THE INFLUENCE OF INTERNAL BANK VARIABLES ON PROFITABILITY WITH THE BI RATE AS A MODERATING VARIABLE

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Abstract

This study examines the effect of internal variables on the profitability of conventional banks in Indonesia, with the Bank Indonesia (BI) Rate as a moderating variable. Profitability is measured using Return on Assets (ROA), while internal factors include credit risk (Non-Performing Loans/NPL), operational inefficiency (BOPO), credit distribution (Loan to Deposit Ratio/LDR and Loan to Asset Ratio/LAR), and bank size (SIZE). The BI Rate is investigated as a potential moderator in the relationship between NPL and ROA. The research employs a quantitative explanatory approach using secondary panel data from seven conventional banks categorized as KBMI 3, listed on the Indonesia Stock Exchange for the period 2019–2023. Data were collected from official sources, including the Financial Services Authority (OJK), Bank Indonesia, and the Indonesian Central Bureau of Statistics (BPS). Multiple regression analysis, both with and without moderation, was conducted to assess the direct effects of internal variables on profitability and the moderating role of BI Rate. The results indicate that credit risk and operational inefficiency negatively affect bank profitability, whereas optimal credit distribution positively impacts ROA. Bank size shows a negative effect on profitability, suggesting that asset expansion without effective cost control and risk management can reduce performance. The BI Rate, however, does not significantly moderate the relationship between NPL and ROA, implying that internal factors, particularly credit risk management and operational efficiency, play a more dominant role in determining profitability for large-scale banks. Overall, this study highlights the importance of robust internal management practices over external monetary policy in maintaining sustainable profitability. The findings provide insights for bank management, investors, and regulators in enhancing financial performance while mitigating credit and operational risks.
Keywords*: Internal Variables; NPL; Profitability; BI Rate; Moderating Variables*

Abstrak

Penelitian ini bertujuan untuk menganalisis pengaruh variabel internal terhadap profitabilitas bank konvensional di Indonesia dengan suku bunga acuan Bank Indonesia (BI Rate) sebagai variabel moderasi. Profitabilitas diukur menggunakan Return on Assets (ROA), sedangkan variabel internal meliputi risiko kredit (Non-Performing Loans/NPL), inefisiensi operasional (BOPO), penyaluran kredit (Loan to Deposit Ratio/LDR dan Loan to Asset Ratio/LAR), serta ukuran bank (SIZE). BI Rate diuji sebagai faktor moderasi dalam hubungan antara NPL dan ROA. Penelitian ini menggunakan pendekatan kuantitatif eksplanatori dengan data panel sekunder dari tujuh bank konvensional KBMI 3 yang terdaftar di Bursa Efek Indonesia selama periode 2019–2023. Data diperoleh dari Otoritas Jasa Keuangan (OJK), Bank Indonesia, dan Badan Pusat Statistik (BPS). Analisis dilakukan menggunakan regresi berganda, baik tanpa moderasi maupun dengan moderasi, untuk mengevaluasi pengaruh langsung variabel internal terhadap profitabilitas serta peran moderasi BI Rate. Hasil penelitian menunjukkan bahwa risiko kredit dan inefisiensi operasional berpengaruh negatif terhadap profitabilitas bank, sementara penyaluran kredit yang optimal memiliki pengaruh positif terhadap ROA. Ukuran bank menunjukkan pengaruh negatif terhadap profitabilitas, menandakan bahwa perlu pengendalian biaya dan manajemen risiko yang efektif saat melakukan ekspansi aset. BI Rate tidak signifikan memoderasi hubungan antara NPL dan ROA, yang menunjukkan bahwa faktor internal, terutama pengelolaan risiko kredit dan efisiensi operasional, lebih dominan dalam menentukan

profitabilitas bank skala besar. Secara keseluruhan, penelitian ini menegaskan pentingnya praktik manajemen internal yang baik dibandingkan faktor kebijakan moneter dalam menjaga profitabilitas berkelanjutan. Temuan ini memberikan implikasi bagi manajemen bank, investor, dan regulator untuk meningkatkan kinerja keuangan sambil memitigasi risiko kredit dan operasional.
Kata kunci : *Variabel Internal; NPL; Keuntungan; Suku Bunga BI; Variabel Moderator*

INTRODUCTION

Banking refers to everything related to banks, including institutions, business activities, and the methods and processes used to carry out business activities in accordance with Law No. 4 of 2023. Banking is a crucial financial institution that functions to collect and distribute funds from and to the public. Therefore, the banking sector plays a very vital role in driving a country's economic growth, because its activities affect the stability and movement of the entire national financial system.

Profitability is one of the main indicators in assessing a bank's performance. As a financial intermediary institution, the main objective of a bank is to generate profits to ensure operational continuity and provide added value to stakeholders. A bank's ability to generate optimal profitability not only reflects its operational efficiency, but also the effectiveness of its risk management and competitiveness in the industry. The level of a bank's profitability is influenced by various factors, both internal and external.

One of the most commonly used financial ratios to measure profitability is Return on Assets (ROA). ROA is a key indicator because it directly illustrates how efficiently a bank manages its total assets to generate profits (Mafaza et al., 2025). The higher the ROA value, the better the bank's performance. The importance of ROA in banking is inseparable from the nature of the banking business, which relies on its assets, in the form of credit, investments, and securities, to generate income. Therefore, ROA is a metric that is closely watched by management, investors, and regulators to assess the effectiveness of business strategies and operational efficiency.

Factors affecting ROA can be categorized into two types: internal and external factors. Internal factors include various aspects that can be controlled by bank management, such as credit risk measured by Non-Performing Loans (NPL), operational efficiency (BOPO), credit distribution strategy (Loan to Deposit Ratio), and bank size (Manurung et al., 2020; Hartanto & Syarif, 2022). On the other hand, external factors are conditions beyond the bank's control that also have an influence, one of which is the benchmark interest rate set by Bank Indonesia (BI Rate), which can have an impact on funding costs and lending rates (Rochmah & Purnamasari, 2023).

Credit risk, as reflected in the Non-Performing Loan (NPL) ratio, is one of the most crucial internal factors. An increase in NPL indicates a potential decline in asset quality that could erode bank income. Various studies have consistently found that credit risk has a negative and significant impact on bank profitability (Adiatmayani & Panji, 2021). Based on data from the Financial Services Authority (OJK) and Bank Indonesia, although the Indonesian banking sector is relatively stable, the NPL rate has fluctuated. The gross NPL ratio for banks in February 2021 was recorded at 3.21%, higher than the 2.52% recorded in December 2019. This increase indicates challenges in maintaining asset quality. During the same period, Bank Indonesia implemented a loose monetary policy by lowering the benchmark interest rate from 5.75% (July 2019) to 3.5% (February 2021) to support economic recovery.

In addition to credit risk, operational efficiency as measured by the ratio of Operating Expenses to Operating Income (BOPO) is also a key determinant of profitability. This ratio provides an overview of how effectively banks manage their costs. In line with various findings, research shows that if the BOPO ratio increases, which means that bank efficiency declines, then the ROA obtained will tend to decrease significantly (Adiatmayani & Panji, 2021; Mulyati & Widhiastuti, 2024).

In the context of credit distribution, the Loan to Deposit Ratio (LDR) and Loan to Asset Ratio (LAR) are two important ratios. LDR measures bank liquidity, while LAR describes the proportion of assets allocated for loans. Optimal management of these two ratios is key, because effective credit distribution, as reflected in the loan-to-deposit and loan-to-asset ratios, has been found to have a significant impact on financial performance or ROA (Mafaza et al., 2025). However, an excessively high LAR can also increase liquidity risk.

A significant external factor in this study is the BI Rate. As a benchmark interest rate, the BI Rate not only affects bank funding costs and profit margins, but also has the potential to moderate the impact of other factors. In the context of this study, the BI Rate is suspected to play a role in strengthening or weakening the relationship between credit risk (NPL) and profitability (ROA). This is in line with other studies that also place interest rate policy as a moderating variable to analyze its impact on banking profitability (Nurfadillah et al., 2023; Mulyati & Widhiastuti, 2024). When the BI Rate is low, the interest burden from non-performing loans can be reduced, thereby mitigating the potential negative impact of NPL on ROA.

Therefore, this study focuses on examining the role of the BI Rate as a moderating variable in the relationship between credit risk and bank profitability. This study will analyze whether monetary policy as reflected by the BI Rate can mitigate the negative impact of credit risk on the profitability of conventional banks in Indonesia. The research subjects are conventional banks in categories BUKU 3 and 4 in Indonesia that are listed on the Indonesia Stock Exchange (IDX) during the period 2018 to 2023.

METHOD

The steps taken in this study are as follows :

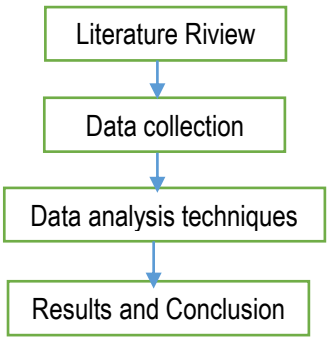

Figure 1. research methodology

This study adopts a quantitative research approach using an explanatory design to investigate the relationship between key financial ratios and profitability in conventional banks in Indonesia. Specifically, the study explores how Non-Performing Loans (NPL), Biaya Operasional terhadap Pendapatan Operasional (BOPO), Loan to Deposit Ratio (LDR), Loan to Asset Ratio (LAR), and Aset impact Return on Assets (ROA), with BI Rate serving as a moderating variable.

The key variables in this study are based on the theoretical framework described in Section 2. Non-Performing Loan (NPL), Biaya Operasional terhadap Pendapatan Operasional (BOPO), Loan to Deposit Ratio (LDR), Loan to Asset Ratio (LAR), and Aset are operationalized using standard financial ratios, which are directly tied to the hypotheses tested in this study. Profitability (ROA), the dependent variable, is measured using the ratio of net profit to total assets, as defined in Section 2. The BI Rate serves as the moderating variable, hypothesized to influence the relationship between NPL and profitability.

The subject of this study focuses on seven conventional KBMI 3 banks in Indonesia with a minimum core capital of 14 to 70 trillion rupiah listed on the Indonesia Stock Exchange from 2019 to 2023 with quarterly reports. This study focuses on conventional banks because their financial structure, operations, and monetary policies differ from those of Islamic banks. This study also focuses on independent variables such as NPL, BOPO, LDR, LAR, SIZE, and BI Rate as moderating variables that are suspected to affect the profitability of conventional banks.

The data analysis technique in this study aims to understand the relationship between the variables studied, namely NPL, BOPO, LDR, LAR, Size, and profitability, as well as to evaluate whether the BI Rate moderates the relationship between NPL and profitability in conventional KBMI 3 banks in Indonesia with a minimum core capital of 14 to 70 trillion, comprising 7 banks in Indonesia listed on the Indonesia Stock Exchange.

The data analysis process began with descriptive analysis to provide an overview of the data, followed by inferential analysis and multiple regression analysis. Multiple regression analysis was conducted using both a model without moderation and a model with moderation to provide comprehensive results regarding the direct and moderating effects of the BI Rate.

RESULT AND DISCUSSION

To analyse the direct effect of independent variables on dependent variables, a multiple regression model without moderation was used. This model evaluates the direct effect of NPL, BOPO, LDR, LAR, and Size on profitability. The multiple regression model without moderation is formulated as follows:

$$ROA_{it} = \alpha + \beta_1 NPL_{it} + \beta_2 BOPO_{it} + \beta_3 LDR_{it} + \beta_4 LAR_{it} + \beta_5 Size_{it} + \epsilon_{it}$$

Where:

ROA = Return on Assets,
α = Constant or Intercept,
NPL = Non-Performing Loans,
BOPO = Operating Expenses to Operating Income Ratio,
LDR = Loan to Deposit Ratio,
LAR = Loan to Asset Ratio,
Size = Size,
β1, β2, β3, β4, β5 = regression coefficients for each independent variable,
ϵ= error term.

This model aims to determine whether each variable, such as NPL, BOPO, LDR, LAR and Size, significantly affects profitability as measured by ROA. The results of this model will show how much each variable contributes to profitability without taking into account the effect of the BI Rate as a moderating variable.

In this study, the BI Rate is positioned only as a moderating variable that influences the relationship between NPL and profitability, without any direct effect. Therefore, the multiple regression model with moderation is written as follows:

$$ROA_{it} = \alpha + \beta_1 NPL_{it} + \beta_2 BOPO_{it} + \beta_3 LDR_{it} + \beta_4 LAR_{it} + \beta_5 SIZE_{it} + \beta_6 (NPL_{it} \times BRate_t) + \varepsilon_{it}$$

Variable descriptions:

a. Profitability (Y) = dependent variable reflecting the bank's profit level.
b. α (Alpha) = constant or intercept.
c. NPL = Non-Performing Loans, ratio of non-performing loans.

d. BOPO = Operating Expenses to Operating Income, measures the bank's operational efficiency.
e. LDR = Loan to Deposit Ratio, measures the bank's ability to channel credit from third-party funds.
f. LAR = Loan to Asset Ratio, measures the proportion of credit to total assets.
g. SIZE = bank size proxied by total assets.
h. NPL × BI Rate = interaction variable that shows the moderating effect of the BI Rate on the relationship between NPL and profitability.
i. $\beta_1 - \beta_6$ = regression coefficients for each variable.
j. ε (Epsilon) = error term or error component.

With this model, researchers can determine whether the BI Rate moderates the relationship between NPL and profitability. The coefficient of the NPL × BI Rate interaction variable will show the extent of the BI Rate's moderating effect. If the coefficient is statistically significant, then the BI Rate acts as a moderator that strengthens or weakens the effect of credit risk on bank profitability.

Hypothesis testing was conducted to test the validity of the hypotheses formulated in the previous subsection. The testing was performed using a t-test by comparing the calculated t and the table t at a significance level of $\alpha = 0.05$. The hypothesis was considered significant if the calculated t met the test criteria and the p-value was < 0.05. The testing decision was determined as follows:

a. One-tailed left-sided t-test (negative direction): H_0 is rejected if t calculated < −t table and p < 0.05.
b. One-tailed t-test (positive direction): H_0 is rejected if t calculated > t table and p < 0.05.
c. Two-tailed t-test (uncertain direction): H_0 is rejected if |t calculated| > t table and p < 0.05.

Multiple linear regression analysis to determine the effect of independent variables consisting of NPL, BOPO, LDR, LAR, and SIZE on bank profitability as measured by ROA. The analysis was conducted in two models, namely a model without moderation and a model with moderation using the interaction of NPL × BI Rate. The purpose of this analysis is to understand the relationship patterns between variables, including how credit risk, operational efficiency, liquidity, and bank size affect profitability, as well as how the BI Rate can modify the effect of credit risk on ROA. The results of this analysis are presented in the form of a regression coefficient table along with an interpretation of the direction and magnitude of the effect of each variable.

Table 1. Linear Regression Test Results.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
without moderation	(Constant)	8.921	2.670		3.341	0.001
	NPL	-0.368	0.053	-0.443	-6.944	0.000
	BOPO	-0.033	0.005	-0.832	-7.354	0.000
	LDR	0.047	0.004	1.367	11.675	0.000
	LAR	-4.254	0.570	-0.519	-7.461	0.000
	SIZE	-0.308	0.141	-0.125	-2.182	0.031
	(Constant)	8.827	2.671		3.305	0.001
	NPL	-0.503	0.142	-0.606	-3.555	0.001

with moderation	BOPO	-0.032	0.005	-0.799	-6.816	0.000
	LDR	0.046	0.004	1.332	10.913	0.000
	LAR	-4.311	0.573	-0.526	-7.528	0.000
	SIZE	-0.301	0.141	-0.123	-2.133	0.035
	NPLxBI_Rate	0.030	0.029	0.173	1.033	0.303
a. Dependent Variable: ROA						

The results of multiple linear regression analysis for both models are presented in Table 1. The first model analyzes the effect of independent variables on profitability without including moderating variables, while the second model adds the interaction variable NPL × BI Rate to test the moderating effect of interest rates on the relationship between credit risk and ROA.

Based on the results of the analysis and discussion, this study provides important implications, both in terms of theory and practice in the banking sector. These implications are relevant to the development of financial and banking management science, and provide guidance for bank management, investors, and regulators in decision making.

The results of this study provide several important theoretical implications. First, the findings reinforce the Intermediation Theory, which states that bank profitability is greatly influenced by the bank's ability to channel funds productively and manage interest rate differentials. This is reflected in the significant positive effect of LDR on ROA, which shows that optimizing the channeling of third-party funds can increase interest income and bank profitability.

Second, this study also confirms the Efficiency Structure Hypothesis, in which operational efficiency is a key factor in determining profitability. A low BOPO ratio is associated with a higher ROA, confirming that banks that are more operationally efficient are able to generate profits more optimally.

Third, this study adds a new nuance to Portfolio Theory and Risk Management. Although NPLs are usually considered to reduce profitability, in KBMI 3 banks, the negative effect of NPLs on ROA can be minimized. This shows that large-scale banks with mature risk management systems can manage non-performing loans through reserves and portfolio diversification, so that the relationship between NPLs and profitability is not linear.

Fourth, the findings show that asset quality is more important than the quantity of credit disbursements. The insignificant effect of LAR on ROA confirms that an increase in the proportion of credit to total assets does not automatically increase profits, so that credit quality and asset profit margins play a more decisive role than the amount of credit disbursed.

Fifth, this study reveals the complexity of monetary policy transmission in large banks. The insignificant role of the BI Rate as a moderating variable indicates that large banks have funding and risk management strategies that enable them to absorb interest rate fluctuations without affecting their profitability.

For bank management, the results of the study emphasize the importance of credit risk management through credit quality monitoring, strict credit analysis, and adequate provisions to reduce NPLs so that profitability can be maintained. Operational efficiency must also be a priority; controlling BOPO through cost management, business process digitization, and productivity improvements will support ROA growth. In addition, optimizing credit distribution (LDR) needs to be balanced with risk and liquidity management so that profitability growth does not compromise asset quality. For large-scale banks (KBMI 3), asset management strategies must take into account internal complexity and bureaucracy, maintain flexibility, and develop digital-based early warning systems, such as big data analytics and more precise credit scoring, to anticipate potential spikes in non-performing loans.

For investors, the research results provide guidance that bank performance assessments should not be based solely on asset size or credit growth. Investors are advised to assess risk management quality, operational efficiency, and credit management strategies as more accurate

and sustainable indicators of profitability. Portfolio diversification is also important to minimize risk. For institutional investors, such as investment managers and pension funds, indicators such as NPL, BOPO, and credit distribution balance need to be included in the assessment model so that investment decisions are more based on long-term fundamentals rather than just short-term profit trends.

For regulators, such as the OJK and Bank Indonesia, the findings of the study show the importance of strengthening supervision of credit quality, operational efficiency, and the effectiveness of macroprudential policies. The results of the study also indicate that the BI Rate does not significantly moderate the effect of NPLs on ROA in large banks. Therefore, regulators need to complement interest rate policies with additional approaches, such as strengthening the banking sector's resilience to credit risk and operational inefficiencies. Programs to improve good corporate governance (GCG), risk management training, and incentives for banks that successfully maintain credit quality and reduce BOPO can be strategic steps. Thus, the competitiveness of KBMI 3 banks can be maintained while supporting the stability of the national financial system.

CONCLUSION AND RECOMMENDATION

Based on the results of analysis and discussion of research on the effects of credit risk, operational inefficiency, credit distribution, and bank size on the profitability of conventional KBMI 3 banks in Indonesia, as well as the moderating role of the BI Rate, several conclusions can be drawn as follows:

1. Credit risk has a negative effect on profitability. The higher the level of non-performing loans, the lower the bank's profitability. This indicates that credit risk management is an important factor in maintaining financial performance.
2. Inefficiency has a negative effect on profitability, confirming that operational efficiency is a crucial factor in determining bank profits. The higher the inefficiency, the lower the bank's ability to generate profits.
3. Credit distribution has a positive effect on profitability, indicating that optimising third-party fund distribution can increase profitability. Conversely, LAR shows a negative effect, emphasising the importance of asset quality over the quantity of credit distributed.
4. Bank size has a negative effect on ROA, indicating that asset expansion without effective cost control and risk management can suppress profitability.
5. The BI Rate does not significantly moderate the relationship between NPL and ROA, indicating that the effect of credit risk on profitability is more dominant internally and is not greatly influenced by fluctuations in the benchmark interest rate.

Overall, this study confirms that internal bank factors, particularly risk management and operational efficiency, are the main determinants of profitability, while external factors such as the BI Rate have a relatively limited moderating role in large banks (KBMI 3).

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