



“Capital adequacy ratio and a bank’s financial stability in Vietnam”

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CAPITAL ADEQUACY RATIO AND A BANK'S FINANCIAL STABILITY IN VIETNAM

Abstract

The objective of this study is to provide more empirical evidence on the impact of the capital adequacy ratio, as well as control and micro variables, on the financial stability of commercial banks in emerging markets such as Vietnam. The study analyzes the impact of the capital adequacy ratio on the financial stability of 18 Vietnamese commercial banks in the period 2010–2020 using the Generalized method of moments (GMM) model. Empirical research results show that the capital adequacy ratio has a positive correlation with the financial stability of Vietnamese commercial banks during the study period. Besides, the study also uses control variables such as Profitability through ROA and ROE, Bank Size (SIZE), Loans to Assets Ratio (LTA), Deposits to Assets Ratio (DTA), and Loan Loss Ratio (LLR), to analyze their impact on the financial stability of Vietnamese commercial banks.

Based on the above results, the study proposes some policy implications to enhance the financial stability of Vietnamese commercial banks using the capital adequacy ratio and the control variables from the GMM model that are statistically significant. The paper also pointed out four limitations of the study in terms of data, research samples, methods and research models, so that further research can be more complete.

Keywords

Basel, commercial banks, GMM, Vietnam

JEL Classification

E47, G28, L10

INTRODUCTION

The world economy in general and Vietnam's economy in particular have experienced numerous turbulences over the past period. Heated growth in some industries and businesses will have both positive and negative effects on the entire economy. Banking, as a financial intermediary, has always been a priority of the State, Government and general public in sustainable and healthy development. Commercial banks may conduct all banking operations and other business activities for profit according to the provisions of the Law on Credit Institutions. Commercial banks operate under special supervision of the State Bank of Vietnam (SBV), so financial stability of commercial banks is also closely monitored by SBV in relevant legal documents.

In the course of operation, the capital adequacy ratio of commercial banks is considered as an indicator to measure their risk level. The capital adequacy ratio should be applied in accordance with international standards to help banks both protect themselves against financial shocks and protect customers and citizens using banking services (Ahmed Abdel Karim, 1996; Białaś & Solek, 2010; Abou-El-Sood, 2016). Capital adequacy ratios serve as a safety valve for banks themselves and their customers or shareholders to minimize expected risks faced by commercial banks, especially for cross-border transactions as these rules are binding on all international banks. The application of regulations on capital adequacy ratio in line with international standards will help commercial banks achieve sound management and administration (Hafez & El-Ansary, 2015).

The Basel Committee on Banking Supervision has issued treaties regulating general principles and banking laws. The Basel Committee standards have been applied around the world for the capital adequacy ratio at commercial banks (Hsu et al., 2007; Białas & Solek, 2010). Understanding and analyzing the impacts of the capital adequacy ratio on the financial stability of commercial banks will give an overview and assessment on the influence of these factors on the financial stability of commercial banks in Vietnam. Based on the empirical research results, executives have more grounds to make decisions that help commercial banks secure stable and sustainable development in the coming period. In addition, the study also helps investors and customers have confidence in the stability of the commercial banking system in Vietnam.

An increase in the capital adequacy ratio by commercial banks can help increase financial stability. However, when the capital adequacy ratio is too high, banks are not efficient in using existing capital sources, thereby reducing profitability, which can cause financial instability. Therefore, the study was conducted to provide more empirical evidence on the impact of the capital adequacy ratio on the financial stability of commercial banks in Vietnam.

1. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

1.1. Financial stability

The concept of bank financial stability may mean different things at different levels. The study examines the definitions of financial stability of commercial banks by some researchers in order to unify the concept used in this study.

Gupta and Kashiramka (2020) argue that financial instability is related to conditions in the financial markets that cause losses or threats to the economy through the operating mechanisms of the financial system. Financial instability will harm the economy through a variety of ways such as weakening the financial position of market participants, disrupting the operation of financial institutions and financial intermediaries, among others.

Raouf and Ahmed (2020) view financial stability as maintaining confidence in the financial system. Threats to financial stability can stem from shocks and contagions when liquidity and compliance with contract terms become questionable. Manifestations of financial instability include unusual and unpredictable changes in prices.

Gulaliyev et al. (2019) consider financial stability as a condition for the financial system to withstand shocks and maintain the payment and cap-

ital allocation functions from savings to investment activities of the economy.

In this study, the financial stability of commercial banks is considered a state in which the system experiences no financial instability, the components of commercial banks operate stably and perform well the financial intermediation function, including payment and transfer of funds to the economy while absorbing the shocks of the economy at the early stage to limit the spread of systemic crisis.

1.2. Capital adequacy ratio of commercial banks

Capital Adequacy Ratio (CAR) of commercial banks is a measure of capital adequacy based on the ratio between equity capital and total risk-weighted assets of a bank (Ahmed Abdel Karim, 1996; Hsu et al., 2007; Białas & Solek, 2010; Hafez & El-Ansary, 2015). The capital adequacy ratio is used by bank managers and investors to assess a bank's level of risk in paying due debts. Banks are required to ensure a certain capital adequacy ratio prescribed by each country's regulations where the bank is located. Adhering to regulations on capital adequacy helps the State manage the stability of the banking sector in particular and the economy in general. Besides, compliance with the capital adequacy ratio helps bank managers to have solid directions in the development of the bank while assuring investors about their deposits.

The central bank will stipulate a minimum capital adequacy ratio for commercial banks by promulgating legal regulations to ensure sound and efficient operation of the financial system. This, in turn, also allows commercial banks to remain resilient to financial shocks, creating a sense of assurance among consumers in their own banks, as well as the entire banking system. As a financial intermediary of the economy, the banking system's stability plays an important role in economic and social development. Therefore, it becomes even more important to meet the required minimum capital adequacy ratio (Abou-El-Sood, 2016; Baldwin et al., 2019; Dao & Nguyen, 2020).

In Vietnam, the capital adequacy ratio (CAR) of banks as regulated by the State Bank of Vietnam represents stability and sustainable development in parallel with sound credit growth and strict credit quality control. In recent years, the banking system has witnessed stronger and sounder development. Banking operations are becoming more diverse in form and growing in scale, posing potential risks on healthy development of the commercial banking system. This highlights the importance of the capital adequacy ratio (CAR) in accordance with Basel standards more evidently than ever and draws more attention from managers (Dao & Nguyen, 2020; Nguyen, 2020).

1.3. Capital adequacy ratio and banks' financial stability

Gupta and Kashiramka (2020) argue that with adequate amounts of capital reserves, banks not only have enough capital to grow their business but at the same time have enough financial capacity to absorb any financial turmoil and maintain financial stability. The capital adequacy ratio also determines the liquidity and absorption of shocks from risks in the banking business, including credit risks, operational risks, market risks, and payment risks.

In the increasingly rapid and diversified development of the financial market in particular and the economy in general, the safe and healthy development direction of the banking system is always the way forward for all economies. To this end, commercial banks need to create financial stability in their business activities. Meeting the

capital adequacy ratio in accordance with the law means a lot to the development of each commercial bank.

By meeting the required capital adequacy ratio, banks can create a buffer to protect themselves against financial shocks, thereby maintaining financial stability. Complying with and meeting the capital adequacy ratio prescribed by laws and regulators not only ensures the bank's efficient operation, but also helps the commercial banking system develop sustainably and serve the role of a financial intermediary of the economy. Besides, the adequate capital adequacy ratio shows that a bank is fully prepared for possible risks, thereby maintaining financial stability and creating peace of mind both for investors and customers (Kabir Hassan et al., 2016; Raouf & Ahmed, 2020).

Kabir Hassan et al. (2016) used the stress test method for a sample of 106 observations based on the monthly data of banks in Turkey for the period 2006–2014 to examine changes in the capital adequacy ratio (CAR) of banks in different risk scenarios. The research findings show that the capital adequacy ratio of banks is reduced below the prudential threshold when under pressure from shocks causing financial instability. This helps confirm the viewpoint that the higher the capital adequacy ratio, the more stable the bank will be.

Kamran et al. (2019) studied the good factors affecting the financial stability of 28 commercial banks in Pakistan in the period 2007–2016. Research findings show that, when the adequacy ratio is just at a moderate level, an increase in the capital adequacy ratio helps commercial banks increase their financial stability. However, when the capital adequacy ratio is too high, it will have a negative impact on the financial stability measures of commercial banks.

Daoud and Kammoun (2020) analyzed the factors affecting the financial stability of 81 Islamic banks across 22 countries in the period 2010–2014. Regression results show that the capital adequacy ratio has a positive effect and is an important indicator contributing to the financial stability of Islamic banks.

1.4. Profitability of commercial banks and financial stability

Profitability of commercial banks is measured by the ratio of profit after tax to total assets of a bank, showing the ability to use assets of the bank (ROA) or the ratio between profit after tax to total equity (ROE). Studies expect that the higher the profitability, the more resources commercial banks have to increase their equity capital and ensure financial stability (Al-Kharusi & Murthy, 2020; Gupta & Kashiramka, 2020; Raouf & Ahmed, 2020; Marie et al., 2021; Amendola et al., 2021; Atellu et al., 2021; Boulanouar et al., 2021).

1.5. Bank size and financial stability

The size of a bank is measured by the natural logarithm of the bank's total assets. Many previous studies have shown a positive correlation between the size and financial stability of commercial banks (Daoud & Kammoun, 2020; Gupta & Kashiramka, 2020; Raouf & Ahmed, 2020; Amendola et al., 2021; Bashir et al., 2021; Boulanouar et al., 2021; Marie et al., 2021).

1.6. Loans to assets ratio and banks' financial stability

The ratio of outstanding loans to total assets is measured by the proportion of outstanding loans in the total asset structure of a bank. Most studies show that increasing the ratio of outstanding loans to total assets will lead to financial instability (Daoud & Kammoun, 2020; Gupta & Kashiramka, 2020; Raouf & Ahmed, 2020; Atellu et al., 2021; Boulanouar et al., 2021).

1.7. Deposits to assets ratio and banks' financial stability

The ratio of deposits to total assets measures the ratio of customer deposits to total capital of a bank. There have been studies on the impact of the ratio of customer deposits to total assets on the financial stability of commercial banks such as Daoud and Kammoun (2020), Al-Kharusi and Murthy (2020), Gupta and Kashiramka (2020), Raouf and Ahmed (2020), Boulanouar et al. (2021), and Atellu et al. (2021).

1.8. Loan loss ratio and banks' financial stability

Loan Loss Ratio (LLR) is measured through the ratio of provision expenses to total credit outstanding, showing the quality of a bank's assets. The higher the credit risk provision ratio, the lower the asset quality of commercial banks, and the lower the expectation of commercial banks' financial stability (Al-Kharusi & Murthy, 2020; Gupta & Kashiramka, 2020; Raouf & Ahmed, 2020; Atellu et al., 2021; Bashir et al., 2021; Boulanouar et al., 2021).

To achieve the research purpose of testing the impact of the capital adequacy ratio and control variables on the capital adequacy ratio of Vietnamese commercial banks, the study proposes the following six (6) research hypotheses based on the review of previous studies:

- H1: Capital adequacy ratio (CAR) has a positive correlation with commercial banks' financial stability.*
- H2: Profitability (ROA/ROE) has a positive correlation with commercial banks' financial stability.*
- H3: Size (SIZE) has a positive correlation with commercial banks' financial stability.*
- H4: Loans to Assets Ratio (LTA) has a negative correlation with commercial banks' financial stability.*
- H5: Deposits to Assets Ratio (DTA) has a positive correlation with commercial banks' financial stability.*
- H6: Loan Loss Ratio (LLR) has a negative correlation with commercial banks' financial stability.*

2. METHODS AND DATA

2.1. Measuring the capital adequacy ratio of Vietnamese commercial banks

In 1988, the Basel Committee on Banking Supervision (BCBS) introduced a capital measure-

ment system commonly referred to as the Basel I treaty. This system provides a credit risk measurement framework with a minimum capital adequacy ratio of 8%. Basel I is not only popularized and mandated among G10 member countries but also voluntarily observed by many other countries around the world. The core of Basel I is to require banks to have a required capital ratio to total risk-weighted assets (RWA) at a prudential threshold of 8%. In June 2004, a new treaty on capital Basel II was adopted. The objective of Basel II is to improve the quality and stability of the international banking system; create and maintain a level “playing field” for banks operating internationally; promote the adoption of more stringent practices in the field of risk management, etc. On September 12, 2010, the Basel Committee officially announced the minimum capital adequacy ratio applicable to commercial banks under Basel III. This set of standards came into effect in 2013 and was fully implemented as of January 1, 2019. This is considered the most complete version of BCBS requirements for the capital adequacy ratio.

This study continues to use the method according to Basel II to calculate the capital adequacy ratio of Vietnamese commercial banks.

$$CAR_{it} = \frac{Tier1_Capital_{it} + Tier2_Capital_{it}}{Risk\ weighted\ assets_{it}}, \quad (1)$$

where *Tier1_Capital* includes equity capital and disclosed reserves; *Tier2_Capital* is second or supplementary layer of a bank’s capital; Risk-weighted assets will vary according to the nature of the loans.

2.2. Financial stability estimation of Vietnamese commercial banks

Financial stability of banks can be measured through Z-score, including Z-score of ROA and Z-score of ROE. The Z-score represents the number of times the standard deviation of a bank’s earnings falls below its expected value, depleting the bank’s equity and putting it at risk of bankruptcy. The higher the Z-score, the lower the bankruptcy probability of a commercial bank or the higher its financial stability. Z-score covers the parameters of standard deviation of ROA, ROE, and better represents a bank’s financial stability.

The indices used in the Z formula are calculated according to the approach of Beck et al. (2013), with a 3-year average time frame, instead of using annual figures, or longer time frames. This 3-year average approach has also been applied by other studies, such as the study by Leroy and Lucotte (2017).

Regarding the calculation formula, the financial stability (*STABILITY*) of commercial banks is measured through the following indicators: ZROA, ZROE, specifically as follows:

$$ZROA_{it} = \frac{ROA_{it} + LEV_{it}}{SDROA_{it}}, \quad (2)$$

$$ZROE_{it} = \frac{ROE_{it} + LEV_{it}}{SDROE_{it}}, \quad (3)$$

among these, ZROA means ROA’s Z-score, ZROE is ROE’s Z-score, SDROA is the standard deviation of ROA for three consecutive years, and SDROE is the standard deviation of ROE for three consecutive years. LEV is a financial leverage ratio measured as the ratio of Total Equity to Total Liabilities.

Based on the mentioned hypotheses, the study proposes a model to study the impacts of capital adequacy ratio on the financial stability of Vietnamese commercial banks using equation (4) and applying for each dependent variable on ZROA and ZROE in equations (5) and (6).

$$STABILITY_{it} = \beta_1 CAR_{it} + \sum_{j=1}^n \beta_j X_{it} + \varepsilon_{it}, \quad (4)$$

$$ZROA_{it} = \beta_1 CAR_{it} + \beta_2 ROA_{it} + \beta_3 SIZE_{it} + \beta_4 LTA_{it} + \beta_5 DTA_{it} + \beta_6 LLR_{it} + \varepsilon_{it}, \quad (5)$$

$$ZROE_{it} = \beta_1 CAR_{it} + \beta_2 ROE_{it} + \beta_3 SIZE_{it} + \beta_4 LTA_{it} + \beta_5 DTA_{it} + \beta_6 LLR_{it} + \varepsilon_{it}, \quad (6)$$

where *i* and *t* represent bank *i* at year *t*; *STABILITY* is a measure of financial stability, expressed by two metrics, namely ZROA, ZROE; *CAR* is the capital adequacy ratio of commercial banks; *X* is the vector of control variables that have an impact on financial stability, which has been investigated in the theory, including the bank’s profitability as measured by ROA or ROE; natural logarithm of

Table 1. The information of banks in the dataset

Bank code	Bank name	Website
ABB	An Binh Commercial Joint Stock Bank	https://www.abbank.vn
ACB	Asia Commercial Joint Stock Bank	https://www.acb.com.vn
BVB	Viet Capital Commercial Joint Stock Bank	https://www.vietcapitalbank.com.vn
EIB	Vietnam Export Import Commercial Joint Stock	https://eximbank.com.vn
HDB	Ho Chi Minh City Development Joint Stock Commercial Bank	https://www.hdbank.com.vn
KLB	Kien Long Commercial Joint Stock Bank	https://kienlongbank.com
MBB	Military Commercial Joint Stock Bank	https://www.mbbank.com.vn
MSB	The Maritime Commercial Joint Stock Bank	https://www.msb.com.vn
NAB	Nam A Commercial Joint Stock Bank	https://www.namabank.com.vn
NCB	National Citizen bank	https://www.ncb-bank.vn
SGB	Saigon Bank for Industry & Trade	https://www.saigonbank.com.vn
SHB	Saigon-Hanoi Commercial Joint Stock Bank	https://www.shb.com.vn
SSB	Southeast Asia Commercial Joint Stock Bank	https://www.seabank.com.vn
STB	Saigon Thuong Tin Commercial Joint Stock Bank	https://www.sacombank.com.vn
TCB	Vietnam Technological and Commercial Joint Stock Bank	https://techcombank.com.vn
VCB	Joint Stock Commercial Bank for Foreign Trade of Vietnam	https://vietcombank.com.vn
VIB	Vietnam International Commercial Joint Stock Bank	https://www.vib.com.vn
VPB	Vietnam Commercial Joint Stock Bank for Private Enterprise	https://www.vpbank.com.vn

total assets representing the size of a bank (*SIZE*); Loans to Assets Ratio (*LTA*), Deposits to Assets Ratio (*DTA*); and Loan Loss Ratio (*LLR*), which represents the bank's asset quality; ε is the noise factor. The study uses a dataset of 18 commercial banks presented in Table 1.

3. RESULTS

The descriptive statistical results presented in Table 2 show that the parameters measuring the financial stability of commercial banks, *ZROA* and *ZROE*, have a mean of 125.41 and 16.11, respectively. *ZROA*'s smallest value out of 260 observations is 9.29 and the largest value is 2,828.72. *ZROE*'s smallest value is 1.52, and the largest value is 195.53. The capital adequacy ratio of commercial banks reached a mean of 0.14, the smallest value is 0.09 and the largest value is 0.55. The difference between the maximum and minimum values of *CAR* shows a large differ-

ence in the capital adequacy ratio of Vietnamese commercial banks.

The control variable *SIZE* (natural logarithm of total bank assets) has a mean value of 18.48, Loans to Assets Ratio (*LTA*) has a mean value of 0.54, Deposits to Assets Ratio (*DTA*) has a mean value of 0.74 and Loan Loss Ratio (*LLR* – ratio of provision expenses to total credit outstanding) has a mean value of 0.01.

Table 3 presents the matrix of correlation coefficients between the variables used. The correlation coefficients between the variables in the model will show an overview of the relationship between the factors in the research model.

To validate the GMM method in regression and ensure the reliability of the regression results in each model, the study carried out a number of tests, including Arellano-Bond AR(1) and AR(2) and Hansen test before using regression results for

Table 2. Descriptive statistics of variables

Variable	Obs.	Mean	Std. dev.	Min	Max
<i>ZROA</i>	198	125.41	258.36	9.29	2,828.72
<i>ZROE</i>	198	16.11	23.62	1.52	195.53
<i>CAR</i>	198	0.14	0.05	0.09	0.55
<i>SIZE</i>	198	18.48	1.04	15.92	21.01
<i>LTA</i>	198	0.54	0.12	0.19	0.74
<i>DTA</i>	198	0.74	0.10	0.42	0.89
<i>LLR</i>	198	0.01	0.01	0.00	0.06

Table 3. Correlation coefficients matrix

	ZROA	ZROE	CAR	SIZE	ROA	ROE	LTA	DTA	LLR
ZROA	1	–	–	–	–	–	–	–	–
ZROE	0.3963	1	–	–	–	–	–	–	–
CAR	0.0153	0.062	1	–	–	–	–	–	–
SIZE	0.0133	0.0567	–0.6126	1	–	–	–	–	–
ROA	–0.1778	–0.0092	0.1114	0.1786	1	–	–	–	–
ROE	–0.1811	–0.0911	–0.2218	0.4964	0.7358	1	–	–	–
LTA	–0.0638	–0.039	–0.0986	0.2023	0.2041	0.1809	1	–	–
DTA	0.117	–0.0315	–0.1787	0.0612	–0.3619	–0.2959	0.3195	1	–
LLR	–0.0275	–0.0814	–0.0822	0.2042	0.1037	0.0658	–0.1709	–0.1433	1

evaluation. The validation results of Hansen test for all four models show that the number of instrumental variables used in the model is appropriate, the instrumental variable is endogenous and not correlated with its error. Arellano-Bond AR(1) and AR(2) test results in Table 4 also show that both models are consistent with p-values of both models, which are greater than 0.05. Therefore, the results in the further analyzed GMM are significant.

The results of regression analysis and Robustness checks in Table 4 analyze the impact of the capital adequacy ratio on financial stability of Vietnamese

commercial banks with dependent variables ZROA and ZROE, respectively, showing the lagged variable of ZROA/ZROE, CAR, ROA/ROE, SIZE, LTA are significant in both models. LLR, in particular, has a significance level of 5% in the model with the dependent variable ZROE.

The validation results of the hypotheses presented in Table 5 show that out of six hypotheses proposed in part 1 of the study, up to five research hypotheses are supported. As for hypothesis H2, empirical research in Vietnam showed opposite results from the initial expectation. Hypothesis

Table 4. Regression results and robustness checks

Dependent variable: ZROA			Dependent variable: ZROE		
	Coef.	P > z		Coef.	P > z
ZROA (–1)	–0.36***	0.00	ZROE (–1)	–0.245**	0.034
CAR	702.00**	0.03	CAR	56.993**	0.025
ROA	–5726.76***	0.00	ROE	–52.706***	0.010
SIZE	42.62***	0.01	SIZE	7.890***	0.000
LTA	–179.75**	0.01	LTA	–59.964**	0.029
DTA	25.07	0.86	DTA	4.010	0.867
LLR	–777.57	0.71	LLR	–2460.981**	0.029
Cons	–607.63	0.10	Cons	–66.341	0.020
AR(1) test	–1.02	0.307	AR(1) test	–1.91	0.057
AR(2) test	–1.47	0.143	AR(2) test	–1.95	0.051
Sargan test	217.41	0.000	Sargan test	276.77	0.000
Hansen test	10.71	1.000	Hansen test	11.24	1.000

Note: *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively. The Arellano-Bond test is to examine the p-order autocorrelation (AR(p)) of the error term (Z-test and Prob. > Z). Sargan and Hansen tests are to check the validity of instrument variables (χ^2 test and Prob. > χ^2).

Table 5. Hypotheses testing results

Hypothesis	Relationship	Decision
H1	Capital adequacy ratio (CAR) has a positive correlation with commercial banks' financial stability	Supported
H2	Profitability (ROA/ROE) has a positive correlation with commercial banks' financial stability	Supported
H3	Size has a positive correlation with commercial banks' financial stability	Supported
H4	Loans to Assets Ratio (LTA) has a negative correlation with commercial banks' financial stability	Supported
H5	Deposits to Assets Ratio (DTA) has a positive correlation with commercial banks' financial stability	Not supported
H6	Loan Loss Ratio (LLR) has a negative correlation with commercial banks' financial stability	Supported

H5 is not supported. The validation results of the hypothesis once again confirm the positive correlation between the capital adequacy ratio and financial stability of commercial banks in Vietnam.

4. DISCUSSION

The research findings shown in Tables 4 and 5 show that the financial stability of Vietnamese commercial banks is affected by:

- 1) capital adequacy ratio;
- 2) profitability;
- 3) bank size;
- 4) Loans to Assets Ratio (LTA); and
- 5) Loan Loss Ratio (LLR).

First, the empirical research results further confirm the positive and significant correlation between the capital adequacy ratio and financial stability of Vietnamese commercial banks. The results of this study support the view that an increase in the capital adequacy ratio will equip banks with a “buffer” to absorb shocks, thereby enhancing the financial stability of commercial banks. The empirical research results in Vietnam are quite similar to previous studies by Kabir Hassan et al. (2016), Kamran et al. (2019), Daoud and Kammoun (2020), Gupta and Kashiramka (2020), and Raouf and Ahmed (2020).

Second, the empirical research results show that profitability has a negative correlation with financial stability of Vietnamese commercial banks at the 1% significance level. These results are quite different from previous studies in the world such as Al-Kharusi and Murthy (2020), Gupta and Kashiramka (2020), Raouf and Ahmed (2020), Amendola et al. (2021), Atellu et al. (2021), Boulanouar et al. (2021), and Marie et al. (2021). The reason why the empirical research results in Vietnam are contrary to previous studies is because in the research period, Vietnamese commercial banks focused on increasing their equity very quickly to meet the SBV’s regulations on capital adequacy, which increased the financial stability of the commercial banks. The incommensurate increase in owner’s equity compared to the increase in profit caused the profitability of commercial banks to decline during the research period.

Third, the empirical research results in the period 2010–2020 show that the size of a bank measured by the natural logarithm of total assets has a positive correlation with the financial stability of commercial banks in Vietnam. The research results further confirm the view that the larger the commercial banks, the more they pay attention to capital adequacy regulations, thereby helping to enhance their financial stability. This result is consistent with the studies by Beck et al. (2013), Daoud and Kammoun (2020), Gupta and Kashiramka (2020), Raouf and Ahmed (2020), Amendola et al. (2021), Bashir et al. (2021), Boulanouar et al. (2021), and Marie et al. (2021).

Fourth, the research findings show that Loans to Assets Ratio (LTA) has a negative correlation with financial stability of Vietnamese commercial banks at the 5% significance level. These results reflect that when the credit growth increases without commensurate control of credit risks, it will lead to an increase in the NPL ratio, posing financial instability for commercial banks. The empirical research results in Vietnam are quite similar to studies by Daoud and Kammoun (2020), Gupta and Kashiramka (2020), Raouf and Ahmed (2020), Atellu et al. (2021), and Boulanouar et al. (2021).

Finally, the Loan Loss Ratio (LLR) as measured through a bank’s asset quality, has a negative correlation with the financial stability of commercial banks in the period 2010–2020. This result is in line with the initial expectation and is quite similar to most previous studies by Al-Kharusi and Murthy (2020), Gupta and Kashiramka (2020), Raouf and Ahmed (2020), Atellu et al. (2021), Bashir et al. (2021), and Boulanouar et al. (2021).

Deposits to Assets Ratio (DTA) has a positive correlation with the commercial banks’ capital adequacy ratio (CAR). However, experimental research in Vietnam shows that this variable is not statistically significant.

The research results also reflect the negative correlation between the DTA variable with the financial stability of Vietnamese commercial banks during the research period. This correlation is quite similar to the research results of Al-Kharusi and Murthy (2020), Daoud and Kammoun (2020), Gupta and Kashiramka (2020), Raouf and Ahmed (2020), Atellu et al. (2021), and Boulanouar et al. (2021).

CONCLUSION

Banking operations are always associated with the development of the economy. The stability of the banking system is taken seriously by all actors in the economy, from the Government, businesses, investors to individual borrowers or depositors. Therefore, the capital adequacy topic of the commercial banking system has received keen attention in recent years. In the context of more extensive and intensive international integration, it is increasingly imperative to increase the financial stability of Vietnamese commercial banks. The estimation results with the GMM dynamic panel data model provide more empirical evidence on the impact of the capital adequacy ratio on the financial stability of Vietnamese commercial banks in the period 2010–2020. The research results can inform the banks' solutions to improve financial stability through the capital adequacy ratio and influential control variables, including profitability, size, ratio, LTA and LLR. Based on empirical research results, the study provides some suggestions and recommendations for policy makers and managers to increase financial stability of Vietnamese commercial banks. First, commercial banks need to have a roadmap to increase the capital adequacy ratio and ensure the minimum capital adequacy ratio in line with international standards, regulations of the State Bank of Vietnam and Basel III Accord. Second, it is recommended that commercial banks maintain profitability at a reasonable level to help increase capital adequacy ratio, thereby increasing financial stability. When commercial banks increase the ratio of equity to total assets, the profitability of banks will decrease in the short term, but this is the basis for long-term financial stability. Third, it is recommended that commercial banks maintain a reasonable size to help increase their financial stability. Commercial banks' growth in size must be accompanied by solutions to strengthen controls and ensure the system's soundness, as well as measures to control the quality of profitable assets and maintain financial stability. Fourth, commercial banks need to maintain a reasonable LTA ratio along with measures to control credit risk to minimize the NPL ratio. When the size of credit balance grows too fast without risk control measures, it will increase the credit risk ratio, posing financial instability for commercial banks. Finally, Vietnamese commercial banks need to increase the effectiveness of credit risk control measures to help reduce the LLR and enhance their financial stability.

Although certain results have been achieved as set out by the initial research goals, the study still has limitations that can be addressed by further studies or developed further for more comprehensive contributions. The main limitations of the study include:

- (i) Research data only covers 18 Vietnamese commercial banks due to the lack of access to complete data of all Vietnamese commercial banks, as well as 100% foreign owned banks in Vietnam.
- (ii) The research model has not shown the impact of macro variables on the financial stability of Vietnamese commercial banks.
- (iii) The research period covers only 11 years (2010–2020), which does not reflect the entire operation period of commercial banks in Vietnam.

AUTHOR CONTRIBUTIONS

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