

PROFITABILITY AND BANK STABILITY: EMPIRICAL EVIDENCE IN VIET NAM

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Abstract— Through the secondary data collected from 2014 to 2019, the research used Pool OLS, FEM, REM and GMM methods to test the impact of profitability on stability of Vietnam commercial bank system. The results show that profitability impact on Vietnam bank stability with high significant, in which liquidity, capital ratio, efficiency ratio, bank size have positive impact on profitability with a high significant. Non-performing loans have negative impact on profitability with a high significant on profitability. The results also show that bank size and capital ratio have a positive impact on bank stability with a high significant while credit risk have a negative relationship with bank stability. From the results obtained, the research proposed solutions for bank management strategy.

Keywords— profitability, bank stability, Vietnam bank system

I. Introduction

Commercial bank play a very important role in the economy, help connect savers and borrowers together. Because the final goal of commercial bank is to seek profit, so profitability is one of the most important things that banks and investors care about. Besides, profitability show the stability of commercial banks and economic health, this also receive the attention of all other subjects in the economy. Profitability is a measure to assess the performance as well as the risks that the bank faces.

As the main source of capital in economy, the profitability of Vietnam's commercial bank system has a great impact on the operation of corporations and stability of the financial system. In the period from 2015 to 2018, profitability improved markedly, increasing from 6.42% in 2015 to 9.06% in 2018. The improvement in profitability of Vietnam commercial banks in 2018 is considered to be the average level of Southeast Asia since the global crisis in 2008. According to National Financial Supervisory Commission, the operation of the bank system is still facing many challenges such as non-performing loans and rising costs. The total value of non-performing loans of 22 banks to March 2019 was about VND 84 trillion, increase more than VND 4.6 trillion, about 5.9% compared to the end of 2018 while the growth of outstanding loans was only at 3.46%, of which 15 banks have increased NPLs. Among the non-performing loan groups, the owe losses-loss loans account for a high proportion, affect to credit growth, the credit growth of this period was lower than in 2017 and 2018.

Because the main source of income come from interest, increasing in non-performing loans will affect to profitability of banks in the future. Profitability not only affect to performance of the bank but also affect to stability of bank system. Many empirical researchers have shown that profitability have impact on the stability of commercial banks such as Yeyati & Micco (2007); Athanasoglou et al. (2008); Onuonga (2014). Bank stability plays a very

important role in maintaining the sustainable development of the economy, an important catalyst for economic growth (Swamy, 2014; Ratnovski, 2013). In the context of integration, the impact of external financial system through the international spillover effect has exacerbated the problems of banking industry (Jahn & Kick, 2012) lead to a systemic crisis (Alshubiri, 2017). Banking stability have a great importance role, Vives (2010) discovered that stability reflects a bank's ability to default. In order to maintain stability, banks need to build an appropriate risk protection system (Alshubiri, 2017) in which banks can identify early warnings for countermeasures (Jahn & Kick, 2012).

II. Literature Review

Profitability are interested by managers and investors because high profit will help banks preserve capital, increase market share and attract investment. Profitability is the net income after tax of commercial banks (Rose, 1999), which is the net profit of the bank (San & Heng, 2013), involving to the return on initial investment (Muya, 2016), which is an increase in profit compared to operating costs (Tariq et al., 2014). This ratio is used to measure the profit made by the bank based on revenue, capital, assets and earnings per share. Profitability is one of the indicators showing growth and success in banking operations (Kabajeh et al., 2012), which is the final goal of investment, demonstrating the efficiency of resource management (Muya, 2016), expressed in two ways including accounting profit and economic profit (Anene, 2014). Corporations often have more benefits when profitability increases. To measure the profitability of a bank, there are various methods that can be used but financial indicators is the most common method (San & Heng, 2013). Theoretically, ROA is favored more than other indicators, Golin (2001), Rivard & Thomas (1997) also confirmed that the ROA is the main measure of the profitability of banks.

To explain determinants of commercial bank profitability, the research used the theories including Efficiency Theory, The Agency Cost Theory and Signaling Theory.

Efficiency theory proposed by Demsetz (1973), this theory state that good governance and effective banks are more profitable, efficiency management not only increases profits but also helps banks increase their market share and improve market concentration (Athanasoglou et al., 2008). For banking industry, the efficient theory said that large banks have better governance and management experience, so they can reduce operating costs and profit will be higher than small banks (Soana, 2011). In addition, the efficiency theory also suggests that efficiency operation affect to the profitability by reducing operating costs (Obumuyi, 2013).

The agency cost theory was initiated by Jensen & Meckling (1976), which assume that the financial structure of a firm is used by managers as a means of dealing with

cash flow problems. In organizational structure of joint stock enterprises, managers and owners are two different objects in which managers represent for the owner to manage the company and they may take actions that are inconsistent with the owner's goal resulting in agency costs (Gedajlovic & Shapiro, 2002; Mian et al., 2012). This cost is divided into three sub-groups including management supervision cost, bond cost and the remaining costs (Jensen & Meckling, 1976).

Theoretically, agency costs and profitability tend to fluctuate in opposite directions (Alfadhl & Alabdullah, 2013). Signaling theory proposed by Arrow (1972) and Spence (1974). This theory said that the best performing or profitable firms often provide good and positive information to the market (Dainelli & Bini, 2011). This theory confirm the relationship between profit and capital structure (Alkhazaleh & Almsafir, 2014). Low debt ratio, capital growth signals a positive impact on bank operations (Alkhazaleh & Almsafir, 2014). Empirical research have provided various information about this effect. Research of Vong & Chan (2009) in Macao showed that capital has a strong influence on profitability, asset quality has a negative impact on the profitability and profitability of large size banks is not higher than small banks and among macro variables, only inflation show a certain relationship with the profitability. Gul et al. (2011) shows a strong relationship between assets, lending, deposits, economic growth, inflation and market capitalization of Pakistan banks' profitability. Islam & Rana (2017) has demonstrated that asset size and net profit margin have no impact on the profitability of the bank, the NPLs ratio has a significant and opposite effect, investment activity have a positive impact on Bangladesh banks profitability. Ozili (2015) conducted a study in Nigeria and found that factors affect to the bank's profitability including loan quality, bank size, capital adequacy and operating cost. Messai et al. (2015) conducted a research for Western European banks and the result showed that capital ratio and credit risk are the two main determinants of profitability, liquidity and GDP rate has a positive relationship with profitability, inflation has a negative impact on the profitability of the bank.

In an increasingly competitive environment, profitability is one of the key factors that help the bank operate smoothly, continuously and have a direct impact on the performance of the bank and its development process (Tariq et al., 2014). Studying the profitability of a bank is very important because profit is not only the most important factor for the existence of a bank, but also provide information about the health of the bank system, then impact on the stability of the bank.

Bank stability is the status of effective implementation of important economic functions such as resource allocation, dispersion and risk handling (Bundesbank, 2003), which is the ability to fully absorb the shock the system faces (Creel et al., 2015), assess changes in financial risks and effective allocation of resources (Houben et al., 2004), show the flexibility of all financial-related activities and sectors to minimize losses and bank crises (Alshubiri, 2017). Bank instability comes from inefficient banks leading to liquidity risk which leads to shocks (Segoviano & Goodhart, 2009) and economic efficiency is likely to be reduced due to financial fluctuations (Chant, 2003).

According to Lepetit and Strobel (2015), Z-score is considered as an indicator of bank stability and is widely used in many researches such as De Nicolo et al. (2003), Boyd et al. (2006), Yeyati & Micco (2007), Hesse & Cihák (2007), Cihák & Hesse (2008), Berger et al. (2008), Gamaginta (2015). A higher Z-score indicates a more stable bank.

Because of this importance, a number of studies have been carried out in various aspects to test and identify signs of instability in order to take countermeasures. Adusei (2015) was conducted a research on the agricultural banking system in Ghana to provide solutions to the debate about bank expansion and funding for retail banks in the country, the results show that when the bank size increases, the stability of the bank also increases, the risk of capital mobilization and the stability of the bank also tend to fluctuate in the same direction. Diaconu & Oanea (2014) conducted a research on determinants of stability and identified the differences between 13 commercial banks and a cooperative bank, the results show differences between 13 commercial banks and the cooperative bank.

III. Research Objectives

The research was conducted to study the impact of profitability on the stability of the Vietnam commercial bank system, thereby propose solutions to increase the stability of bank system.

The specific objective is to check the relationship between profitability and bank stability, identify the factors affect to the profitability of the Vietnam commercial banking system. Identify the factors of profitability affect to the stability of Vietnam commercial banks. Measuring the impact of factors affect to the stability of Vietnam commercial banks and suggest solutions to improve stability for Vietnam commercial banks.

IV. Data and Methodology

A. Research Data and Estimation Methodology

The research uses a panel data of 286 observations collected from the financial statements from 2014 to 2019, in which some data collected from the Vietnam central bank's website and some from the ADB Indicators. Because the research use time series data, the model estimation methods chosen are FEM, REM, Pool GLS and GMM.

B. Model and Hypotheses

Empirical studies on the impact of profitability on bank stability with three main part including checking the relationship between profitability and bank stability, identify factors affect to profitability and the impact of profitability on stability of commercial banks, this is the basis for selecting relevant research models. Most empirical research used multivariate regression models with panel data for commercial banks of each country or many countries. This study approach towards research on the choice of model comes from two reason. Firstly, choose a multivariate regression model, using table data of Vietnam commercial banks from 2014 to 2019. Secondly, to ensure the estimation

of the regression model is accurate, choosing the appropriate variables, the author has conducted multi-collinear test, variance change and autocorrelation. Besides, FEM, REM, Pool GLS methods are used to test the hypotheses proposed, this approach is consistent with domestic and foreign research trends.

The selection of basic variables and propose research hypotheses are mainly based on the empirical evidences, mainly from the research of Athanasoglou et al. (2006); Diaconu & Oanea (2015). The thesis proposes three research models for three phases, the first phase will determine the factors that affect to bank's profitability, the second phase will examine the relationship between profitability and bank stability, the final phase study the impact of profitability on bank stability. Model in the first phase as following:

$$ROA = \alpha_0 + \sum_{j=1}^J \beta_j X_{it}^j + \sum_{l=1}^L \beta_l X_{it}^l + \varepsilon_{it} \quad (1)$$

Where, ROA is bank profitability of bank i. α_0 is a constant. X are independent variables, group j includes internal factors of the bank (liquidity, credit risk, capital ratio, bank size, operating expenses) and group l includes macro factors (inflation, economic growth). β_j is the impact of the independent variable on profitability. β_l is the effect of the lag variable on the profitability of the bank. ε_{it} is the disturbance. Based on research of Athanasoglou et al. (2006) and Diaconu & Oanea (2015), variables of the model are shown in table I.

TABLE I. VARIABLES OF MODEL ⁽¹⁾

Variables	Description	Expected effect	Authors
ROA	Return on Asset (Net Income/ Total Asset)		
LA	Liquidity (total Loans/ total Assets)	+	Abreu & Mendes (2001)
LLP	Credit risk (NPL/ Total Loans)	-	Hassan and Bashir (2003)
EA	Capital Adequacy (Equity/ Total Assets)	+	Bizuayehu (2015); Bourke (1989); Berger (1995).
OEA	Operation Efficiency Ratio (Operating Expenses/ Loan Ratio)	+	Hoffmann (2011); Pasiouras (2007)
LNASSET	Size of the bank (Natural log total assets)	+/-	Mamatzakias & Remoundos (2003); Berger (1995); Vander (1998)
GDP	Economic growth (Real GDP growth rate)	+	Demirguc & Huizinga (1999); Guru et al. (2002); Nier (2000)
INF	Inflation (growth rate of CPI)	+	Mamatzakias & Remoundos (2003); Athanasoglou et al. (2006); Kosmidou (2008)

Source: summary of previous studies

In the second phase, to examine the relationship between profitability and bank stability, the research use the model based on research by Casu & Girardone (2009) and Tan (2016).

$$y_{it} = \alpha_0 + \alpha_1 y_{i,t-1} + \alpha_2 y_{i,t-2} + \beta_1 x_{i,t-1} + \beta_2 x_{i,t-2} + \theta_t + \delta_i + \mu_{it} \quad (2)$$

Where y is profitability (ROA) or bank stability (Z-score), i and t represent for bank i in year t, α_0 is the intercept, $\alpha_1, \alpha_2, \beta_2, \beta_1$ are the coefficients to be estimated, θ_t is the time effect, δ_i stands for individual bank effect, and μ_{it} is the error term.

$$Z\text{-score} = [E(\text{ROAA}) + \text{Ebq/Abq}] / \sigma(\text{ROAA})$$

Where, ROAA is return on average of total asset. Ebq/Abq is the ratio of average equity to average of total asset. $\sigma(\text{ROAA})$ is standard deviation of ROAA

Model in the final phase used to study about the impact of profitability on bank stability

$$Z\text{-score} = \alpha_0 + \sum_{j=1}^J \beta_j X_{it}^j + \sum_{l=1}^L \beta_l X_{it}^l + \varepsilon_{it} \quad (3)$$

Where, ROA is bank profitability of bank i. α_0 is a constant. X are independent variables, group j includes internal factors of the bank (liquidity, credit risk, capital ratio, bank size, operating expenses) and group l includes macro factors (inflation, economic growth). β_l is the impact of the independent variable on profitability. β_j is the effect of the lag variable on the profitability of the bank. ε_{it} is the disturbance. Based on research of Athanasoglou et al. (2006) and Diaconu & Oanea (2015), independent variables of the model are shown in table II.

TABLE II. VARIABLES OF MODEL ⁽³⁾

Variables	Description	Expected effect	Authors
LA	Liquidity (total Loans/ total Assets)	+	Ongore & Kusa (2013)
LLP	Credit risk (NPL/ Total Loans)	-	Hassan & Bashir (2003)
EA	Capital Adequacy (Equity/ Total Assets)	+	Athanasoglou et al. (2006); Dang (2011)
OEA	Operation Efficiency Ratio (Operating Expenses/ Total Loan)	+	Obamuyi (2013); Memmel & Raupach (2010)
LNASSET	Size of the bank (Natural log total assets)	+	Bowa (2015); Hoffmann & Rodrigo (2011)
GDP	Economic growth (Real GDP growth rate)	+/-	Kosmidou (2008) Tan & Floro (2012)
INF	Inflation (growth rate of CPI)	-	Rasiah & Ratneswary (2010)

Source: summary of previous studies

v. Empirical Analysis

Descriptive statistics of the research are shown in table III. This indicates that the dispersion between observations in the sample is expressed as mean, maximum, minimum and standard deviation. Values of variables are unevenly distributed, through mean and standard deviation. The data is unbalanced.

TABLE III. DESCRIPTIVE STATISTICS

Variables	Obs	Mean	Standard deviation	Min	Max
ROA	337	.2260534	.1934235	-.42	.95
OEA	336	.0164107	.1081355	.001	1
EA	338	.0717337	.074318	.021	.726
LLP	303	28.81518	14.63639	1	70
LA	337	.6123739	.1004914	.13	1
GDP	352	6.200455	.7521683	5.06	7.46
INF	368	.2395652	.4070172	-.44	1.38
LNASSET	338	4.85793	1.168709	.6931472	18.3269
ZSCORE	329	993.4019	17993.29	-.5746551	326370

Source: calculating from Stata 12

The correlation coefficient matrix in table IV show the results of the research variables of the model 1. The results show that the correlation coefficients are relatively small, without serious multi-collinear phenomena due to low correlation coefficients value (the highest is 0.2299, the comparison standard is 0.8 (Farrar & Glauber, 1967))

TABLE IV. CORRELATION COEFFICIENT MATRIX OF THE MODEL 1

	ROA	OEA	EA	GDP	INF	LLP	LNASS ET	LA
ROA	1.0000							
OEA	0.3792	1.0000						
EA	0.0240	0.1095	1.0000					
GDP	0.2299	0.0525	0.1039	1.0000				
INF	-0.0473	0.0339	0.0198	-0.2019	1.0000			
LLP	0.2268	0.2951	-0.1066	-0.0373	-0.1024	1.0000		
LNASS ET	0.0443	0.0899	0.1586	-0.0527	-0.0098	-0.0168	1.0000	
LA	0.0575	-0.1641	-0.1554	0.1955	-0.0928	-0.0292	-0.1819	1.0000

Source: calculating from Stata 12.

Checking the multicollinearity phenomenon with VIF coefficient, the result in table V. show that the VIF of all independent variables is less than 10.

TABLE V. THE RESULTS OF MULTICOLLINEARITY PHENOMENON CHECK

Variables	VIF	1/VIF
OEA	1.16	0.860346
LLP	1.14	0.876359
LA	1.13	0.886251
GDP	1.12	0.896666
EA	1.09	0.917645
INF	1.07	0.936986
LNASSET	1.06	0.943149
MEAN VIF	1.11	

Source: calculating from Stata 12.

Initially, the study use the regular panel data regression model with the Pool OLS method to estimate the regression equations and test some hypotheses of the OLS model. After that, the research estimated all three models: Pooled OLS, FEM and REM, but due to the variance change, White test results with Prob> chi2 = 0.0026, less than 1%, so the research will eventually regress according to GMM model. The results of regression of model 1 shown in table VI and in model (4).

TABLE VI. SUMMARY OF REGRESSION RESULTS OF MODEL 1

	POOL ROA	FEM ROA	REM ROA	GMM ROA
OEA	0.0571*** [7.72]	0.00220 [0.23]	0.0303*** [3.43]	0.0354*** [7.61]
EA	0.000801 [1.30]	0.00258*** [4.28]	0.00203*** [3.29]	0.0000357 [0.10]
LA	-0.0120 [-0.11]	0.465*** [4.78]	0.366*** [3.61]	0.305** [2.48]
GDP	0.0400*** [3.00]	0.0128 [1.07]	0.0311*** [2.78]	0.0402*** [4.90]
INF	-0.00166 [-0.07]	0.00873 [0.51]	0.00113 [0.06]	0.0161 [1.12]
LLP	0.000165-0.000501*** [0.93]	-0.000419*** [-3.30]	0.000470** [-2.64]	0.000257** [2.00]
LNASS ET	0.0690*** [2.31]	0.189*** [-3.99]	0.0862*** [-1.47]	0.000257** [2.16]
CONS	-1.718*** [-5.32]	-3.861*** [-5.20]	-2.065*** [-4.73]	-0.464*** [-4.95]
N	287	287	287	287
R-SQ	0.263	0.323		
Chow test (P-value)	0.0000			
Hausman test (P-value)	0.0000			
Breusch – Pagan test (P-value)	0.0000			

t statistics in brackets
 * p<0.1, ** p<0.05, *** p<0.01

Source: calculating from Stata 12.

$$ROA = -1.348068 + 0.0409971OEA + 0.0009975EA + 0.2723803LA + 0.0371016 GDP - 0.0004154 LLP + 0.0445881LNASSET (4)$$

The correlation coefficient matrix in the table VII show the results of the research variables of model 3

TABLE VII. CORRELATION COEFFICIENT MATRIX OF THE MODEL 3

	ZSCORE	GDP	INF	OEA	EA	LLP	LNASS ET
ZSCORE	1.0000						
GDP	0.1806	1.0000					
INF	-0.0733	-0.2061	1.0000				
OEA	0.1800	0.0700	0.0320	1.0000			
EA	0.1117	-0.0536	0.0189	0.2971	1.0000		
LLP	-0.0582	-0.0639	-0.0618	0.2136	-0.1251	1.0000	
LNASS ET	0.0174	0.1108	-0.0407	-0.3982	-0.6287	0.1867	1.0000

Source: calculating from Stata 12.

In model 2, three methods including Pooled OLS, FEM and REM used to process data, but due to the variance change, the White test results Prob> chi2 = 0.0000, less than 1% so the research will regress according to the GMM model. The results shown in table VIII.

TABLE VIII. SUMMARY OF REGRESSION RESULTS OF MODEL 2

	POOL ZSCORE	FEM ZSCORE	REM ZSCORE	GMM ZSCORE
ROA	2.270*** [2.63]	2.743*** [3.12]	2.331*** [2.71]	5.940*** [13.73]
ROA(-1)	1.158 [1.09]	2.690** [2.19]	1.326 [1.24]	
ROA(-2)	-2.194** [-2.21]	-1.721 [-1.59]	-2.168** [-2.19]	
ZSCORE (-1)	0.188* [1.74]	0.0447 [0.40]	0.167 [1.54]	
ZSCORE (-2)	-0.00807 [-0.07]	-0.125 [-0.90]	-0.0193 [-0.15]	
_CONS	-0.320 [-1.55]	-0.507** [-2.05]	-0.320 [-1.49]	-1.213*** [-11.12]
N	150	150	150	329
R-sq	0.069	0.142		

t statistics in brackets

*p<0.1, ** p<0.05, *** p<0.01

Source: calculating from Stata 12.

To test model 3, the research also use three methods including Pooled OLS, FEM and REM to estimate, autocorrelation phenomena, variance change, multicollinearity phenomena does not occur and the estimation results show in table IX that the model FEM is most suitable.

TABLE IX. SUMMARY OF REGRESSION RESULTS OF MODEL 3

	POOL ZSCORE	FEM ZSCORE	REM ZSCORE
GDP	0.172** [2.15]	0.0498 [0.59]	0.153** [2.07]
INF	-0.138 [-0.96]	-0.0917 [-0.75]	-0.127 [-1.01]
OEA	0.160*** [3.59]	0.00763 [0.11]	0.103* [1.82]
EA	0.00902** [2.44]	0.0279*** [6.50]	0.0214*** [5.24]
LLP	-0.00216** [-2.03]	-0.00317*** [-2.93]	-0.00339*** [-3.20]
LNASSET	0.272*** [2.92]	1.145*** [4.08]	0.494*** [3.61]
LA			
_CONS	-5.867***	-21.76***	-10.05***
N	286	286	286
R-SQ	0.102	0.229	

t statistics in brackets

*p<0.1, ** p<0.05, *** p<0.01

Source: calculating from Stata 12.

$$Z\text{-score} = -21.75932 + 1.145095 \text{ LNASSET} - 0.0031701\text{LLP} + 0.027891\text{EA} \quad (5)$$

Research results of model 4 show that factors affect to profitability of Vietnam commercial banking system including operating costs, equity, loans, bank size, credit risk and economic growth in which loan is the most powerful variable and has a positive relationship with profitability. Bank size is positively correlated with profitability, which further support "Too Big to Fail" theory when banks believe they are less at risk when their size is too large from which makes loans easier, more profitable. Equity and economic growth are positively correlated with profitability, completely suitable with the original expectations of the research and Bourke (1989); Berger (1995), imply that high equity will lead to higher financial leverage, combined with the high capital demand of corporations as economic growth will lead to higher profitability. Research results show that operating expenses are positively related, which is completely opposite to the author's expectations, but it can be explained that when increasing operating expenses for the operation process. The needs of corporations for doing business is satisfied, so the bank increase profitability.

The research results of model (5) show that among factors affect to Vietnam commercial banking system profitability, bank size has the strongest impact on bank stability and this relationship is positive, the bigger the bank size, the higher the profitability is, so the bank will more stable.

Equity has a positive effect on bank stability and NPLs has a counter effect on bank stability, which is suitable with

the initial expectation, because when credit risk occurs, banks have to make provision and reduce its profit. In addition, the undesirable impact of NPLs will greatly affect the stability of the bank.

VI. Conclusion and Policy Implications

A. Conclusion

Through collecting the data from 2014 to 2019 and use Pool OLS, FEM, REM and GMM method to test the impact of profitability to Vietnam commercial bank stability. Dependent variables in the both model including liquidity, credit risk, capital ratio, efficiency ratio, bank size, economic growth and inflation. The results show that profitability impact on Vietnam bank stability with high significant, in which liquidity, capital ratio, efficiency ratio, bank size have positive impact on profitability with a high significant. Non-performing loans have negative impact on profitability with a high significant on profitability. The results also show that bank size and capital ratio have a positive impact on bank stability with a high significant while credit risk have a negative relationship with bank stability.

B. Policy Implications

From the research results, the research proposed implications for management of Vietnam commercial bank focus on credit risk management.

Firstly, banks need enhance credit risk governance to reduce reserve ratio. The regression results show that the credit risk provision ratios and profitability ratios are inversely related, so banks need to pay more attention in lending to reduce bad debts, not lending to customers who do not have healthy financial capacity.

Secondly, banks need to classify debts and make provisions for credit losses on the basis of combining with internal credit ratings according to current regulations, strengthening inspection and supervision in the debt classification process and bank should accept a decrease in profits due to the provision, as these will be the money used to handle loans when non-performance loans are incurred, avoiding the bank's crisis based on bad debt as well as excess liquidity.

Finally, bank need to build and perfect the risk management system to comply with Basel II standards. Identification of risk signs is one of the most important steps in the credit risk management process. Identification of the warning signals for a loan. Identifying and forecasting credit risks is one of the areas that needs to be improved and carried out regularly and continuously.

C. Limitations

The study was conducted for the case of Vietnam but there was no comparison with other countries and limitations on research data sources, so the number of observations was not high.

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