of 0.216 at a 1% significance level, it can be concluded that an increase in the NPL ratio leads to higher liquidity. This finding contradicts the author's initial hypothesis, as poor-quality loans typically make it difficult to recover principal and interest, reducing liquidity supply and increasing liquidity risk (Hang et al., 2022). Therefore, the NPL ratio was expected to negatively affect bank liquidity. However, the research results contradict this expectation, aligning with findings from Donjeta & Albert (2021), Khaled et al. (2020), Thuy & Diep (2018), and Hong (2015), all of which support a positive correlation.

Fifthly, the loan-to-deposit ratio negatively impacts the liquidity of listed commercial banks in Vietnam from 2015 to 2022. The impact coefficient is -0.259 at a significance level of 1%, indicating that higher loan ratios correspond to lower liquidity in banks. Thus, hypothesis H5 is accepted. This finding aligns with the conclusions of the liquidity risk theory, as expanding lending activities can lead to credit risk and diminish banks' liquidity (Moulton, 1918). Furthermore, it is consistent with studies by Ahmet & Melek (2022), Hang et al. (2022), Nguyen et al. (2021), Pham (2021), Thuan & Tuyet (2021), Thuy & Diep (2018), and Diep & Lam (2015), as well as Hong (2015).

Sixthly, the cost-to-income ratio negatively affects the liquidity of listed commercial banks in Vietnam during the same period. The impact coefficient is -1.233 at a significance level of 1%, suggesting that a higher cost ratio leads to reduced liquidity in these banks. This result aligns with the author's expectations when proposing the research model. Additionally, similar findings have been reported by Van (2021), Liulu & Qiujing (2021), and Vinh & Dung (2020).

Seventhly, GDP growth rate has a positive effect on the liquidity of listed commercial banks in Vietnam from 2015 to 2022. The impact coefficient is 0.154 at a significance level of 5%,

indicating that higher GDP growth correlates with increased liquidity. This result contradicts the author's expectations, as a booming economy typically encourages banks to expand their lending portfolios (Ibish et al., 2019). Conversely, during economic downturns, banks tend to hold more liquid assets and lend only for suitable investments (Hanh & Vy, 2019). Nevertheless, this study's conclusion is consistent with the findings of Viet & Vinh (2019).

Finally, the inflation rate does not show statistical significance, indicating that it cannot be concluded whether inflation affects the liquidity of commercial banks in Vietnam from 2015 to 2023. Therefore, hypothesis H8 is rejected. It was expected that inflation would positively influence liquidity, as rising inflation reduces the real value of money and assets, leading banks to restrict credit issuance, which would, in turn, enhance liquidity (Thanh et al., 2022; Viet & Vinh, 2019). However, this study did not establish a definitive relationship between inflation and the liquidity of listed commercial banks in Vietnam. Similar results have been found in studies by Chi et al. (2023), Ahmet & Melek (2022), Hang et al. (2022), Nguyen et al. (2021), Pham (2021), Van (2021), Diyaeldin (2020), and Munteanu (2012).

Conclusions and Policy Implications

Conclusions

This study was conducted to identify the factors affecting the liquidity of listed commercial banks (NHTM) on the Vietnamese stock market. The data used for the analysis were collected from the financial statements and annual reports of 20 listed commercial banks. The analytical methods employed to achieve the research objectives included random effects models and fixed effects models. Through the Hausman test, the fixed effects model was selected to explain the factors influencing liquidity. However, the model violated the conditions regarding autocorrelation and heteroscedasticity. Thus, the Generalized Least Squares (GLS) model was employed to address these issues, revealing that bank size, profitability, non-performing loan ratio, loan ratio, and cost ratio are significant factors affecting liquidity. The study draws several conclusions as follows:

Firstly, Bank Size is a positive relationship between bank size and liquidity; therefore, larger banks tend to have enhanced liquidity. In addition, the equity ratio negatively impacts liquidity, indicating that a higher equity ratio leads to reduced liquidity. Thirdly, Profitability has a positive effect on liquidity, suggesting that higher operational efficiency in banks correlates with improved liquidity. Fouthly, The Non-Performing Loan Ratio positively affects liquidity, meaning that banks with higher non-performing loans must improve their liquidity to mitigate liquidity risk. Fifthly, The loan ratio negatively impacts liquidity, indicating that increased lending results in lower liquidity. Sixthly, Cost Ratio is a negative relationship between the cost ratio and liquidity; thus, higher operational costs lead to lower liquidity in banks. Lastly, GDP Growth Rate is a positive correlation between GDP growth and liquidity, meaning that higher GDP growth facilitates improved liquidity for banks. Finally, the study did not find sufficient evidence to assess the impact of inflation on the liquidity of listed commercial banks from 2015 to 2022.

Policy Implications

Based on the findings, seven aspects influence the liquidity of listed commercial banks in Vietnam. These can serve as a foundation for proposing policy implications aimed at ensuring the liquidity of these banks. The implications include recommendations for commercial banks and the State Bank of Vietnam.

Policy Implications for Commercial Banks

Firstly, as profitability positively affects liquidity, improving operational efficiency is essential for bank growth. In addition to strengthening credit risk management and operational costs, banks should focus on technology adoption, which can significantly aid in managing operations. Secondly, given that total asset size positively impacts liquidity while the equity ratio negatively affects it, banks seeking to improve liquidity should consider increasing total asset size. This could be achieved through various means, such as issuing additional shares to current shareholders or potential investors, issuing long-term bonds, or increasing retained earnings. Thirdly, Operating costs encompass various items, with interest expenses being the most significant. Therefore, banks should implement policies that balance deposit and lending rates to minimize interest expenses. Additionally, managing administrative costs is crucial to ensure operational viability. Fourthly, although the study indicates that the loan ratio negatively affects liquidity, reducing lending could lead to diminished income and operational efficiency. Banks should therefore expand lending within their financial capacity while ensuring liquidity. Fifthly, Banks must enhance their assessment of loan applications to minimize the likelihood of granting credit to high-risk clients. Furthermore, post-disbursement monitoring should be rigorous, with staff regularly evaluating clients' use of funds and repayment capacity. Lastly, Commercial banks should stay informed about domestic and international economic trends and financial policies to comply with regulations. They should analyze the impacts of macroeconomic policies on their operations and develop strategies to respond to challenges or capitalize on opportunities.

Policy Implications for the State Bank of Vietnam

Firstly, it is siginificant to establish a Framework for Increasing Bank Equity. Since most operational funding for commercial banks comes from liabilities, it is essential to enhance their equity base. The State Bank of Vietnam should design a regulatory framework regarding the equity structure of banks. Secondly, Promoting Key Economic Sectors is really necessary. The State Bank should provide guidance on priority industries for economic development, assisting banks in directing credit toward these sectors. Thirdly, State Bank needs to consider the regulating a Balanced and Stable Economy. Economic fluctuations impact all sectors, including financial institutions. Therefore, the State Bank must maintain its position through policies that regulate interest rates, capital adequacy ratios, and credit volume.

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