Banking Risk and Country Governance: Evidence in Vietnam

Thi Thanh Nhan Do, Ngoc Thuy Trang Le, Le Kieu Oanh Dao and Hong Thu Nguyen

September 13, 2021

BANKING RISK AND COUNTRY GOVERNANCE: EVIDENCE IN VIETNAM

Do Thi Thanh Nhan

Faculty of Finance and Banking, Ton Duc Thang University, Ho Chi Minh City, Vietnam

Le Ngoc Thuy Trang

Undergraduate Studies Department, Ton Duc Thang University, Ho Chi Minh City, Vietnam

Dao Le Kieu Oanh

Faculty of Banking, Banking University, Ho Chi Minh City, Vietnam

Nguyen Hong Thu

Thu Dau Mot University, Viet Nam

ABSTRACT

The purpose of this paper is to study the determinants of banking risk and national governance in the Vietnamese context. Our study used data sets for 20 commercial banks in Vietnam by using REM regression model to consider different characteristics of factors that influence the risk of banks. Furthermore, the study makes assumptions about the relationship of each factor to banking risk in combination with macro and governance variables. Therefore, the paper introduces new perspectives in banking risk management.

Keywords: Bank risk, National Administration, Vietnam Bank

1. Introduction

The global financial crisis of 2008 demonstrated the importance of risk management. It posed a requirement for implementing bank risk management, which drives Vietnamese banks to develop and adopt a better risk management system to prevent the crisis and successfully integrate. However, many Vietnamese banks either do not manage risks efficiently or thoroughly understand the risks. Many leaders focus on business, profit, revenue rather than risk management. Whereas, improving the risk management process will control the board of management and the board of directors strictly and effectively, and help to integrate the risk management process into the daily decision-making process. However, how to effectively manage bank risks? This question is not only true and important to the pre and post-recession period but also crucial to the recovery phase and the taking of opportunities after the recession for the operation of each bank.

In the finance and banking sector, commercial banks play a critical role in the stability and sustainability of the entire economy. As a result of the financial crisis boom accompanied by weaknesses and failures in the operation of many commercial, national governance and operational risk management are becoming the top concerns in many countries around the world, from developed countries with advanced financing such as the United States, Europe, Japan to

developing countries with infant financial markets, including Vietnam. Moreover, national governance is the most crucial determinant of macro competitiveness and growth in an economy. Over the past decade, Viet Nam has been recognized as a middle-income country by impressive economic growth results. However, the slower pace of development in social sectors, including education and health, has contributed to slowing human development. This suggests that the national governance system still faces many challenges to keep up with economic development.

The banking system's environment and operational institution have taken positive steps in recent years with notable successes but are vulnerable to macroeconomic instability. The stability and soundness of each country's banking system are increasingly important, even decisions for macroeconomic stability. Besides, the banking system in Vietnam has remarkable changes in internal governance, the organizational apparatus, the application of technology, and modern banking services. Nevertheless, the instability of the macro-economic system has caused many risks and hurt the banking system in every respect. The banking system is the "victim" of economic instability, and in turn, it is the "perpetrator" of the unrest.

In addition, poor bank governance may cause the bank's collapse and create a widespread domino effect on the entire economy. Furthermore, poor governance has also caused the public to lose confidence in the banks' ability to manage assets and capital, including the public's deposits, which could trigger the liquidity crisis. In addition to accountability to shareholders, banks are also responsible for the deposits of their customers and other stakeholders. Therefore, operations are subject to regulation by strict statutory systems and regular supervision. Good commercial banking management is an effective risk management mechanism because it involves all aspects of a bank's operations. Furthermore, risk management is the foundation to maintain business operations, so it is a fundamental part of corporate governance. The first step in management in banking is to determine what factors impact a bank's risk.

This paper broadens current opinion lines on bank risk issues by considering the role of national management when modelizing bank risk. The study expects that improving the quality of governance will contribute to a decline in banking risk while other factors remain constant. By reviewing The quality of national management, this study will test a key result in The study "The Regulation of Bank Capital: Do Capital Standard Promote Bank Safety? "By Besanko and Kanatas (1996). Likewise, Imbiecrowicz and Rauch (2014) argue that the simultaneous impact of credit risk and liquidity risk will affect the bank's stability. The study expects that improving the quality of governance will contribute to a decline in banking risk while other factors remain constant. In addition, this article will provide the benefits of reviewing the impact of operating

quality on banking risk. There are a few studies that have also examined the relationship between various banking regulations and bank risks. "Bank Governance, Regulation and Risk Taking" (Laeven and Levine, 2009) found that the same regulation will have different impacts on risk depending on the Bank's corporate governance structure. "Bank Risk and Regulation: Does one size Fit All? "Klomp and de Haan (2011) used data from more than 200 banks to review the impact of regulation and bank supervision on risk. In contrast to most previous studies, bank regulation and oversight have an impact on risk in high-risk banks but have no significant effect on low-risk banks, according to their research. Then, derived from the reality of Vietnam, the topic selected for the research is: "Banking risk and national governance in Viet Nam". This paper focuses on examining factors, especially country governance, that affect banking risk in Vietnam.

2. Theoretical basis and Literature review

2.1. Theoretical basis

Banking risk overview

Commercial banks, like other business institutions, operate for profit but special because the object of business is money, which is done by attracting social monetary capital to lend, and transferring money from savings into investment. The main activities of the commercial bank include: capital mobilization activities; The use of capital and the provision of intermediate services such as household collection services and household expenditures for customers who have bank deposit accounts; transfer services in the same bank or in two different banks; providing consultancy services to customers for financial matters, services for holding documents, precious objects and payroll services for enterprises in need; automated deductible services... banks are financial intermediation, so banks can "take the risk" that comes from both sides. To understand the risks involved in banking needs to observe the activities that banks are performing and analyze the risks in their operations. Compared with other business units, bank operations have some special characteristics. Firstly, the capital a bank uses to fund its depositors is not the capital of a bank but is formed from a variety of sources. This also means that banks received more or fewer deposits can have a direct impact on their operations. Additionally, risk can arise from the formation of capital sources used. Secondly, the control and management of capital flow beyond direct management of the bank due to the transfer of money to customers. A bank's ability to recover funds is not only dependent on the bank itself and the customer but also depends on a wide variety of other factors affecting the bank and the customer. This characteristic is related to the bank's ability to anticipate possible risks. Finally, the banking business sector is subject to close supervision by the state management agencies. Although the supervisory objective of these agencies is to reduce the risk to the economy through a financial management mechanism for bank

operations, the banks own projects are not precise, its credit policies are unreasonable, and control is not performed well during the lending process.

Risk classification

Potential risks in commercial banks include two types: risks of internal origin and systemic risks due to the impact of a banking market. Internal risks include some risks. Firstly, credit risk which is the loss arising from the customer's failure to pay both principal and interest of the loan in full or the customer's late payment of principal and interest after being granted credit. Credit risk is not only limited to lending activities but also includes many other credit-related activities of the bank such as guarantees, commitments, approval of trade finance, lending in the inter banks, valuable securities (bonds, stocks...), bonds, swaps, lease-purchase credits, cofinancing, etc "Risk Management in Banking" (Joel Bessis, 2001) Secondly, Liquidity risk is risk in the financial sector. This risk occurs when a bank lacks funds or short-term assets that are feasible to meet the needs of depositors and borrowers. The risk occurs when changes in the secondary market make it difficult for banks to convert assets into money to meet the payment needs. This possibility occurs when transaction rise, or the duration of the transaction is lengthened. Thirdly, interest rate risk is also known as market risk, is the risk caused by an adverse change of interest rates in the market to the value of bonds, valuable papers, financial instruments with interest rates on the business books of banks, and credit institutions. This risk comes in case market interest rates rise, when bank loans and investments fall in value and the bank will suffer losses. Another case of interest risk is when market interest rates fall, causing banks to accept investments and loan raised funds at high interest rates to assets at low interest rates. Fourthly, Exchange risk refers to the losses that an international financial transaction may incur due to currency fluctuations. Exchange rate risk describes the possibility that an investment's value may decline due to changes in the relative values of the currencies involved. (Thu Trang, 2020) Fifthly, Default risk is term used when a company or individual is unable to make the necessary payments for their debt obligations. Lenders and investor are exposed to default risk in most forms of credit extension. A company with a higher level of risk will have a higher return. (Lê, 2019) Moreover, the banking system has to deal with systemic risks. Firstly, Inflation risk is the risk that affects commercial bank activities due to rising inflation such as reduced liquidity, difficulty in mobilizing capital, curated credit operations and more risk exposure, reduced returns... high inflation will weaken, even break capital markets, greatly affecting the operation of commercial banks. Secondly, Technological risk arises when investments in technological development fail to produce the intended cost savings. In bank risks, technological risk can result in a significant drop in bank competitiveness and a potential cause of future bank bankruptcy. For example, excess capacity, outdated

technology, materials inefficiencies or organizational dimensions that makes scale growth ineffective. Thirdly, risks of changing the regulatory environment are risks related to the financial impact of changing state and law regulatory regulations. It is not always possible for a commercial banking system to meet changes in regulatory and regulatory requirements, especially changes on a global scale. Fourthly, risk of the economic cycle, volatility of market factors are related to fluctuations of the global and national economies. During a period of stagnation, banking services will suffer from reduced bank revenues and fees.

Finally, risk from a natural environment change dramatically increases the frequency and severity of natural disasters, natural disasters and human living conditions resulting in damage to bank customers, rendering them unable to repay debts to banks. Therefore, to measure and manage a bank's risk, one must first identify the factors that impact a bank's risk. The following section summarizes previous studies related to this issue and makes assumptions about the impact of factors on bank risk.

2.2. Literature review

Like other business institutions, commercial banks operate for profit. Still, they are special because the object of business is money, which is done by attracting social monetary capital to lend, and transfer money from savings into investment. In particular, banks are financial intermediaries which have the risk from the formation of capital sources used (Wahdan and Leithy, 2017). Although the supervisory objective of these agencies is to reduce the risk to the economy through a financial management mechanism for bank operations, the bank's projects are not precise, its credit policies are unreasonable, and control is not performed well during the lending process.

First of all, the function of charter capital in bank management reform, particularly in improving bank risk, has been examined for more than five decades (Van Hoose, 2007). Throughout this time, the sheer volume of research implies that holding a specific amount of capital might either enhance or lower a bank's risk. In the presence of charter capital rules, these studies looked at the impact of imperfect knowledge and moral risk on bank risk. According to Koehn and Santomero (1980), greater capital requirements might lead to increased bank risk. In addition, Blum (1999) claims that if equity increases are too costly, the only way to expand capital is to take on more risk. Lee and Hsieh (2013) propose that increasing bank capital is associated with lower bank risk in Asia. According to Shrieves and Dahl (1992), the presence of banking regulation increases bank risk unless it is supported by increased management.

Moreover, the brand value is the total value of a bank due to having a bank license. This value is frequently used in conjunction with a bank's values determined by the amount of actual or

possible deposit insurance (Craine, 1995). This value is sometimes regarded as the present value of economic profit if banks continue to operate in this manner indefinitely. The value of a bank's brand will reduce the bank's morally dangerous search behavior (Marcus, 1984). Furthermore, it has been suggested that a monopoly caused by increased market power might improve the bank's brand image (Keeley, 1990; Besanko and Thakor, 1993). Banks will take action to prevent this. Banks will act to protect this brand value by choosing to invest in a lower-risk asset portfolio.

As banking size increases, a Z-score increases, or a bank's degree of financial stability increases. The high total bank assets represent the large size of banks, which account for mainly the amount of money lent to customers and customers' deposits. In Viet Nam, most large banks are old and well-established within the public, so that a share of these banks is proportionately large. So these banks tend to pursue low-risk policies, and they have good risk management systems. These banks can hold the best diversified and most balanced portfolio of loans. Therefore, during operations, banks' level of financial stability on aggregate wealth will be higher than that of other banks (Cebenoyan A. S, 1999 and Megginson W. L, 2005).

The loan growth increases bank risk, which is linked to signals of excessive growth in both the Asian financial crisis and the 2008 banking crisis. Cocheo (1991, page 48) illustrated the following object, which is not new: "It could be a weed if it grows quickly." Kwan and Eisenbeis (1997) claimed that low-to-medium-growth credit banks are unsuitable for asset formation and long-term consequences on viable banks. They also believe that excessive bank credit is linked to the poor lending quality and the probability of bank failure. The idea has been backed by Laeven (2002) and Foos et al. (2010).

Regarding the regulatory quality, in a system with insufficient information, the bank regulator is seen as a representative entity on behalf of stakeholders who are uninterested in risk, particularly small depositors. To protect the rights of small depositors, the regulator will aim to limit decisions that negatively impact assets and liabilities and operate off the balance sheet. In this context, through a variety of regulations such as capital and liquidity requirements, the regulator plays a role in risk mitigation. Several studies have looked at how bank capital affects risk management in the face of bank rules. Authors such as Barth et al. (2004) and Calem et al. (1999, pp. 350) point out that the existence of capital rules might play a significant role when picking a bank risk. According to Delis and Staikouras (2011), increased oversight lowered bank risk and increased market impact in decreasing bank risk. The capital requirements, especially when supplemented by G-activities, remain high.

For macroeconomic controls GDP per capita growth, there have been many empirical studies on the impact of GDP growth on banking efficiency. Abreu and Mendes (2003) show that GDP

growth has a positive impact on the banking business while Nasserinia et al. (2017) find out the counterproductive relationship between economic growth and banking business.

Inflation also causes a drop in the value of banks' assets while increasing their risk of default on loans, which affects bank's revenue, cost, and profitability. Putranto et al. (2014) find that the inflation rate positively impacts bank profitability. Conversely, Husni Ali Khrawish (2011) concluded the negative correlation between these two factors. On the other hand, Wahdan and Leithy (2017), Demirguc - Kunt and Huizinga (1999) show that macroeconomics variables do not affect the business situation or the level of bank competition.

Finally, the risk of the banks has changed dramatically as well as increases the frequency. Therefore, to measure and manage a bank's risk, one must first identify the factors that impact a bank's risk. Especially, national governance should be included in the analysis.

3. Methodology

3.1. Data and variables

3.1.1. Data of model

We use the data from the published annual financial statements of 20 joint-stock commercial banks listed on the Ho Chi Minh Stock Exchange (HOSE) and Hanoi Stock Exchange (HNX) in Vietnam with 200 observations from 2010-2020. In addition, Vietnamese macroeconomic data of the country are taken from the World Bank (W.B).

3.1.2. Dependence Variable

Z-score

Z-score is usually measured for the solvency which assesses the bankruptcy risk of banks (Boyd et al., 1993). Z-score represents a decrease in earnings that will cause a capital deficit, thereby causing the bank to fall into bankruptcy and face bankruptcy risk.

$$\text{Z-score} = \frac{\overline{ROAA} + \bar{K}}{\delta(\overline{ROAA})}$$

We have:

K = - (Equity/Total assets), $\delta(\overline{ROAA})$ is the standard deviation of ROAA.

This paper uses a two-year to generate estimates of bank risk (Williams, B. (2014). With ROAA, this study uses the approach of Alizadeh (2002) to apply Log (high value - low value). The assumption is that ROAA is always less than the absolute value of k, the Z-score will always be negative because it measures the probability of loss. The larger the absolute value of the Z-score, the harder it is for the company to go bankrupt. To ensure a uniform interpretation of the coefficients, the Z-score will be multiplied by a minus sign and inverted.

3.1.3. Independence Variable

Equity on total assets (ETA)

Equity is one of the factors affecting the bank's risk. This study will use the bank's equity as a percentage of total assets to test whether the increase or decrease in the capital has a significant impact on the bank's risk. To calculate this index, the authors divide the bank's equity by the square of total assets (Foos et al., 2010).

The Equity on total assets (ETA) defined as

$$\text{Equity on total assets (ETA)} = \frac{\text{Equity}}{\text{Total assets}}$$

Bank size

Assets represent the size of the bank; The larger the bank's assets, the larger its size will be. According to previous studies such as Foos et al. (2010), Jin-Li Hu & CTG (2004), Somanadev et al. (2011), bank size is calculated using the natural logarithm of total assets of the bank to reduce the bank difference.

The bank size (BS) defined as

$$\text{Bank Size (BS)} = \text{Log (total assets)}$$

Franchise Value

Some banks choose to increase their liabilities by raising capital through the domestic deposit market, the domestic capital market (both debt and equity), or the international capital market. This study argues that banks with high domestic deposits that do not need to raise capital in the capital market have higher brand value due to the infrastructure needed to raise capital as well as a reputable source of capital. Following Barry Williams (2014), we calculate Franchise value by a bank's investment (the fixed assets it uses to carry out banking activities) divided by total assets.

The Franchise Value (FV) defined as

$$\text{Franchise Value (FV)} = \frac{\text{Fixed assets}}{\text{Total assets}}$$

Noninterest Revenue

The increase in bank income based heavily on service operations indicates a structural change in bank risk, as discussed above. To measure this effect, the total service operating income on total revenue will be used (using the 2-year mobile average value) (Allen and Santomero, 2001; Lepetit et al., 2008b.)

The Noninterest Revenue (NR) defined as

$$\text{Noninterest Revenue (FV)} = \frac{\text{Income from service activities}}{\text{Total revenue}}$$

Loan growth

Loan growth is measured by a change in total loans over two years in accordance with the dependent variable used by Kwan (1997).

The Loan growth (LGR) defined as

$$\text{Loan growth (LGR)} = \frac{\text{Total outstanding loans year}_t}{\text{Total outstanding loans year}_{(t-1)}}$$

Governance effectiveness and regulatory quality

The World Governance Indicators of the WB provide six metrics of the different aspects of national management (Kaufmann et al., 2010). Since this paper focuses on the impact of banking risk regulations, the authors will use two out of six measures are (I) government efficiency and (II) executive quality. World Governance Indicators defines government effectiveness as "an awareness of the quality of public services, the quality of civil services and the degree of independence from political pressures, the quality of construction and implementation of policies, and the reliability of government commitment to such policies." The quality of operations is defined as: "The perception of the government's ability to create and implement entire policy sutures and regulations that allow and promote private sector development '" this study will use Indicators based on the metrics provided by the World Governance Indicators, which rank each country on a scale from zero to 100 for each of the selected measurements, Barry Williams (2014)

Macroeconomic controls

To adjust these macroeconomic differences, a measure of economic performance will be used. GDP growth will regulate the difference in the development of the financial system and the effects of the economic cycle (Cole et al., 2008; Sturm and Williams, 2010; Athanasoglou et al., 2008.). In addition, as inflation also plays a role in determining bank returns (Athanasoglou et al., 2008), the country's changes in inflation will be incorporated into the model from zero to 100 for each of the selected measurements, Barry Williams (2014).

Thus, we have a dependence variable (Z-score) and 11 independence variables including Equity to total assets (ETA), Franchise value (FV), Bank size (BS), Loan growth (LG), Noninterest revenue (NIR), Governance effectiveness (GE), Regulatory quality (RQ), GDP growth (GDPG), inflation (INF), $Regulatory\ Quality * Equity\ Total\ Asset$s (RQE) and $Regulatory\ Quality * Franchise\ Value$ (RQF).

The model will be estimated using equation (1) below:

Bank risk = α + β_1*ETA + β_2*FV + β_3*BS + β_4*LGR + β_5*NIR + β_6*GE

$\qquad$ **+ β_7*RQ + β_8*GDPG + β_9*INF + β_{10}*RQE + β_{11}*RQF** $\qquad$ **(1)**

in which, β_1 is an intercept, and β_2, β_3, β_4, β_5, β_6, β_7, β_8, β_9, β_{10} and β_{11} are parameters associated with the corresponding independent variables included in the model.)

3.2. Research Methods

All variables will be estimated using the mean values estimated using the two-year average. First, the author will consider the multicollinearity of the model by VIF test. This is performed to check whether a single variable a certain explanation is correlated with some other explanatory variable. Accordingly, we use the correlation coefficient between the variables to test. If treatment absolute values of variables are greater than 0.8 and statistically significant, the model is more likely multicollinearity occurs. After that, we use the POLS model to consider an economic relationship between a dependent variable Y and two independent variables X_1, X_2, and a or more unobserved variables. We have tabular data for Y, X_1 and X_2 consisting of N - arguments object and T - time, so we will have NxT observations.

The Pooled OLS regression model has the form:

$$\mathbf{Y_{it}} = \boldsymbol{\alpha_1} + \boldsymbol{\beta_1} \mathbf{X_{it1}} + \boldsymbol{\beta_2} \mathbf{X_{it12}} + ... + + \boldsymbol{\beta_k} \mathbf{X_{itk}} \mathbf{u_{it}} \qquad (2)$$

with $i = 1, 2, \dots , N$ and $t = 1, 2, \dots, T$

where Y_{it} is the value of Y for object i at time t; X_{it1} is the value of X_1 for object i at time t; X_{it2} is the value of X_2 for object i at time t; and u_{it} is the error of object i at time t.

For each cross-unit, is an unobservable factor that does not change over time, it is specific to each cross-unit. If correlated with any variable X_t then divisors The amount of regression from the regression Y on X_t will be cross-affected by the dissimilar factors least observable. Even if i is not correlated with any of the solutions. Either way, its presence renders OLS estimates ineffective and Standard error has no effect.

Thus, the authors use more the a fixed-effects model (FEM) and random-effects model (REM). However, to select between three models which is appropriate. The author performed the Hausman test và Breusch – Pagan Lagrangian test. When we have a suitable model, we will also test the selected model for autocorrelation or variable variance. If yes, then the author will use the Generalized Least Squares (GLS) regression method to overcome.

4. Findings:

4.1. Description statistics

We follow Boyd et al. (1993) to calculate Z-score for 20 commercial banks in Vietnam during 2010-2020 based on the secondary data collected from banks' audited annual financial statements. Table 4.1.1 presents the descriptive statistics for all the major characteristics used in our main regression models.

Table 1: Descriptive statistics of variables

Variable	Obs	Mean	Std. Dev.	Min	Max
ZSCORE	200	2.09555	1.69483	-1.8386	6.95543
ETA	200	9.40801	4.28606	4.11023	27.5644
BS	200	8.05119	0.50626	6.76175	9.14659
FV	200	1.50355	1.34985	0.15252	6.04568
NIR	200	5.07245	3.39539	0.28232	16.5901
LGR	200	0.24471	0.21431	-0.301	1.13304
GE	200	50.73	3.55009	46	55.3
RQ	200	33.17	4.38821	28	41.8
GDPG	200	5.24	0.60351	4.2	6
INF	200	6.08	4.99081	0.6	18.7
RQE	200	306.883	130.229	144.287	791.097
RQF	200	49.4326	130.229	5.3533	225.091

Notes: ETA = Equity/Total assets; FV = Fixed assets/Total assets; BS= log (Total assets); LGR = Total outstanding loans yeart/ Total outstanding loans year(t-1); NIR =Noninterest revenue; GE = Governance effectiveness; RQ = Regulatory quality; GDPG = GDP growth; INF = Inflation; RQE = Regulatory Quality * Equity Total Assets; RQF = Regulatory Quality * Franchise Value.

The mean and standard deviation of Zscore is 2.09% and 6.95%, respectively. The minimum is approximately -1.83 (Vietcombank in 2019), and 6.955 is the maximum (TPbank in 2012). Average Equity to Total Assets averaged is 9.4% with a standard deviation of 4.29%, lowest value 4.11% (BIDV 2018), and highest value 27.56% (Viet Capital Bank 2010). Bank size has an average value of 8.05% and a standard deviation of 0.5%, with a minimum value of 6.76% (in Vietnam Capital Bank 2010) and a maximum value of 9.15% (in BIDV 2019). Franchise value has a 1.5% average and 1.34% standard deviation, with the lowest value being 0.15% (TP Bank in 2016) and the highest value being 6.04% (SaiGonBank in 2011). Noninterest Revenue has a median value of 5.07% and a standard deviation of 1.34%, with the smallest value being 0.28% (KienLongBank in 2014) and the largest being 16.5% (TechcomBank 2018). Loan growth has a mean value of 0.24% and a standard deviation of 0.21%, the lowest value is negative 0.3% (2011) and the highest value is 1.13% (2010).

Governance effectiveness has mean and standard deviations which are 50.73 and 3.55 respectively, the lowest being 46% and the highest value is 55.3%. The mean and standard deviation of regulatory quality are 33.17% and 4.38%, respectively with a minimum value of 28% and a maximum value of 51.8%. GDP growth has a mean value of 5.24% and a standard deviation of 0.6%, the lowest value is 4.2% and the highest value is 6%.

4.2. Correlation matrix

Table 2: Correlation matrix with Z-SCORE

VARIA-BLES	Z-SCORE	EAR	BS	FV	NR	LGR	GE	EQ	GDP	INF	REA	RFA
Z-SCORE	1.0000											
ETA	-0.1251	1.0000										
BS	0.4642	-0.7313**	1.0000									
FV	-0.1873**	0.6183**	-0.4914**	1.0000								
NIR	0.4273**	-0.2710**	0.5928**	-0.2390**	1.0000							
LGR	0.0478	0.0425	-0.1906**	-0.1907**	-0.1552*	1.0000						
GE	-0.2196**	-0.2838**	0.3059**	-0.0451	0.2033**	-0.1442*	1.0000					
EQ	-0.0931	-0.2769**	0.3331**	-0.0747	0.2807**	-0.1817**	0.8628**	1.0000				
GDPG	0.0185	-0.2055**	0.2161**	-0.0787	0.3045**	-0.0767	0.7040**	0.8194**	1.0000			
INF	0.2574**	0.2077**	-0.2487**	0.0146	-0.1339	-0.0412	-0.7525**	-0.5915**	-0.3371**	1.0000		
RQE	-0.1612*	0.9505**	-0.6570**	0.6278**	-0.1758*	-0.025	-0.0287	0.0102	0.0295	0.0368	1.0000	
RQF	-0.2299**	0.5605**	-0.4487**	0.9817**	-0.2113**	-0.2190**	0.0817	0.067	0.0399	-0.0702	0.6189**	1.0000

*Notes: ** Correlation is significant at the 0.01 level (2-tailed)*
* Correlation is significant at the 0.05 level (2-tailed)
ETA = Equity/Total assets; FV = Fixed assets/Total assets; BS= log (Total assets); LGR = Total outstanding loans yeart/ Total outstanding loans year(t-1); NIR =Noninterest revenue; GE = Governance effectiveness; RQ = Regulatory quality; GDPG = GDP growth; INF = Inflation; RQE = Regulatory Quality ∗ Equity Total Assets; RQF = Regulatory Quality ∗ Franchise Value.

Table 2 reports the correlation matrix for the variables used in our analysis. Accordingly, a correlation coefficient measures the degree of linear correlation between the two variables, regardless of whether one variable depends on the others. Regression results show that the coefficients for independent variables in the above matrix are less than 80%, so independent variables in the model have no high correlation, and the possibility of multilinear occurrence in the regression model is low.

4.3. Regression results

With the VIF test, multicollinearity has occurred for the model. However, according to Goldberger, "When a study has the problem of multicollinearity, it is necessary to see if this problem is still persuasive if the "small sample size problem" is substituted for the "multicollinearity

problem." He suggests deciding how small the number of observations n is before deciding that they have a small sample size problem, as when they decide the value of R^2 in an auxiliary regression function before saying that the problem of collinearity is serious. Therefore, the authors continue to use these variables for the model.

After performing regression respectively POLS, FEM, REM, and Hausman test to select the appropriate model. We have selected the REM model as the most appropriate model with Prob>chi2 = 0.9357. However, there appears the phenomenon of heteroscedasticity (Breusch and Pagan Lagrangian multiplier test have Prob > chibar2 = 0.0000) and autocorrelation (Prob > F = 0.0000 from Wooldridge test) in the REM model. Thus, the authors use the GLS model to overcome heteroscedasticity and autocorrelation. The results are shown in Table 3

Table 3: Regression according to 4 model (POLS, FEM, REM, GLS)

VAIRIABLES	POLS	FEM	REM	GLS
ETA	-0.248	-0.496***	-0.462***	0.0442
	[-1.18]	[-3.67]	[-3.47]	[0.33]
BS	2.935***	1.310**	1.938***	1.815***
	[9.25]	[2.42]	[4.50]	[5.05]
FV	1.927***	2.439***	2.291***	0.827**
	[3.18]	[6.24]	[5.99]	[2.09]
NIR	0.0184	0.00133	0.0178	0.0879***
	[0.52]	[0.04]	[0.52]	[2.61]
LGR	1.503***	1.482***	1.556***	0.883***
	[3.40]	[5.05]	[5.40]	[4.58]
GE	-0.175***	-0.185***	-0.183***	-0.151***
	[-2.86]	[-5.16]	[-5.14]	[-4.87]
EQ	-0.0516	-0.0117	-0.0402	0.0415
	[-0.80]	[-0.26]	[-0.95]	[1.16]
GDPG	0.816***	0.662***	0.708***	0.506***
	[2.94]	[3.83]	[4.16]	[4.07]
INF	0.0674**	0.0582***	0.0629***	0.0366***
	[2.31]	[3.36]	[3.67]	[3.53]
RQE	0.0125*	0.0186***	0.0178***	0.00249
	[1.88]	[4.41]	[4.27]	[0.61]
RQF	-0.0570***	-0.0767***	-0.0704***	-0.0257**
	[-3.09]	[-6.02]	[-5.78]	[-2.17]
_Cons	-17.64***	-3.824	-8.543**	-11.03***
	[-4.54]	[-0.86]	[-2.29]	[-3.34]
N	200	200	200	200
R-sq	0.561	0.614		
	Prob > F = 0.0000	Prob > F = 0.0000	Prob > chi2 = 0.0000	Prob > chi2 = 0.0000
	F (11, 188) = 21.87	F (11,169) = 24.44	Wald chi2(11) = 283.24	Wald chi2(11) = 194.99

Notes: * p<0.1, ** p<0.05, *** p<0.01

ETA = Equity/Total assets; FV = Fixed assets/Total assets; BS= log (Total assets); LGR = Total outstanding loans yeart/ Total outstanding loans year(t-1); NIR =Noninterest revenue; GE = Governance effectiveness; RQ = Regulatory quality; GDPG = GDP growth; INF = Inflation; RQE = $Regulatory\ Quality * Equity\ Total\ Assets$; RQF = $Regulatory\ Quality * Franchise\ Value$.

Table 3 indicates that 8/11 independence variables have statistical significance, including Franchise value (FV), Bank size (BS), Loan growth (LG), Non- Interest revenue (NIR), Governance effectiveness (GE), GDP growth (GDPG), inflation (INF) and Regulatory Quality*Franchise value (RQF). Meanwhile, Equity to total assets (ETA), Regulatory quality (RQ), and Regulatory Quality*Equity Total Assets (RQE) are not enough basis to determine

the influence on bank risk.

Bank size: From the debate on the issue of Too big to fail in developing and developed countries (Kaufman, 2014), an important relationship between bank size and bank risk has been shown. The support from the Too big to fail point of view partly increases bank risk. Research results show that size increase is associated with bank risk. An increase of 1 unit of LTA will increase the bank's risk (Z-score) by 0.1815 units at a 1% significance level. Similar to the research results of Fu et al., (2014) when it is said that the smaller the scale, the less the risk would be.

Franchise value: The incremental franchise value is found to increase bank risk. Particularly, when the franchise value goes up 1 unit, it would result in significant growth in risk (0.827 units), which means that the franchise value has a great influence on the bank's operations. It is noteworthy that the regulatory quality regime improved, and may partly reduce the risk of moral hazard to the bank. Keeley (1990) asserted that an increase in monopoly rents leadto higher franchising value. From the results of franchise value with regulatory quality, we find the negative relationship with risk at a 5% significance level; specifically, when the franchise value under good quality control increases 1 unit, the bank risk will reduce 0.0257 units. Williams, B. (2014) also supports this view.

Noninterest revenue: Non-interest revenue has a positive effect on bank risk with 99% confidence. When this variable increases by 1 unit, it will increase bank risk by 0.0879 units. This suggests that the bank income diversification in pursuit of profit increases risk as it may be increasing with anomalous information, leading to increased moral hazard among management of the bank. The results are similar to the study of Elyasiani and Wang (2008), Lepetit et al., (2008a), DeYoung and Roland (2001), and Stiroh and Rumble (2006). As mentioned in theory, non-interest income has a U-shaped relationship with risk. When banks diversify investment, it will increase income, and at a reasonable level, it will have a good effect on the activities of the bank. However, when non-interest revenue is over-limited in the average industry, it increases risks (information asymmetry and moral hazard). The results coincide with the results of previous studies (Lepetit et al., 2008b and Williams, B., 2014).

Loan Growth: Regression results show that credit growth of 1 unit will increase risk significantly (0.883 units) at a 1% significance level. This suggests that credit activities have a great impact on the bank's risk because it is the main activity that generates revenue for the bank. Loan growth also has a U-shaped relationship with risk. If the bank maintains a stable credit level, it will not affect the risk too much, but if it exceeds the industry average, the risk will be high. Similar results were found for Daniel Foos & CTG (2010) and Williams, B., (2014).

Governance effectiveness: The results show a negative correlation between governance efficiency and bank risk, which means that improving governance can reduce bank risk. Specifically, when the management is evaluated to increase by 1 unit, the impact will decrease by 0.151 units at a 1% significance level. This is also proven by research….

Macroeconomic controls: The GDP growth and inflation that participate in the model have a positive relationship with the dependent variable. A unit increase in GDP growth and inflation increases bank risk by 0.506 units and 0.0366 units, respectively. It is noteworthy that the impact of GDP growth is quite significant. GDP growth will lead to an increase in bank risk, which is opposite to the findings of Lee and Hsieh (2013). From the economic perspective, we can explain this difference: when an economy grows, it increases demand for production and consumption, which helps credit growth. Still, as shown in the section credit growth is U-shaped; excessive growth will lead to increased risk for the Bank.

Similarly, when the inflation rate in the economy increases, the State Bank implements a tight monetary policy to combat inflation, the credit activities will also be affected. Specifically, the increase in lending interest rates will push up the input costs of enterprises, which reduces the business efficiency of borrowing enterprises, thereby directly affecting their ability to repay loans to banks. In addition, tightening lending by banks will lead to the illiquidity of the economy, stagnant production and business activities, businesses misappropriating capital from each other, insolvency; many enterprises, especially small and medium-sized enterprises, face the risk of bankruptcy, pushing the burden of bad debt to banks. This also means increased risk for the Bank.

5. Conclusions

The study uses the data collected from 20 Vietnamese joint-stock commercial banks' financial reports and annual reports that have been audited and published for the period 2010-2020. We follow Barry Williams (2014) to measure bank risk and the factors that impact bank risk under national governance by a fixed effects model. Finally, we used the random effects model test to select the best model for panel data. However, to overcome the phenomenon of heteroscedasticity and autocorrelation, the authors use the Generalized Least Squares (GLS) regression method.

In fact, an increase in equity will help the bank prevent default risk by ensuring liquidity for the bank in operation. Furthermore, bank equity growth will lead to low risk, subsequently to increased bank risk as bank management looks for riskier (higher return) projects to control enough revenue to cover high capital expenses (Blum, 1999, Koehn and Santomero, 1980) in the long term. However, the research results of authors with banks in Vietnam do not have enough basis to conclude the impact of this variable on bank risk. The debate on banking policy

after the 2008 financial crisis has focused attention on the problem of being too big to fail (Kaufman, 2014) with backing support from the State Bank, so it has created a subjectivity and dependence, thus easily make high-risk decisions. Therefore, large banks should be more cautious in controlling decisions with large amounts of money and need to have quality policies and regulations to ensure increased revenue but remain an acceptable level of risk.

The loan growth also needs to be well controlled because this is the bank's main activity, but it is also the cause for bad debts. Credit growth has a U-shaped relationship with risk; thus, it will make the risk low if the growth reaches an acceptable level with appropriate supply. But if the growth rate is high, it will threaten the stability of the banking system. At the same time, external effects such as GDP growth will increase risks, which contrasts with the research results of Lee and Hsieh (2013). An inflation increase can make banking operations more volatile, and bankruptcy risk increases.

Regarding the impact of governance, if the quality manager is good and not affected by politics or regulations in implementation, the risk will be reduced. This shows that if a country builds a good operating environment, the bank will have to bear less risk. However, the research still has some limitations. Firstly, the estimated model insufficiently expresses the influence of factors on bank risk due to a lack of consistency in the banking system's information source. Secondly, many other risk factors have been overlooked in the research, such as the non-performing loan ratio (NPL), which is the capital contribution ratio of foreign investments. According to the authors, this may be a suggestion for future studies.

REFERENCES

Williams, B. (2014). Bank risk and national governance in Asia. *Journal of Banking & Finance*, *49*, 10-26.

Phạm, T. T. (2020). *Năng lực cạnh tranh và mức độ ổn định của các ngân hàng thương mại Việt Nam trong bối cảnh tham gia Hiệp định đối tác toàn diện và tiến bộ xuyên Thái Bình Dương* (Doctoral dissertation, Trường Đại học Ngân hàng Thành phố Hồ Chí Minh).

Boyd, J. H., Graham, S. L., & Hewitt, R. S. (1993). Bank holding company mergers with nonbank financial firms: Effects on the risk of failure. *Journal of banking & finance*, *17*(1), 43-63.

Foos, D., Norden, L., & Weber, M. (2010). Loan growth and riskiness of banks. *Journal of Banking & Finance*, *34*(12), 2929-2940.

Lê Ngọc Quỳnh Anh (2020). Các nhân tố ảnh hưởng đến sự ổn định tài chính của các ngân hàng thương mại Việt Nam. *Hue University Journal of Science*.

Kwan, S., & Eisenbeis, R. A. (1997). Bank risk, capitalization, and operating

efficiency. *Journal of financial services research*, *12*(2), 117-131.

Barth, J. R., Caprio Jr, G., & Levine, R. (2004). Bank regulation and supervision: what works best?. *Journal of Financial intermediation*, *13*(2), 205-248.

Besanko, D., & Thakor, A. V. (1995). 10 Relationship banking, deposit insurance and bank portfolio choice. *Capital markets and financial intermediation*, 292.

Blum, J. (1999). Do capital adequacy requirements reduce risks in banking?. *Journal of Banking & Finance*, *23*(5), 755-771.

Buch, C. M., & DeLong, G. (2004). Cross-border bank mergers: What lures the rare animal?. *Journal of Banking & Finance*, *28*(9), 2077-2102.

Calem, P., & Rob, R. (1999). The impact of capital-based regulation on bank risk-taking. *Journal of Financial Intermediation*, *8*(4), 317-352.

Diamond, D. W. (1984). Financial intermediation and delegated monitoring. *The review of economic studies*, 51(3), 393-414.

Koehn, M., & Santomero, A. M. (1980). Regulation of bank capital and portfolio risk. *The journal of finance*, *35*(5), 1235-1244.

Lee, C. C., & Hsieh, M. F. (2013). The impact of bank capital on profitability and risk in Asian banking. *Journal of international money and finance*, 32, 251-281.

Marcus, A. J. (1984). Deregulation and bank financial policy. *Journal of banking & finance*, *8*(4), 557-565.

Parkinson, M. (1980). The extreme value method for estimating the variance of the rate of return. *Journal of business*, 61-65.

Stiroh, K. J. (2004). Do community banks benefit from diversification?. Journal of Financial *Services Research*, *25*(2), 135-160.

VanHoose, D. (2007). Theories of bank behavior under capital regulation. *Journal of Banking & Finance*, *31*(12), 3680-3697.

Allen, F., & Santomero, A. M. (2001). What do financial intermediaries do?. *Journal of Banking & Finance*, *25*(2), 271-294.

Boyd, J. H., Graham, S. L., & Hewitt, R. S. (1993). Bank holding company mergers with nonbank financial firms: Effects on the risk of failure. *Journal of banking & finance*, *17*(1), 43-63.

Cole, R. A., Moshirian, F., & Wu, Q. (2008). Bank stock returns and economic growth. *Journal of Banking & Finance*, *32*(6), 995-1007.

Delis, M. D., & Staikouras, P. K. (2011). Supervisory effectiveness and bank risk. *Review of Finance*, *15*(3), 511-543.

Fu, X. M., Lin, Y. R., & Molyneux, P. (2014). Bank competition and financial stability in

Asia Pacific. *Journal of Banking & Finance*, *38*, 64-77.

Klomp, J., & De Haan, J. (2012). Banking risk and regulation: Does one size fit all?. *Journal of Banking & Finance*, *36*(12), 3197-3212.

Laeven, L. (2002). Bank risk and deposit insurance. *The world bank economic review*, *16*(1), 109-137.

Srairi, S. (2013). Ownership structure and risk-taking behaviour in conventional and Islamic banks: Evidence for MENA countries. *Borsa Istanbul Review*, *13*(4), 115-127..

Khrawish, H. A., & Al-Sa'di, N. M. (2011). The impact of e-banking on bank profitability: Evidence from Jordan. *Middle Eastern Finance and Economics, 13*(1), 142-158.

Wahdan, M., & Leithy, W. (2017). Factors affecting the profitability of commercial banks in Egypt over the last 5 year (2011–2015). *International Business Management*, *11*(2), 342-349.

Demirgüç-Kunt, A., & Huizinga, H. (1999). Determinants of commercial bank interest margins and profitability: some international evidence. *The World Bank Economic Review*, *13*(2), 379-408.