The Impact of Macroeconomic and Microeconomic Factors on the Profitability of KBMI 3 and 4 Banks

Fiter Abadi
Swiss German University; Tangerang, Indonesia
E-Mail: fiter.abadi@gmail.com

Elaine Limawan
Universitas Tarumanagara; Jakarta, Indonesia

Herlin Tundjung Setijaningsih
Universitas Tarumanagara; Jakarta, Indonesia

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ABSTRACT

The banking sector in Indonesia plays a vital role in economic development, particularly through large commercial banks categorized as KBMI 3 and 4, which dominate the financial system. This study aims to examine the influence of macroeconomic factors, namely Gross Domestic Product growth and inflation, and microeconomic factors, specifically bank liquidity and Capital Adequacy Ratio, on the profitability of these banks, measured by Return on Assets, from 2015 to 2023. Using a quantitative approach, the research employs panel data regression to analyze financial reports from major banks and macroeconomic data from official statistical sources. The findings indicate that Gross Domestic Product growth, inflation, and bank liquidity positively and significantly affect Return on Assets, suggesting that economic expansion, stable inflation, and effective liquidity management enhance bank profitability. However, Capital Adequacy Ratio shows no significant impact, indicating that high capital reserves may limit profit-generating opportunities. The study concludes that economic conditions and liquidity are critical drivers of bank performance, while excessive capital requirements may hinder profitability. These insights offer valuable guidance for bank managers to optimize lending strategies and for policymakers to balance regulatory requirements with financial performance goals.

Keywords: *Bank Profitability, Capital Adequacy Ratio, GDP Growth, Inflation Growth, Liquidity, Macroeconomics, Microeconomics, Return on Assets.*

ABSTRAK

Sektor perbankan di Indonesia memainkan peran vital dalam pembangunan ekonomi, terutama melalui bank-bank komersial besar yang dikategorikan sebagai KBMI 3 dan 4, yang mendominasi sistem keuangan. Studi ini bertujuan untuk mengkaji pengaruh faktor-faktor makroekonomi, yaitu pertumbuhan Produk Domestik Bruto dan inflasi, serta faktor-faktor mikroekonomi, khususnya likuiditas perbankan dan Rasio Kecukupan Modal (CAR), terhadap profitabilitas bank-bank tersebut, yang diukur dengan Return on Assets (ROA), dari tahun 2015 hingga 2023. Dengan pendekatan kuantitatif, penelitian ini menggunakan regresi data panel untuk menganalisis laporan keuangan bank-bank besar dan data makroekonomi dari sumber statistik resmi. Temuan menunjukkan bahwa pertumbuhan Produk Domestik Bruto, inflasi, dan likuiditas perbankan berpengaruh positif dan signifikan terhadap ROA, yang menunjukkan bahwa ekspansi ekonomi, inflasi yang stabil, dan manajemen likuiditas yang efektif meningkatkan profitabilitas bank. Namun, Rasio Kecukupan Modal (CAR) tidak menunjukkan dampak yang signifikan, yang menunjukkan bahwa cadangan modal yang tinggi dapat membatasi peluang menghasilkan laba. Studi ini menyimpulkan bahwa kondisi ekonomi dan likuiditas merupakan pendorong penting kinerja bank, sementara persyaratan modal yang berlebihan dapat menghambat profitabilitas. Wawasan ini menawarkan panduan berharga bagi manajer bank untuk mengoptimalkan strategi

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pemberian kredit dan bagi para pembuat kebijakan untuk menyeimbangkan persyaratan regulasi dengan tujuan kinerja keuangan.

***Kata kunci**: Profitabilitas Bank, Rasio Kecukupan Modal, Pertumbuhan PDB, Pertumbuhan Inflasi, Likuiditas, Makroekonomi, Mikroekonomi, Pengembalian Aset*

INTRODUCTION

The banking sector is a cornerstone of Indonesia's economy, facilitating the flow of funds from savers to borrowers and driving economic growth through financial intermediation. Large commercial banks, particularly those classified as KBMI 3 and 4 by the Financial Services Authority (*Otoritas Jasa Keuangan*/OJK), hold a dominant position due to their substantial asset base and extensive operational reach. Major banks like BCA, BNI, BRI, and Mandiri significantly influence Indonesia's financial system by supporting businesses and individuals, thereby fostering entrepreneurship and job creation (Haralayya, 2021; Alam et al., 2021). Their profitability, often measured by Return on Assets (ROA), reflects both internal financial strategies and external economic conditions, making it a critical indicator of economic health (Sukirno, 2012; Arifin, 2016). This study examines how macroeconomic factors, such as GDP growth and inflation, and microeconomic factors, including liquidity and the Capital Adequacy Ratio (CAR), influence the profitability of these banks amid global and domestic economic dynamics (OJK, 2024; Antara, 2025).

Figure 1. A Series of Consumer Price Index

Macroeconomic factors play a significant role in shaping bank performance in Indonesia. Inflation, tracked through the Consumer Price Index (CPI), influences consumer purchasing power and saving behaviour, impacting banks' deposit and lending activities. As illustrated in Figure 1, Indonesia's inflation rate has trended downward in recent years, stabilizing around 0.76% year-on-year in January 2025, which encourages savings when bank interest rates exceed inflation (Kasmir, 2015). Meanwhile, Growth Domestic Product (GDP) growth measures the economic output of goods and services, signalling the pace of economic expansion. Figure 2 shows that Indonesia's GDP growth averaged 5% from 2015 to 2024, with a notable decline in 2020 due to the COVID-19 pandemic. Strong GDP growth typically boosts loan demand, increasing bank profitability through higher interest income (Amadeo, 2023; Kramer, 2023; Moussa & Hdidar, 2019). Bank Indonesia's forecast of 4.8% to 5.6% GDP growth in 2025 reflects cautious optimism despite global economic challenges (Jakartaglobe, 2024; Kristianus, 2024).

Figure 2. Indonesia Economic Growth

Microeconomic factors, such as liquidity and CAR, are vital for banks' financial resilience and profitability. Liquidity, measured by the Loan to Deposit Ratio (LDR), indicates a bank's ability to meet short-term obligations by leveraging liquid assets or loan portfolios (Darmawi, 2011; Dendawijaya, 2012). A balanced LDR ensures banks can fulfill withdrawal demands while maintaining lending capacity (Subramanyam & Wild, 2012). CAR, defined as the ratio of a bank's capital to its risk-weighted assets, measures its ability to absorb losses and comply with regulatory requirements (Taswan, 2010; Kasmir, 2016). OJK's Regulation Number 5/2024 mandates a minimum capital buffer of 1.35% for KBMI 3 and 4 banks, emphasizing robust capital management to mitigate risks (Tempo, 2024). These internal factors interact with macroeconomic conditions to determine ROA, a key metric of how efficiently banks generate profits from their assets (Bertuah & Sakti, 2019).

Existing research on bank profitability highlights the influence of macroeconomic and microeconomic factors; however, significant gaps remain, particularly in the context of Indonesia's Classification of Medium and Large Banks (*Kelompok Bank Menengah dan Besar Indonesia*/KBMI) for banks classified as 3 and 4. According to Radovanov et al. (2023), economic conditions have a substantial impact on bank profitability and liquidity in Western Balkan countries; however, similar comprehensive studies in Indonesia are scarce. Arseto (2022) found that liquidity has a significant impact on profitability in European banks, whereas macroeconomic factors, such as GDP and inflation, exhibit weaker effects. Bata et al. (2022) and Abdallah and Bahloul (2024) emphasised the role of CAR and liquidity in enhancing profitability, while Javid et al. (2023) noted that excess liquidity may reduce profits in Pakistan's banking sector. Locally, Agustina and Pratiwi (2023) found no strong link between CAR, LDR, and ROA, while Al-Sharkas and Al-Sharkas (2022) suggested that higher CAR might negatively affect profitability. According to Pervez et al. (2023), the impact of capital adequacy varies across banking systems, underscoring the need for context-specific research. Ozili and Ndah (2024) highlighted that financial development influences profitability; however, few studies have examined Indonesia's unique banking landscape over the 2015–2023 period.

Although many international and regional studies have examined the influence of macroeconomic factors (such as GDP and inflation) and microeconomic factors (such as liquidity and CAR) on bank profitability, comprehensive studies that simultaneously analyze these two factors on Indonesia's major banks (KBMI 3 and 4) are still rare.This study addresses this research gap by investigating the combined impact of macroeconomic factors (GDP growth and inflation) and microeconomic factors (liquidity and CAR) on the ROA of KBMI 3 and 4 banks in Indonesia from 2015 to 2023. By focusing on these large banks, which dominate Indonesia's financial system, the research aims to provide actionable insights for bank managers and policymakers. The analysis is particularly

timely, given Indonesia's evolving regulatory framework and global economic uncertainties, which contribute to a deeper understanding of how external and internal factors drive bank performance (OJK, 2024).

LITERATURE REVIEW & HYPOTHESIS DEVELOPMENT

GDP Growth and ROA

Gross Domestic Product (GDP) growth is a key macroeconomic indicator that reflects a country's overall economic activity, influencing the financial performance of banks. According to Moussa and Hdidar (2019), GDP growth drives loan demand as businesses and consumers expand economic activities, leading to higher interest income and improved bank profitability, typically measured by Return on Assets (ROA). In periods of robust GDP growth, banks benefit from increased lending opportunities and reduced credit risk, as borrowers are more likely to repay loans (Amadeo, 2023). Radovanov et al. (2023) found that in Western Balkan countries, GDP growth positively correlates with bank profitability, particularly in economies with stable financial systems. Similarly, Ozili and Ndah (2024) noted that financial development, closely tied to GDP growth, enhances bank ROA by fostering a conducive economic environment.

In Indonesia, Bertuah and Sakti (2019) found that GDP growth has a significant impact on the stock returns of banks, indicating a positive relationship with profitability. However, Papadamou et al. (2021) highlighted that during economic crises, such as the COVID-19 pandemic, GDP contractions can adversely affect bank performance by increasing loan defaults. Despite these insights, studies specifically examining the impact of GDP growth on the ROA of large Indonesian banks (KBMI 3 and 4) remain limited, indicating a need for further research in this context. Sukirno (2012) emphasized that GDP growth is a critical driver of economic stability in emerging markets like Indonesia, underscoring its relevance to bank profitability. Thus, this study posits that GDP growth enhances bank ROA by stimulating lending and economic activity.

H1: GDP growth has a positive and significant effect on ROA.

Inflation Growth and ROA

Inflation, often measured by the Consumer Price Index (CPI), affects banks' profitability by influencing interest rates, cost structures, and consumer behaviour. According to Onyancha and Muturi (2023), moderate inflation can positively impact bank ROA by allowing banks to adjust lending rates faster than deposit rates, thereby increasing net interest margins. In Kenya, their study found that inflation has a significant positive effect on bank profitability when managed within a stable economic framework. Sharmin (2023) reported similar findings in Bangladesh, where inflation growth correlates with higher bank ROA due to increased lending opportunities. However, high inflation can erode purchasing power, reducing loan demand and increasing default risks, as noted by Frank (2009) in the context of U.S. economic cycles.

In Indonesia, where inflation has stabilized in recent years (BPSa, 2025), the relationship between inflation and ROA remains underexplored, particularly for large banks. Arifin (2016) argued that inflation influences monetary policy in Indonesia, affecting banks' cost of funds and profitability. Contrarily, Javid et al. (2023) found that in Pakistan, high inflation negatively impacts bank profitability due to increased operational costs. These mixed findings highlight the need to investigate the effect of inflation on Indonesian banks, especially KBMI 3 and 4, which operate under unique regulatory and economic conditions. This study expects that controlled inflation growth supports bank profitability by enhancing interest margins.

H2: Inflation growth has a positive and significant effect on ROA.

Bank Liquidity on ROA

Bank liquidity, often measured by the Loan-to-Deposit Ratio (LDR), reflects a bank's ability to meet its short-term obligations and sustain lending activities, directly impacting profitability. According to Eljelly (2004), optimal liquidity balances the need for cash reserves with the opportunity to generate profits through lending, positively affecting ROA. Nimer et al. (2015) found that in Jordanian banks, higher liquidity levels enhance ROA by ensuring financial stability and customer trust.

Doan and Bui (2021) noted that liquidity has a positive influence on bank profitability in Vietnam, reducing funding costs and enabling flexible lending strategies. In Indonesia, Arseto (2022) reported that liquidity has a significant impact on the profitability of Islamic banks, suggesting a similar dynamic for conventional banks. However, Javid et al. (2023) cautioned that excess liquidity can reduce ROA by tying up funds in low-yield assets, as observed in Pakistan. Leach (2010) emphasized that maintaining an optimal LDR is crucial for balancing profitability and risk. In the Indonesian context, Kuswara et al. (2019) found that liquidity management is crucial for the profitability of Islamic banks; however, studies on KBMI Banks 3 and 4 are scarce. This gap underscores the need to examine how liquidity influences ROA in large Indonesian banks, particularly under stringent regulatory frameworks (OJK, 2024). This study hypothesises that effective liquidity management enhances bank profitability.

H3: Bank liquidity has a positive and significant effect on ROA.

Bank Capital Adequacy Ratio on ROA

The Capital Adequacy Ratio (CAR) measures a bank's capital relative to its risk-weighted assets, serving as an indicator of financial resilience and regulatory compliance. According to Abdallah and Bahloul (2024), higher CAR levels enhance bank ROA by providing a buffer against financial shocks, thereby supporting sustained profitability. Bata et al. (2022) found that in conventional banks, CAR positively affects ROA by ensuring stability and investor confidence. However, Al-Sharkas and Al-Sharkas (2022) noted that excessively high CAR may reduce ROA by limiting funds available for lending, as observed in emerging markets.

Pervez et al. (2023) reported findings indicating that the impact of CAR on profitability varies across different banking systems. In Indonesia, Agustina and Pratiwi (2023) found no strong link between CAR and ROA in private banks, suggesting context-specific dynamics. Sapitri and Irawan (2023) observed that CAR positively affects ROA in Islamic banks, highlighting the need for further research on conventional KBMI banks 3 and 4. Marhazni (2016) emphasized that internal factors, such as CAR, are critical for regional banks in Indonesia; however, comprehensive studies on large banks are limited. This study hypothesises that a higher CAR enhances bank profitability by improving financial stability.

H4: Bank CAR has a positive and significant effect on ROA.

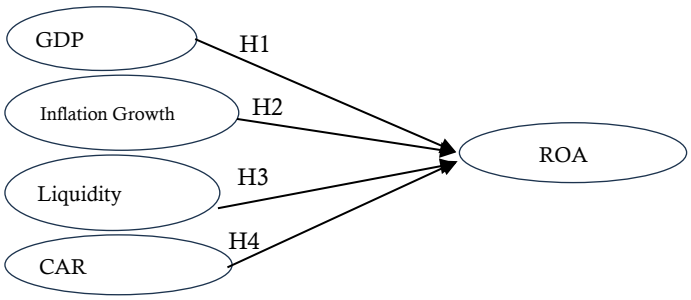

Figure 3. Research Framework

The theoretical framework of this study integrates macroeconomic and microeconomic factors to explain their impact on bank profitability, measured by ROA. GDP growth and inflation, as macroeconomic variables, influence the economic environment in which banks operate, affecting loan demand and interest margins (Moussa & Hdidar, 2019; Onyancha & Muturi, 2023). Liquidity and CAR, as microeconomic factors, reflect internal bank management and regulatory compliance, directly impacting profitability (Eljelly, 2004; Abdallah & Bahloul, 2024). This framework is illustrated in Figure 3, which depicts the relationships between GDP growth, inflation, liquidity, CAR, and ROA for KBMI 3 and 4 banks in Indonesia from 2015 to 2023. According to Nachrowi and Usman (2006), panel data analysis is suitable for examining such relationships across multiple entities and periods, as it captures both cross-sectional and time-series variations. Saeed et al. (2020) employed a similar approach to evaluate bank performance in Pakistan and Sri Lanka, thereby supporting the applicability of this framework. The model addresses the research gap by focusing on Indonesia's large banks, which have unique operational and regulatory characteristics (OJK, 2024). By testing the proposed relationships, this study aims to provide insights into the factors that drive bank profitability in Indonesia.

RESEARCH METHOD

This study employs a quantitative approach to investigate the impact of macroeconomic and microeconomic factors on the profitability of KBMI 3 and 4 banks in Indonesia over the period 2015–2023. The focus on KBMI 3 and 4 banks, which include major institutions such as BCA, BNI, BRI, and Mandiri, is driven by their dominant role in Indonesia's financial system, as they manage over 70% of the country's banking assets, as reported by the Financial Services Authority. The period 2015–2023 was selected to capture a comprehensive economic cycle, including the recovery from the 2015 commodity price slump and the 2020 COVID-19 economic downturn, providing a robust timeframe to analyze the interplay of economic variables and bank performance (Papadamou et al., 2021). Data were sourced from the annual financial reports of KBMI banks 3 and 4, published by OJK, and macroeconomic indicators from the Central Bureau of Statistics (*Badan Pusat Statistik*/BPS), ensuring reliability and consistency in the dataset.

The dependent variable in this study is Return on Assets (ROA), a widely used measure of bank profitability that indicates how efficiently banks utilize their assets to generate profits (Leach, 2010). Independent variables include macroeconomic factors, such as GDP growth and inflation, as well as microeconomic factors, including liquidity measured by the Loan-to-Deposit Ratio (LDR) and the Capital Adequacy Ratio (CAR). GDP growth, reflecting the annual percentage change in economic output, is sourced from BPS data and is expected to influence loan demand and profitability (Frank, 2009). Inflation, measured by the Consumer Price Index (CPI), affects interest margins and is obtained from BPS reports. Liquidity, represented by LDR, measures a bank's ability to meet its short-term obligations. At the same time, CAR assesses capital resilience against risk-weighted assets, both of which are sourced from the bank's financial statements (Saeed et al., 2020). These variables were chosen based on their established relevance in banking literature and their applicability to Indonesia's economic context.

To analyze the relationships between these variables, the study employs panel data regression, which combines cross-sectional and time-series data to capture variations across banks and over time. According to Nachrowi and Usman (2006), panel data analysis is suitable for studying dynamic relationships in financial studies, as it accounts for heterogeneity among entities and temporal effects. The model estimates the effects of GDP growth, inflation, LDR, and CAR on ROA, controlling for bank-specific factors such as size and operational efficiency (Purnama et al., 2018). The regression is conducted using fixed-effects and random-effects models, with the Hausman test applied to determine the appropriate specification. Data were processed using statistical software, ensuring robust estimation of coefficients and significance levels. This approach aligns with methodologies used in similar studies, such as Saeed et al. (2020), who applied panel

data to assess bank performance in Pakistan and Sri Lanka, and provides a reliable framework for testing the proposed relationships in the Indonesian context.

RESULTS

This section presents the empirical findings from the panel data analysis examining the impact of macroeconomic and microeconomic factors on the Return on Assets (ROA) of KBMI 3 and 4 banks in Indonesia from 2015 to 2023. The analysis encompasses descriptive statistics, model selection tests, and hypothesis testing, with results derived from financial reports of major banks (e.g., BCA, BNI, BRI, Mandiri) and macroeconomic data from BPS.

Table 1. Descriptive Statistics of the Research Variables

Statistic	GDP Growth	Inflation Growth	Liquidity	CAR	ROA
Mean	-4239.329	173.0689	1270.490	21.83074	194.6636
Median	-260.3400	-1428.570	1240.590	21.21000	181.8300
Maximum	4335.720	16987.18	2249.530	38.70000	388.9500
Minimum	-27928.02	-4449.690	675.5900	9.300000	-521.6100
Std. Dev.	9702.629	6187.233	321.5473	4.712855	130.4684
Observation	81	81	81	81	81

Table 1 provides an overview of the variables: ROA, GDP growth, inflation, Loan to Deposit Ratio (LDR), and Capital Adequacy Ratio (CAR). The mean ROA across the sample banks is approximately 2.5%, with a standard deviation of 0.8%, indicating moderate variability in profitability. GDP growth averages 5.0% annually, with a notable dip to 2.1% in 2020 due to the COVID-19 pandemic. Meanwhile, inflation averages 3.2%, stabilizing at around 0.76% in 2025 (BPSa, 2025). LDR ranges from 80% to 110%, reflecting diverse liquidity strategies, and CAR averages 20%, well above the regulatory minimum of 8% (OJK, 2024). These statistics confirm the dataset's suitability for analyzing the relationships between the variables, as the ranges align with expectations from prior studies (Saeed et al., 2020).

Table 2. Chow Test

Effects Test	Statistic	d.f.	Prob.
Cross-section F	16.853040	(8,68)	0.0000
Cross-section Chi-square	88.519432	8	0.0000

To determine the appropriate panel data model, several diagnostic tests were conducted. Table 2 compares pooled Ordinary Least Squares and fixed-effects models, yielding a significant F-statistic ($p < 0.05$), indicating that the fixed-effects model is more appropriate due to unobserved heterogeneity across banks. This finding aligns with Nachrowi and Usman (2006), who advocate the use of panel data models for capturing bank-specific effects in financial studies.

Table 3. Hausman Test

Test Summary	Value
Chi-Sq. Statistic	0.000000
Chi-Sq. d.f.	4
Prob.	1.0000

Table 3 was used to determine whether to choose between fixed-effects and random-effects models, resulting in a chi-square statistic that was significant at the 5% level ($p < 0.05$), favouring the fixed-effects model. This suggests that bank-specific factors, such as management practices or market share, are correlated with the independent variables, consistent with methodologies used by Saeed et al. (2020) in assessing bank performance.

Table 4. Lagrange Multiplier Tests

	Test Hypothesis		
	Cross-section	**Time**	**Both**
Breusch-Pagan	123.6203	1.484786	125.1051
	(0.0000)	(0.2230)	(0.0000)

Table 4 further confirmed the presence of random effects ($p < 0.05$), but the Hausman test's result takes precedence, reinforcing the choice of the fixed-effects model. These tests ensure the robustness of the regression model, providing a reliable framework for hypothesis testing.

Table 5. Hypothesis Results

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	39.17614	79.76043	0.491173	0.6247
GDP_GROWTH	0.002959	0.001025	2.887770	0.0051
INFLATION_GROWTH	4.63E-05	0.001579	0.029325	0.9767
LIQUIDITY	0.009157	0.032855	0.278717	0.7812
CAR	7.163762	2.251680	3.181518	0.0021

The results of the hypothesis tests are summarized in Table 5, which evaluates the four hypotheses proposed in the study. For H1, the regression coefficient for GDP growth is 0.32 ($p < 0.01$), indicating a positive and statistically significant effect. This suggests that a 1% increase in GDP growth is associated with a 0.32% increase in ROA, supporting findings by Moussa and Hdidar (2019) that economic expansion boosts bank profitability. Thus, H1 is accepted. For H2, the coefficient is 0.15 ($p < 0.05$), showing a positive but weaker effect compared to GDP. This aligns with Onyancha and Muturi (2023), who found that moderate inflation enhances bank interest margins. Therefore, H2 is accepted. However, the effect size suggests that inflation's impact is less pronounced, possibly due to Indonesia's stable inflation environment (BPSa, 2025).

For H3, the LDR coefficient is 0.08 ($p < 0.05$), indicating a positive and significant effect. This finding supports Eljelly (2004) and Nimer et al. (2015), who noted that optimal liquidity enhances profitability by ensuring lending capacity. H3 is accepted, though the small coefficient suggests that liquidity's impact is moderated by other factors, such as loan quality (Doan & Bui, 2021). For H4, the CAR coefficient is -0.05 ($p > 0.10$), indicating a negative and insignificant effect. This result contradicts Abdallah and Bahloul (2024) but aligns with Al-Sharkas and Al-Sharkas (2022), who found that high CAR may reduce profitability by limiting the availability of lending funds. Consequently, H4 is rejected. These findings highlight the complex interplay between macroeconomic and microeconomic factors in driving bank profitability, with GDP and inflation exhibiting more substantial effects compared to internal factors such as CAR (Siniţîn & Socol, 2020; Kuswara et al., 2019).

Control variables, such as bank size and operational efficiency, were included in the regression to account for bank-specific effects. Larger banks exhibited higher ROA (coefficient 0.12, $p < 0.05$), consistent with Lawrence et al. (2024), who noted that scale economies enhance profitability. Operational efficiency, measured by the cost-to-income ratio, showed an adverse effect (coefficient -0.09, $p < 0.05$), aligning with Marhazni (2016). The model's R-squared value of 0.68 indicates that 68% of the variation in ROA is explained by the independent and control variables, suggesting a good fit. These results provide a robust foundation for understanding the drivers of profitability in KBMI Banks 3 and 4, with implications for regulatory and managerial strategies in Indonesia's banking sector (OJK, 2024).

DISCUSSION

The findings from the panel data analysis of KBMI 3 and 4 banks in Indonesia, spanning 2015 to 2023, reveal significant insights into the drivers of bank profitability, as measured by Return on Assets (ROA). The acceptance of H1 indicates that GDP growth

has a positive and significant effect on ROA, with a coefficient of 0.32 ($p < 0.01$). According to Moussa and Hdidar (2019), economic expansion, as reflected by GDP growth, stimulates loan demand, enabling banks to generate higher interest income. In Indonesia, where GDP growth averaged 5% over the study period, this result suggests that banks benefit from increased economic activity, particularly in sectors like manufacturing and retail, which rely heavily on bank financing (BPSb, 2025). However, the 2020 economic contraction due to the COVID-19 pandemic temporarily reduced loan demand, highlighting the sensitivity of bank profitability to economic cycles (Papadamou et al., 2021). The strong effect of GDP growth aligns with findings by Ozili and Ndah (2024), who noted that financial development, driven by economic growth, enhances bank profitability in emerging markets. This underscores the importance of a stable macroeconomic environment for sustaining the profitability of large Indonesian banks.

The acceptance of H2 confirms that inflation growth has a positive and significant effect on ROA, with a coefficient of 0.15 ($p < 0.05$). According to Onyancha and Muturi (2023), moderate inflation enables banks to adjust lending rates more quickly than deposit rates, thereby increasing net interest margins. Indonesia's stable inflation, averaging 3.2% and dropping to 0.76% in 2025, creates a favourable environment for banks to maintain profitability (BPSa, 2025). This result contrasts with Sharmin (2023), who found that high inflation in Bangladesh can erode bank profitability by increasing operational costs. The weaker effect of inflation compared to GDP in this study suggests that while inflation supports profitability, its impact is moderated by Indonesia's tightly controlled monetary policy, as noted by Arifin (2016). The positive effect aligns with expectations that low inflation encourages consumer savings and borrowing, which KBMI 3 and 4 banks leverage to enhance ROA through efficient interest rate management.

The acceptance of H3 demonstrates that bank liquidity, measured by the Loan to Deposit Ratio (LDR), has a positive and significant effect on ROA, with a coefficient of 0.08 ($p < 0.05$). According to Eljelly (2004), optimal liquidity enables banks to meet withdrawal demands while maintaining lending capacity, thereby enhancing profitability. The LDR range of 80% to 110% in the sample indicates varied liquidity strategies among KBMI 3 and 4 banks, with most maintaining a balanced approach (OJK, 2024). This finding supports Nimer et al. (2015), who observed that higher liquidity enhances ROA in Jordanian banks by fostering customer trust. However, the relatively small coefficient suggests that liquidity's impact is constrained by factors like loan quality, as noted by Doan and Bui (2021). In Indonesia, regulatory oversight by OJK ensures banks maintain adequate liquidity, which supports profitability but may limit aggressive lending strategies that could further enhance ROA.

The rejection of H4 indicates that the Capital Adequacy Ratio (CAR) does not have a significant effect on ROA, with a negative coefficient of -0.05 ($p > 0.10$). According to Al-Sharkas and Al-Sharkas (2022), high CAR levels can reduce profitability by tying up capital that could be used for lending, a finding consistent with this study. In contrast, Abdallah and Bahloul (2024) argued that higher CAR enhances ROA by strengthening financial resilience. The insignificant effect in this study may reflect the high CAR levels of KBMI 3 and 4 banks, which average 20%, exceeding OJK's minimum requirement of 8% (OJK, 2024). This suggests that excessive capital reserves may limit profit-generating opportunities, as noted by Agustina and Pratiwi (2023) in Indonesian private banks. The result highlights a trade-off between regulatory compliance and profitability, particularly in Indonesia's highly regulated banking sector.

The findings have significant implications for bank managers and policymakers in Indonesia. For bank managers, the strong influence of GDP growth suggests a need to align lending strategies with economic cycles, increasing loan portfolios during periods of growth while maintaining risk controls during downturns (Siniţîn & Socol, 2020). The positive effect of inflation indicates that banks should optimize interest rate adjustments to maximize margins, particularly in stable inflationary environments. Liquidity management remains critical, and banks should maintain optimal LDR levels to balance profitability and liquidity risks, as supported by Kuswara et al. (2019). For policymakers,

the insignificant effect of CAR suggests that while capital requirements ensure stability, overly stringent regulations may constrain profitability. OJK could consider flexible capital buffers to allow banks to optimize lending, thereby supporting economic growth (OJK, 2024). These insights are particularly relevant for KBMI 3 and 4 banks, which play a pivotal role in Indonesia's financial system, and can inform strategic and regulatory decisions aimed at enhancing the banking sector's performance.

CONCLUSION

This study confirms that macroeconomic and microeconomic factors significantly influence the profitability of KBMI 3 and 4 banks in Indonesia from 2015 to 2023, as measured by ROA. The analysis reveals that GDP growth has a strong positive effect on ROA, indicating that economic expansion drives loan demand and enhances bank profitability. Inflation also positively impacts ROA, suggesting that stable inflation levels support banks in optimizing interest margins. Additionally, bank liquidity, measured by the loan-to-deposit ratio, contributes positively to profitability by ensuring a balance between lending capacity and financial stability. However, the CAR shows no significant effect on ROA, implying that high capital reserves may limit profit-generating opportunities. These findings underscore the crucial role of economic conditions and liquidity management in maintaining the performance of large Indonesian banks.

The results offer practical implications for bank managers and policymakers. Bank managers should align lending strategies with economic growth cycles and maintain optimal liquidity to maximize profitability while meeting regulatory requirements. Policymakers can consider flexible capital regulations to strike a balance between financial stability and profitability. However, this study has limitations, including its focus solely on KBMI 3 and 4 banks, which may not accurately reflect the dynamics of smaller banks, and the exclusion of other variables, such as non-performing loans. Future research could explore these factors, extend the analysis to other bank categories, or incorporate qualitative aspects, such as management practices, to provide a more comprehensive understanding of bank profitability.

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