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Does banking market power matter on financial stability?

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A B S T R A C T

This study investigates the impact of market power on bank financial stability using bank-level data from 24 banks in Vietnam over the 2008- 2017 period. In order to measure the degree of market power in the Vietnam banking sector, we compute the separated Lerner index by fixed effect model, random effect model, and Z-score as a measure of financial stability. We use the static and dynamic panel data regression methods to estimate the relationship between market power and financial stability. Our results support the "competition - stability" view and show that Vietnamese commercial banks facing little competition tended to be less stable. We also find that size had a positive effect on stability while loan growth rate had a negative effect on financial stability. The study suggests some important policy implications for improving bank stability in Vietnam.

1. Introduction

In the literature, the impact of competition on bank stability is one of the debated issues. From the "competition-stability" perspective, Mishkin (1999), Beck et al. (2006), Berger et al., (2009), Coccorese (2005), and Jiménez et al. (2010) emphasize that an increase in concentration will have a larger impact on banks' instability. However, the "competition-fragility" view suggests that an increase in competition among banks will reduce profit margins and lead to encouraging bank risks. This paper builds on the work of Wahyoe et al. (2011) and Widede et al. (2015) and applies to Vietnam. First, Wahyoe et al. (2011) estimated the impact of market power on banking stability for 12 Asian countries from 2001 to 2007 period. They postulated that higher market would increase financial instability. However, on closer inspection, the level of financial instability of commercial banks depends on the economic structure of each country from the research sample. Second, Widede et al. (2015) examined the impact of market power on banking stability for 18 countries in the Middle East and North Africa (MENA) and pointed out that there was little correlation between market power and financial instability in the period 2000-2008. In Vietnam, Nguyen et al. (2017) mentioned that competition helps Vietnamese commercial banks have more stable operating results in the first stage and would gradually decrease when the financial crisis occurs. Further research is needed to provide evidence for the relationship between market power and banking stability in Vietnam.

2. Literature review

2.1. Bank market power

According to OECD (2002), market or monopoly power is the ability that firm can increase and maintain market price above the level which beats the competition. If there is a market power, there would be a reduction of output and loss of economic

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welfare. Comparing prices and marginal costs with the market structure, Church and Ware (2000) determined that a firm in a perfectly competitive market has no market power, whereas a firm in an exclusive market has the strongest market power. There is an inverse relationship between market power and competition. The more competitive the market is, the lower the market power of firms is and vice versa, the more monopoly on the market, the higher the market power of firms. Fernandez de Guevara et al. (2005) defined the bank's market power as an indicator of competitiveness and described the extent to which banks can set prices for products and banking services that exceed the marginal cost of the bank.

In this study, the market power of banks is regarded as an indicator of the ability to control the market and impose prices on products and services in the direction of benefiting banks. In a less competitive market, banks take a higher level of monopoly. In contrast, more competition allows banks to have less market power.

2.2. Financial stability of banks

The concept of financial stability of banks has different views and scopes. We examine the definitions of the financial stability of commercial banks from the previous studies. According to Crockett (1997), stability can be defined as the lack of pressure that may lead to measurable economic harm away from a narrow group of customers and counterparts. The bank's financial instability occurs when economic performance is reduced due to fluctuations in the prices of financial assets. The financial instability occurs only when: (i) real economic costs occur; (ii) greater potential losses, not actual losses; (iii) losses not only happen to banks and financial intermediaries but to all institutions; (iv) when financial instability occurs with banks it will have a greater impact because banks are directly related to the payment system. By the definition of financial instability, Mishkin (1999) also provided the definition for financial stability. Financial instability happens when there are information flows that affect the financial system so that its role of channeling funds for effective investment opportunities can no longer be executed. Duisenberg (2001) compared financial stability to monetary stability. While monetary stability is the reflection of the durable situation of overall price, financial stability is hard to be defined. Generally, financial stability be the stable and permanent operation of factors or components that contribute to financial system. Chant et al. (2003) stated that the financial instability can be related to financial market conditions that threaten and harm the economy through the operating mechanism of financial system. Financial instability can negatively affect the economy by many approaches such as weaken financial situation, interfere the operation of institution or financial intermediation. Large (2003) considered financial stability as maintaining confidence in financial system. The threats to financial stability can be involved in the shocks and spread so that the liquidity and the respect to contract terms would be questioned. Financial instability expresses through the suddenly and unexpected changes in price. Tomasso (2003) defined financial stability as the condition in which financial system can be resistant to the shocks and can still perform the transaction function as well as cascade capital from savings to investment activities.

In this study, banks' financial stability refers to an absence of instability, a condition in financial markets that the components of commercial banks are operating stably and well-performing. A stable financial system is the capability of allocated resources and absorbed shocks, avoiding these from creating disorder effect on other financial system or the real economy.

2.3. The impact of market power on banks' financial stability

Studies of market power and financial stability of commercial banks have different views on this relationship. There are two main opposing views on this matter as follows:

The "competition-fragility" view highlights that a more concentrated market allows banks to earn a higher profit; thus creating a capital buffer against crisis and reducing a bank's risk-taking behavior; and the "competition-stability" view claims that more competition allows banks to have more stability.

The "competition-fragility" view suggests that an increase of the market power of banks will have a large impact on banks's fragility**,** because banks have the opportunity to impose prices to increase profit margins to help stabilize the banks' finances. Conversely, when the market is increasingly competitive and market power of banks decreases, this leads to margins of banks shrinking, causing banks to finance riskier projects to increase profits**.** Therefore, they face greater risks and create financial instability. There is some evidence from the research to support this view, including Jayakumar et al. (2018), Yusgiantoro et al. (2018), Cuestas et al. (2017), Mensi and Labidi (2015), Soedarmono et al. (2011), Jiménez et al. (2010), Uhde and Heimeshoff (2009), Schaeck et al. (2009), Coccorese (2005) Albaity et al. (2019), Rui et al. (2017), Beck et al. (2013), Hellmann et al. (2000), Agoraki et al. (2011), Maudos and Guevara (2011), Ariss (2010), Beck et al. (2006), and Keeley (1990).

The "competition-stability" view is supported by Albaity et al. (2019), Rui et al. (2017), Beck et al. (2013), Agoraki et al. (2011), Maudos and Guevara (2011), Ariss (2010), Beck et al. (2006), and Keeley (1990). These studies argue that the higher market power, the more opportunity banks have to impose prices to increase profit margins to stabilize the banks' finances. On the contrary, when the market is more competitive or the market power of the banks is low, the bank's profit margin is narrowed so banks have to finance riskier projects to increase profits, causing greater risks and creating financial instability for banks.

Although the topic attracts considerable attention**,** empirical results on the relationship between bank market power and financial stability are ambiguous and inconclusive. In the research of Keeley (1990), the impact of market power on financial stability was analyzed, but comparing market price ratios to book value of total assets was out of date. There are more recent studies examining the relationship between market power and financial stability by using some specific financial indicators.

Regarding market concentration measurement, there are different methods and indicators used in the following studies. Herfindahl-Hirschman index is analyzed in the studies of Beck et al. (2006) and Rui et al. (2017). H – Panzar index was used in the research of Schaeck et al. (2009). Beck (2013) uses H and HHI indicators. Maudos and Guevara (2011) combined Herfindahl-Hirschman index and Lerner index. Lerner index is also calculated in the researches of Ariss (2010), Soedarmono (2011), Agoraki (2011), Mensi and Labidi (2015) and Yusgiantoro et al. (2018). Cuestas et al. (2017) also used Lerner index, but combine with market share. Jayakumar et al. (2018) also used the Lerner index, but the work was associcated with Boone and H index. In terms of financial stability measurment, there are various indicators which are examined. Z-score was calculated in the researches of Uhde and Heimeshoff (2009), Ariss (2010), Soedarmono (2011, 2013), Maudos and Guevara (2011), Agoraki (2011), Beck (2013), Mensi and Labidi (2015) and Yusgiantoro et al. (2018). Z-score was also used in the study of Cuestas et al. (2017) that combined with loan loss reserves ratio. Rui et al. (2017) used M2 / GDP indicators, Credit assets, Growth rate, CPI. The research of Jayakumar et al. (2018) combined bank-level capitalization ratio, Z-score, the provision of non-performing loans, private credit by deposit money banks ratio, the composite index of banking stability as a measure of financial stability. There is one noticeable issue that deservedly to be noticed. Most of the studies examined the impact of market power on financial stability for developed countries such as Europe, the US, and China. There are few studies examine the link between market power and financial stability in emerging market like Vietnam. The paper thus applies the dynamic panel data to examine the interaction between bank market power and financial stability of the Vietnamese banking system.

3. Methodology

3.1. Bank market power measurements

This paper examines the market power of the sample by the Lerner index. The Lerner index has various advantages comparing to other indicators (such as the H index, the market share or market concentration measures). First, this is the only indicator that can measure the market power varying at the bank level. Secondly, the effect of pricing power on the asset and funding side of the bank can be illustrated by the Lerner index at the same time. Finally, geographical market is not required by the Lerner index. As a result, the Lerner index is applied commonly as a market power proxy (Beck et al., 2013).

In this study, we calculate the Lerner index for individual bank and individual year, as follows:

(I) Using the cost function to estimate marginal cost

The translogarithmic cost function depends on: Total Cost is approximated by a function included total assets and the prices of three inputs: labor price (W1), capital price (W3), and operating price (W3).

$$LnTC_{it}=\alpha+\beta_1 lnTA_{it}+ \beta_2(lnTA_{it})^2+ \beta_3 lnW1_{it} + \beta_4 lnW2_{it} + \beta_5 lnW3_{it} + \beta_6 lnTA_{it}lnW1_{it} + \beta_7 lnTA_{it}lnW2_{it} + \beta_8 lnTA_{it}lnW3_{it} + \beta_9(lnW1_{it})^2 + \beta_{10}(lnW2_{it})^2+ \beta_{11}(ln(W3_{it})^2+ \beta_{12} lnW1_{it}lnW2_{it} + \beta_{13} lnW2_{it}lnW3_{it} + \beta_{14} lnW1_{it}lnW3_{it} + \varepsilon_{it} \quad (1)$$

Note that subscripts *i*, and *t* refer respectively to bank and time, respectively. TC_{it} means total cost, TA_{it} represents total assets, Labor price ($W1_{it}$) is measured by the staff cost/total assets ratio. Capital price ($W2_{it}$) is the Interest expense/total deposits ratio. Operating price ($W3_{it}$) is the management costs and other operating costs/fixed assets ratio.

In order to ensure that the total cost is calculated the same way at level 1,we limit the regression coefficient conditions as follows: $\beta_1+ \beta_4+ \beta_5=1$; $\beta_6+ \beta_7+ \beta_8=0$; $\beta_9+ \beta_{12}+ \beta_{13}=0$; $\beta_{10}+ \beta_{12}+ \beta_{14}=0$; $\beta_{11}+ \beta_{13}+ \beta_{14}=0$.

To calculate the marginal cost, we use the following equation:

$$MC_{it} = \frac{\partial TC_{it}}{\partial TA_{it}} = \frac{TC_{it}}{TA_{it}}[\beta_1 + 2\beta_2 \ln TA_{it} + \beta_6 \ln W1_{it} + \beta_7 \ln W2_{it} + \beta_8 \ln W3_{it}]. \quad (2)$$

The translog function is estimated by using panel data through fixed effects (random effects), random effects and GMM regression.

(ii) The Lerner index

The Lerner index is computed as follows:

$$Lerner_{it} = \frac{P_{it} - MC_{it}}{P_{it}}, \quad (3)$$

where P_{it} denotes the price of banking outputs proxied by the ratio of total operating income to total assets for the i^{th} bank at time *t*; and MC_{it} represents the marginal cost calculated from estimating a translogarithmic cost function.

3.2. Bank stability measurements

Bank stability is measured using the standard deviation of the return on total assets (SDROA) or the standard deviation of return on equity (SDROE). However, the more common indicators used in the literature are the Z-scores, including the Z-ROA and the Z-ROE. The Z-score represents the number of standard deviations that a bank's profit must drop below its expected value before the bank becomes insolvent. Thus, a higher value of Z-score indicates greater banking stability.

The Z-score, therefore, covers the parameters of the standard deviation of ROA, ROE, and better represents the bank's financial stability. The ratio is calculated by a three-year rolling time, rather than a yearly or full sample period. Beck et al. (2013) show that this calculation will avoid the variation in Z-scores within banks over time from variation in the levels of capital and profitability. This also helps to avoids the denominator being computed over different window lengths for different banks under an unbalanced panel dataset. Leroy et al. (2017) also applies the three-year rolling time calculation for their study.

The Z-score is calculated by the following formulas:

$$ZROA_{it} = \frac{ROA_{it} + ETA_{it}}{SDROA_{it}}, \quad (4)$$

$$ZROE_{it} = \frac{ROE_{it} + 1}{SDROE_{it}}, \quad (5)$$

where *ZROA* denotes the *Z-score* of *ROA*, *ZROE* is the Z-score of *ROE*, *SDROA* is the standard deviation of last three-year return on assets and *SDROE* is the standard deviation of last three-year return on equity.

3.3. Estimation models

The analysis of the link between market power and financial stability follows a model proposed by Leroy and Lucotte (2017). This model is also applied by other studies related to bank stability with different control variables depending on the research sample, such as the study of Beck et al. (2013). The equations can be specified as follows:

$$\text{STABILITY}_{it} = \beta_1 \text{LERNER}_{it} + \sum_{j=1}^{n} \beta_j X_{it} + \varepsilon_{it}, \quad (6)$$

where *i* and *t* respectively denoting banks and time. $STABILITY_{it}$ is a proxy for bank stability, calculates by *SDROA* (standard deviation of last three-year return on assets), *SDROE* (standard deviation of last three-year return on equity); the variables X_{it} are a set of {k} variables controlling for bank-specific characteristics, the total equity divided by total assets (ETA); the total loan divided by total assets(LTA); the loan growth rate (Loangr), the logarithm of total assets (Size), and ε_{it} is the estimation error.

3.4. Methodology

This paper applies the dynamic panel-data estimation or two-step system GMM suggested by Arellano and Bond (1991). This technique is based on the important assumption that instrumental variables are internal, this means the current variable depends on its lagged periods. This estimation can be used as follows: (i) the sample has small time and large numbers, (ii) the relationship between variables is linear, (iii) the dependent variable is dynamic, (iv) the independent variables are not exogenous, ie, they regard to the lagged period and current error, (v) it has the fixed effect, which means that it has unobserved heterogeneity; (vi) heteroskedasticity and autocorrelation can occur within the error of units, but not between units. With the above characteristics, the two-step system GMM estimation is consistent with our research objectives and data, because the dependent variable (Stability) and the main independent variable (Lerner_index) of the model are dynamic, or the current variables may have a correlation to the lagged one.

4. Empirical results

In this study, we use Eq. (3) to calculate the Lerner index, which represents the market power of 24 Vietnamese commercial banks. The Lerner index represents the degree of difference between the actual price and the marginal cost, thus, to gain high profit, the Lerner index is positive, and the higher the Lerner index, the higher the market power. Then the bank can dominate the market by imposing market interest rates, reducing the level of market competition and vice versa. However, in the short term, the Lerner can be negative because banks use a price reduction strategy in a crisis period, thus, this causes the actual price will fall less than the marginal cost (Coccorese, 2005). Table 1 shows the results of the average Lerner index by estimating the fixed effect model (FEM) and the random effect model (REM). The findings show the differences in the market power of the Vietnamese commercial banks. For the Lerner index under FEM model (Lerner_F), SCB, MSB, and NCB are the banks with the lowest Lerner index, respectively 0.0168, 0.0395 and 0.0787, respectively. In contrast, EIB is the bank with the highest Lerner index, at 0.9781, which is significantly higher than the other banks in the system with the Lerner index from 0.1 to 0.2. Besides, the result of estimating the Lerner index by REM model (Lerner_R) is lower than the result from FEM model, 50% of banks in the system have Lerner index below 0.1, EIB has the highest Lerner index at 0.9777, and the other banks have Lerner index from 0.1 to 0.2.

Table 1
The results of the FEM and REM regression of the Lerner index by bank

No.	Bank	Lerner_F	Lerner_R	No	CODE	Lerner_F	Lerner_R
1	ACB	0.1340	0.0992	13	PGB	0.1399	0.1156
2	ABB	0.1217	0.1017	14	STB	0.1338	0.0915
3	BID	0.0962	0.0493	15	SCB	0.0168	0.0283
4	EIB	0.9781	0.9777	16	SEA	0.0894	0.0939
5	HDB	0.0827	0.0650	17	SGB	0.1947	0.1677
6	KLB	0.1905	0.1667	18	SHB	0.1305	0.1288
7	LPB	0.2220	0.2092	19	TCB	0.1699	0.1326
8	MSB	0.0395	0.0167	20	TPB	0.1048	0.1758
9	MBB	0.2356	0.2140	21	VCB	0.1642	0.1323
10	NAB	0.0974	0.0925	22	VIB	0.1340	0.0904
11	NCB	0.0787	0.0664	23	CTG	0.1396	0.0869
12	OCB	0.1692	0.1530	24	VPB	0.1542	0.1033

Source: Author's computed

Table 2
The average Lerner index by year

Year	Lerner_F	Lerner_R
2008	0.1897	0.1794
2009	0.2414	0.2369
2010	0.2264	0.2218
2011	0.1535	0.1346
2012	0.1404	0.1092
2013	0.1299	0.1085
2014	0.1388	0.1162
2015	0.1502	0.1232
2016	0.1462	0.1174
2017	0.1575	0.1356

Source: Author's computed

Table 2 represents the average Lerner index estimates for banks by year. The average Lerner index of banks is calculated under the FEM model increased during the crisis period in 2008 and 2009, increasing from 0.1897 in 2008 to 0.2414 in 2009. From 2009 to 2013, the average Lerner index of banks decreased gradually and reached 0.1299 in 2013. In the next period, the index increased slightly and reached 0.1356 in 2017. The results of estimating the Lerner index from the REM model also tend to increase and decrease over time. Results from the FEM model but the Lerner index value from the REM model is lower than value from the FEM model 0.01 to 0.03.

Table 3
Descriptive statistics of variables

Variable	Obs.	Mean	SD	Min	Max
Z_ROA	240	115.5253	247.0414	-1.494937	2670.77
Z_ROE	240	108.7697	185.4108	-1.621565	1331.276
SDROA	240	0.0033866	0.0051791	0.0000217	0.0319211
SDROE	240	0.0687481	0.3357808	0.0007578	3.051916
Lerner_f	240	0.1673918	0.1913134	-0.3113375	0.9866485
Lerner_r	240	0.1482716	0.1963072	-0.1953657	0.9863464
LnTA	240	18.24965	1.184754	14.89359	20.90749
Loangr	240	0.3127717	0.4127542	-0.3129475	4.781569
LTA	240	0.5152333	0.1561539	0.0202983	0.8516832

Source: Author's computed

Table 3 reports the summary of statistics for the maximum, minimum, average and standard deviation of the variables used to estimate the relationship between market power and financial stability of the Vietnamese commercial banks during the 2008-2017 period. For the banks' financial stability, the average Z_ROA index was 115.53; the average Z_ROE was 108.77; the average SDROA 0.003 and SRROE reached 0.068. There is a difference between the largest and smallest values of the above indicators, which means the financial stability of Vietnamese commercial banks are very different. The Vietnamese commercial banks have a high concentration of market power through the large Lerner index including EIB, MBB, LBB while commercial banks have lower market strength and are more competitive than NCB**,** MSB**,** and SCB. Table 4 also shows a significant difference among banks in terms of loan growth, size and outstanding balance of total assets of Vietnamese commercial banks in the research period. In order to analyze the impact of market power on the financial stability of the Vietnamese commercial banking system, we estimate model (6) by both the static and dynamic panel data methods including the fixed-effect model (FEM), the random-effects model and the generalized method of moments (GMM). Table 4 and 5 respectively include the results of the impact of Lerner_f và Lerner_r on banks' financial stability (ZROA, ZROE). Columns (1) to (6) indicate respectively the results of FEM, REM and system GMM methods. When we compare FEM and REM, the Hausman test shows FEM fits better. In fact, the findings show that most of the Lerner indexes have negative effects on the bank's financial stability variables, which means the market power increases or the competition decreases will reduce the stability in Vietnam.

Table 4
Estimation results for LnZROA as dependent variable

Variables	Fixed Effects (FE)		Random Effects (RE)		Sys-GMM	
	(1)	(2)	(3)	(4)	(5)	(6)
L.LnZROA	0.302*** (0.071)	0.301*** (0.071)	0.537*** (0.061)	0.537*** (0.60)	0.598*** (0.097)	0.981*** (0.265)
Lerner_f	-1.870* (1.114)		-0.482 (0.326)		-0.510*** (0.182)	
Lerner_f^2	0.253 (.337)		0.054 (0.339)		2.596*** (0.502)	
Lerner_r		-1.761* (1.021)		-0.462 (0.315)		- 1.650*** (0.561)
Lerner_r^2		0.251 (0.336)		0.053 (0.337)		1.878* (1.139)
Loangr	0.319 (0.247)	.352 (0.252)	0.050 (0.223)	0 .061 (0.224)	0.097 (0.143)	-4.512** (1.943)
LnTA	0.143 (0.151)	0.148 (0.150)	.048 (0.055)	0.047 (0.055)	0.004 (0.116)	0.449*** (0.564)
LTA	1.143 (0.769)	1.012 (0.760)	0.503 (0.439)	0.459 (0.436)	0.518* (0.302)	-1.386 (4.149)
Cons	-0.122 (2.721)	-0.193 (2.693)	0.880 (1.032)	0.916 (1.034)	1.299 (1.945)	3.475 (9.114)
Diagnostic tests						
AR(1)					0.001	0.002
AR(2)					0.101	0.266
Hansen Test					0.243	0.603
Wald test (P-Value)					1164.04 (0.000)	673.40 (0.000)
Observations	214	214	214	214	214	214
No. of banks	24	24	24	24	24	24
No of Instruments					25	23
R-squared	0.1872	0.1879	0.1629	0.1624		

Note: ***,**,* denote significance at the 1%, 5% and 10% level. Standard errors in parentheses
Source: Author's computed

Table 5
Estimation results for LnZROE as dependent variable

Variables	Fixed Effects (FE)		Random Effects (RE)		Sys-GMM	
	(1)	(2)	(3)	(4)	(5)	(6)
L.LnZROE	0.390*** (0.073)	0.390*** (0.073)	0.538*** (0.060)	0.540*** (0.60)	0.314*** (0.039)	0.317*** (0.038)
Lerner_f	-2.189* (1.138)		-0.625* (0.325)		-1.652*** (0.547)	
Lerner_f^2	.475 (0.345)		0.514 (0.332)		2.339*** (0.478)	
Lerner_r		-1.920* (1.045)		-0.580* (0.315)		-1.779*** (0.608)
Lerner_r^2		0.481 (0.344)		0.052 (0.331)		2.174*** (0.487)
Loangr	.158 (0.254)	0.185 (0.259)	-0.110 (0.217)	-0 .097 (0.218)	3.180*** (0.805)	3.072*** (0.846)
LnTA	0. 199 (0.162)	0.210 (0.161)	0.031 (0.054)	0.047 (0.055)	0.142** (0.068)	0.120* (0.068)
LTA	-.451 (0.774)	-0.610 (0.767)	0.302 (0.437)	0.240 (0.433)	0.857 (0.810)	.951 (0.951)
Cons	-.581 (2.883)	-0.797 (2.860)	1.337 (1.012)	1.381 (1.015)	-1.034 (1.463)	-0.652 (1.465)
Diagnostic tests						
AR(1)					0.011	0.011
AR(2)					0.247	0.200
Hansen Test					0.299	0.266
Wald test (P-Value)					461.17 (0.000)	452.14 (0.000)
Observations	214	214	214	214	214	214
No. of banks	24	24	24	24	24	24
No of Instruments					23	23
R-squared	0.2387	0.2377	0.2152	0.2152		

Note: ***,**,* denote significance at the 1%, 5% and 10% level. Standard errors in parentheses Source: Author's computed

We have conducted the estimations for ZROA and ZROE respectively and chose the appropriate instrument variables. The results also reflect that the null hypothesis of correct specification is not rejected by the Hansen and the serial-correlation test, which indicates that the study has valid instruments and no serial correlation. The p-value of Wald tests are smaller than 1%, thus, all models are appropriate. The results show the regression coefficients of the Lerner_f index in the models (1) and (5) are statistically significant at 10% (FEM) and a 1% level of significance (GMM), while Lerner_r in the models (2) and (6) is

statistically significant at 10% (FEM) and 1% level of significance (GMM). In addition, the regression coefficient of the Lerner index has a negative value while the regression coefficient of Lerner^2 has a positive value. This finding indicates that the Lerner index and Z-score have a non-linear relationship. This means the higher the market power (or the lower the competition), the lower the stability of the Vietnamese banking system. However, when the competition reduces to a certain threshold, the banking system will stabilize. This non-linear relationship has been mentioned in the study of Liu et al. (2013).

Our results show that higher market power of Vietnamese commercial banks in the period of 2008-2017 led to a decrease in the financial stability of commercial banks. The negative effect of market power on the financial stability of commercial banks is consistent with the previous studies of Tuyen et al. (2017), Le Hung Cuong (2015) for Vietnamese commercial banks. The finding also confirms the negative relationship between market power and financial stability from other studies, such as Jayakumar et al. (2018); Yusgiantoro et al. (2018); Cuestas et al. (2017); Mensi and Labidi (2015); Soedarmono et al. (2011); Jimenez et al. (2010; Uhde and Heimeshoff (2009); Schaeck, Cihak and Wolfe (2009); and Coccorese (2005). Furthermore, the results indicate that the size of Vietnamese commercial banks (measured by LnTA) had a positive effect on the financial stability of the Vietnamese commercial banks in the research period. The results in column 6 of Table 4 show a negative and significant relationship between Loangr and Z-score of the Vietnamese commercial banks in 2008-2017. This result is consistent with Soedarmono et al. (2011) and Xiaoqing et al. (2014). Besides, the finding also confirms the negative relationship between LTA and Zscore following Xiaoqing et al. (2014).

5. Conclusions and recommendations

Our study has investigated the impact of market power on financial stability by using a panel data of the 24 Vietnamese commercial banks over the period 2008 - 2017. We have used the Lerner index as a measure of degree of market power and the Z-score as a measure of financial stability for the Vietnamese commercial banks. The results show that the two indicators Lerner_F and Lerner_R had negative effects on lnZROA and lnZROE. The result is consistent with the "competitive-stability" view for Vietnamese commercial banks, thus, reduced market power will boost the financial stability of Vietnamese commercial banks. From the above results, the study suggests some policy suggestions in order to increase the level of financial stability and risk control by controlling the market power of commercial banks. To promote financial stability in Vietnam, bank managers should maintain a bank's market share, or increase market share by expanding their service network, improving financial capacity through capital mobilization and efficient use of capital. In addition, they should monitor and control credit risk as well as develop stronger independent credit policies in order to maximize profits. Improving capital adequacy ratios are required for banks to maintain the banking system's safety. Banks should also encourage financial innovation based on effective risk management, thus, this will enables banks to become more stable via product innovation.

The State Bank of Vietnam (SBV) should create an environment for banks to compete fairly and reduce the concentration of market power in the large commercial banks, thus this will enhance the financial stability in the banking system. In addition, the SBV should improve risk monitoring of Vietnamese commercial banks during the gradual loosing of management. More importantly, although the SBV has made significant reforms and amendments to regulations, it still needs to focus on improving the internal management system of commercial banks. In addition, it is necessary to strengthen supervision of the operation of credit institutions to ensure the safe and healthy operation of credit institutions. In conclusion, it is essential to improve the competitiveness of the Vietnamese commercial banks in the context of globalization of financial markets and regional economic integration. The Vietnamese commercial banks should improve their competitiveness by strengthening their financial capacity and continuing to expand the bank's market share. This study contributes to empirical research by analysing the relationship between market strength and financial stability that help to consider how regulations promote financial stability through the bank market power. However, the study could not classify the banks to their size or growth of banks. Further research will examine the impact of market concentration on financial stability by classifying the size of the bank and the different growth of banks in the market.

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