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THE EFFECT OF DOMINANT RISK MANAGEMENT COMPONENTS IN ASSET-LIABILITY MANAGEMENT ON THE FINANCIAL PERFORMANCE OF COMMERCIAL BANKS IN INDONESIA

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Abstract:
This study aims to investigate the effect of bank size, leverage, capital adequacy ratio, interest rate risk, liquidity risk, and credit risk on financial performance. This study focuses on banks listed on the Indonesia Stock Exchange and analyzes financial statements from 2020 to 2024. Purposive sampling was used to select 38 banks for this study. Eviews 9.0 was used for panel data regression analysis. The results show that bank size, capital adequacy ratio, and liquidity risk have a significant positive effect, while credit risk has a significant negative impact. Interest rates and leverage have no effect. This implies that to maintain their financial success in the face of changing economic conditions, banks need to implement efficient risk management.

INTRODUCTION

The financial performance of the banking sector plays a critical role in maintaining the stability of the global financial system. In recent years, banking financial performance has exhibited considerable volatility amidst rising economic uncertainty, interest rate fluctuations, and liquidity pressures. These conditions demand that banks optimize their asset and liability management to preserve stability and profitability. The effectiveness of asset and liability management determines a bank's ability to maintain profitability while ensuring resilience against risks. Effective asset and liability management has been proven to contribute positively to profitability, highlighting the significance of Asset Liability Management (ALM) in supporting the sustained performance of financial institutions (Abebe, 2022).

In line with the importance of asset and liability management, financial performance serves as a vital indicator in assessing the operational success of a bank. It reflects the bank's capability to manage resources effectively and efficiently to generate profit. Interest rate risk, credit risk, and liquidity risk are the three primary risks within Asset Liability Management that most significantly impact bank profitability. A bank's capacity to handle critical risks arising from the continuity between assets and liabilities has a significant impact on its profitability, as measured by Return on Assets (ROA) (Astuti, 2025).

Within the framework of Asset Liability Management, there are several primary types of risk that banks must manage to maintain stability and financial performance. One such risk is liquidity risk. Liquidity risk occurs when a bank faces difficulties meeting its short-term obligations, such as deposit withdrawals by customers. This risk can affect operational stability and diminish public confidence in the bank if not managed properly (Astuti, 2025). According to research by Hasaneen (2025), liquidity risk has a significant effect on ROA, which underscores the importance of liquidity risk management in maintaining stability and profitability. This is in line with research by Akinselure (2025), which also found a significant effect on ROA. The results indicate that efficient liquidity management helps banks sustain growth and enhance customer trust. In addition to influencing profitability (ROA), liquidity also plays a crucial role in determining a company's funding policy. A business's ability to meet its short-term commitments on time is reflected in its liquidity, making it a vital component in the formation of capital structure (Khotimah, 2023).

In addition to liquidity risk, another equally important risk is credit risk. Credit risk relates to the ability of debtors to meet their loan payment obligations. Non-Performing Loans (NPL) will increase if debtors fail to make payments, which can decrease a bank's assets and profitability. This negatively impacts financial performance because higher credit risk increases provision expenses and reduces income, according to research by Akinselure (2025). This contradicts research by Ogundele (2025), which revealed a substantial beneficial effect and suggested better credit risk management. These studies indicate that credit risk can diminish a bank's financial performance.

Furthermore, interest rate risk is also a significant concern in asset and liability management. Interest rate risk arises from market interest rate fluctuations that can affect a bank's net interest income. These fluctuations influence financial stability and

bank profitability by causing imbalances between interest-sensitive assets and liabilities. This condition drives banks to adjust their risk management strategies to maintain sustainable performance (Shahin, 2022). Shahin (2022) found that an increase in interest rate risk has a positive and significant effect on bank profitability, as it encourages higher net interest income through income diversification. Conversely, Akinselure (2025) found that interest rate risk has a negative and significant effect on bank profit margins, emphasizing that interest rate risk management is essential in supporting financial performance.

In addition to risk factors, internal bank factors such as capitalization also play a vital role in determining financial performance. One key metric that indicates a bank's ability to maintain financial stability and use its capital to absorb unexpected loss risks is the Capital Adequacy Ratio (CAR). This ratio reflects the strength of a bank's capital in maintaining profitability while managing risk. High capital adequacy has been proven to enhance a bank's financial performance. Panthee (2025) found that CAR has a positive and significant impact on bank profitability, which in that study was measured using Return on Assets (ROA). This is consistent with research by Yuan (2025), which also indicates that high capital adequacy strengthens the influence of financial technology on bank profitability.

In addition, bank characteristics such as firm size also influence financial performance. The operational capability and potential for effective risk management of a bank are reflected in its size, which is generally calculated as the logarithm of its total assets. Risk constraints are often reduced due to greater access to capital markets and cheaper funding sources for larger banks (Lalon, 2025). Ogundele (2025) found that bank size has a positive effect on financial performance, as larger banks possess greater resources to enhance operational performance and manage risks. This is in line with research by Nguyen (2025), which shows that bank size has a positive effect on profitability, where larger banks tend to be more efficient and have higher competitiveness through the diversification of financial services. Furthermore, Khasanah (2023) also found that firm size has a significant effect on financial performance, as larger organizations generally have better oversight systems and risk management.

In addition to firm size, the funding structure reflected in leverage is also a factor that needs consideration. The debt-to-equity ratio indicates how much of a bank's assets are funded by debt compared to equity. A high debt ratio can increase risk by raising

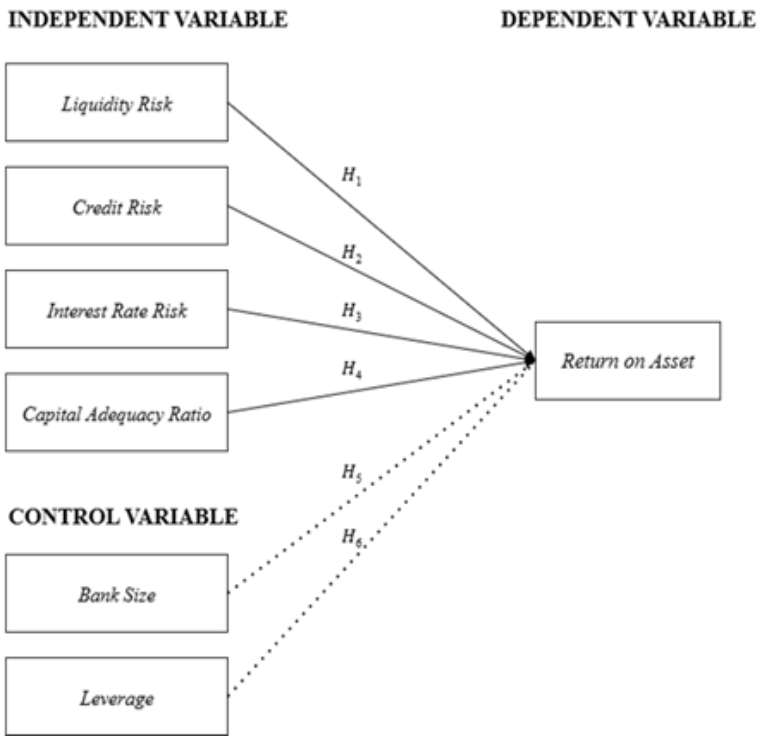
interest rates and lowering profitability. On the other hand, well-managed leverage can enhance a bank's market performance (Karnasi, 2025). According to research by Abebe (2022), there is a substantial negative impact because the high interest costs of both short-term and long-term debt commitments can reduce ROA. This differs from research by Akinselure (2025), which found a significant beneficial effect because, while it can increase returns, it also increases risk if not properly controlled. However, leverage does not have a noticeable influence on financial performance according to research by Syaiful (2021), which suggests that high debt levels may not always have a negative impact if a business has sound financial control and oversight to manage risks.

Although various studies have examined the factors affecting banking financial performance, previous research results still show inconsistencies. Some studies found that variables such as the capital adequacy ratio significantly increase Return on Assets (Panthee, 2025), while other variables such as risk and leverage show mixed results in influencing bank financial performance. These differing findings indicate that the relationships between variables and financial performance are not yet fully conclusive. Furthermore, previous research has generally been conducted in different contexts and periods, using analysis approaches that are not yet integrated, thus failing to provide a comprehensive overview of the simultaneous influence of these variables on banking financial performance. Consequently, there remains a research gap related to inconsistent empirical results and the limited comprehensive approaches used. Therefore, this study is conducted to re-examine the factors affecting banking financial performance through a more comprehensive approach. This study expands upon previous theoretical knowledge by using a panel data regression analysis model and Return on Assets as the primary indicator to provide a measurable impact on bank financial performance.

LITERATURE REVIEW

The conceptual framework of this research is developed based on the insights offered in the preceding context:

Figure 1
Conceptual Framework



Source: Processed Data, 2025

This research develops the following research hypotheses based on the fundamental conceptual framework provided previously:

The Effect of Liquidity Risk on Financial Performance

Hasaneen (2025) found that liquidity risk has a significant negative effect on ROA in Egyptian banking, demonstrating the importance of liquidity management in maintaining bank stability and profitability. Similarly, Akinselure (2025), studying banks in Nigeria, also found that liquidity risk, influenced by customer deposits, affects profitability. These findings suggest that effective liquidity management can support bank growth and enhance customer trust. Furthermore, Abuelgasim (2025) showed that higher liquidity levels can increase efficiency, stability, and bank profitability, particularly during crises, based on research on banking in Sudan. This indicates that liquidity not only serves as a reserve to meet short-term obligations but also plays a role in maintaining the sustainability of a bank's financial performance. Therefore, this study develops the following hypothesis:

H1: *Liquidity Risk* berpengaruh negatif terhadap kinerja keuangan bank.

The Effect of Credit Risk on Financial Performance

From the perspective of Agency Theory, high credit risk can emerge due to less cautious management decision-making in credit distribution, thereby increasing the potential for non-performing loans and reducing bank profitability. According to research by Akinselure (2025) conducted in Nigeria, credit risk, determined by loans to customers, has a significant negative impact on return on assets (ROA) because it increases provision expenses and reduces income. Conversely, Abebe (2022), in a study on Microfinance Institutions in Sub-Saharan Africa, found that the Net Loan Portfolio actually has a positive effect on ROA, indicating that well-managed credit can support profitability. Meanwhile, Ogundele (2025) found that credit risk, measured by the Non-Performing Loan Ratio, suppresses bank financial performance and suggests strengthening credit risk management. Therefore, this study develops the following hypothesis:

H2: Credit risk has a negative effect on the financial performance of banks.

The Effect of Interest Rate Risk on Financial Performance

Interest rate risk is closely related to a bank's net interest income and profit stability. Akinselure (2025) emphasizes that interest rate fluctuations have a significant positive effect on bank profit margins, making the management of interest rate risk essential in supporting financial performance. Meanwhile, Abebe (2022) found that the mismatch between fixed-rate loans and floating-rate funding increases interest rate risk, which has a significant negative impact on bank profitability. In contrast to these conclusions, Shahin (2022) demonstrates that interest rate risk actually has a significant positive effect on financial performance in several countries, where increased interest rate risk can be utilized to boost income through diversification strategies. Accordingly, the following hypothesis is developed in this study:

H3: Interest Rate Risk has a positive effect on the financial performance of banks.

The Effect of Capital Adequacy Ratio on Financial Performance

The Capital Adequacy Ratio is a ratio that demonstrates a bank's ability to provide capital to cover risks arising from its operational activities. From a signaling theory perspective, a high CAR level can serve as a positive signal to investors and regulators that the bank is in a healthy financial condition and possesses a strong capacity to handle risk. High capital adequacy enhances a bank's financial performance, according to research by Panthee (2025), which indicates that CAR has a positive and substantial impact on bank

profitability (ROA) in Nepal. A study by Majondo (2025) in Tanzania produced similar findings, concluding that CAR has a favorable and substantial impact following changes in capital adequacy legislation. This is consistent with a 2025 study by Yuan in China, which also suggests that CAR has both advantages and disadvantages. According to that study, financial technology has a greater influence on bank profitability when capital adequacy is high. Accordingly, the following hypothesis is developed in this study:

H4: Capital Adequacy Ratio has an effect on the financial performance of banks.

The Effect of Bank Size on Financial Performance

Bank size is associated with economies of scale, access to funding, and the ability to diversify income. Ogundele (2025) and Akinselure (2025) both state that because larger banks possess greater resources to support operational performance and manage risks, bank size has a beneficial impact on ROA. Similarly, Nguyen's (2025) study on commercial banking in the ASEAN region indicates that bank size has a major impact on profitability, as larger banks are often more efficient and can enhance competitiveness by diversifying their financial services. Accordingly, the following hypothesis is developed in this study:

H5: Bank size has a positive effect on the financial performance of banks.

The Effect of Leverage on Financial Performance

The level of a bank's asset financing through debt is reflected in its leverage, which, if not managed properly, can reduce profitability (Ogundele, 2025). A bank's return on assets (ROA) is heavily influenced by high leverage. According to Abebe (2022), high interest payments from short-term and long-term debt obligations can decrease ROA. Conversely, Akinselure (2025) characterizes leverage as a control variable that, if not handled correctly, can increase both risk and profitability. Therefore, this study develops the following hypothesis:

H6: Leverage has a positive effect on the financial performance of banks.

RESEARCH METHODS

This research employs a purposive sampling method. Qualitative data were gathered using secondary data collection methods. Data sources include the Indonesia Stock Exchange website (www.idx.co.id) and the respective company websites. Over a five-year period, 38 banking organizations were included in the sample, covering 190 financial reporting periods from 2020 to 2024.

Table 1
Sample Selection Criteria

Description	Amount
Banking population listed on the IDX during the 2020 - 2024 period	43
Conventional banks with incomplete data in financial reports and years	(1)
Banks with mixed conventional-sharia reports	(4)
Total research units of analysis	**38**
Total observations over 5 years (n x research period)	**190**

Source: Processed Data, 2025

From 2020 to 2024, a total of 43 banks listed on the Indonesia Stock Exchange (IDX) served as the population for this study. A total of 190 financial reports from 38 banks were used as the research sample. The dependent variable in this study is financial performance, measured using Return on Assets, which reflects the bank's ability to generate profit from its total assets by comparing net income to total assets.

The independent variables include interest rate risk, measured based on the sensitivity of interest rate changes to bank performance; credit risk, proxied by non-performing loans, which is the ratio of non-performing loans to total credit granted; liquidity risk, proxied by the loan to deposit ratio, showing the comparison between total credit and third-party funds; and capital adequacy, measured by the capital adequacy ratio, which is the ratio of capital to risk-weighted assets. Furthermore, the control variables in this study are leverage, measured by the ratio of total debt to total assets, and bank size, proxied by the natural logarithm of total assets.

This study uses panel data regression analysis as the analytical method, which includes descriptive statistics, regression model selection, and hypothesis testing through the t-test. This analysis is conducted to examine the simultaneous and partial effects of the independent variables on the dependent variable.

RESEARCH FINDINGS

To provide a comprehensive summary of the data underlying our investigation, we use descriptive statistics. The Eviews 9.0 program was used to process the data. Table 2 displays the conclusions drawn from this careful statistical investigation.

Table 2
Descriptive Statistics Test Results

	ROA	LQR	CRR	INT	CAR	BKSZ	LEV
Mean	0.005967	0.803399	0.026450	0.068666	0.406264	31.37757	0.756540
Median	0.007295	0.755294	0.018938	0.063084	0.294001	30.82605	0.808049

Maximum	0.044167	4.836969	0.284287	0.251940	2.838783	35.22840	1.917284
Minimum	-0.180577	-0.088949	0.000000	6.27E-05	0.104952	27.99650	0.007102
Std. Dev.	0.022896	0.489402	0.031167	0.032472	0.339413	1.693924	0.259351

Source: Processed Data, 2025

This study examines panel data from numerous commercial banks over a specific observation period. Based on the descriptive statistical findings in Table 2, ROA as a proxy for financial performance has an average value of 0.005967, with a minimum value of -0.180577 and a maximum of 0.044167, indicating a significant performance gap among the banks in the sample, including several banks that recorded negative ROA. Liquidity risk (LQR) shows an average of 0.803399 with a standard deviation of 0.489402, reflecting the diversity of liquidity conditions among the sampled banks. Credit risk (CRR) and interest rate risk (INT) stand at averages of 0.026450 and 0.068666, respectively. The capital adequacy ratio (CAR) has an average of 0.406264 with a maximum value reaching 2.838783, illustrating a considerable difference in capital structure between banks. Bank size (BKSZ), with an average of 31.37757, represents the natural logarithm of total assets, while leverage (LEV) stands at an average of 0.756540.

Model Selection Analysis

a. Chow Test

Table 3
Chow Test Results

Redundant Fixed Effects Tests
Equation: EQ01
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	2.228911	(37,146)	0.0004
Cross-section Chi-square	85.081446	37	0.0000

Source: Processed Data, 2025

The Fixed Effects Model is the appropriate model to use, according to the Chow Test results presented in the table, which include a Cross-section F statistic of 0.0004 and a Chi-square probability of 0.0000.

b. Hausman Test

Table 4
Hausman Test Results

Correlated Random Effects - Hausman Test
Equation: EQ01
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.

Cross-section random	2.738623	6	0.8409

Source: Processed Data, 2025

It is clear from the Hausman Test results in the table that the probability value is 0.8409. Therefore, it can be concluded that the Random Effects Model is the best model to use.

c. LM Test

Table 5
LM Test Results

Lagrange Multiplier Tests for Random Effects
Null hypotheses: No effects
Alternative hypotheses: Two-sided (Breusch-Pagan) and one-sided (all others) alternatives

	Test Hypothesis Cross-section	Time	Both
Breusch-Pagan	13.21364 (0.0003)	0.491563 (0.4832)	13.70520 (0.0002)
Honda	3.635057 (0.0001)	0.701115 (0.2416)	3.066137 (0.0011)
King-Wu	3.635057 (0.0001)	0.701115 (0.2416)	1.801438 (0.0358)
Standardized Honda	4.360592 (0.0000)	1.169673 (0.1211)	-1.026497 --
Standardized King-Wu	4.360592 (0.0000)	1.169673 (0.1211)	-0.876948 --
Gourierioux, et al.*	--	--	13.70520 (< 0.01)

Source: Processed Data, 2025

The Random Effects Model is used because the analysis of the LM Test findings, as shown in the table, reveals that the Breusch-Pagan cross-section probability value is 0.0003. Based on the model selection tests performed—starting from the Chow Test and Hausman Test to the LM Test—it can be concluded that the Random Effect Model is the best estimation model for this study.

DISCUSSION

The panel data regression model used by the previous study by Akinselure (2025) can be written as follows:

$$\mathbf{ROA}_{it} = \text{-}0.182232 - 0.003657\mathbf{LQR}_{it} - 0.140256\boldsymbol{CRR}_{it} + 0.049552\boldsymbol{INT}_{it} + 0.018629\mathbf{CAR}_{it} + 0.005670\mathbf{BKSZ}_{it} + 0.000111\mathbf{Lev}_{it}$$

Description:

β = Koefisien

β1-6 = Koefisien

ROA = *Return on Assets*

LQR = *Liquidity Risk*

CRR = *Credit Risk*

INT = *Interest Rate Risk*

CAR = *Capital Adequacy Ratio*

BKSZ = *Bank Size*

LEV = *Leverage*

i = Intercept

t= Period (Time)

ε = Error Term

The Effect of Liquidity Risk on Financial Performance

The findings in Table 7 show that the examination of the impact of liquidity risk factors significantly increases ROA. This is consistent with research by Hasaneen (2025), which demonstrates that financial performance (ROA) is significantly and positively influenced by liquidity risk. This indicates that banks can maintain sufficient liquid assets without compromising their profitability. Banks can meet their short-term obligations and continue to channel cash into profitable loans that generate income by managing liquidity effectively, thereby enhancing financial performance. The findings of this study contradict those of Ogundele (2025), who states that liquidity risk significantly and negatively affects financial performance (ROA). A high percentage of non-performing loans (NPL), an imbalance between assets and liabilities, and a bank's inability to meet short-term operational commitments all contribute to negative liquidity risk, which ultimately erodes consumer confidence. This condition suggests that an increase in liquidity risk will reduce a bank's ability to generate profit. To minimize such impacts, banks need to optimize the loan to deposit ratio (LDR), strengthen liquid reserves, and conduct strict supervision of credit quality to maintain liquidity stability while sustaining profitability.

The Effect of Credit Risk on Financial Performance

The regression results table shows that the credit risk variable significantly interferes with the ROA analysis. This is in line with research by Lew (2022), which indicates that credit risk has a major and detrimental influence on bank financial performance, with increasing non-performing loans (NPL) leading to a decrease in return on assets (ROA). Due to higher credit risk, banks must set aside more money for loan loss reserves, which reduces their profitability. High non-performing loans (NPL) signal a decline in the bank's ability to generate profit, which ultimately affects overall financial performance. The results of this study contradict the findings of Akinselure (2025), who found that credit risk significantly and positively affects financial performance (ROA). By increasing interest income, fostering consumer confidence, and adapting to shifts in economic policy, effective credit risk management can, in some circumstances, actually enhance financial performance.

The Effect of Interest Rate Risk on Financial Performance

The interest rate risk variable has no effect on ROA, according to the regression study findings table. This is consistent with research by Munzir (2025), which reveals the absence of a significant impact of interest rate risk on ROA. This condition indicates that interest rate fluctuations do not have a direct impact on the bank's net interest income because most banks have diversified their income streams and adopted efficient interest rate risk management, allowing them to maintain profit stability even amidst market interest rate peaks. This contradicts the findings of Shahin (2022), which state that interest rate risk significantly and beneficially influences ROA. This discrepancy may be the result of variations in interest rate policies and the macroeconomic climate.

The Effect of Capital Adequacy Ratio on Financial Performance

The regression analysis of the capital adequacy ratio variable indicates that it significantly increases ROA, as shown in Table 7. This is in line with research by Panthee (2025), which demonstrates that the capital adequacy ratio has a substantial positive impact on ROA. This implies that a bank's financial performance improves with sound capital adequacy. These results contradict the study by Yeasin (2022), which found that the capital adequacy ratio has a significant negative impact on ROA. This suggests that an increase in capital adequacy does not always correlate with an increase in bank earnings. Some productive funds are maintained as reserves when the proportion of capital

required to meet prudential standards increases, which lowers net profit and prospective interest income. Consequently, a high CAR can reduce ROA, indicating a trade-off between effective bank profitability and capital stability.

The Effect of Bank Size on Financial Performance

The results of the regression study show that bank size significantly increases ROA, which is in line with the findings of Akinselure (2025) that bank size has a positive effect on financial performance. In the context of banks listed on the Indonesia Stock Exchange, larger banks generally have advantages in terms of asset diversification, broader access to funding, as well as larger networks and customer bases, enabling them to increase credit distribution and interest income, which impacts profitability growth. Furthermore, large banks tend to be more efficient by utilizing economies of scale and possessing better risk management systems. This result contradicts the findings of Nanik (2022), which showed a negative influence, likely due to differences in sample characteristics and banking conditions, where in this study, the operational advantages of large banks are more dominant than the potential risks faced.

The Effect of Leverage on Financial Performance

It is clear from the regression analysis results in Table 7 that the leverage variable has no significant effect on financial performance. This finding is in line with the research by Utama (2023), which shows that financial performance is not affected by leverage. This indicates that debt has little influence on changes in bank profitability. This is because the majority of a bank's funding structure consists of customer deposits and other financial instruments, rather than just debt. This result contradicts the research by Akinselure (2025), which found that leverage has a positive and substantial impact on ROA. This implies that the proportional use of debt can increase a bank's efficiency and ability to generate profit. Banks can increase productive assets, such as credit distribution, by using debt-based financing, which directly affects interest income growth. Therefore, well-managed leverage plays an important role in strengthening bank profitability.

CONCLUSION

The study findings indicate that bank size, capital adequacy ratio, credit risk, and liquidity risk all significantly influence the financial performance of banks. Theoretically, this research provides empirical evidence that strengthens the relevance of Asset Liability

Management theory within the Indonesian banking context, particularly in explaining how the management of assets and liabilities impacts bank profitability. Furthermore, these results reinforce the Capital Buffer Theory, which posits that banks with strong capitalization are better able to absorb risks and maintain their performance.

Practically, these findings provide a foundation for financial managers to maintain optimal liquidity, strengthen credit risk controls, and ensure the availability of sufficient capital to sustain profitability. For investors, a bank's capacity to handle liquidity, credit risk, and capital strength can serve as a reference in evaluating the health and prospects of a bank before making investment decisions. The observation of internal variables, which have not yet fully captured all factors affecting bank financial performance, is a limitation of this study. To provide a more complete picture of the elements influencing bank profitability, additional research is suggested to extend the study period and include operational efficiency variables such as the Cost to Income Ratio (CIR), as used in the study by Almeida (2025).

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