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FACTORS AFFECTING BANK COMPETITIVENESS DURING NON-ECONOMIC CRISES: A STUDY IN ASEAN COUNTRIES

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ABSTRACT

This investigation examines the essential elements that have shaped the competitive landscape of banks in ASEAN nations during non-economic crises, covering the years from 2010 to 2023. The S.GMM method and necessary tests are used to control regression results. We found empirical evidence that positive influencing factors included: the previous year's competitiveness had an impact of 0,27; the size of banks has an impact of 0,11; the size of equity has an impact at 1,78; the profitability rate has an impact at 1,22; the growth rate of total assets has an impact of 0,014 on the competitiveness of banks. On the contrary, negative factors include factors such as the ratio of loans to total assets have an impact of -0,049; income diversification has an impact of -2,34; technological innovation or non-economic crisis to competitiveness. The authors also address the interaction between income diversification and technological innovation. Results show that these factors have a negative impact on the dependent variable during the research period. Based on the research results, we propose several implications with the expectation that they will provide useful strategies for enhancing competitiveness in the future, as well as add reliable empirical evidence to upcoming research.

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1. Introduction

After the Covid-19 pandemic and the recent Russia-Ukraine war, the global economy in general, and the banking sector in ASEAN countries in particular, have been severely affected. However, facing difficulties and overcoming the consequences during volatile economic times clearly shows that strong organizations and enterprises continue to survive and grow. Conversely, individuals lacking resilience may encounter difficulties or potentially face insolvency. In reaction to external difficulties, such as pandemics or natural catastrophes, the economy encounters various market shocks. To ensure survival and growth, any organization, particularly banks, must implement tactics to bolster its internal resilience and developmental capacities in an unpredictable economic landscape. They must promptly address issues while being adaptable and aggressive in transforming risks into opportunities for development.

In the context of fostering international collaboration, the banking industry stands as a prominent financial domain within the economy. The efficacy of a nation's banking sector is contingent upon several objective and subjective elements. The internal strength of a bank and the comprehensive growth and stability of the national or regional economy are crucial factors. To attain superior growth, banks must augment their market power.

Emerging economic markets in ASEAN nations have consistently drawn considerable international investment. Investors, both local and foreign, must engage in financial transactions with esteemed institutions that have robust brands and excellent reputations. Consequently, banks must assess their competitiveness (CPC) to perpetually enhance their brand and standing. Determining the variables affecting a bank's competitiveness and formulating suitable development plans to improve the bank's position is essential.

The banking sector functions as the backbone of a country, facilitating intermediate financial services for the majority of payment transactions inside the economy. The presence of a dense network of local and international banks in each country heightens competitiveness. Assessing a bank's true competitiveness and the elements that affect it is essential for formulating an operating plan.

Based on theories such as: Adam Smith (1723-1790). He said that competition along with the economy, if coordinated rhythmically in a reasonable way, will bring many benefits to society. The economic theory of W.S.Jevons (1835-1882), A.Mashall (1842-1924) and L.Walras (1834 - 1910). It points out the basic principle of the movement of the capitalist system to navigate competition in a static form with four forms: Perfect Competition, Monopolist Competition, Monopoly and Oligopoly. Micheal Porter's "competitive advantage" theory. Developing the above theory, there are also many empirical studies conducted in the field of banks on factors affecting competitiveness such as: Berger et al. (2008), Bui Dan Thanh and Vo Phuong Anh (2023), Kasman and Carvallo (2014), Delis (2012), Duong Thi Anh Tien and Le Thi Huong (2022), Fu et al. (20140, Fungáčová et al. (2013), Nhung et al. (2023), Vo Xuan Vinh and Duong Thi Anh Tien (2017), and Yin (2021), however, these studies have not focused on the ASEAN region in the context of a volatile economy with the impact of the Covid19 pandemic, the impact of the Russia-Ukraine war, and major changes in technology, so this is a research gap that the authors want to explore and answer in this study.

The prevalent methodology involves relying on theoretical frameworks and prior research to identify relevant techniques and competitiveness metrics, assess the level and trajectory of elements influencing a bank's competitiveness, and formulate appropriate

policies. Consequently, the following text is structured as follows: Section 2 examines the theoretical framework and existing literature; Section 3 outlines the research technique and empirical dataset; Section 4 presents the regression outcomes and analyzes the research findings; Section 5 concludes and offers policy suggestions derived from the results. The authors anticipate that the study findings will provide further trustworthy empirical data for further studies on bank competitiveness.

2. Theoretical basis and previous studies

Many renowned economists such as Adam Smith (1776), Michael Porter (1985), and Theodore Levitt (2004) have discussed the concepts of competition, competitive strength, and competitive advantage early on in a series of studies. Generally, the authors understand competition as an organization's pursuit of a superior position over its rivals within the same industry, sector, or market. Organizations focus on developing services that improve and enhance customer engagement by providing better products or services in order to enhance their position and create a distinctive edge. Services tailored to their needs more efficiently and at the best price provide a satisfying experience for customers. However, the intensity of rivalry varies by circumstance. To gain a competitive edge or strength, firms must innovate and differentiate themselves by taking into account a variety of criteria such as pricing, product quality, and customer service.

Currently, there is no formal meaning of the term "competitiveness." Previous development of foundational theories of competition serves as the main basis for studies on competitiveness. Competitive theories generally understand competitiveness as the internal strength of an organization within the market. How to enhance an organization's strength and which factors affect the increase or decrease of competitiveness are issues that attract much attention from both managers and academic researchers.

Popular indicators for measuring competitiveness in the banking sector include the H-statistic (Panzar & Rosse, 1987), the Boone indicator (Boone, 2008), and the Lerner index (Lerner, 1934). According to Claessens and Laeven (2004), the H-statistic is only suitable for balanced markets, which is impractical in reality because markets are always subject to volatility. The Boone indicator, which concentrates exclusively on the redistribution of profits from less efficient institutions to more efficient ones, does not adequately address the broader market and its competitive dynamics (Maudos & Solís, 2011). Conversely, the Lerner index, based on Lerner's robust theoretical framework, has demonstrated its effectiveness in measuring bank competitiveness and capturing competitive behavior in dynamic market conditions (Berger et al., 2008; Beck et al., 2013; Nhung et al., 2023). The Boone and H-statistic are recommended when studying competitiveness at the industry level, but many prior studies suggest that the Lerner index is more suitable for measuring bank competitiveness over time (Berger et al., 2008; Bùi & Võ, 2023; Kasman & Carvallo, 2014; Delis, 2012; Dương & Lê, 2022; Fu et al., 2014; Fungáčová et al., 2013; Nhung et al., 2023; Võ & Dương, 2017; Yin, 2021).

The research by Võ and Dương (2017) examined the factors influencing the competitiveness of Vietnamese commercial banks (measured by the LERNER index) during the period 2005-2014, using the SGMM method. The results showed that past competitiveness and total asset size positively affected the LERNER index, while factors such as equity capital, loan loss provisions, GDP, and inflation had negative impacts on competitiveness. Additionally, the study found

empirical evidence that state-owned banks had better competitiveness due to capital and policy protection.

Bùi and Võ (2023) used OLS, FEM, REM, and FGLS methods to analyze the factors affecting the competitiveness of 27 Vietnamese banks during the period 2009-2021. The results revealed that multiple elements, including bank size, equity size, total asset growth rate, the ratio of non-interest income to total assets, the count of commercial banks, and inflation, played a significant role in boosting competitiveness. Conversely, the researchers discovered that elements like loan loss provisions and the cost to total asset ratio adversely affect competitiveness.

Yin (2021) studied the impact of factors on the competitiveness of banks in 148 countries during the period 1987-2015 using the SGMM method. The results showed a positive relationship between bank competitiveness and factors like total asset size, equity capital, total asset growth rate, return on equity (ROE), and the Herfindahl-Hirschman Index (HHI). On the contrary, GDP and inflation negatively affected competitiveness, especially in banks from less developed economies.

In a study of 118 banks from ASEAN countries, Dương and Lê (2022) measured bank competitiveness using the LERNER index and market concentration indices based on capital and lending size (HHI_SIZE, HHI_Deposit). The study utilized data from 2002 to 2017 and applied FEM, REM, and SGMM regression methods. The results indicated that past competitiveness, equity size, total asset size, income diversification (HHI), and total asset growth rate positively influenced the LERNER index, while GDP growth and inflation had negative effects. The research found better competitiveness among state-owned banks.

Aubrey and Njenga (2023) conducted a survey study to identify strategic factors that enhance the competitiveness of Rwanda's banking sector, surveying 150 bank employees in Kigali. The results, processed using SPSS, indicated that strategic product access, customer relationship marketing, strategic leadership, and strategic technology application played crucial roles in boosting bank competitiveness.

The COVID-19 pandemic has significantly affected the global economy, particularly in the ASEAN countries where the financial sector has encountered significant obstacles. Initially, the contagion presented obstacles to banking operations; however, it also served as an incentive for banks to improve their internal resilience in order to preserve operational stability. Therefore, further empirical evidence is needed to demonstrate the impact of technology innovation on bank competitiveness in the ASEAN region.

This research utilizes the Lerner index to assess bank competitiveness within the ASEAN region. Furthermore, it examines the elements that impacted competitiveness both prior to and following the Covid-19 pandemic, integrating a Covid-19 dummy variable into the model. The article recommend banks to expand their service networks and implement technological advancements to guarantee system stability and enhance competitiveness. In addition, it investigates the factors that affected competitiveness both before and after the Covid-19 pandemic, incorporating a Covid-19 dummy variable into the model. The research promotes the expansion of service networks and the adoption of technological advancements by banks in order to guarantee system stability and increase competitiveness. As a result, this investigation employs two distinct perspectives: Initially, it evaluates the extent and trajectory of each factor's influence on bank competitiveness; subsequently, it investigates the interactive relationship between income diversification and technology access

and bank competitiveness. The study employs the Technology Innovation Index (TII) based on the research of Gebregziabher and Makina (2019) and Lumsden (2018). Specifically, the components of the TII include the number of commercial bank branches per 100,000 people, the number of ATMs per 100,000 people, the number of mobile subscriptions per 100 people, and the percentage of bank accounts accessed via the Internet as a proportion of the population.

3. Research data and methodology

3.1. Research data

The authors gathered data from 61 banks across six ASEAN countries—Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Vietnam—spanning the period from 2010 to 2023 to ensure comprehensive data for the research indicators. The bank-specific variables are derived from secondary data sourced from financial statements. In contrast, macroeconomic factors, including GDP growth rate and inflation rate, as well as indicators of technological innovation—such as the number of commercial bank branches per 100,000 people, the number of ATMs per 100,000 people, the number of mobile subscriptions per 100 people, and the percentage of internet banking accounts relative to the population—were obtained from the World Bank and the IMF. The dataset constitutes a balanced panel and adheres to the financial year format. The components for measuring technological innovation were published by the World Bank and IMF until 2022. Consequently, the authors employed a data imputation method, utilizing the average of the three adjacent years to fill in missing values. The dataset constitutes a balanced panel.

3.2. Research methodology

Research Model Development

Based on the previous studies by Berger et al. (2008), Kasman and Carvallo (2014), Dương Thị Ánh Tiên and Lê Thị Hương (2022), Fu et al. (2014), Fungáčová et al. (2013), Võ Xuân Vinh and Dương Thị Ánh Tiên (2017), and Yin (2021), the general research model is proposed as follows:

$$BANK\_COMPETITION_{it} = \alpha_0 + \alpha_1 BANK\_COMPETITION_{it-1} + \alpha_2 BANK_{it} + \alpha_3 MACRO_t + e_{it} \quad (1)$$

In the model, $BANK\_COMPETITION_{it}$: represents the competitiveness of bank i in year t, measured by the Lerner index, which ranges from (0, 1), where a higher Lerner value indicates greater competitiveness.; $BANK_{it}$: includes the specific characteristics of bank i in year t (detailed in Table 1); $MACRO_t$: refers to the macroeconomic environment in year t including GDP, INF and various indicators measuring technological accessibility.

The research model is analyzed in detail as follows:

$$LERNER_{it} = \alpha_0 + \alpha_1 LERNER_{it-1} + \alpha_2 SIZE_{it} + \alpha_3 ETA_{it} + \alpha_4 LTA_{it} + \alpha_5 DHHI_{it} + \alpha_6 MS_{it} + \alpha_7 ROE_{it} + \alpha_8 GTA_{it} + \alpha_9 GDP_t + \alpha_{10} INF_t + \alpha_{11} Covid\_19_t + \alpha_{12} TII_t + e_{it} (MH01)$$

$$LERNER_{it} = \alpha_0 + \alpha_1 LERNER_{it-1} + \alpha_2 SIZE_{it} + \alpha_3 ETA_{it} + \alpha_4 LTA_{it} + \alpha_5 (DHHI_{it} * TII_t) + \alpha_6 MS_{it} + \alpha_7 ROE_{it} + \alpha_8 GTA_{it} + \alpha_9 GDP_t + \alpha_{10} INF_t + \alpha_{11} Covid\_19_t + e_{it} (MH02)$$

Variable Calculation Methodology

Dependent variable: LERNER (a measure of competitiveness), is determined by the ratio of the difference between output price and marginal cost relative to the output price, calculated using the following formula:

$$LERNER_{it} = (P_{it} - MC_{it})/P_{it} \quad \textbf{(1)}$$

MC is calculated following a two-step process (Kasman & Carvallo, 2014), as follows: *Step 1:* Take the natural logarithm of the total cost function:

$$LnTC_{it} = \alpha_0 + \alpha_1 LnQ_{it} + (1/2)\alpha_2(LnQ_{it})^2 + \alpha_3 LnW_{1it} + \alpha_4 LnW_{2it} + \alpha_5 LnW_{3it} + \alpha_6 LnQ_{it}LnW_{1it} + \alpha_7 LnQ_{it}LnW_{2it} + \alpha_8 LnQ_{it}LnW_{3it} + \alpha_9 LnW_{1it}LnW_{2it} + \alpha_{10} LnW_{1it}LnW_{3it} + \alpha_{11} LnW_{2it}LnW_{3it} + (1/2)\alpha_{12}([LnW_{1it})]^2 + (1/2)\alpha_{13}[LnW_{2it})]^2 + (1/2)\alpha_{14}[LnW_{3it})]^2 + \alpha_{15}T + (1/2)\alpha_{16}T^2 + (1/2)\alpha_{17}TLnQ_{it} + \alpha_{18}TLnW_{1it} + \alpha_{19}TLnW_{2it} + \alpha_{20}TLnW_{3it} + \varepsilon \quad \textbf{(2)}$$

Whereas: TC represents total cost (including interest and non-interest expenses); Q is total assets; The three input prices are: ***W1****: the cost of deposits (interest expenses/total loans),* ***W2****: the cost of labor (salary expenses/total assets),* ***W3****: the cost of physical capital (other operating expenses/fixed assets);* **T** is the time trend, used to capture the impact of technological changes on the production function over time. For example, T = 1 for 2010, T = 2 for 2011, with T = 14 for 2023; **ε** is the random error term; **α1 ... α20** are the estimated parameters.

Step 2: Take the first derivative from equation (2).

$$MC = \frac{dTC}{dQ} = \left(\alpha_1 + \alpha_2 lnQ_{it} + \alpha_6 lnW_{it_1} + \alpha_7 lnW_{it_2} + \alpha_8 lnW_{it_3} + \alpha_{17}T \right) * \frac{TC}{Q_{it}}$$

Independent variable

Table 1. Definition and calculation method of variables in the model

Variable	Meaning	Calculation	Source
SIZE	Bank Size (Total Assets)	Ln(Total Assets)	Berger et al. (2008), Kasman and Carvallo (2014)
ETA	Equity Size	Equity / Total Assets	Berger et al. (2008), Kasman and Carvallo (2014)
LTA	Loan Size	Loan Balance / Total Assets	Berger et al. (2008), Kasman and Carvallo (2014)
DDHI	Income Diversification Ability	$= 1 - [(NET/(NII))^2 + (NON/(NII))^2]$ *Where:* - NON: Non-interest Income - NET: Net Interest Income - NII = NON + NET	Võ Xuân Vinh and Dương Thị Ánh Tiên (2017), and Yin (2021)
MS	Market Strength	= Bank's Total Assets / Total Assets of Credit System	Fu et al. (2014), Fungáčová et al. (2013), Vo and Dương (2017), and Yin (2021)
ROE	Return on Equity		Berger et al. (2008), Kasman and Carvallo (2014)
GTA	Total Asset Growth Rate	$= (SIZE_{it} - SIZE_{it-1})/ SIZE_{it-1}$	Berger et al. (2008), Kasman and Carvallo (2014)

Variable	Meaning	Calculation	Source
GDP	GDP Growth Rate		Fu et al. (2014), Fungáčová et al. (2013), Vo and Dương (2017), and Yin (2021)
INF	GDP-adjusted Inflation Rate		Fu et al. (2014), Fungáčová et al. (2013), Vo and Dương (2017), and Yin (2021
PhiKT	Year with Covid, Russia-Ukraine War	= 0: Years without Covid or Russia-Ukraine War (2010 - 2018) = 1: Years with Covid or Russia-Ukraine War (2019 - 2023)	Author built
TII	Technological Innovation Index	$=\frac{1}{2}[\frac{\sqrt{(I_1)^2+...+(I_n)^2}}{\sqrt{n}} + (1 - \frac{\sqrt{(1-I_1)^2+...+(1-I_n)^2}}{\sqrt{n}})]$ I_1: Number of bank branches per 100,000 people I_2: Number of ATMs per 100,000 people I_3: Mobile Subscriptions per 100 people I_4: Internet Banking Accounts (% of population)	Author calculations

4. Research results and discussion

4.1. Summary results of the research dataset

The research, involving a dataset of 61 banks across six ASEAN nations (Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Vietnam) from 2010 to 2023, produced the following significant findings:

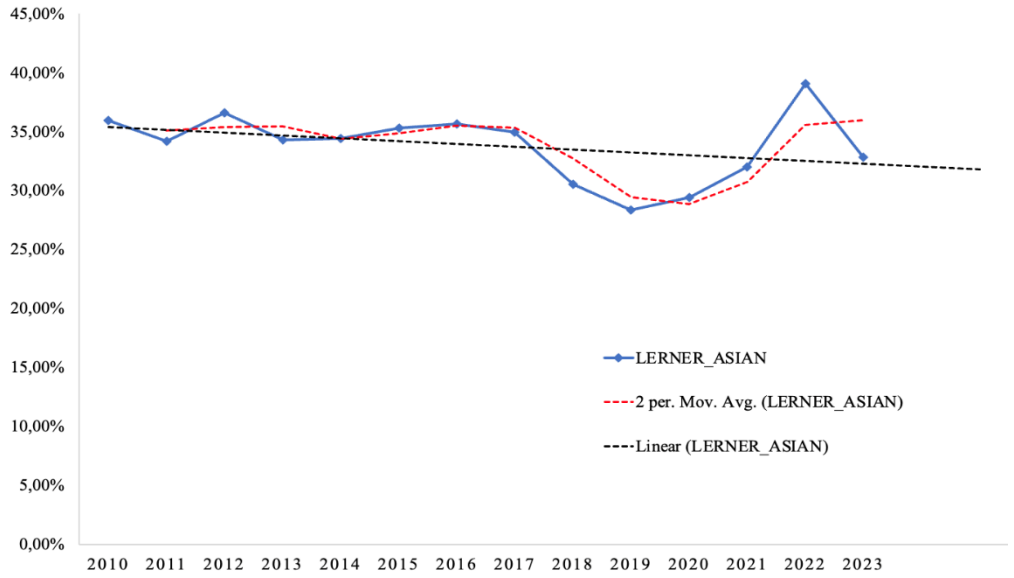

Figure 1. Competitiveness Trends of 61 Banks in the ASEAN Region from 2010 to 2023

First, the overall competitiveness of the ASEAN banking sector (as observed by country groups) shows a declining trend (Figure 2). The statistical analysis conducted by the authors suggests that this downward trend was abruptly initiated in 2017-2018. Competitiveness gradually increased as the COVID-19 pandemic commenced in 2019. This implies that the financial sector in the ASEAN countries has a promising future. The COVID-19 outbreak necessitated that banks implement strategies to enhance their competitiveness in the broader market for survival and expansion. The expansion of service networks and the acceleration of investments in technology were both significant during this period. The decrease noted between 2022 and 2023 aligns with anticipated trends. This should not be interpreted as a negative indicator; rather, the previously high level of market competition has peaked, resulting in a gradual decrease in competitiveness.

Secondly, an analysis of the average LERNER index values by country (Figure 3) throughout the study period reveals that the competitiveness of banks in the Philippines, Vietnam, and Thailand showed an upward trend, whereas Indonesia, Malaysia, and Singapore experienced a gradual decline. The LERNER index values for all countries demonstrated an upward trend during the Covid-19 pandemic, which was in line with the study's assumptions.

Third, Singapore consistently maintained the greatest ranking in bank competitiveness among the six countries examined. Given Singapore's early adoption of technology across various sectors, including finance, and its high level of development, the researchers anticipate this outcome. The relative stability of its competitiveness during the Covid-19 period demonstrated the resilience of the banking sector in Singapore.

4.2. Regression Results and Discussions

The model's VIF is 1.67, which is less than the 2.0 threshold, as indicated by the results of the F-test which was conducted to verify the validity of the variables and the accuracy of the proposed model. This discovery facilitates the determination that multicollinearity is absent. The study employed the Wooldridge test to evaluate autocorrelation and the Breusch-Pagan

test to evaluate heteroscedasticity. The objective was to identify potential issues with the model that could result in these two issues. In order to evaluate the presence of endogeneity, the Durbin-Wu-Hausman test was implemented during the combination procedure. The findings indicate that the variables ETA and ROE may exhibit endogeneity.

Table 1. Results of the Durbin Wu-Hausman test

Variable	P_Value	Results
ETA	p = 0.0001	Endogenous
ROE	p = 0.0316	Endogenous

The SGMM regression procedure, as delineated by Arellano and Bond (1991), was implemented to address the identified deficiencies in the model. Table 3 summarizes the results of the SGMM regression and other pertinent tests:

Table 2. SGMM Regression results

No.	Variable	SGMM_MH01	Result	SGMM_MH02	Result
1	LERNER_1	0.2784**	+	0.3127**	+
2	SIZE	0.1116***	+	0.1262***	+
3	ETA	1.7796***	+	1.9713***	+
4	LTA	-0.0491*	-	-0.481	-
5	DDHI	-2.3470***	-		-
6	MS	0.0261	+	0.0565	+
7	ROE	1.2215***	+	0.7981***	+
8	GTA	0.0136***	+		+
9	GDP	-3.3044***	-	-4.1362***	-
10	INF	-0.4227	-	-0.4792	-
11	TII	-0.4381	-		-
12	PhiKT	-0.2149***	-	-0.1701***	-
13	DDHI_TII			-2.8200***	-
Data Information	Number of Observations	854			
	Number of Banks	61			
Test Results	Number of Instrumental Variables	27		27	
	Mean VIF	1.67		1.72	
	F-test	Prob > F = 0.0000		Prob > F = 0.0000	
	Hausman test	Prob>chi2 = 0.0036		Prob>chi2 = 0.0036	
	Breusch- Pagan test	Prob > chibar2 = 0.0000		Prob > chibar2 = 0.0000	
	Wooldridge test	Prob > F = 0.0001		Prob > F = 0.0001	
	AR (2)	0.4610		0.5990	
	Sargan test	0.9080		0.8080	
	Hansen test	0.9120		0.8130	

Note: *(***), (**), (*) denote statistical significance at the 1%, 5%, and 10% levels, respectively.*

The findings in Table 3 demonstrate that the AR(2) values for both models surpass 10%, indicating the appropriateness of the SGMM regression method and affirming the lack of second-order autocorrelation in the models. Model 1 and Model 2 demonstrate Sargan and Hansen test P-value coefficients greater than 10%, suggesting proper model specification and suitable selection of representative and instrumental variables. Based on the test results, the factors influencing the competitiveness (CPC) of banks in the ASEAN region are identified (see Appendix 1 and Appendix 2)

Past Competitiveness (LERNER_1): The regression coefficient is positive, implying that past competitiveness positively influences current competitiveness. This finding is consistent with prior research (Delis, 2012; Dương & Lê, 2022; Võ & Dương, 2017; Yin, 2021). This result is also in line with the reality of banks because when the competitiveness of the previous year is good, it will attract more resources for business activities, thereby increasing competitiveness.

Bank Size (SIZE): The regression result is positive and statistically significant. This means that bigger banks are in a better situation to grow their market share, which makes them more competitive. There are benefits for bigger banks, like more service growth, better technology systems, and easier access for customers. This result is consistent with prior studies (Delis, 2012; Dương & Lê, 2022; Võ & Dương, 2017; Yin, 2021; Bùi & Võ, 2023). The research results are also completely in line with the practice of banks because when the capital scale is large, banks will have many opportunities to invest in technology and offer attractive business strategies for customers.

Equity-to-asset ratio (ETA): The regression results show a positive and statistically significant coefficient, indicating that higher equity strengthens bank competitiveness. The results are consistent with the practical situation of banks, specifically: Banks with substantial equity are less pressured by loan repayments or non-performing loans. Moreover, banks with higher equity tend to invest more aggressively, expanding their scale and market presence and thus further enhancing their competitiveness. This finding is in line with expectations and previous studies (Dương & Lê, 2022; Võ & Dương, 2017; Yin, 2021; Bùi & Võ, 2023).

Lending Capacity (LTA): The LTA variable has a negative and statistically significant coefficient. The results are in line with the practice of the research phase because: indicating that lending activities are posing risks that reduce bank competitiveness. Non-performing loans are a significant concern for banks in ASEAN, particularly in the aftermath of the COVID-19 pandemic. Despite various interest rate support policies, both repayment capacity and demand for new loans have significantly decreased. The market's reluctance to invest after the pandemic's economic shock has made collecting existing debts more difficult and resulted in little new loan generation.

Income Diversification (DDHI) and Technological Innovation (TII): Both DDHI and TII have negative regression values when looking at how they affect success on their own (Model 1). This means that advances in technology and different ways to make money have not been very useful and have hurt competitiveness. When examining the combined effects of income diversification and technological innovation, the DDHI_TII coefficient remains negative. The COVID-19 pandemic's influence may explain this. After the outbreak in 2019, banks realized the necessity of adopting technology for management and operations, leading to significant investments in technological development. Simultaneously, banks expanded their service offerings to enhance competitiveness. However, these

investments are costly, putting financial pressure on banks, while returns take time to materialize. As a result, both DDHI and TII negatively affect competitiveness, which contradicts the findings of previous studies (Dương & Lê, 2022; Võ & Dương, 2017; Bùi & Võ, 2023), which concluded that income diversification positively influences competitiveness without considering the context of Covid-19.

Market Strength (MS): This variable represents the proportion of a bank's equity in relation to the total assets of the national credit system. Banks that possess larger equity and market share tend to be more competitive, similar to those that possess larger asset sizes. Despite the favorable regression coefficient, it lacks statistical significance.

Return on equity (ROE): the variable has a positive and statistically significant regression coefficient. This indicates that elevated returns on equity enhance competitiveness since augmented earnings alleviate financial stresses. Moreover, heightened profitability indicates a bank's favorable reaction to market circumstances, thus augmenting its reputation and standing. This result aligns with Yin's (2021) findings, which suggest that business performance positively affects bank competitiveness.

Total Asset Growth Rate (GTA): The regression results indicate that total asset growth positively impacts competitiveness. Recognizing the importance of sustainable banking development, particularly after the effects of COVID-19, banks have focused on asset growth to strengthen their market positions. This finding is consistent with previous studies (Dương & Lê, 2022; Yin, 2021; Bùi & Võ, 2023).

The regression coefficients for GDP and inflation are negative, indicating that macroeconomic factors during the observation period had a detrimental impact on the competitiveness of ASEAN banks. Rapid economic development may result in significant improvements in bank performance indicators. However, fast development may provide issues since it may raise debt levels, lowering the quality of loans and investments undertaken. This, in turn, reduces the efficiency of banks and negatively effects their competitiveness. This outcome aligns with previous research (Dương & Lê, 2022; Võ & Dương, 2017; Yin, 2021), while opposing the conclusions drawn by Delis (2012) and Bùi & Võ (2023).

Factors Influencing Non-Economic Crises (PhiKT): The negative regression coefficient for the PhiKT dummy variable indicates that crises, such as pandemics and wars, have a detrimental effect on bank competitiveness. As noted earlier, crises such as pandemics and wars have a direct impact on bank investments and lead to an increase in non-performing loans. Banks may possess surplus liquidity; however, they encounter obstacles in lending as a result of a notable decline in new borrowers and challenges in recovering outstanding debts. The consequences of the recent pandemic, although service networks have expanded, remain unresolved and continue to negatively affect competitiveness.

5. Conclusion and proposed implications

This empirical investigation seeks to assess and analyze the elements influencing the competitiveness of 61 banking institutions across ASEAN nations from 2010 to 2023. We utilize the Lerner index to measure competitiveness, after thoroughly comparing and evaluating its appropriateness with the research data. Based on previous studies, we propose a model for investigation that includes relevant components. The test results validate the suitability of the model and its components. The results from the S.GMM regression

suggest that variables including LERNER_1, SIZE, ETA, ROE, and GTA exhibit a positive correlation with the Lerner index. Conversely, elements such as LTA, DDHI, TII, the Covid-19 pandemic, and the Russia-Ukraine conflict adversely affect the Lerner index. In the analysis of the non-economic crisis context, it is essential to take into account the concurrent effects of both DDHI and TII on the Lerner index. The results of our analysis demonstrate that DDHI_TII exhibits a negative correlation with the Lerner index, as evidenced by the negative correlation coefficient. The regression findings have yielded insights and suggestions. We would like to present the following essential observations:

The regression findings indicate that an increase in LERNER_1, SIZE, ETA, ROE, and GTA leads to an elevation in the Lerner index. This indicates that previous levels of competitiveness, along with the magnitude of assets and equity, positively affect competitiveness. Nevertheless, the excessive accumulation of capital and assets may lead to potential risks, including elevated interest expenses and pressures related to debt repayment. Moreover, over investment in assets without fully using their potential may lead to inefficiency and resource wastage. Investments in technology systems may entail substantial initial costs, with the attainment of profits often necessitating an extended duration, especially during the continuing recovery of the world economy from the repercussions of the COVID-19 epidemic and the Russia-Ukraine war. Therefore, it is crucial to meticulously design a strategy for capital increase, implement a phased approach to investment disbursement, and exercise diligent oversight to prevent waste and inefficiency that could negatively impact a bank's competitive standing.

Furthermore, the empirical data indicates that lending practices, diversification of income sources, and advancements in technology have not shown significant effectiveness in the recent timeframe. As previously indicated, significant investments may exert financial pressure on banking institutions, and realizing their potential benefits requires time and input from several sources. While the integration of technology and the proliferation of services are imperative and inevitable advancements, it is vital to advance cautiously to avert the misallocation of resources and capital. The implementation of technology has the potential to greatly decrease expenditures related to time, workforce costs, and the overall experience of customers. Therefore, instead of continuously seeking new investments, financial institutions should focus on maximizing the use of already-existing resources that have not yet reached their full potential. Furthermore, financial institutions ought to emphasize the importance of investing in a workforce with advanced skills. In light of recent non-economic crises, numerous financial institutions have adopted policies aimed at reducing their workforce. Despite the limited availability of skilled individuals, their contributions can help banks cut expenses while simultaneously enhancing their reputation, brand image, and competitive edge.

Additionally, the efficiency of any system, including financial institutions, is dependent on the presence of clarity, consistency, and coherence at all levels of the organization. A sizeable number of traditional business processes have been rendered obsolete by the implementation of financial technology systems, which are typically empowered by artificial intelligence. It is crucial to avoid excessive reliance on emerging technology. Establishing mechanisms for cross-verification and frequent evaluation of procedures involving several offices or responsibilities within the bank is essential. It is essential to meticulously evaluate the advantages and disadvantages of expanding services and investing in new technologies. The authors will examine this

from several perspectives and over an extended period to get sufficient information on the system's alignment with market demands in the future research.

Finally, a bank's leadership, vision, and strategic management significantly influence its internal strength and success. Furthermore, creating a clear and transparent legal framework, especially concerning the protection of customer rights, is essential for building customer trust. Clearly articulated and appropriate policies enhance banking operations, fostering increased efficiency and smoothness. Consequently, financial institutions can improve their standing, trustworthiness, and competitive advantage in the market.

The competitive position of banks in ASEAN nations is being severely impacted by macroeconomic issues, according to a number of studies that were conducted in the past. This demonstrates the negative effect that the current economic crisis has on the banking sector. In light of this, it is of the utmost importance for financial institutions to promptly provide guidance and inspire employees at all levels to work towards the presentation of strategic solutions to regulatory authorities and government agencies. The objective of this strategy is to effectively address challenges and make the most of opportunities in order to improve the competitiveness of the banking sector and the institutions that make up that industry.

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