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Determinants of Bank Stability in Emerging Economies: Empirical Evidence From Vietnam

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ABSTRACT

The thesis explores the main factors affecting the financial stability of commercial banks in Vietnam. It utilizes annual panel data from 27 banks listed on the Vietnamese Stock Exchange, covering the period from 2009 to 2023. Findings reveal that factors such as the equity-to-asset ratio (ETA), bank size (SIZE), return on equity (ROE), and ownership structure (OWN) positively correlate with financial stability, whereas non- performing loans (NPL) negatively affect it. The impact of net interest margin (NIM) and loan-to-deposit ratio (LDR) on stability remains inconclusive. Among macroeconomic factors, the inflation rate (INF) positively influences financial stability, while GDP growth (GDP) does not have a significant effect. Additionally, COVID-19 variables showed no significant association with financial stability.

Keywords: Commercial bank, emerging economies, financial stability, impact, solutions.

1. Introduction

In the context of deepening economic integration, the banking sector plays a crucial role in Vietnam's economic growth and development. Thus, improving and maintaining the financial stability of the commercial banking sector has been one of the key priorities over the past decade. During this period, there was a strong emphasis on restructuring, mergers, and acquisitions within the banking system, particularly targeting weak banks that were compelled to merge or be acquired at 0 VND or under close supervision. This has raised concerns about the financial stability of commercial banks in Vietnam.

The COVID-19 pandemic has had severe impacts on the economies and commercial banking systems worldwide, including in Vietnam. The pandemic disrupted economic activities, leading to business closures, reduced production, and limited business expansion, which in turn decreased capital demand. Although the average lending interest rate rose slightly to 8% per year

ISSN: 2455-8834

Volume:09, Issue:08 "August 2024"

after the pandemic was under control, businesses' uptake of capital remained low as they adjusted to the new normal. Consequently, the deposit-to-total non-interbank loan ratio exceeded 120% in 2020 but gradually decreased in 2021 and 2022. Despite challenges in traditional lending, banks have focused on enhancing their service offerings and leveraging non-interest income, such as fees from service activities. Although banks faced some difficulties, their profitability ratios and net interest margins remained stable from 2019 to 2022.

Looking ahead to 2024, the General Statistics Office forecasts that persistent global economic risks will negatively impact Vietnam's economic recovery prospects. The lingering effects of the pandemic, high inflation due to tight monetary policies, rising public debt, sluggish globaltrade growth, and volatility in crude oil and food prices, along with extended interest rate increases in many countries, contribute to the uncertain recovery of the global economy. The Deputy Governor of the State Bank highlights the need for balanced monetary policy to stabilize the macroeconomy, control inflation, stabilize the monetary market, and ensure the long-term stability of the banking system.

On this basis, conducting research on factors that influence the financial stability of commercial banks in Vietnam is of utmost importance in order to ensure the sustainable development of the system and the overall economy of the country. By identifying potential risks and proposing effective management measures, banks can enhance the stability and safety of the banking system. Therefore, the purpose of this paper is to examine factors that affect the financial stability of commercial banks in Vietnam.

In Vietnam, research on factors influencing bank stability is relatively sparse. This study employs four models - Pooled Ordinary Least Squares (OLS), Fixed Effects Regression Model (FEM), Random Effects Regression Model (REM), and Generalized Least Squares Regression Model (GLS) - to analyze these factors. These models are compared and tested to identify the most effective one. The use of GLS is particularly noteworthy as it effectively addresses issues of autocorrelation and heteroscedasticity.

The rest of this paper is organized into the following sections. The next section reports the background theories and a review of the previous literature. Section 3 describes the model, data, methodology, and model, and Section 4 provides some empirical results and robustness checks. The final section summarizes the main conclusions and proposes some recommendations.

2. Literature Review

Chand, Kumar, and Stauverman (2020) study bank stability in Fiji from 2000 to 2018, using measures like the Z-score and risk-adjusted ratios. They find that stability is positively correlated with bank size, funding and credit risk, and bank competition, as well as inflation and

ISSN: 2455-8834

Volume:09, Issue:08 "August 2024"

economic growth. Conversely, liquidity risk, net interest margin, and remittance inflow negatively impact stability. The study also highlights that the political crisis in 2000 and 2006, and the 2007-2008 global financial crisis harmed bank stability.

Yensu et al. (2021) examine the main determinants of commercial banks' stability in Ghana between 2008 and 2017. Their findings show that firm-specific factors like bank size and net profit margin positively affect stability, while interest cover has a negative impact. The study also finds that board characteristics, such as CEO gender, board size, and meeting frequency, positively influence stability. Macroeconomic factors like inflation and GDP growth are positively associated with bank stability, whereas higher bank rates negatively affect it.

Elahi et al. (2021) examine how operating cash flows affect the financial stability of banks in Pakistan using annual panel data from 20 commercial banks (2011-2019). They find that operating cash flows and net interest margin positively impact stability, while the cost-to-income ratio and advances net of provisions to total assets ratio negatively affect it. The study highlights the importance of managing cash flows and net interest margins for bank stability, and notes that income diversification, asset quality, financial leverage, capital ratio, financial performance, breakup value per share, and bank size do not significantly impact stability.

Koskei (2021) examines the determinants of bank stability in Kenya, using monthly data from January 2015 to December 2019. The study, employing multiple regression analysis, finds that lower liquidity ratios, inflation rates, and lending rates negatively impact banking stability. Conversely, loan growth and return on equity positively affect stability. The exchange rate, return on assets, and public debt do not significantly impact banking stability.

Sari and Sudarmawan (2023) investigate factors influencing the stability of Islamic banks in Southeast Asia from 2014 to 2021. Using data from 11 banks in Brunei, Indonesia, and Malaysia, and applying panel data regression, they find that institutional quality positively affects stability, while financing growth negatively impacts it. Earnings management does not significantly affect stability. The study suggests banks should focus on improving institutional quality and be cautious with financing expansion to enhance stability.

In Vietnam, Nguyen and Tran (2021) study the determinants of financial stability in Vietnamese commercial banks, measured by the capital adequacy ratio. Using panel data from 30 banks for 2007-2019, they find that loan provisions, credit gaps, output gaps, and deposit ratios negatively impact the capital adequacy ratio. Conversely, profitability ratio, bad debt ratio, liquidity ratio, and risk ratio have a positive effect on it.

Pham and Dao (2021) analyze the impact of competition on the financial stability of 31 Vietnamese commercial banks from 2010 to 2018. Using the Lerner index to measure

ISSN: 2455-8834

Volume:09, Issue:08 "August 2024"

competitiveness and the Z-Score index for financial stability, they find that increased competitiveness positively affects stability. They also highlight that the equity-to-asset ratio, loan-to-asset ratio, and income diversification improve financial stability, while factors like bank size, capital mobilization market share, loan loss provisions, asset growth, and ownership type negatively affect it. Additionally, foreign bank assets, GDP growth, and inflation positively influence stability.

Subsequently, Nguyen (2022) examines the determinants of financial stability in Vietnamese commercial banks using the Z-Score metric. The study uses annual panel data from 24 commercial banks listed on the Vietnamese Stock Exchange for 2011–2020 and employs various regression models, including OLS, FEM, REM, and GLS. The findings reveal that total assets, return on equity, and the equity-to-total-assets ratio positively and significantly impact financial stability, suggesting that larger, more profitable banks tend to be more stable. Conversely, the ratio of outstanding loans to total assets negatively affects stability, indicating that higher loan levels may challenge the stability of Vietnamese commercial banks. The study does not determine the impact of credit growth rate or earnings growth rate after tax on bank stability.

More recently, Nguyen, Pham, and Le (2023) analyze how liquidity risk affects the performance of 19 Vietnamese commercial banks from 2013 to 2022, including 190 observations before and during the COVID-19 pandemic. Using OLS, FEM, REM, and GLS panel data regression methods, they find that liquidity risk and capital adequacy positively impact bank performance, while credit risk and the pandemic negatively affect it. Additionally, bank size positively influences performance. The study recommends improving liquidity risk management to enhance the business performance of Vietnamese banks.

Likewise, Nguyen (2023) investigates factors affecting bankruptcy risk in Vietnamese joint stock commercial banks from 2010 to 2021, using panel data from 30 banks and regression methods. Findings from the System Generalized Method of Moments (SGMM) indicate that higher operating expenses and inflation increase bankruptcy risk, while larger bank size and higher return on assets reduce it. The study underscores the importance of managing bankruptcy risks to enhance stability in Vietnam's banking sector

After evaluating the research situation, it is evident that the majority of studies have utilized data sets only up to the year 2019. However, since 2019, the outbreak of the COVID-19 pandemic has had a profound impact on both the global and Vietnamese economies, highlighting the importance of considering performance, stability, and financial health of the banking sector. While there are a limited number of studies examining the effects of COVID-19 on the financial stability of banks, such as those by Elnahass et al. (2021), Phan et al. (2021), Maria et al. (2022), Shabir et al. (2023), and Nguyen, Pham, and Le (2023). Consequently, it is essential to update

ISSN: 2455-8834

Volume:09, Issue:08 "August 2024"

the dataset to present times to offer a more modern viewpoint that is in line with the status of the Vietnamese banking sector.

3. Variables, Model specification, Sample Overview

3.1. Measuring financial stability

To measure financial stability, we follow the previous studies and use Zscore index. The Z-Score is a common measure of stability at the level of individual institutions. The popularity of the Z-Score stems from its clear (negative) relationship to the probability of a financial institution's insolvency. It explicitly compares buffers (capitalization and returns) with risk (volatility of returns) to measure a bank's solvency risk. A higher Z-Score therefore implies alower probability of insolvency. Accordingly, Zscore is measured as:

$$Zscore_i = \frac{E_{it}/A_{it} + ROA_{it}}{\sigma(ROA_i)} \qquad (3.1)$$

where:

$Zscore_i$ is financial stability of bank i in the period;

ROA_{it} is return on asset of bank i in time t;

E_{it} is equity of bank i in time t;

A_{it} is total assets of bank i in time t;

$\sigma(ROA_i)$ is standard deviation of return on assets of bank i in time t.

3.2. Factors affecting the financial stability of commercial banks

3.2.1. Equity-to-Asset Ratio (ETA)

The equity-to-asset ratio measures the proportion of a company's assets financed by shareholders' equity, reflecting financial leverage and solvency. It indicates a bank's internal strength and ability to cover losses, thus supporting stability. Le et al. (2020) and Pham, Dao, and Nguyen (2021) find a positive relationship between this ratio and financial stability in Vietnamese banks. Nguyen (2023) also suggests that banks with a higher ratio are better positioned to offer services, build trust, and generate profits, thereby enhancing financial stability.

3.2.2. Non-performing Loans (NPL)

ISSN: 2455-8834

Volume:09, Issue:08 "August 2024"

Empirical findings on the impact of non-performing loans (NPLs) on bank stability are mixed. Nguyen and Tran (2021) and Chand et al. (2020) find a positive effect of NPLs on stability, while Kharabsheh and Ghraibeh (2022) and Katuka et al. (2023) find a negative effect, suggesting that higher NPLs weaken stability. Some studies, such as Nguyen and Le (2020) and Nguyen (2023), find no significant relationship. This study expects the non- performing loan ratio to negatively impact the financial stability of Vietnamese commercial banks.

3.2.3. Bank Size (SIZE)

Bank size, measured as the natural logarithm of total assets, reflects a bank's financial capacity and market presence. Larger banks benefit from economies of scale and improved intermediation, monitoring, and diversification (Chand et al., 2020). Studies by Chand et al. (2020), Yensu et al. (2021), Le et al. (2020), Pham, Dao, and Nguyen (2021), and Nguyen (2023) show that larger banks are generally more stable. A bigger bank typically faces lower bankruptcy costs and higher growth, contributing to better stability. Thus, bank size isexpected to positively impact the financial stability of Vietnamese commercial banks.

3.2.4. Return on Equity (ROE)

Return on equity (ROE) measures a bank's profitability and efficiency by dividing netprofit after tax by shareholders' equity. A higher ROE indicates better profit generation from equity and efficient capital use. Studies by Koskei (2020), Chand et al. (2020), and Nguyen (2022) show ROE positively affects bank stability, suggesting that higher ROE enhances stability. Thus, ROE is expected to positively impact the financial stability of Vietnamese commercial banks.

3.2.5. Net Interest Margin (NIM)

Net interest margin (NIM) measures a bank's profitability from lending and investments, calculated by dividing net interest income by total interest-earning assets. Nguyen et al. (2015) and Elahi et al. (2021) find a positive correlation between NIM and bank stability, indicating effective asset and liability management. However, Chand et al. (2020) report a negative association, suggesting that higher NIM may indicate risky credit expansion and increase default risks, which can undermine stability. This is consistent with Le et al. (2020) for the Vietnamese banking sector. Therefore, NIM is expected to negatively impact the financial stability of Vietnamese commercial banks.

3.2.6. Loan-to-Deposit Ratio (LDR)

The loan-to-deposit ratio (LDR) measures a bank's liquidity and its ability to fund lending activities, calculated by dividing total loans by total deposits. A higher LDR indicates greater

ISSN: 2455-8834

Volume:09, Issue:08 "August 2024"

reliance on external funding. Innocent et al. (2021), Le et al. (2020), and Bui, Ho, and Nguyen (2023) find that a higher LDR positively impacts financial stability and operational efficiency. Therefore, the loan-to-deposit ratio is expected to positively affect the financial stability of Vietnamese commercial banks.

3.2.7. Ownership structure (OWN)

Nguyen et al. (2015) find that state-owned banks are generally more stable due to depositortrust and lower risk exposure, a view supported by Boulanouar et al. (2021) for the GCC banking sector. However, this stability is less pronounced for large state-owned banks and can be negative when controlled for size, as noted by Pham and Dao (2021) and Pham, Dao, and Nguyen (2021). Thus, while state-owned banks benefit from capital and protection policies, these factors may reduce their stability amid market fluctuations. Therefore, ownership structure is expected to negatively impact the financial stability of Vietnamese commercial banks.

3.2.8. GDP Growth (GDP)

GDP growth measures a country's economic progress, with an increase in real GDP indicating a healthy economy. Studies show a positive correlation between economic growth and bank stability (Chand et al., 2020; Nguyen and Le, 2020; Yensu et al., 2021; Pham and Dao, 2021). Higher GDP growth enhances bank stability by boosting household income, savings, and investment prospects. Therefore, GDP growth is expected to positively impact the financial stability of Vietnamese commercial banks.

3.2.9. Inflation Rate (INF)

The inflation rate, measured by the Consumer Price Index (CPI), affects bank stability. Studies show that moderate inflation positively impacts bank stability by signaling economic growth, increased demand, and higher real estate transactions, which can boost bank assets and profitability (Chand et al., 2020; Pham and Dao, 2021; Pham, Dao, and Nguyen, 2021). Thus, inflation is expected to positively impact the financial stability of Vietnamese commercial banks.

3.2.10. COVID-19 Period (COV)

COVID-19, which emerged in late 2019 and early 2020, has severely impacted global health and economic development, causing significant declines in global activity and increasing risks. Vietnam experienced four COVID-19 waves from January 2020 to April 2021. Elnahass et al. (2021) report that COVID-19 has led to higher insolvency risk, lower credit risk, and increased asset risk, reducing financial performance and stability. This is supported by Phan et al. (2021), Maria et al. (2022), and Shabir et al. (2023). The pandemic has notably weakened the banking

ISSN: 2455-8834

Volume:09, Issue:08 "August 2024"

sector's profitability and stability, making banks more vulnerable to economic shocks. Therefore, COVID-19 is expected to negatively impact the financial stability of Vietnamese commercial banks.

3.3. Model specification

To examine factors affecting bank stability, we use the following regression model:

$$\begin{aligned} \mathbf{Zscore_i} = {} & \boldsymbol{\beta_0} + \boldsymbol{\beta_1}\mathbf{ETA_{it}} + \boldsymbol{\beta_2}\mathbf{NPL_{it}} + \boldsymbol{\beta_3}\mathbf{SIZE_{it}} + \boldsymbol{\beta_4}\mathbf{ROE_{it}} + \boldsymbol{\beta_5}\mathbf{NIM_{it}} \\ & + \boldsymbol{\beta_6}\mathbf{LDR_{it}} + \boldsymbol{\beta_7}\mathbf{OWN_{it}} + \boldsymbol{\beta_8}\mathbf{GDP_{it}} + \boldsymbol{\beta_9}\mathbf{INF_t} + \boldsymbol{\beta_{10}}\mathbf{COV_t} + \boldsymbol{\varepsilon_{it}} \end{aligned} \quad (3.2)$$

where:

$Zscore_i$ is financial stability of bank i in the period; ETA_{it} is equity to asset ratio of bank i in time t; NPL_{it} is non-performing loans of bank i in time t; $SIZE_{it}$ is bank size of bank i in time t; ROE_{it} is return on equity of bank i in time t; NIM_{it} is net interest margin of bank i in time t; LDR_{it} is loans to deposits ratio of bank i in time t; OWN_{it} is dummy variable, represents ownership of bank i in time t; is dummy variable, represents COVID-19 pandemic; GDP_{it} is GDP growth in time t; INF_{it} is inflation rate in time t; ε_{it} is error term.

3.4. Sample overview

The sample for this study includes 27 commercial banks operating in Vietnam. Data were collected from annual financial reports published on Vietnamese stock exchanges and the official websites of these banks, covering the period from 2009 to 2023. Macroeconomic data were sourced from the annual Statistical Yearbook provided by the General Statistics Office of Vietnam.

4. Empirical Results

4.1. Descriptive statistics

Table 4.1 displays the descriptive statistics for all variables. The average bank stability (Zscore) is 36.26 with a standard deviation of 16.13, showing significant variation in financial stability among Vietnamese banks from 2009 to 2023. The average equity-to-asset ratio (ETA) is 0.094, with a notable range from 0.015 to 0.33, indicating varied financial leverage. Non-performing loans (NPL) average 0.023 with a standard deviation of 0.022 anda large range from 0.00 to 0.29, showing consistent fluctuations. The average bank size (SIZE) is 18.64, with a range between 15.02 and 21.56 and a low standard deviation of 1.31, indicating minimal disparity in size. The average return on equity (ROE) is 0.104 with a standard deviation of 0.103,

ISSN: 2455-8834

Volume:09, Issue:08 "August 2024"

and a broad range from -0.82 to 1.38, reflecting less volatility. The net profit margin (NIM) averages 0.03 with a standard deviation of 0.01, and a significant range from -0.007 to 0.088, suggesting low efficiency in capital use. The loan-to- deposit ratio (LDR) averages 0.819 with a range from 0.134 to 1.692 and a standard deviationof 0.163, indicating less fluctuation. Dummy variables for ownership (OWN) and the COVID-19 period (COV) have mean values of 0.148 and 0.133, respectively. GDP growth ranges from 2.56% to 8.01%, and inflation ranges from 0.63% to 18.67%.

Table 1: Descriptive statistics

Variable	Observation	Mean	Standard deviation	Min	Max
Zscore	405	36.257	16.131	13.338	126.055
ETA	405	0.094	0.043	0.015	0.332
NPL	405	0.023	0.022	0	0.297
SIZE	405	18.642	1.313	15.018	21.556
ROE	405	0.105	0.104	-0.820	1.382
NIM	405	0.030	0.012	-0.008	0.088
LDR	405	0.819	0.163	0.135	1.692
OWN	405	0.148	0.356	0	1
COV	405	0.133	0.340	0	1
GDP	405	0.059	0.015	0.025	0.080
INF	405	0.053	0.043	0.006	0.187

4.2. Correlation matrix

Table 2 presents the correlation matrix of the study variables. According to Gujarati (2021), multicollinearity is indicated by correlations above 80%. The highest correlation, 0.79, is between ETA and Zscore, which is below 80%, suggesting ETA is a strong predictor of financial stability. SIZE, NIM, OWN, LDR, and INF also show relatively strong correlations with Zscore,

ISSN: 2455-8834

Volume:09, Issue:08 "August 2024"

while other variables have weak correlations. Overall, multicollinearity is not severe.

Table 2. Correlation matrix

		1	2	3	4	5	6	7	8	9	10	11
1	*Zscore*	1										
2	*ETA*	0.79*	1									
3	*NPL*	0.02	0.06	1								
4	*SIZE*	-0.54*	-0.59*	-0.13*	1							
5	*ROE*	-0.08	-0.15*	-0.21*	0.40*	1						
6	*NIM*	0.39*	0.36*	-0.09	0.08	0.37*	1					
7	*LDR*	0.18*	0.18*	-0.072	0.12*	0.19*	0.29	1				
8	*OWN*	-0.30*	-0.34*	-0.07	0.62*	0.13*	-0.04	0.23*	1			
9	*COV*	-0.08	-0.09*	-0.08	0.19*	0.09	0.01	0.05	0.00	1		
10	*GDP*	-0.03	-0.02	0.01	-0.06	-0.07	-0.02	-0.00	-0.00	-0.85*	1	
11	*INF*	0.22*	0.22*	0.08	-0.29*	-0.04	0.15*	-0.15*	0.00	-0.25*	0.05	1

4.3. Regression results

The regression results of 4 models are summarized in Table 3. In Table 3, the results are presented where Zscore is the dependent variable. As can be seen from the table, six out of the ten exogenous factors exhibit statistically significant effects on Zscore at a 5% significance level, namely ETA, NPL, SIZE, ROE, OWN, and INF.

Specifically, the ETA coefficient is positively and significantly linked to bank stability at the 5% level. This indicates that higher equity levels in a bank's capital structure correlate with greater stability. ETA is the most influential factor on financial stability among Vietnamese banks, with a coefficient of 370.569, aligning with findings by Le et al. (2020), Pham, Dao, and Nguyen (2021), and Nguyen (2023). Nguyen (2023) notes that banks with high equity-to- asset ratios are better positioned to offer services, build customer trust, and achieve financial stability.

Table 3 also reveals that non-performing loans (NPL) negatively and significantly impact bank stability in Vietnam at the 5% level. As NPLs increase, bank stability weakens, consistent with Katuka et al. (2023) but contradicting Nguyen and Tran (2021). Since late 2007, Vietnam has seen a rise in bad debts, peaking from 2.52% in 2010 to 8.82% in 2012, and reaching 13% of

ISSN: 2455-8834

Volume:09, Issue:08 "August 2024"

total loans by 2012 according to Fitch Ratings. Although restructuring efforts improved the situation between 2014-2018, the COVID-19 pandemic is expected to exacerbate bad debts in 2020-2021. By the end of 2021, the on-balance sheet bad debt ratio was 1.9%, with a gross ratio of 7.31%, and bad debt balances increased by 17.3% from 2020. Rising NPLs lead to decreased profits and tighter credit standards, negatively affecting bank operations and profitability.

The coefficient of SIZE is 0.248, positively and significantly linked to bank stability (Zscore) at the 5% level. Larger banks tend to be more stable, aligning with Chand et al. (2020) in Fiji, Yensu et al. (2021) in Ghana, and studies by Le et al. (2020), Pham, Dao, and Nguyen (2021), and Nguyen (2023) in Vietnam. Larger banks typically face lower bankruptcy costs and have better growth potential, thanks to ample customer deposits and liquidity. Nguyen (2023) highlights that banks with substantial financial resources are better equipped to manage risks.

Meanwhile, return on equity (ROE) significantly positively impacts banks' financial stability at the 5% level. Higher ROE indicates more efficient capital utilization and greater shareholder value, aligning with Koskei (2020), Chand et al. (2020), and Nguyen (2022). Despite a performance decline from 2008 to 2014 due to bad debts, Vietnamese banks improved efficiency and profitability from 2014 onwards. Even amid the COVID-19 pandemic, banks-maintained stability through policies like restructuring debt and adjusting loan provisions (Tran and Ho, 2023).

The regression results show that ownership structure (OWN) has a significant positive impact on bank stability, with a coefficient of 1.182 at the 5% level. This finding aligns with Nguyen et al. (2015) and Boulanouar et al. (2021). Nguyen et al. (2015) found that Vietnamese state-owned banks are less likely to face bankruptcy due to strong depositor trust and minimal risk exposure. While state-owned banks in Vietnam, such as Agribank, BIDV, Vietcombank, and Vietinbank, have lower financial stability Z-scores compared to joint-stock banks, they show less volatility and greater stability. These banks, benefiting from cheap capital, competitive deposit rates, and protective policies, have continued to grow and maintain stability, even during the COVID-19 pandemic.

The regression results also reveal that NIM has a positive but statistically insignificant effect on financial stability in Vietnamese banks. Similarly, LDR is negatively associated with financial stability but also statistically insignificant. This implies that the net interest margin and loan-to-deposit ratio do not significantly affect financial stability in Vietnam from 2009to 2023.

In terms of macroeconomic factors, the inflation rate (INF) has a significant and positive effect on the financial stability of Vietnamese commercial banks at a 5% significance level.

This finding aligns with Chand et al. (2020) and Pham, Dao, and Nguyen (2021), who note that

ISSN: 2455-8834

Volume:09, Issue:08 "August 2024"

higher inflation can boost economic growth, demand, and bank profitability, thereby enhancing stability. Despite global financial crises, Vietnam effectively managed inflation during the COVID-19 pandemic, with CPI growth rates at 3.23% in 2020 and 1.84% in 2021. This successful inflation control, coupled with flexible monetary policies, helped the Vietnamese banking system maintain stability amidst global challenges. On the other hand, GDP growth has a positive but statistically insignificant correlation with banks' financial stability.

Finally, the regression results also indicate that the COVID-19 period had no significant impact on the financial stability of the banking sector. This contrasts with findings by Elnahass et al. (2021) and Maria et al. (2022). Despite the pandemic's negative effects on Vietnam's economy, banks achieved unexpectedly high profits due to reduced operational costs, investment in modern technology, and the rise of digital banking. These factors, including increased low-interest deposits and expanded services, helped banks maintain stability and profitability.

Table 3: Regression results of OLS, FEM, REM and GLS

Variables	OLS		FEM		REM		GLS	
	Zscore		Zscore		Zscore		Zscore	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
ETA	387.347	0.000	386.848	0.000	387.017	0.000	370.569	0.000
NPL	-14.612	0.003	-10.2366	0.001	-10.607	0.001	-7.915	0.000
SIZE	0.626	0.000	0.514	0.000	0.555	0.000	0.248	0.050
ROE	9.652	0.000	5.738	0.000	5.941	0.000	4.884	0.000
NIM	-9.266	0.416	-11.467	0.157	-11.155	0.170	8.967	0.129
LDR	-1.574	0.033	1.193	0.021	0.981	0.058	-0.014	0.973
OWN	0.275	0.514	0 (omitted)		0.307	0.730	1.182	0.008
COV	0.954	0.142	1.119	0.005	1.069	0.007	0.096	0.706
GDP	14.647	0.296	14.997	0.073	14.365	0.088	3.248	0.484
INF	5.868	0.040	6.401	0.000	6.541	0.000	2.619	0.025
_cons	-12.372	0.000	-12.154	0.000	-12.799	0.000	-4.821	0.045
No. of obs.		405						

ISSN: 2455-8834

Volume:09, Issue:08 "August 2024"

5. Conclusion

The main objective of the study is to examine the key determinants of financial stability using yearly data over the 2009 – 2023 period from Vietnam's commercial banking sector. Various regression models like OLS, FEM, REM, and GLS are employed in the study. The research provides an insight into the current financial stability status of commercial banks, emphasizes the importance and influence of banking system stability on the Vietnamese economy, and presents specific indicators for measuring banks' financial stability.

The findings suggest that financial stability is influenced both positively and negatively by certain factors. Bank-specific factors like equity-to-asset ratio (ETA), bank size (SIZE), return on equity (ROE), ownership structure (OWN) exhibit a positive correlation with banks' financial stability. Conversely, non-performing loans (NPL) show a negative relationship with financial stability. However, the study does not definitively determine the impact of net interest margin (NIM) and loan-to-deposit ratio (LDR) on bank financial stability. Regarding macroeconomic factors, inflation rate (INF) is found to have a positive effect on banks' financial stability, while GDP growth (GDP) does not impact the financial stability of banks. COVID-19 variables are also found to have no significant relationship with financial stability.

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