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FACTORS AFFECTING THE LEVEL OF BANK COMPETITION: IMPIRICAL EVIDENCE AT VIETNAM COMMERCIAL BANKS

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ABSTRACT

The objective of this research is to assess the level of competition and the factors affecting the level of competition of Vietnam commercial banks for the period from 2008 - 2016. The authors measure Lerner Index according to the formula of Abba Lerner (1934) to proxy level of competition and uses SGMM for table data to analyze the factors affecting the level of competition of Vietnam commercial banks for the period of 2008 - 2016. The results show that factors that increase the level of competition among banks include equity, outstanding loans, cost-effectiveness, bank size, economic growth rate and inflation. Meanwhile, high return on equity has the effect of reducing competition pressure.

KEYWORDS: Competition, commercial bank, SGMM

INTRODUCTION

Vietnam's banking and finance sector in the period 2011 - 2016 witnessed the mergers, acquisitions and restructuring of commercial banks under the project "Restructuring Credit Institutions (CIs) for the period 2011-2015" approved by the Prime Minister. One of the main objectives of this project is to improve the domestic and international competition of Vietnam commercial banks, to prioritize the handling of weak CIs; to carry out the merger, consolidation and acquisition of CIs on the principle of voluntariness; increase chartered capital and handle bad debts of CIs and step by step restructure CIs' operation, management and administration. This project from the Government resulted in a reduction in the number of banks in the system when weak banks were forced to merge. The mergers and acquisitions of Vietnam commercial banks also raised concerns about the possibility of a decline in the competition of the banking industry and the impact on the financial stability of Vietnam commercial banks.

In the context of Vietnam's joining into the ASEAN Economic Community (AEC) by 2015, or the signing of important FTAs, the need to improve the competition of Vietnam commercial banks is one of the key factors supporting this process. Realization of AEC has made ASEAN the third

largest market in the world after China and India. In addition, the successful signing of FTAs between Vietnam and ASEAN with India, Japan, South Korea, Australia & New Zealand, Chile, creates both opportunities and challenges for the financial system as well as commercial banks in Vietnam.

Trends and requirements to improve the competition of commercial banks are increasingly interested. There are number of research on this topic in Vietnam as well as in the world. However, there is no updated research for the commercial banking system in Vietnam until the end of 2016. In addition, previous studies have not yet assessed the level of competition and the factors affecting competition in different conditions such as normal conditions and crisis conditions. In addition, the majority of previous studies assessed the intrinsic factors of the bank, and have not yet combined with the assessment of external factors to the degree of competition of Vietnam Banking system.

This study is needed to supplement the empirical evidence on the level of competition and the factors that affect the level of competition of the banking system in developing countries in general and in Vietnam in particular. Research results will serve as a basis to help policy makers and other stakeholders better understand the current state of bank competition and the factors affecting the level of bank competition, then set strategies and solutions to improve bank competition in Vietnam.

2. Theoretical background about competition and factors affecting competition:

2.1. Theoretical background about competition:

Competition has appeared since the existence of commodity economy, and over time competition has been accompanied by the development of the commodity economy. Many economists have studied about competition and there are also many concepts of competition.

According to Samuelson and Nordhaus (1985), competition is the rivalry between competing businesses to win customers or markets.

According to Porter (1980), competitive advantage is first of all based on the ability to maintain a low cost of production and then to rely on product differentiation versus competitor.

According to Porter (1985, 1998), competition is gaining market share. The essence of competition is to seek profit, which is higher than the average profit that an enterprise has. The result of competitive process is to average the profit in the industry and reduce price.

According to Christensen (2010), competitive advantage is any value a business provides to motivate customers to buy their product or service rather than their competitors' products and services, and create entrance barriers to potential and current opponents

In recent decades, the concept of bank competition has been addressed and considered in many studies around the world.

According to Nguyen ThiQuy (2008), the competitiveness of a bank is the ability of the bank to create, maintain and develop the advantages to maintain and expand its market share, to achieve higher returns than industry average and to continue to increase, while ensuring safe and healthy

operation, to be able to resist and overcome adverse changes in the business environment.

According to Nguyen ThanhPhong (2010) bank competitiveness is the bank ability to maintain and develop the inherent advantages in order to consolidate and expand market share, to increase profits and to be able to resist and overcome adverse changes in the business environment.

2.2. Measuring level of bank competition

There are various methods of measuring the level of bank competition. However, the Lerner index has been used extensively in empirical research on banking competition, such as Berger et al. (2009), Fungáčová et al. (2013), Fu et al. (2014). This method can be used to measure and estimate the level of competition for each year and for different type of bank ownership.

The Lerner index, proposed by Abba Lerner (1934), shows bank market power by looking at the ratio between marginal cost and price. In a perfectly competitive environment, the price is equal to marginal cost, while in monopoly condition, price is greater than the marginal cost. Therefore, to measure monopoly power, the Lerner index is a widely used method in the world, considering the difference between the price and the marginal cost.

$$Lerner = \frac{P - MC}{MC}$$

Where P is the selling price and MC is the marginal cost. The Lerner index ranges from 0 to 1. The smaller Lerner index (near zero) represents the higher the level of competition. In contrast, the larger Lerner (roughly equal to 1) represents greater monopoly power.

In perfect competition, the price is equal to the marginal cost, therefore Lerner index will be zero. When the price is greater than the marginal cost, the Lerner is greater than 0 and is between 0 and 1. When Lerner is as close as 1, the monopoly power of the company is higher.

2.3. Theoretical background on bank competition and factors affecting the level of bank competition

Competition in the banking sector has attracted the attention of many local and international researchers.

A number of studies analyzing the competitiveness of European banks in the early 2000s show a decline in competition (Fernandes et al., 2005). In addition, many other studies have noted that bank integration process in the European Union in the years 2000 - 2010 has taken place extensively through the simplification of capital transfer procedures, simple regulations in terms of operating licenses, removing legal barriers to market entry, the use of a common currency and the reduced risk of foreign exchange to banks. All those matters have accelerated the process of bank acquisition and expanding beyond borders and provide cross-border services. Overall, the level of competition for European banks has increased over the past decade (Goddard et al. 2013).

Repkova (2012) studies the competitiveness of the Czech banking system for the period 2000-2010. To measure level of concentration, the author used the Lerner index, the HHI index, and the CR index. The data was collected from 15 Czech banks (represent 90% of the market). In combination

with general analysis, the author conducts a separate analysis of the credit market and the deposit market. The Lerner estimation result shows that the Czech banking market is not perfectly competitive and does not compete exclusively during the study period. The level of competition for Czech banks has decreased in the period 2005-2010 and is affected by the increase in capital costs. The Lerner analysis also shows a low level of competition in the deposit market. The author also suggest that the extension of this study is to use the Panzar-Rosse model or the Bresnahan model to assess the competitiveness of the Czech banking system as these models are highly accurate.

Bolt and Humphrey (2012) studies the competitiveness of US banks, which used HHI, Lerner and H-statistics to measure the level of competition. The authors argue that each of these indicators can be used to measure competition but in different ways. This is not a problem if all three indicators have a close correlation between banks. However, the results of the study also show that these three metrics may not correlate between banks. In this study, the authors analyzed separate revenue data for traditional banking services (including consumer loans and business loans), along with securities trading activities payment services and investment banking services.

Fungáčová et al. (2013) studies the market power of Russian banks in the period 2001-2007 using the Lerner index. The results show that the level of competition among Russian banks has only slightly increased during the study period. The average Lerner rating of Russian banks is as high as that of banks observed in developed countries, implying that the banking sector in Russia is not too incompetitive. Moreover, the study results show no evidence of a higher market power of state-owned banks or a lower market power of foreign banks. This implies that market power does not depend on the type of ownership of the bank. In addition, the study identifies factors that influence market power including market concentration, risk factors, and non-linear influence of scale.

Laurent's (2013) studies bank competition in European countries, in which the author examines the degree of competition among EU banks in the period 2000-2010 to assess the behavior of European banks in this period. In this study the author uses the Lerner index and the Rosse-Panzar model to measure the level of bank competition. As the level of banks competition increases, it is expected that the benefits to the economy increase, especially in the European integration process. It is also implied that increase the level of competition will help to decrease the cost of financial services and provide easier access to credits and investments. However, the results of Laurent study show that the level of competition of European banks has not increased significantly during this period. Cause since the early 2000s, the process of mergers and acquisitions took place mainly among domestic organizations, which did not affect the level of competition. In recent years this situation has changed a lot with many mergers and acquisitions beyond the national borders, increasing the level of competition with the emergence of many new competitors in the market.

Fu et al. (2014) uses the Lerner index to measure the competitiveness of commercial banks in 14 Asia-Pacific countries for the period 2003-2010. The results show that Lerner index in each country is different and decreases in the period 2005-2008.

Hamza and Kachtouli (2014) study the level of competition and market power of Islamic banks and commercial banks in the Middle East and North Africa and Southeast Asia for the period 2004-2009. The authors used concentration ratio (CR), HHI, the Panzar and Ross H index and the Lerner index

to measure the level of competition and market power of banks. The results show that, according to the HHI method, the concentration of banks is low. The PR-H and Lerner estimation results show the exclusive competitive characteristics of the market. This study suggests that in order to build effective business strategies and plans, each bank needs to analyze the market structure and level of competition. Specifically, for Islamic banks in the Middle East, North Africa and Southeast Asia, one of the key factors for increasing the level of competition is through product diversification and the introduction of new products to the market. The limitation of this study is that it focuses only on banks in data-driven countries to analyze and exclude other countries that may have a different level of competition and market power.

Saibu (2015) examines the competitiveness and concentration of Nigerian banks for the period 2001-2013. The study uses detailed bank data for banks and measures competition using PR-H-statistic and Lerner index. The research results show the monopolistic competitiveness of Nigerian banks during the study period. The Lerner Index shows an increase in the level of competition especially after the merger. The study also shows that risk factors, revenue diversification, and regulatory tightening are all important factors affecting the level of bank competition and market power.

Vo XuanVinh and Duong ThiAnhTien (2017) study the competitiveness and factors affecting the competitiveness of Vietnam commercial banks in the period 2005-2014. The authors use the Lerner index to measure bank competitiveness and apply panel estimation methods for table data. The results show that competition among commercial banks in Vietnam is relatively strong in relation to China commercial banks. At the same time, the results also show that factors such as capital size, credit risk provision, non-interest income ratio, equity ownership ratio, number of banks, goverment ownership have a significant impact on the competitiveness of banks.

3. Research methodology:

3.1. Research model:

To examine the factors affecting the level of competition of Vietnam commercial banks, in this research we follow the studies of Fungáčová et al. (2013), as well as the studies of Vo XuanVinh and Duong ThiAnhTien (2017). The research model is as follows:

$$Lerner_{it} = \alpha + \beta_1 Lerner_{it-1} + \beta_2 ETA_{it} + \beta_3 LOATA_{it} + \beta_4 ROA_{it} + \beta_5 CIR_{it} + \beta_6 LnAssets_{it} + \beta_7 GDP_{it} + \beta_8 INF_{it} + u_{it} (1)$$

This study measured the level of competition of Vietnam commercial banks by using Lerner index. There are a number of competition indicators, in this study we use the Lerner index developed by Abba Lerner's (1934). This is a method that commonly used in many research in the world. The Lerner index is defined as the difference between the output price and the marginal cost over the marginal cost through the formula:

$$Lerner_{it} = \frac{P_{it} - MC_{it}}{MC_{it}}$$

In particular, P is the price measured by Total Revenue per total asset of each bank. MC is the

marginal cost of each bank. Without direct observation, the MC is estimated based on the total cost function. The Translog cost function is used, inheriting the work of Raúl and Jesús (2012), as below:

$$\mathrm{LnTC} = \alpha_0 + \sum_{j=1}^{3} \alpha_j \times w_{it}^{j} + \frac{1}{2}\sum_{j=1}^{3}\sum_{k=1}^{3} \alpha_{jk} \times \mathrm{lnw}_{it}^{j} \times \mathrm{lnw}_{it}^{k} + \beta_1 \mathrm{lnY}_{it} + \frac{1}{2}\beta_2 (\mathrm{lnY}_{it})^2 + \sum_{j=1}^{3} \beta'_j \times \mathrm{lnY}_{it} \times \mathrm{lnw}_{it}^{j} + \varphi_{1t} \times T + \frac{1}{2}\varphi_{2t} T^2 + \sum_{j=1}^{3} \varphi_{3t} \times T \times \mathrm{lnw}_{it}^{j} + \varphi_{4t} \times T \times \mathrm{lnY}_{it} + \mu_t + \varepsilon_{it}$$

In which, TC is the total cost, w is the price of the three inputs (personnel expenses / total assets, interest expenses / total deposits, and other operating expenses / fixed assets), Y is the total assets, T is the time trend reflecting the effect of technical progress, μ records the individual fixed effects, and ε is the error rate.

The total bank cost function is estimated using fixed effects with robust standard. After estimating the total cost TC, the MC marginal cost is determined by taking the first derivative of the total bank function, as follow:

$$\mathrm{MC} = \frac{\mathrm{TC}}{\mathrm{Y}}(\beta_1 + \beta_2 \ln \mathrm{Y}_{it} + \sum_{j=1}^{3} \beta'_j \times \mathrm{lnw}_{it}^{j} + \varphi_{4t} \times T)$$

The bigger Lerner index (close to 1) implies the weaker the competition between banks and the stronger the level of competitiveness of each bank.

Besides, to consider the impact of these factors on the level of competition of Vietnam commercial banks under normal conditions and crisis conditions, we add to model (1) a CRISIS dummy variable. The dummy variable value is 1 during the economic crisis of 2008-2009 and is 0 in the remaining years. Specific models are as follows:

$$\mathrm{Lerner}_{it} = \alpha + \beta_1 \mathrm{Lerner}_{it-1} + \beta_2 \mathrm{ETA}_{it} + \beta_3 \mathrm{LOATA}_{it} + \beta_4 \mathrm{ROA}_{it} + \beta_5 \mathrm{CIR}_{it} + \beta_6 \mathrm{LnAssets}_{it} + \beta_7 \mathrm{GDP}_{it} + \beta_8 \mathrm{INF}_{it} + \beta_9 \mathrm{KHUNGHOANG}_t + u_{it} \quad (2)$$

The variables in the model are described in the following table:

Table 1. Variables in the research model:

Variables	Description
Lerner	The level of competition. Measured by the Lerner estimation results
ETA	Capital structure. Measured by the ratio of total equity to total assets
LOATA	Loan to Total Assets ratio
ROA	Return on total assets

CIR	Cost Income ratio. Measured by Total cost divided by Total revenue
LnAssets	Natural logarithm of total assets represented Bank scale
GDP	Growth of gross domestic product. Measured by % GDP growth rate
INF	Changes in the inflation rate. Measured by % Δ CPI
CRISIS	Represent crisis condition. The dummy variable value is 1 during the economic crisis of 2008-2009 and is 0 in the remaining years

3.2. Model estimation method:

This study uses the system GMM (SGMM) method of Arellano and Bover (1995), Blundell and Bond (1998). This method is commonly used in linear dynamic table data estimation or table data that exist variable changes and self-correlation phenomena.

In addition, the SGMM method is suitable for this study because the data table has small T (11 years), large N (24 banks), which means few time but more observations. Besides, there exists a linear relationship between the dependent variable and the explanatory variables. Dynamic model is used with one or two sides of the equation containing the delayed variable. At this time, static table estimations do not allow the creation of representative variables from the variables themselves in the model. Independent variables are not strictly extrogenous, which means they are correlated with residuals; or endogenous variables exist in the model. There are individual fixed effects and variable or autocorrelation of the error.

With the SGMM method, model reliability tests should be performed including:

Autocorrelation test of residuals: According to Arellano & Bond (1991), the GMM estimation requires a first order correlation and no second correlation of residuals. Thus, when testing the hypothesis H0: there is no first-order correlation (test AR (1)) and no second order correlation (test AR (2)), we reject H0 At the AR test (1) and acceptance of H0 at the AR test (2), the model satisfies the requirements.

Model Validation and Representing Variables Test: Similar to other models, model conformance can be achieved through the F test. The F test will examine the statistical significance of the estimation coefficient of the explanatory variables with the hypothesis H0: All coefficients of estimation in equation are zero, so for the appropriate model to reject the H0 hypothesis. In addition, the Sargan / Hansen test is also used to test the hypothesis H0: the variables are consistent. Accepting the H0 hypothesis means that the variables used in the model are consistent.

3.3. Research Data

This study uses a sample of 24 commercial banks in Vietnam for the period from 2008 to 2016. This is a balanced panel, consisting of 216 observations. The data is derived from the annual financial statements of commercial banks. Information needed for research collected from audited financial

statements, annual reports and public disclosures of commercial banks. The descriptive statistics for the variables used in this study are shown in Table 2.

Table 2: Descriptive Statistics of sample

Variable	Mean	Std. Dev.	Min	Max	Obs
BANKSIZE	17.97906	1.256402	14.69872	20.72988	216
EQTA	0.1124928	0.0810996	0.0241392	0.999422	216
LOANTA	0.5113043	0.1564076	0.0046616	0.8516832	216
CIR	0.8932342	0.0794948	0.6137335	1.218747	216
ROE	0.084263	0.0866288	-0.8200213	0.2846456	216
GDP	0.0591846	0.004797	0.0524737	0.0668	216
INF	0.090399	0.0692676	0.0063061	0.2311632	216
LERNER	.2957634	.0849353	.0214135	.608538	216

Table 2 presents statistics describing variables used in the regression model of factors affecting the level of competition of Vietnam commercial banks. Data show that there is heterogeneity among the banks in the sample. Bank scale variable BANKSIZE is calculated by the natural logarithm of the total assets, having average value of 17.98; the max value is 20.73 of BID in 2016; the min value is 14.70 of TIENPB in 2008. The ratio of equity to total assets EQTA is 11.25% average; max value is 99.94% of TIENPB in 2008 when the bank was newly established, the entire asset was financed by equity; the min value is 2.4% of Tien PB in 2016. Loans to customers on total assets LOANTA reached 51.13% average, the max value was 85.2% of OCB in 2008, the min value was 0.46% of TIENPB in 2008 when this bank was newly establish. The operating expense on operating income ratio was 89.32% average, the max value was 121.87% of TIENPB in 2011, the min value was 61.37% of SGB in 2010. The return on equity (ROE) averaged 8.43%, the max value was 28.5% of ACB in 2008, the min value was -82% belonged to TIENPB in 2011. The variable representing the level of competition of Vietnam commercial banks is LERNER index with average value 29.58%, the max value is 60.85% of TIENPB in 2008, the min value is 2.14% of TIENPB in 2011. For Macroeconomic environment measurements, the average economic growth rate for the nine years 2008-2016 is 5.92%, the min value is 5.25% in 2012, the max value is 6.68% 2015; The average inflation rate for nine years from 2008 to 2016 is 9.04%, the lowest rate is 0.63% in 2015, the highest rate is 23.12% in 2008.

4. Empirical results

4.1. Model estimation results:

To consider the factors affecting the level of competition of Vietnam commercial banks, we use SGMM method. Model (1) looks at the factors that affect the level of competition of Vietnam commercial banks under normal conditions while model (2) considers the impact in the context of crisis. Estimated results are as follows:

Table 3: Estimation resultby SGMM

	Dependent variable: Lerner	
	(1)	(2)
LERNER(t-1)	0,1449***	0,0874***
	(0,0137)	(0,0116)
EQTA	-0,0976***	0,0326
	(0,0250)	(0,0351)
LOANTA	-0,0379***	-0,0613***
	(0,0106)	(0,0095)
CIR	-0,8494***	-0,8246***
	(0,0134)	(0,0174)
ROE	0,0286***	0,0323***
	(0,0073)	(0,0082)
BANKSIZE	-0,0288***	-0,0239***
	(0,0018)	(0,0020)
GDP	-0,4447**	0,4086***
	(0,1856)	(0,1318)
INF	-0,1634***	-0,1274***
	(0,0128)	(0,0154)
CRISIS		0,0215***
		(0,0021)
_CONS	1,5938	1,4412
AR (1) p-value	0,007	0,003
AR (2) p-value	0,517	0,306
Hansen p-value	0,275	0,3
Number of groups	24	24
Number of instruments	26	26

F-test p-value	0,000	0,000

The estimation results of models examining the factors affecting level of competition of Vietnam Commercial banks using the SGMM method. Lerner variable represents the level of competition used in medal (1), (2). The dummy variable representing the Financial crisis period of 2008, 2009 (crisis). AR (1), AR (2) p-value is the p-value of the first and second correlation tests of the residual. Hansen p-value is the p-value value of the Hansen test for the suitability of variables in the model. F-test p-value is the p-value of the F test for conformance of the model. Standard error values are enclosed in parentheses ().
***, **, * indicate statistically significance at 1%, 5%, 10% accordingly
Source: Calculated results from Stata 12.0 software

The suitability of regression using the SGMM method was evaluated by F-test, Hansen test, and Arellano-Bond (AR) test. The F test measures the statistical significance of the estimated coefficients. Hansen test examines the excessive constraints, the rationality of the representative variables. The AR test determines whether there is a residual relation in the model.

In both models, the Hansen test has p-value of 0.275 and 0.3, respectively, which are greater than 0.1, then we accept the hypothesis H0: the model is correctly defined, the representative variables are reasonable. The F-test in both models has a p-value of 0.000 which is less than 0.01, so we reject the H0 hypothesis: all estimation coefficients in equation are zero, or estimation coefficients of the explanatory variables is statistically significant. So both models are suitable.

The AR1 test of both models has a p-value of 0.007 and 0.003, all of which are less than 0.1, the we reject the H0 hypothesis: there is no level 1 sequence correlation, which means there is level 1 sequence correlation. The AR2 validation test of both models has p-value of 0.517 and 0.306, respectively, which was greater than 0.1, then we accept the hypothesis H0: there was no level 2 correlation in the residuals of the regression model.

The regression coefficient of the lernert-1 variable is 0.11449 and is statistically significant showing that the level of competition of the bank depends on the level of competition in the previous year, which also shows that the regression method used is suitable. The positive regression coefficient shows the positive relationship of lerner this year with that of previous year, which means that if lerner of previous year increased, lerner of this year also increased and vice versa. The higher the level of competition in the previous year, the higher the level of competition next year. Thus, the regression method used is consistent with the dynamic table model. The lerner variable represent level of competition of Vietnam commercial banks is significantly impacted by the level of competition last year (lernert-1) , the intrinsic factors of the Bank, and external macroeconomic environment factors.

4.2. Result discussion:

The regression results in Table 3 show that the eight variables proposed in the model affect the level of competition of Vietnam commercial banks, include last year competition index, equity on total asset ratio,loans on total assets ratio, operating expense on operating income ratio, return on equity, bank size, economic growth, and inflation rate.

The regression coefficient of the EQTA variable is -0.0976 negative and is statistically significant showing the inverse relationship of the equity to total assets ratio to the lerner index. When this ratio increase, lerner decreases, the level of competition of commercial banks increased. EQTA is a variable representing the financial capacity of commercial banks. The higher the ratio, the higher of assets financed by equity. Accordingly, the higher the financial autonomy of banks and the higher the level of competition. In contrast, the lower EQTA ratio represents almost all of the bank's assets is financed by external sources such as mobilized capital, loans, and the lower the level of competition. Thus, the results of the study are consistent with economic theory and provide more empirical evidence to show that when banks have higher equity capital on total assets, then level of competition will be higher.

The regression coefficient of the LOANTA variable is -0.0379 negative and is statistically significant showing the inverse relationship between the loan to total asset ratio and the lerner, as LOANTA ratio increases, the lerner decreases, the level of competition of the bank increased. When the outstanding loans increased, LOANTA increased. The income of Vietnamese commercial banks depends mainly on lending activities, so a high loan to total assets ratio can bring a high income ratio andcompetition level of commercial banks increase. It should be noted that the risk of competitive pressure can increase the risk of deteriorating credit quality, affecting the safe operation of banks.

The regression coefficient of the CIR variable is -0.8494 negative and is statistically significant showing the inverse relationship between the ratio of costs to income ratio and lerner. As this CIR ratio increases, Lerner reduced, the level of competition of banks increased. CIR represents the ability to manage business activities of commercial banks, as CIR increases mean increased operating expenses / operating income. Operating expenses include labor costs, depreciation and other operating expenses; Interest expenses, business expenses of business services are deducted from income. Thus, the increase in CIR implies that the bank costs more for operations and administration, corresponding to a decrease in Lerner index, which implies an increase in level of competition among banks.

The regression coefficient of the ROE variable is 0.0286 positive and is statistically significant showing a positive relationship between return on equity and lerner, as this ROE ratio increases, the lerner increase, the level of competition among banks decreased. ROE represents the profitability of commercial banks. Many research indicates that when profitability increases, the competitive pressure of commercial banks decreased. This result is due to the increase in bank profits will add financial resources to the bank, help to invest in technology, improve productivity and reduce marginal costs, leading to an increase in the lerner index, which reduces the competitive pressure among commercial banks.

The regression coefficient of the BANKSIZE variable is -0.0288 negative and is statistically

significant showing a negative relationship between bank size and lerner, as the bank size increases, the lerner decreases, the level of competition among banks increased. High total assets amount represent large bank operation scale.With the bank's main activities being to mobilize deposits and loans, bank total assets demonstrate the ability to mobilize deposits from customers and big outstanding loans. Expanding the business can increase competitive pressures. Total assets increased, but if the quality of assets was not high, then bad debts will be high accordingly and be difficult to recover, the bank would face high credit risk, leading to liquidity risks, increase in banking costs, and increase competitive pressure of commercial banks.

The regression coefficient of the GDP variable is -0,4447 negative and is statistically significant showing the inverse relationship between economic growth and the lerner index, as economic growth rates increase, lerner decreases and level of the bank competition increased. According to Liang & Reichert (2006), at some points in the economic cycle, higher economic growth leads to higher incomes and better education, which creates greater demand for banking services, more complex and risky in business management requirements.

According to the economic cycle theory, economic cycles include degradation, recovery and growth. According to Keynesianism, as the economy shrinks, the government needs to use fiscal policies and ease monetary policy to stimulate demand. One of the government policies to promote economic development is loosening monetary policy through increased money supply from credit. Loose and relaxed credit policies can lead to credit risk degradation, and increased bad debt. This has led to an increase in bank operating expenses and increased competitive pressure on commercial banks. Thus, the financial policies that promote economic growth can affect the level of competition of commercial banks.

The regression coefficient of the INF variable is -0,1634 negative and is statistically significant showing the inverse relationship between inflation and lerner index, as the inflation rate increases, the lerner decreases, the level of bank competition increased and vice versa. This result can be explained by the increase in inflation leading to the increase in operating expenses of the bank, leading to increased competition among commercial banks. In particular, during the 2008-2009 crisis, the study results shows that the regression coefficient of the CRISIS variable is 0.0215 positive and statistically significant, indicating a positive relationship between crisis and Lerner index; level of bank competition in crisis is low. In times of crisis, customers become more cautious in borrowing and dealing with banks. In addition, banks in crisis need to prioritize all resources to maintain operations and overcome the crisis. After a period of crisis, competitive pressure between banks will likely increase again.

5. Conclusion and policy implication:

Firstly, banks should well control their costs and improve productivity as well as resource management to enhance the bank's competitiveness.

Secondly, it is necessary for banks to strictly control credit activities and take measures to actively deal with bad debts, recovere debts from customers or debt sell in order to increase the quality of loan assets and optimize operations performance to enhance the bank competitiveness.

Thirdly, in addition to the diversification of income sources, banks should increase level of equity, invest and develop modern technology foreffective operations of the system.

Fourth, macro variables are often out of control of commercial banks. Therefore, it is necessary to actively deal with changes in the macro economy in order to preserve the bank's assets. This will help banks to cope with economic shocks, and forecasts risk, so that banks can provide a suitable strategy and ensure profitability, while preserving the assets of the bank.

Fifth, banks should develop and provide diversified products to match with customers demand. Banks should conduct market research and study customer segmentation in order to offer suitable products to different customers, to formulate preferential policies on interest rates and promotions that suitable for each customer segmentation.

Sixth, each bank must develop proper business strategy, in accordance with the conditions inside and outside the bank. Each bank has its own strengths in serving customers. Today, the competition between banks is increasing, while products and services of banks are almost the same, therefore the quality of customer service is very important.

Seventh, modern technology is a precondition for the deployment of new types of services, quick and complete information updates, while minimizing risks. On the other hand, modern technology also helps banks reduce costs, reduce transaction time while still ensuring the safety of customers, helping to protect customers effectively. The commercial banks need to exchange and cooperate to learn the experience of foreign banks in the world. They should link with service providers to develop a wide range of products on the basis of modern science and technology. Besides, it is necessary to invest in modern machinery and good security, and at the same time, develop a strict management and supervision mechanism, handle quickly and satisfactorily for customers.

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