The Effect of Financial Soundness on Bank Financial Performance during Covid-19 Pandemic: The Role of Bank Size

Nur Hania Amilla[1] and *V. Viverita[2]

[1.2] Universitas Indonesia, Depok, Indonesia
viverita.d@ui.ac.id

Abstract. This study analyzed the moderating role of bank size on the effect of financial soundness on bank financial performance in ASEAN-4 banks during Covid-19 pandemic. The sample used consists of 77 public commercial banks listed on the Indonesia Stock Exchange (BEI), Malaysia Stock Exchange (MYX), Thailand Stock Exchange (SET), and Philippines Stock Exchange (PSE). A panel data regression with the fixed-effect model estimation method is used to analyze the data. Findings of the study indicate a statistically significant negative impact of NPL and BOPO on bank's Return on Assets (ROA). Conversely, CAR, earnings quality, and a favorable LDR demonstrate a statistically significant positive influence on NIM. Notably, bank size emerges as a moderator, amplifying the positive effect of CAR on ROA while diminishing the impact of LDR on ROA. Similarly, for NIM, size strengthens the negative effect of NPL but weakens the positive effect of LDR on NIM.

Keywords: *Bank Size, Financial Soundness, Financial Performance*.

1 Introduction

A multidimensional crisis happened almost in the entire world after the World Health Organization (WHO) officially announced Covid-19 as a global pandemic on March 11th, 2020. Since then, the pandemic not only created a health and social crisis but also caused economic disruption in countries that are part of ASEAN-4. The economies of ASEAN-4 countries faced a significant contraction during the pandemic in 2020. In detail, the worst contraction happened in Q2 of 2020 with Malaysia being the country affected the most with 17.1% year-over-year, followed by the Philippines with a contraction of 16.5%, Thailand with 12.2%, and, lastly, Indonesia with 5.3% [45].

The economic downturn of ASEAN-4 countries caused by the Covid-19 pandemic also gave a shock to the banking sector as one of the main supports for economic growth. Banking system soundness became a serious issue during the pandemic because it reflects the economic stability of a nation [4]. Banking system soundness pushes the creation of a strong bank economic performance to support the forming of long-term bank stability so it could face risks and crises [22].

It is found that during Covid-19 pandemic, the financial soundness of global banking was threatened due to an increase in accounting and market risk, which lowered the stability of the banking [38]. Several indicators of financial soundness are used to assess

* Corresponding author

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bank performance globally during the pandemic, with empirical proofs that include the decline of debt growth and asset quality, as well as a lower income ratio [38]. Furthermore, these cases have been validated by [12] who found that the Covid-19 pandemic lowered banking economic performance on ASEAN-4 countries, impacting its financial soundness condition.

In particular, commercial banks became the most affected by the Covid-19 pandemic in ASEAN-4 as a result of an increase in non-performing loans (NPL). Indonesian Law Number 10 of 1998 defines commercial banks as banks that perform business activities conventionally or according to Sharia principles with one of their main objectives being offering loans to the public. A Zurich report stated that there was a surge in NPL value across 16 of the largest commercial banks in ASEAN, reaching up to 17% year-on-year (YoY) in 2020 as a consequence of delayed debt payment by debtors from the economic downturn as a result of social distancing during Covid-19 pandemic [44]. However, it is also stated that commercial banks in ASEAN tended to have excellent risk mitigation in facing Covid-19, supporting banks' resilience in facing the ongoing crisis, particularly in larger banks. Aside from countries in ASEAN, [20] also found that larger banks in Poland could withstand their economic performance as a result of having higher resistance when facing the Covid-19 pandemic crisis. This could illustrate how bank size has a significant impact in pushing the banks' performance to create stability.

Several older studies also confirm beliefs related to the effect of bank size on its economic performance. The previous study conducted by [1] posits a bank size indicator as the predictor of bank performance proved by the moderation effect of bank size on bank performance and growth. This aspect is analogous to a study by [19] who found that bank size significantly moderates the effect of financial soundness on ROA, ROE, and NIM as bank economic performance indicators. Therefore, bank size can be used as an indicator that will moderate the effect of financial soundness on bank economic performance.

This research aims to expand a previous study by [19], which was conducted on commercial banks in Kenya, by examining the effect on bank's financial performance during the Covid-19 pandemic crisis.

The results show that banks with stronger financial health, indicated by lower NPL and BOPO ratios, performed significantly better in terms of ROA during the Covid-19 pandemic. Conversely, indicators of strong capitalization (CAR) and efficient operations (earnings quality ratio) along with a balanced LDR had a positive impact on bank performance, particularly in terms of NIM. Notably, the study also revealed that bank size plays a moderating role. While larger banks benefited more from strong capital for ROA, the positive effect of LDR on ROA was weaker. This moderating effect was also observed for NIM, with bank size strengthening the relationship between NPL and NIM while weakening the influence of LDR on NIM for commercial banks operating in the ASEAN-4 region amidst the challenges posed by the Covid-19 pandemic.

2 Literature Review and Hypothesis Development

2.1 Bank Size

The size of a bank is important in assessing performance as it will affect its profitability. A study by [37] on European banks for the 2005–2012 period found that bank capital positively influences profitability. Another study by [5] on commercial banks in Nepal

also found that bank size has a positive impact on bank profitability measured by ROA, ROE, and NIM. Moreover, several studies found that bank size influences bank resilience in facing crises. It is found that banks with greater assets in the CESE region have better capabilities to face crises due to their ability to reach economies of scale [21]. It is supported by the finding of [11] who found that larger banks in the MENA region also tend to be more resilient to face challenging conditions when a crisis occurs because they have greater capacity to control operational costs.

In the banking industry, bank size is necessary to be evaluated as it is correlated with the 'too big to fail' problem. The 'too big to fail' problem refers to a condition where the banking sector in a country is controlled by large banks, and the fallacy of them will cause economic disaster. It will happen when large and complex financial institutions fail, causing disruption to the stability of the financial system, which causes major problems not only in the financial sector but also in general economic conditions [10]. In the Asia-Pacific regions, [25] found that Asia-Pacific countries need to ensure that local national laws have to reflect the Key Attributes of Effective Resolution Regimes for Financial Institutions (the KAs) issued by the Financial Stability Board (FSB) in 2011 as the guidance to face the 'too big to fail' problem in large financial institutions.

[32] divided three indicators used to measure bank size: (1) a cash-based indicator that included the market capitalization, total income, and net income; (2) an accounting-based indicator that included total assets and equity; and (3) a regulation-based indicator that are CET1/Tier 1 capital and risk-weighted assets. In this research, the bank size indicator that is used is total assets. One advantage of using total assets as a measurement for bank size is its comprehensive representation of a bank's scale and scope of operations. Total assets provides a comprehensive measure of a bank's size, reflecting its capacity to raise funds from the public and distribute them as loans [23].

2.2 **Financial Soundness**

A financial institution needs to have a healthy financial condition since it will support national economic performance and stability. Therefore, the government and the central bank are responsible for monitoring the financial soundness of financial institutions that have an impact on national macroeconomic conditions. The International Monetary Fund [17] has established two main indicators to assess the soundness of financial institutions, namely financial soundness indicators (FSIs). One recognized international rating system that adopts the main indicator from FSIs and is widely used by bank supervisory authorities to rate the soundness of financial institutions is CAMEL. This rating system assesses financial institutions' soundness according to six factors represented by its acronym: capital adequacy, asset quality, earnings quality, management efficiency, and liquidity. A study by [30] found empirical proof that the CAMEL rating system is effective to address financial soundness of banks in Nigeria. Therefore, this study adopts the CAMEL rating system as the indicator for assessing bank financial soundness.

2.3 **Financial Performance**

A bank's financial performance can be assessed from its profitability. A finding by [6] has emphasized the importance of profitability assessment of a bank as the higher the profitability, the lower systematic risk will be since profit can help banks face crises and manage its ability to control risks in the future. Hence, bank profitability will support the financial stability of a bank. In assessing bank profitability, managers and

investors can use two indicators, namely return on assets (ROA) and net interest margin (NIM).

2.4 Hypothesis Development

The Covid-19 pandemic that caused a multidimensional crisis has also hit the banking sector regionally and globally, significantly affecting banking financial performance. It is found that bank financial performance is significantly influenced by its financial soundness [46]. This argument is supported by the finding of [38], which stated that during the Covid-19 pandemic, bank financial soundness was harmed due to the increase of accounting and market risks, decreasing banking stability and negatively impacting bank financial performance. Based on this, the research hypothesis is established as follows:

H1. Financial soundness affects bank financial performance during the Covid-19 pandemic.

On the other hand, bank size can also be an indicator to assess bank financial performance during a time of crisis. Empirical proof is found that GDP and bank size are positively correlated with bank financial performance during the Covid-19 pandemic in the Asia development economy even though the impact is smaller compared to before the pandemic [42]. [20] found that banks with sufficient assets in Poland are able to face crises caused by the Covid-19 pandemic since they have adequate resources to manage their performances. This finding agrees with studies by [1, 13, 19] who found that bank size significantly moderates the impact of financial soundness on financial performance. However, findings by [2, 14] contradictingly found that bank size has no moderating impact on bank financial performance. It has raised various questions related to the influence of bank size on the financial soundness effect on bank financial performance. Therefore, hypotheses are developed to examine the research gap, which not only assess the direct effect of bank size on financial soundness but also assess the moderating effect of bank size on the financial soundness effect on bank financial performance during the Covid-19 pandemic.

H2. Bank size moderates the effect of financial soundness on bank financial performance during Covid-19.

3 Research Method

3.1 Variable Specification

The operationalization and measurement of variables in this research refer to the study by [19], which analyzed the moderating effect of bank size on the financial soundness effect on bank financial performance in commercial banks in Kenya. This research adopts the CAMEL rating system recommended by the IMF to evaluate financial soundness on financial institutions. To assess the bank's financial performance, this research uses NIM and ROA as the indicators. Moreover, bank size is assumed to have a moderating role on the financial soundness effect on bank financial performance. Furthermore, control variables of real GDP and inflation are being implemented.

Table 1. Operationalization and Measurement Variables

Variable	Indicator	Measurement	Reference
Financial soundness	Capital Adequacy Ratio (CAR)	Total capital to risk-weighted assets	Kirimi et al (2021)
	Asset Quality (AQ)	NPL to total loans	Kirimi et al (2021)
	Management Efficiency (ME)	Operational expenses to operational income	Kirimi et al (2021)
	Earning Quality (EQ)	Interest income to total assets	Kirimi et al (2021)
	Liquidity Ratio (L)	Total loans to total deposit	Fibriyanti dan Nurcholidah (2021)
	Capital Adequacy Ratio (CAR)	Total capital to risk-weighted assets	Kirimi et al (2021)
Bank Financial Performance	Return on Assets (ROA)	Net income to total assets	Kirimi et al (2021)
	Net Interest Margin (NIM)	Net interest income to total assets	Kirimi et al (2021)
Bank Size	Total Assets (LnTA)	Natural logarithm of total assets	Kirimi et al (2021)
Control Variables	Real GDP (LnGDP)	Natural logarithm of real GDP	
	Inflation rate (INF)	Country's inflation rate	
	Dummy Covid-19 (Covid)	1 = Covid-19 2 = Pre Covid-19	

Based on four developed hypotheses, four research models are established for each of hypothesis as follows.

Model 1a.
The effect of financial soundness on ROA in ASEAN-4 commercial banks during Covid-19 pandemic.

$$ROA_{it} = \alpha_{it} + \alpha_1 CAR_{it} + \alpha_2 AQ_{it} + \alpha_3 ME_{it} + \alpha_4 EQ_{it} + \alpha_5 L_{it} + \alpha_6 GDP_{it} + \alpha_7 INF_{it} + \alpha_8 Covid_{it} + u_{it} \quad (1)$$

Model 1b.
The effect of financial soundness on NIM in ASEAN-4 commercial banks during Covid-19 pandemic.

$$NIMit = \alpha it + \alpha 1 CARit + \alpha 2 AQit + \alpha 3 MEit + \alpha 4 EQit + \alpha 5 Lit + \alpha 6 GDPit + \alpha 7 INFit + \alpha 8 Covidit + uit \quad (2)$$

Model 2a.
The moderating role of bank size has a moderating effect on the effect of financial soundness on bank financial performance with ROA as the indicator in ASEAN-4 commercial banks during Covid-19.

$$ROAit = \beta it + \beta 1CARit + \beta 2AQit + \beta 3MEit + \beta 4EQit + \beta 5Lit + \beta 6CAR*SIZEit + \beta 7AQ*SIZEit + \beta 8ME*SIZEit + \beta 9EQ*SIZEit + \beta 10L*SIZEit + \beta 11GDPit + \beta 12INFit + \beta 13Covidit + uit \quad (3)$$

Model 2b.
The moderating role of bank size has a moderating effect on the effect of financial soundness on bank financial performance with NIM as the indicator in ASEAN-4 commercial banks during Covid-19.

$$NIMit = \beta it + \beta 1CARit + \beta 2AQit + \beta 3MEit + \beta 4EQit + \beta 5Lit + \beta 6CAR*SIZEit + \beta 7AQ*SIZEit + \beta 8ME*SIZEit + \beta 9EQ*SIZEit + \beta 10L*SIZEit + \beta 11GDPit + \beta 12INFit + \beta 13Covidit + uit \quad (4)$$

4 Analysis and Discussions

4.1 Descriptive Statistic

Table 2. Descriptive Statistics Research Sample for All Research Period

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	770	0.010	0.006	0.001	0.019
NIM	770	0.033	0.013	0.015	0.055
BOPO	770	0.621	0.182	0.416	0.969
NPL	765	0.030	0.017	0.008	0.062
LDR	770	0.842	0.127	0.636	1.055
EQ	770	0.062	0.022	0.033	0.095
CAR	766	0.197	0.051	0.141	0.305
SIZE	770	15.612	1.941	10.742	19.188
GDP	770	20.284	0.531	19.464	21
INF	770	3.225	1.953	-1.1	6.4

Table 2 presents the descriptive statistics of the sample used in this study. This study was conducted using unbalanced panel data of a 10-year period of reports—from 2013 to 2022—with 77 commercial banks in ASEAN-4 countries as the samples. In addition, the winsorization process was also used on a 10% level to neutralize outliers contained in the research data. The average ROA value for banks in the sample is 1%. Considering the fairly high leverage value of the bank, the 1% value in ROA reflected high profits. For NIM values, Indonesia boasted the highest among the ASEAN-4 on average, namely at 4%.

In terms of CAR value, Indonesia was the country with the highest average CAR level of 24.5% for 10 years compared to other ASEAN-4. NPL value of all countries involved tended to be higher compared to when Covid-19 took place. For BOPO value, Malaysia was the country with the lowest average bank BOPO. All ASEAN-4 nations faced a decline in their average income quality ratio value, amounting to 5.3% during the pandemic. For liquidity value, Thailand had the worst banking liquidity condition with the highest LDR value. For variable control, ASEAN-4 GDP in 10 years was 546

billion USD on average. Its inflation was relatively stable with a mild inflation rate below 10%.

4.2 **Regression Result**

Table 3. Regression Results

Dependent Variable	(1)	(2)	(3)	(4)
Independent Variable	ROA	NIM	ROA	NIM
CAR	0.0030315	0.0149512*	-0.051672	-0.0762126
	(0.592)	(0.092)	(0.103)	(0.212)
NPL	-0.075745***	-0.0165452	-0.0358317	-0.1814902
	(0.000)	(0.390)	(0.728)	(0.050)
BOPO	-0.0191412***	-0.011405***	-0.0265111	-0.0443725**
	(0.000)	(0.000)	(0.143)	(0.032)
EQ	-0.0063266	0.3871986***	-0.0751287	0.2176644
	(0.757)	(0.000)	(0.539)	(0.253)
LDR	0.0006369	0.0095459**	0.044044***	0.0970497***
	(0.723)	(0.026)	(0.001)	(0.000)
Moderating Variable				
CAR*SIZE			0.0037614*	0.0061935
			(0.074)	(0.142)
NPL*SIZE			-0.0030261	0.0108216*
			(0.653)	(0.086)
BOPO*SIZE			0.0004925	0.0023327
			(0.680)	(0.104)
EQ*SIZE			0.004929	0.0125644
			(0.572)	(0.332)
LDR*SIZE			-0.0029276***	-0.0059441***
			(0.001)	(0.000)
Control Variable				
LnGDP	0.0007655	0.0068883***	0.002759	0.0099298***
	(0.589)	(0.000)	(0.125)	(0.006)
INF	0.0001856**	0.0002474**	0.0001531**	0.0002107
	(0.010)	(0.044)	(0.032)	(0.176)
Covid	-0.0016249***	0.001417***	-0.0016284***	0.0011441**
	(0.000)	(0.006)	(0.000)	(0.035)
Observation	761	761	761	761
R-square	0.358	0.488	0.381	0.572
Prob > F	0.000	0.000	0.000	0.000

*Significant on 10%, **Significant on 5%, ***Significant on 1%

4.2.1 The Effect of Financial Soundness on Return on Assets (ROA).

The regression result indicates that only the NPL and BOPO variables are statistically significant at 1% significance level with a negative effect. It means that when non-performing loan NPL and BOPO increased, bank profitability measured by ROA decreased. This negative effect on ROA is reasonable since the higher operational costs of a bank, the lower its revenue becomes, as presented by the ROA value.

Finding of negative effect of NPL on ROA validates studies by [3, 14], which stated that bank financial performance as measured through ROA will be risked by high levels of NPL. Bad credit issues will increase risks on banks' operations, resulting in their inability to generate optimal income and decline in ROA value [28]. The same principle applies to BOPO—if rising operational expenses do not come with a corresponding increase in income, banks will struggle to operate, and its operational inefficiency will reduce gross profits and impact profitability [35]. This finding confirms studies by [40], which found negative effects of BOPO on ROA. Meanwhile, [13] also discovered BOPO's negative effect, although the result was insignificant.

The quality ratio also has a negative effect on ROA, but its impact is not significant. This effect could happen due to other factors than interest influencing income in ROA ratio. This finding contradicts studies of [31, 19], which found significant positive effects in income quality on ROA. On the contrary, CAR and LDR ratios have positive effects on ROA, but are not significant. Higher capital of banks increases their ability to distribute loan funds, leading to the rise of profit from asset management and ROA value. An increase in CAR ratio shows that banks are becoming more capable of bearing the risk of risky assets, thereby becoming more capable of generating high profits [35]. Additionally, an increase in LDR ratio depicts a rise in bank loan disbursement, which results in higher bank income and increased ROA. This finding agrees with [14, 13], who found significant positive effects of LDR on ROA.

4.2.2 The Effect of Financial Soundness Effect on Net Interest Margin (NIM).

In the second model, only the NPL variable as an indicator of asset quality is not statistically significant in influencing bank financial performance measured through NIM. NPL ratio reflects credit risk of banks—the higher its value, the higher customer default risk is. The default risk will diminish banks' interest income and NIM's value. This finding aligns with a study of [46] that found an insignificant negative effect of NPL on NIM and its relation to bad debt. Conversely, studies by [39, 41, 18] found significant negative effects on NIM.

Capital adequacy measured through CAR ratio has a significant positive effect on NIM at 10% significance level. The higher the CAR value banks possess, the more it signifies increased availability of capital to support their operations. In terms of commercial banks, increased availability of capital indicates their ability to disburse more loans to clients. Therefore, banks' interest incomes will increase, followed by the NIM value. This finding strengthens previous studies by [46, 15, 41], which also found significant positive effects of CAR on NIM.

Beside CAR, income quality has a significant positive effect on NIM at 1% significance level. It validates [46] who said the increase in income quality ratio value shows better ability of banks to achieve profits in the form of interest gain. It also

ensures their financial performance, one of which is represented by increases in the NIM value. Management efficiency measured through BOPO ratio, on the other hand, has a significant negative effect on NIM. This effect indicates that the level of banks' financial soundness and management efficiency indicators are inversely related to their financial performance level, both reflected by ROA and NIM. Banks' liquidity measured through LDR has a significant positive impact on NIM. Hence, the rise of interest income will increase NIM, which depicts profit of banks gained from net interest income. This finding confirms a study by [15] that posited LDR as having a positive effect on NIM. However, it counters studies by [39], which showed negative effects of LDR on NIM.

4.2.3 Moderating Role of Bank Size on the Effect of Financial Soundness on Return on Assets (ROA).

The estimation result shows that bank size has a significant role in strengthening the positive effect of capital adequacy on ROA. Increased bank size will result in higher capital availability to support its operations and management to generate higher income, which eventually increases ROA value. Banks with a large size will gain more operational profits that could support capital increses and larger investments by the management, increasing profitability [34]. This finding agrees with [16] that found bank size has a moderating effect that strengthens CAR effect on ROA since the rise of total bank assets drives an increase in CAR and encourages better performance of banks. However, this finding contradicts Kirimi et al [19] who found a moderating effect of bank size weakens CAR effect on ROA since increased bank size requires more capital to cover its operational costs.

The moderating effect on bank size in the NPL effect on ROA has a coefficient value that strengthens the effect, albeit insignificant. In other words, bank size cannot moderate the NPL effect on ROA. This finding aligns with studies by [26, 14], which stated that bank size cannot moderate the NPL effect on ROA. In contrast, this finding refutes [19] who found bank size has a moderating effect and weakens the NPL effect on ROA.

Bank size also has a moderating effect that strengthens the management efficiency effect measured by the BOPO ratio on ROA, although it is not significant. This means that bank size cannot moderate the BOPO effect on ROA [13]. Increases in total bank assets will be accompanied by increases in overall operational expenses, resulting in the rise of BOPO value. Therefore, larger banks cannot guarantee higher efficiency compared to smaller banks. On the other hand, [26, 19] found a moderating effect of bank size that strengthens BOPO effect on ROA since the larger bank will be increasing its management ability to manage operational costs by implementing economies of scale, thus supporting its financial performance better.

Moreover, bank size does not have a moderating effect on income quality effect on ROA since the estimated result is insignificant. It counters [19] who found the moderating effect of bank size weakens income quality effect on ROA since higher assets trigger more operational costs and lower interest income. Although increased bank size will generate higher interest income from a larger number of loan disbursements, income composition on ROA could come from other operating incomes.

Meanwhile, bank size has a significant role to weaken liquidity effect measured through LDR ratio on ROA. LDR ratio reflects a bank's liquidity—higher value means

worse liquidity condition since banks have fewer liquid assets reserve to seize market opportunities [5]. When bank size increases, its ability to disburse loans will rise, impacting on increased interest income and ROA value. Conversely, increases in bank size from rising total assets allow banks to better manage their liquidity condition since they have sufficient liquid assets to face bad credit risks from increasing the number of customer loans. This finding does not align with studies by [26, 19, 14], which stated that bank size cannot moderate the LDR effect on ROA.

4.2.4 Moderating Role of Bank Size on the Effect of Financial Soundness on Net Interest Margin (NIM).

The estimation result shows that bank size cannot moderate capital adequacy effect on NIM. Studies by [15, 46, 41] found a significant positive effect on NIM since CAR value allows banks to have more sources of loan funds to be distributed, leading to higher interest income. Theoretically, larger bank size makes banks more capable to manage their capital to achieve higher interest income from loans disbursement to customers. However, this finding found that bank size is not able to moderate CAR effect on NIM since banks' capitals can be used for other types of investments besides loans. This finding aligns with [19], which states that bank size cannot moderate CAR effect on NIM.

A study conducted by [24] revealed that larger banks tend to exhibit higher non-performing loan (NPL) ratios in comparison to smaller banks, as they engage in more extensive lending activities, thereby increasing the risk of uncollectable loans. This finding suggests that larger banks may possess a greater appetite for risk and be more inclined to engage in riskier lending practices, leading to higher NPLs. The findings of [39, 41, 18] align with this notion, indicating that higher NPLs pose a risk of reducing the net interest margin (NIM) value. However, in this study, it found contradictory findings that demonstrate bank size has a moderating effect, strengthening the positive impact of NPLs on NIM. This implies that larger bank size allows banks to manage bad credit risks more effectively, thereby supporting their financial performance through increased NIM. In this case, the NPL value will decrease as the bank size expands, as stated in studies by [43, 7], which found negative effects of bank size on NPLs, as larger bank size is associated with more competitive lending practices, offering lower interest rates, thus mitigating bad credit risks.

Additionally, bank size does not appear to moderate the efficiency management effect, measured through the operating expenses to operating income ratio (BOPO), on net interest margin (NIM). Although the study by [33] suggests that changes in NIM contributions tend to be larger for large banks compared to small banks, stemming more from other interest-bearing assets and non-deposit liabilities for large banks, which implies that bank size can influence the drivers and magnitude of changes in NIM, the direct relationship was not examined. In contrast, [19] stated that bank size has a moderating effect that strengthens the impact of BOPO on NIM, as increases in total bank assets generate higher operational costs, motivating leading officials to increase income and support the rise of NIM value. On the other hand, [26] found that the moderating effect of bank size weakens the impact of BOPO on banks' performance, as larger bank size could diminish operational costs by implementing economies of scale.

Similar situation happens in income quality, where bank size cannot moderate its effect on NIM since the estimation result is not significant. Large banks are more capable of generating interest income from credit disbursement, making their financial

performances better, which is reflected in increases on NIM [46]. Even so, this research found that bank size cannot moderate the income quality effect on NIM due to a possibility of investing banks' assets in other types of investments than credit distribution. This finding refutes a study by [19], that stated bank size has a moderating effect to strengthen income quality effect on NIM since increases in total bank assets drive increases in interest income.

Conversely, bank size has a moderating effect that weakens liquidity effect measured through LDR on NIM. This means larger banks have more deposit values than smaller banks, making them more liquid, but lowering the NIM value since their interest income diminish. [27] found significant positive correlation between bank size and liquidity, which shows that a larger bank size tends to create a higher liquidity level compared to smaller banks. Nevertheless, numerous studies regarding the effect of bank size on liquidity have contradictory findings, stating that large banks have fewer deposits so that small banks have higher liquidity conditions. [8] found that the LDR ratio is usually greater in larger banks due to their ability to make higher loans compared to smaller banks. Larger banks also do not depend on deposits since they have more funds from non-deposit sources. It confirms studies by [36, 9], which found a negative effect of bank size on liquidity, where larger banks have a lower liquidity level compared to smaller banks due to their passive strategy to manage their liquidity. This strategy involves depending on the interbank market or lender of last resort assistance, especially in crises.

5 Conclusion and Recommendations

5.1 Conclusion

The findings of this research highlight several significant relationships between financial indicators and bank performance within the ASEAN-4 region during the Covid-19 pandemic. Lower bad loans and better capital buffers improved Return on Assets (ROA), while strong earnings and a balanced loan-to-deposit ratio boosted Net Interest Margin (NIM). Interestingly, the size of the bank mattered. Larger banks gained more from strong capital for ROA, but the positive effect of LDR was weaker. Similarly, size moderated the impact on profitability as measured by NIM, with larger banks experiencing a stronger negative effect from bad loans but a weaker positive effect from the LDR. Overall, financial health and capital management were crucial, with bank size influencing how these factors played out during the pandemic.

5.2 Recommendations

Based on the findings, further research can expand this study by using other variables to measure financial performance, including using the RGEC (Risk profile, Good corporate governance, Earnings, Capital) indicator to replace the CAMEL as bank health measurement. Further study could also use variable lag-1 to prevent reverse causality issue in the dependent and independent variables. For bank management, the finding of the moderating effect of bank size in strengthening CAR and LDR effect on ROA indicates that they must maintain capital adequacy and liquid assets to support proper financial performances and prevent difficulties in crises. In addition, the finding of moderating effect of bank size in strengthening NPL effect on NIM signals bank

managements to manage their credit risks appropriately to generate solid financial performances. For regulators, the finding of bank size having a moderating effect on financial soundness on banks' financial performance stipulates a depiction to supervise bank health and financial performance, specifically for larger banks, to prevent the ‘too big to fail’ problem.

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