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Impact of Credit Risk Management on the Stability of Vietnam Commercial Banks

Sang Tang My
Ho Chi Minh City University of Economics and Finance (UEF), Ho Chi Minh City, Vietnam

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Corresponding Author:
Sang Tang My
Ho Chi Minh City University of Economics and Finance (UEF), Ho Chi Minh City, Vietnam

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Abstract: Risk management is the way that all business entities need to implement in order not to lose their capital. This issue in the credit granting activities of Vietnam credit institutions is now more urgent. The data of the research collected from Vietnam commercial banks from 2005-2019, the research used the methods of Pooled OLS, FEM, REM and GMM to process panel data. The results show that credit risk and the previous period's stability have a positive relationship with bank stability, in which non-performing loans and loan loss provision and has a very strong relationship. NPLs and non-interest income have the opposite and very strong relationship with bank stability. From the above research results, solutions related to credit risk management, capital management and non-interest revenues are proposed to increase business efficiency and improve Vietnam bank stability.

INTRODUCTION

Playing a role as the main intermediary financial institution of the economy, the operation of the commercial banking system has a great influence on other subjects. However, after the 2007 financial crisis, the non-performing loan ratio of the banking sector increased, leading to a decrease in the overall business efficiency of the banking system. Non-performing loans are considered non-liquid assets for banks because banks cannot generate income from these debts. Lack of liquidity is the main cause of the banking panic[1].

During the period from 2011-2013, Vietnam's macro economy was affected from world financial crisis. State Bank have to use many solutions to reduce non-performing loans. The results obtained in the period from 2012-2017, non-performing of the bank system decreased, newly arising non-performing loans were restrained, business efficiency improved, ROA in 2017 reached 0.8% compared to 0, 48% in 2016, ROE in 2017 reached 10.2% compared to 5.94% in 2016, the liquidity of the system was also better than the previous period.

In recent times, the total value of non-performing loans on the balance sheet of 22 commercial banks by March 2019 is about 84 trillion dong, an increase of >4.6 trillion dong, about 5.9% compared to the end of 2018 while outstanding loans growth was only 3.46%, of which 15 banks had increased non-performing loans. Among the non-performing loans groups, the loss debt accounts for a high proportion, affecting credit growth, credit growth of this period is lower than in 2017 and 2018[2].

Literature review: Credit risk is the potential change in net income and market value of capital resulting from the failure of customers to repay or repay late[3], an inherent and important factor of the bank[4]. This is the main

Table 1: Description of variables in the model

Variables	Calculation	Expected	Researchers
Bank stability (Z-score)	[E(ROAA)+Ebq/Abq]/σ(ROAA)	NA	NA
Bank variables			
Non-Performing Loan (NPL)	Impaired loan/Total loan	-	Tanaka and Osuka[5] and Marshal and Onyekachi[6]
Loan Loss Provision (LLR)	Loan loss provision/Total loan	-	Tanaka and Osuka[5] and Marshal and Onyekachi[6]
Laverage (LEV)	Total debt/Total asset	-	Delis and Kouretas[7]
Liquidity (ETA)	Bank equity/Total asset	+	Thakor[8] and Said *et al*.[9]
Non-Interest Income (NII)	Non-interest income/Total income	+	Alexiou and Sofoklis[10]
Bank size (SIZE)	Logarit of total asset `	+	Hoffmann
Inefficiency (EFF)	Operation cost/Operation income	+	Andres and Arce[11] and Khalil *et al*.[12]
Bank Credit Growth (CRG)	(Total loan of the year t-Total loan of the year t-1)/Total loan of the year t	-	Carlson *et al*.[13]

The synthesis of previous studies; NA = Not Available

cause of the financial crisis in developing countries[14]. Three common groups of causes leading to credit risk of banks include banks, customers and macroeconomic variables[1, 15].

Credit risk management is very important to reduce loss due to credit risk for banks. Credit risk management is the systems, processes and controls that banks implement to ensure the repayment of loans by customers, minimizing non-payment on time[16]. This is an ongoing process and a major challenge in the contemporary world[17], requiring banks to combine mandates and coordinated operations to control and direct risks. Good credit risk management contributes positively to the accomplishment of the ultimate bank goal[18].

Credit risk measurement is an important stage in credit risk management and quantifying credit risk can become complicated due to lack of data, diversity of borrowers and the complexity of the causes of credit risk. To measure credit risk, banks can use many different ways. Credit risk can be measured by rating credit risk, using a credit scoring system, credit risk model and a very commonly used method is Basel standards.

Poorly managed credit risk can cause liquidity risks leading to insolvency of commercial banks[19]. The effectiveness of credit risk management has a certain impact on the stability of the bank's operations in which bank stability is the ability to completely absorb the shocks faced by the system[20] is the state of efficient realization of important economic functions such as resource allocation, decentralization and risk treatment[21]. Bank stability increases when the solvency of a bank increases[22]. In addition, the bank's stability is influenced by internal factors, factors of the banking system, macro factors and external governance factors[23].

To measure bank stability, there are many different approaches. One of the most popular method is based on accounting. This model helps forecast the possibility of crisis for each individual bank, uses financial indicators to measure such as the Z-score. This index has the advantage of being easy to calculate for banks. Z-score is used to measure the insolvency of commercial banks[24], thereby identifying the stability of commercial banks[25]. Z-score shows that reducing income will cause a capital deficit, comparing clearly capital and profit with the risk of fluctuation of profit, thereby causing banks to fall into insolvency, bankruptcy and unstable[26]. High Z-score index shows error in low rate of return, bank is stable and vice versa.

Credit risk has a certain impact on the stability of the banking system. When credit risk arises, the bank cannot recover the initial capital and the interest, lead to high liquidity risk[4] and threatening the stability of the banking system[14].

Bank stability is primarily affected by macro factors such as inflation, GDP growth and interest rates[27], property prices[28] and financial crisis[29], economic freedom and employee welfare[30]. Internal banking factors also have impacts on bank stability such as ROA, capital ratio, income diversification[31], board size, gender, competition[32], credit concentration[33].

The foundation theory is used including credit risk theory, risk management theory, commercial lending theory and trade-off theory. To determine the impact of credit risk on bank stability, the research model is based on research by Chaibi and Ftiti[34] and Svrtinov *et al*.[1] in which the dependent variable is z-score:

$$Z\text{-score}_{it} = \alpha+\beta_j X_{i,t}+vi+\varepsilon_{i,t}$$

Where:

α = The intercept

$X_{i,t}$ = Vectors of internal variables in the bank

NPL_i, t, $LLR_{i,t}$, $EFF_{i,t}$, $LEV_{i,t}$, $NII_{i,t}$, $SIZE_{i,t}$, $CRG_{i,t}$, $ETA_{i,t}$; β_j is the impact of the independent variables i on the Z-score; vi are specific characteristics not observed between banks; $\varepsilon_{i,t}$ is the residual of the model. Description of variables, calculation and expected of variables in the model are presented in Table 1.

MATERIALS AND METHODS

The research uses three approaches including descriptive research, investigative research and explanatory research. To analyze the impact of credit risk on the stability of Vietnam's commercial banking system,

the research uses a combined research method. The research used Pooled OLS regression model, fixed effect (FEM), regression model with random effects (REM) to solve the panel data. If there is multicollinearity, variance change or cointegration, the Generalized Method of Moments (GMM) is used for processing to ensure a steady and efficient estimate of the model.

The research uses a data sample of 384 observations, retrieved from Bankscope. This data was collected from 28 Vietnam commercial banks. The total assets of these 28 banks in 2019 account for >85% of the whole system, so, they are representative for Vietnam commercial bank system. Macro data is extracted in ADB indicators from 2005-2019.

RESULTS AND DISCUSSION

Descriptive statistics results show the mean, standard deviation, the maximum and minimum values of the variables representing the impact of credit risk on bank stability (Table 2). Among the variables, bank stability, inefficiency and bank size are variables with relatively high standard deviation, the difference between the smallest and largest value is the highest.

Correlation analysis results show that EFF, ETA, LLR, SIZE, CRG have a positive relationship with Z-score, NPL, LEV, NII have a negative relationship with Z-score. The results also showed that the relationship between the two variables GRG and ETA had a correlation coefficient of 0.9620,>0.8[35], showing a serious multicollinearity phenomenon. Test of the autocorrelation phenomenon by VIF shows that the two variables CRG and ETA with VIF are very large, respectively 16.85 and 14.02. The research removed ETA from the model, VIF of all variables were <10 (Table 3).

At the significance level of 1% the White test gives Prob>χ^2 = 0.0000, so, the null hypothesis is rejected. At the significance level of 1%, Wooldridge test result gives Prob>F = 0.0024, the model is correlated. The model has not serious multicollinearity phenomenon, autocorrelation phenomenon and heteroskedasticity. GMM method used to solve the problem. At 1% significance level (due to Prob>χ^2 = 0.0000), the model results are appropriate and usable. Thus, the final results used to analyze the impact of credit risk on bank stability will be based on GMM method.

The study results showed that LLR has a positive relationship with Z-score at the 1% level. The implication that provision of credit risk of banks increases, thus, increasing bank stability. There is an negative relationship between NPL and Z-score at the significance of 1%, the ratio of non-performing loan and bank stability have a negative relationship, bad credit risk management leads to serious consequences for the whole banking system. This result is completely consistent with the study of Chaibi and Ftiti[34]. There is a negative relationship between NII and Z-score at the significance of 1% when the non-interest income increases, the bank's stability decrease, this contrary similar to the results of Dietrich and Wanzenried[36]. L.Z-Score and Z-Score have

Table 2: The results of descriptive statistics

Variables	Obs	Mean	SD	Min	Max
z-score	371	2.262678	1.804082	0.0528	12.5477
ETA	380	0.1023092	0.0616704	0.0041	4624
CRG	380	0.4343045	1.020566	-1	11.3268
EFF	375	0.0200931	0.0076664	0.007	0.0884
LLR	383	0.3474319	4.39156	-0.007	86.3019
NPL	349	0.0198539	.0135546	0.0002	0.1032
LEV	384	0.8897294	0.134121	-0.422	1.7112
NII	383	0.2199755	0.6205942	-2.1087	11.6503
SIZE	384	17.95054	1.550093	11.8835	20.9956

Calculation results from Stata software 16

Table 3: The regression results

	(z-scores)			
Variables	1	2	3	4
CRG	9.534*** [3.32]	15.37*** [5.31]	12.75*** [4.48]	-14.48 [-0.74]
EFF	2.572*** [3.85]	0.890 [1.21]	2.032*** [2.98]	-0.505 [-0.69]
LLR	30.43** [2.39]	28.11** [2.02]	30.81** [2.33]	26.83* [1.87]
NPL	-19.26*** [-2.64]	-19.85*** [-2.81]	-20.33*** [-2.88]	-20.97*** [-3.54]
LEV	0.00749 [0.01]	0.156 [0.13]	0.0240 [0.02]	-33.51 [-1.56]
NII	-0.964 [-1.55]	-1.231* [-1.85]	-1.208* [-1.89]	-2.613*** [-4.36]
Size	0.266*** [2.60]	0.853** [6.24]	0.502*** [4.38]	0.0269 [0.05]
L.z-score	-	-	-	0.121*** [3.24]
CONS	-4.479* [-1.84]	-14.95*** [-5.27]	-8.734*** [-3.44]	34.07 [1.60]
N	326	326	326	270
R^2	0.100	0.207	-	-

t-statistics in brackets *p<0.1; **p<0.05; ***p<0.01; Calculation results from Stata software 16

a positive relationship at the 1% level. Current bank stability is influenced by previous year's bank stability. If the bank operates stably in the previous year, the next year tends to be more stable. This result is similar to the study of Ghenimi and Omri[29].

CONCLUSION

The research results show that credit risk and the previous period's stability have a positive relationship with bank stability in which non-performing loans and loan loss provision and has a very strong relationship. NPLs and non-interest income have the opposite and very strong relationship with bank stability. From the above research results, solutions related to credit risk management, capital management and non-interest revenues are proposed to increase business efficiency and improve Vietnam bank stability.

LIMITATION

Because of the limited data collection, the research did not compare with the commercial banking systems of other countries in the region to see the position of Vietnam commercial banks at the present time.

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