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Research Article

The Effect of NPL, BI Rate, Inflation, NIM, and CAR on the ROA of Commercial Banks in Indonesia During 2019–2023

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Abstract: Profitability, measured by Return on Asset (ROA), is a key indicator for assessing the performance and resilience of the banking sector. During the 2019–2023 period, the Indonesian banking sector faced significant pressure from the COVID-19 pandemic, which impacted asset quality and financial performance. This study aims to analyze the simultaneous and partial effects of Non-Performing Loan (NPL), the BI Rate, inflation, Net Interest Margin (NIM), and Capital Adequacy Ratio (CAR) on the ROA of commercial banks in Indonesia. This research employs a quantitative approach using monthly secondary data from 2019 to 2023. The analysis was conducted using Robust Least Squares (RLS) with M-estimation, a Wald test for simultaneous significance, and a z-statistic for partial tests. The results indicate that, simultaneously, the five independent variables have a significant effect on ROA with a significance value of 0,000 and a coefficient of determination of 67,1 percent. Partially, NPL has a significant negative effect on ROA, while NIM, CAR, and inflation have significant positive effects. The BI Rate shows no significant influence. The implications of these findings highlight the managerial importance of strengthening credit risk management to control NPL, enhancing intermediation efficiency to maintain a healthy NIM, and preserving capital adequacy. From a policy perspective, these results justify the continued strengthening of prudential supervision over banks' internal ratios by financial authorities. Furthermore, the insignificance of the BI Rate suggests that the monetary policy transmission to bank profitability is indirect, necessitating a focus on internal factors to maintain the stability of the banking sector..

Keywords: Banking Sector, NIM, NPL, RLS, ROA

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1. Introduction

The banking sector plays a pivotal role in sustaining economic growth and ensuring financial stability within a country, including Indonesia. As financial intermediaries, banks perform the vital function of channeling public funds into productive activities through credit, thereby fostering a healthy economic cycle. The performance of commercial banks, which dominate Indonesia's financial system, is commonly assessed through profitability indicators, with Return on Assets (ROA) being a primary metric. ROA reflects a bank's effectiveness in generating net income from its total assets, where a higher ratio indicates superior asset management capabilities (Ikhwal, 2016).

From a global regulatory perspective, the importance of maintaining robust bank profitability was underscored by the Basel III framework, developed in response to the 2007–2009 financial crisis. This framework aims to strengthen the regulation, supervision, and risk management of banks worldwide. Strong profitability is considered crucial as it enhances a

bank's capacity to absorb financial shocks and potential losses. A healthy ROA, therefore, better positions a bank to comply with stricter capital requirements, manage its Risk-Weighted Assets (RWA), and ensure operational continuity during periods of economic distress.

At the national level, the emphasis on profitability is reflected in the Indonesian Banking Architecture (API) designed by the Otoritas Jasa Keuangan (OJK). The API's objective to build a resilient and efficient banking system is contingent upon the strength of individual commercial banks. In this context, profitability as measured by ROA is essential, as it enables banks to effectively manage risks, invest in technological advancements, and pursue sustainable operational expansion, all of which align with the overarching goals of the national framework.

During the 2019–2023 period, the Indonesian banking industry faced multiple challenges, including increased credit risk, fluctuations in the benchmark interest rate (BI Rate), rising inflation, and growing uncertainty in asset quality (Bank Indonesia, 2025a, 2025b; Otoritas Jasa Keuangan, 2021). These conditions placed significant pressure on bank operations and financial performance. Profitability became more volatile, reflecting broader macroeconomic instability. Consequently, analyzing the factors that influence ROA is essential for understanding the performance and resilience of the banking sector during the recovery phase.

A wide array of internal and macroeconomic factors have been identified as potential determinants of ROA. Among the internal factors, Non-Performing Loans (NPL), Net Interest Margin (NIM), and Capital Adequacy Ratio (CAR) are widely considered critical indicators of asset quality, income-generating efficiency, and solvency, respectively. From a macroeconomic perspective, the BI Rate represents the stance of monetary policy, while inflation captures the general price level affecting both operational costs and demand for credit. These variables are frequently employed in empirical studies examining bank profitability across emerging and developed economies.

Despite the theoretical consistency, empirical findings on the effects of these variables remain inconclusive. Darmawan (2020), Rizqi & Nasution (2020) and, Yughi & Lestari (2023) found that NPL has a negative impact on ROA, supporting the traditional view that higher credit risk lowers profitability. Conversely, Hediati & Hasanuh (2021), Yeni et al. (2024), and, Zulfikri et al. (2022) reported a positive and significant relationship between NPL and ROA, suggesting that banks may compensate for higher risk through pricing strategies or that well-managed high-risk portfolios can still yield profits. Similarly, studies on BI Rate show divergent results: Darmawan (2020) indicated a negative effect, while Fauziah (2021) indicated a positive not significant and Rachmawati & Marwansyah (2019) found insignificant relationships.

Inconsistencies also appear in the literature regarding inflation, NIM, and CAR. While Nugroho et al. (2023) concluded that inflation reduces ROA in Islamic banks, Purba et al. (2024) found positive significant effects and Saleh (2021) found positive and insignificant effects. Whereas Rachmawati & Marwansyah (2019), and Supardi et al. (2016) found an insignificant effects. For NIM, studies by Yughi & Lestari (2023) and Nufus & Munandar (2021) reported no significant effect on ROA, whereas Siagian et al. (2021) found a negative relationship and Rosandy & Sha (2022) along with Putra & Rahyuda (2021) reported a significant positive impact. Similar inconsistencies exist in the findings related to CAR. Fauziah (2021) and Anton & Cynthia (2024) found that CAR had a negative but insignificant effect on

ROA. Kinanti & Putra (2024) and Rachmawati & Marwansyah (2019) concluded that CAR had no significant effect, while Stefanus et al. (2023) reported a positive but statistically insignificant relationship. In contrast, Hediati & Hasanuh (2021) found a significant positive effect of CAR on ROA in their study.

Another gap in the literature lies in the methodological approach. Many studies rely on ordinary least squares (OLS), which is sensitive to outliers and heteroscedasticity, common issues in bank-level panel data. The use of robust estimation techniques, such as robust least squares (RLS) with M-estimators, remains limited in Indonesian banking research. Employing robust methods could improve the accuracy and reliability of coefficient estimates, especially in the presence of non-normal residuals or extreme observations.

This study aims to address these gaps by investigating the simultaneous effect of NPL, BI Rate, inflation, NIM, and CAR on the ROA of commercial banks in Indonesia during the 2019–2023 period. Monthly data are analyzed using robust least squares estimation with M-estimation to mitigate the influence of outliers and heteroscedasticity. By integrating both internal and macroeconomic variables within a unified framework and applying robust methodology, this study contributes to the empirical understanding of profitability determinants in the post-pandemic Indonesian banking sector.

2. Literature Review and Hypothesis

Several studies have explored the relationship between bank-specific financial ratios and profitability indicators such as ROA. NPL have frequently been examined as a determinant of ROA due to their association with credit risk and asset quality. Darmawan (2020), Rizqi & Nasution (2020) and, Yughi & Lestari (2023) consistently found a negative effect of NPL on ROA among different types of banks in Indonesia. These findings support the classical theory that higher credit risk reduces a bank's ability to generate returns. However, contrasting evidence is presented by Hediati & Hasanuh (2021), Yeni et al. (2024), and Zulfikri et al. (2022), who reported a positive and significant relationship between NPL and ROA.

Interest rate policy, reflected in the BI Rate, is another important external factor affecting ROA. Darmawan (2020) observed a negative impact of BI Rate on bank profitability. In contrast, studies by Fauziah (2021) indicated a positive not significant and Rachmawati and Marwansyah (2019) found that BI Rate had an insignificant effect on ROA. Inflation has also been studied as a macroeconomic determinant of ROA. Nugroho et al. (2023) showed that inflation negatively affected ROA in Islamic banks, implying that rising prices may increase operational costs and reduce net returns. On the other hand, Purba et al. (2024) found positive and significant effects and Saleh (2021) found positive and insignificant effects. Whereas Rachmawati & Marwansyah (2019), and Supardi et al. (2016) found an insignificant effects.

The NIM, which reflects the efficiency of banks in managing their interest income over interest expenses, is often expected to be positively associated with ROA. However, empirical findings remain divergent. While Rosandy & Sha (2022) and Putra & Rahyuda (2021) identified a positive and significant relationship between NIM and ROA, Siagian et al. (2021) found a significant negative impact. Meanwhile, Yughi and Lestari (2023) and Nufus and Munandar (2021) reported no significant relationship.

CAR is designed to measure a bank's capital buffer and risk-bearing capacity. Research by Fauziah (2021) and Anton & Cynthia (2024) found that CAR had a negative but insignificant effect on ROA. Kinanti & Putra (2024) and Rachmawati & Marwansyah (2019) concluded that CAR had no significant effect. In contrast, Hediati and Hasanuh (2021) reported a positive and significant impact of CAR, implying that well-capitalized banks may gain investor confidence and perform better. Stefanus et al. (2023) also found a positive but statistically insignificant relationship. These inconsistent findings emphasize the need for a more rigorous analysis using recent data and advanced estimation methods.

Overall, the literature highlights substantial variation in the effects of both internal and external factors on bank profitability in Indonesia. Variations in sample periods, bank types, and analytical approaches contribute to the inconsistencies observed.

3. Method

This study adopts a quantitative research with an associative approach, to analyze the impact and relationship between variables that affect ROA. This approach was chosen to examine how NPL, BI Rate, Inflation, NIM and CAR influence ROA. The study was conducted within the Indonesian banking sector, with a specific focus on commercial banks.

The object in this study include dependent variable, Return on Assets (ROA) that represent profitability of commercial banks in Indonesia. The independent variables include NPL, BI Rate, Inflation, NIM and CAR with all measurement are count in percentage.

This study utilize monthly data spanning from 2019 to 2023, where the data obtained from official sources including Bank Indonesia and Statistik Perbankan Indonesia (SPI) from OJK. To address the potential presence of outliers and heteroscedasticity common in fincial data, the relationship is estimated using Robust Least Square (RLS) method with M-estimation. Hypothesis testing is conducted using the Wald test to assess the simultaneous significance of all variables and z-statistic to evaluate partial significance of each independent variable.

4. Results and Discussion

Multiple Linear Regression Analysis

According to Wooldridge, (2021, p. 66), multiple regression analysis allows researchers to explicitly control for many other factors that simultaneously affect the dependent variable. This framework enables the measurement of the relationship between multiple independent variables and a single dependent variable, both simultaneously and partially.

Table 1. Multiple Linear Regression Analysis Result

Dependent Variable: ROA
Method: Least Squares
Sample: 1 60
Included observations: 60

Variable	Coefficient	Std. Error	t-statistic	Prob.
C	0,971646	1,285889	0,755622	0,4532
NPL (X_1)	-0,593737	0,194990	-3,044955	0,0036

BI_Rate (X_2)	0,007009	0,053361	0,131359	0,8960
INFLASI (X_3)	0,063730	0,021291	2,993298	0,0042
NIM (X_4)	0,495981	0,179456	2,763798	0,0078
CAR (X_5)	0,019394	0,015126	1,282211	0,2052

R-squared	0,822599	Mean dependent var	2,332667
Adjusted R-squared	0,806173	S.D. dependent var	0,367404
S.E. of regression	0,161753	Akaike info criterion	-0,710855
Sum squared resid	1,412854	Schwarz criterion	-0,501421
Log likelihood	27,32566	Hannan-Quinn criter.	-0,628934
F-statistic	50,07893	Durbin-Watson stat	1,508262
Prob(F-statistic)	0,000000		

Source: secondary data processed, 2025

The following is the regression equation obtained in this study which refers to Table 1.

$$\hat{Y} = 0.971 - 0.593\,X_1 + 0.007X_2 + 0.064X_3 + 0.496X_4 + 0.019X_5$$

Std. Error	= (1.285)	(0.194)	(0.053)	(0.021)	(0.179)	(0.015)
$t_{statistic}$	= (0.755)	(-3.044)	(0.131)	(2.993)	(2.763)	(1.282)
Sig.	= (0.453)	(0.003)	(0.896)	(0.004)	(0.007)	(0.205)

R^2 = 0.822

$F_{statistic}$ = 50.07893

Classical Assumption Test

Classical assumption testing is a fundamental requirement in multiple linear regression analysis. To ensure that the estimated coefficients are BLUE (Best Linear Unbiased Estimators), the regression model must satisfy several classical assumptions, namely normality, autocorrelation, heteroskedasticity, and multicollinearity (Utama, 2016, p. 99; Wooldridge, 2021, p. 95).

Normality Test

A normality test was performed to determine whether the residuals from the regression model are normally distributed. This study employed the Kolmogorov-Smirnov test for this purpose, with the results summarized in the following table.

Table 2. Normality Test Result

		Unstandardized Residual
N		**60**
Normal Parameters[a,b]	**Mean**	**0,0000000**
	Std. Deviation	**1,5474717**

Most Extreme Differences	Absolute		0,147
	Positive		0,147
	Negative		-0,068
Test Statistic			0,147
Asymp. Sig. (2-tailed)[c]			0,002
Monte Carlo Sig (2-tailed)[d]	Sig		0,003
	99% Confidence Interval	Lower Bound	0,002
		Upper Bound	0,005

Source: secondary data processed, 2025

Based on the normality test using One-Sample Kolmogorov-Smirnov shown in Table 2, it show that the value of Asymp. Sig. (2-tailed) is 0.002 with upper bound of 0.005 and lower bound of 0.002. Given that the p-value is less than actual level of significance 5 percent (0.05). It can be concluded that the data are not normally distributed and thus do not fulfil the assumption of normality required for classical linear regression.

Autocorrelation Test

The autocorrelation test is conducted to determine whether there is a correlation between the residuals of one observation and those of another.

Table 3. Autocorrelation Test Result

R-squared	0,822599	Mean dependent var	2,332667
Adjusted R-squared	0,806173	S.D. dependent var	0,367404
S.E. of regression	0,161753	Akaike info criterion	-0,710855
Sum squared resid	1,412854	Schwarz criterion	-0,501421
Log likelihood	27,32566	Hannan-Quinn criter	-0,628934
F-statistic	50,07893	Durbin-Watson stat	1,508262
Prob(F-statistic)	0,000000		

Source: secondary data processed, 2025

As shown in Table 5, the Durbin-Watson statistic is 1.508, which falls within the acceptable range of 1.5 to 2.5. This indicates no significant autocorrelation, suggesting that the regression model safe from autocorrelation.

Heteroscedasticity Test

Heteroscedasticity testing is conducted to assess whether the variance of residuals is constant across all levels of the predicted values. The Glejser test is employed in this study to detect any heteroscedastic patterns.

Table 4. Heterocedasticity Test Result

F-statistic	2,183145	Prob. F(5,54)	0,0695
Obs*R-Squared	10,08913	Prob. Chi-Square(5)	0,0727

Scaled explained SS	12,14930	Prob. Chi-Square(5)		0,0328
Variable	Coefficient	Std. Error	t-statistic	Prob.
C	2,526893	0,817774	3,089964	0,0032
NPL (X_1)	-0,252904	0,124006	-2,039449	0,0463
BI_Rate (X_2)	-0,060523	0,033936	-1,783452	0,0801
INFLASI (X_3)	0,010065	0,013540	0,743369	0,4605
NIM (X_4)	-0,248063	0,114127	-2,173570	0,0341
CAR (X_5)	-0,011036	0,009619	-1,147251	0,2563

Source: secondary data processed, 2025

As shown from Table 4, the Glejser test reveals that the significance values for NPL is 0.0463 and NIM is 0.0341 indicate a partial heteroskedasticity issue. Although the overall model meets the homoskedasticity assumption, as reflected by the Prob. F is 0.0695 and Prob. Chi-Square is 0.0727, the violation occurs at the individual level. It can be concluded that the data do not fulfil the assumption of homoscedasticity.

Multicollinearity Test

Multicollinearity testing is employed to identify potential high intercorrelations among the explanatory variables, which may distort the reliability of coefficient estimates in the regression model.

Table 5. Multicollinearity Test Result

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	1,653510	3791,879	NA
NPL (X_1)	0,038021	708,8549	8,325446
BI_Rate (X_2)	0,002847	149,3159	6,601950
INFLASI (X_3)	0,000453	10,48649	1,724097
NIM (X_4)	0,032205	1659,804	2,382202
CAR (X_5)	0,000229	317,9637	1,203291

Source: secondary data processed, 2025

Based on Table 4, it shows that there are no independent variables that have a tolerance value less than 0.10 and there are also no independent variables that have VIF value more than 10.00. It can be concluded that the data are free from multicollinearity symptoms.

Robust Least Square Estimation

The results of the multiple linear regression indicate violations of classical assumptions, specifically normality and heteroskedasticity. These issues may lead to biased and misleading inferences in both partial and simultaneous hypothesis testing. To address these problems, this study use robust regression model, which is resistant to violations of normality and heteroskedasticity.

Table 6. Robust Least Square (RLS) Estimation

Dependent Variable: ROA

Method: Robust Least Squares
Sample: 1 60
Included observations: 60
Method: M-estimation
M settings: weight=Bisquare, tuning=4,685, scale=MAD (median centered)
Huber Type I Standard Errors & Covariance

Variable	Coefficient	Std. Error	z-statistic	Prob.
C	**-1,010797**	**1,109799**	**-0,910793**	**0,3624**
NPL (X_1)	**-0,418988**	**0,168288**	**-2,489708**	**0,0128**
BI_Rate (X_2)	**0,036638**	**0,046054**	**0,795546**	**0,4263**
INFLASI (X_3)	**0,060830**	**0,018375**	**3,310418**	**0,0009**
NIM (X_4)	**0,724983**	**0,154882**	**4,680885**	**0,0000**
CAR (X_5)	**0,029743**	**0,013054**	**2,278367**	**0,0227**

R-squared	**0,671485**	**Adjusted R-squared**	**0,641067**
Rw-squared	**0,903915**	**Adjust Rw-squared**	**0,903915**
Akaike info criterion	**78,32747**	**Schwarz criterion**	**93,24687**
Deviance	**0,976645**	**Scale**	**0,119248**
Rn-squared statistic	**365,5500**	**Prob(Rn-squared stat.)**	**0,000000**

Source: secondary data processed, 2025

$$\hat{Y} = -1.010 - 0.418\,X_1 + 0.036X_2 + 0.060X_3 + 0.724X_4 + 0.029X_5$$

Std. Error = (1.109) (0.168) (0.046) (0.018) (0.154) (0.013)

$z_{statistic}$ = (-0.910) (-2.489) (0.795) (3.310) (4.680) (2.278)

Sig. = (0.362) (0,012) (0.426) (0.009) (0.000) (0.022)

R^2 = 0.671

Coefficient of Determination Test

The coefficient of determination (R^2) reflects the extent to which the variation in the dependent variable can be explained by the independent variables. In this study, the R^2 value can be found in Table 7.

Table 7. Coefficient Determination Test Result

R-squared	**0,671485**	**Adjusted R-squared**	**0,641067**
Rw-squared	**0,903915**	**Adjust Rw-squared**	**0,903915**
Akaike info criterion	**78,32747**	**Schwarz criterion**	**93,24687**
Deviance	**0,976645**	**Scale**	**0,119248**
Rn-squared statistic	**365,5500**	**Prob(Rn-squared stat.)**	**0,000000**

Source: secondary data processed, 2025

Based on Table 8, the R-squared value of 0.671 indicates that 67.1% of the variation in ROA can be explained by NPL, BI Rate, Inflation, NIM, and CAR. The remaining 32.9% is influenced by other factors not included in the model, such as operational efficiency (BOPO), liquidity ratio (LDR), bank size, funding structure, ownership structure, and other macroeconomic variables (Khamisah et al., 2020; Kinanti & Putra, 2024; Pujiawan & Andhani, 2024; Putra & Rahyuda, 2021; Rosandy & Sha, 2022; Supardi et al., 2016). However, due to scope limitations and data availability, such variables were not included in this research. This might highlight the potential for future research to develop a more comprehensive profitability model for commercial banks.

Simultaneous Effect Test (Wald Test)

Table 8. Simultaneous Effect Test Result

Wald Test
Equation: RLS

Test Statistic	Value	df	Probability
F-statistic	**73,10999**	**(5, 54)**	**0,0000**
Chi-square	**365,5500**	**5**	**0,0000**

Null Hypothesis: C(2) = 0, C(3) = 0, C(4) = 0, C(5) = 0, C(6) = 0
Null Hypothesis Summary:

Normalized Restriction (=0)	Value	Std. Err.
C(2)	**-0,418988**	**0,168288**
C(3)	**0,036638**	**0,046054**
C(4)	**0,060830**	**0,018375**
C(5)	**0,724983**	**0,154882**
C(6)	**0,029743**	**0,013054**

Source: secondary data processed, 2025

As shown in Table 9, the result of the Wald (F-test) indicates a significance value of 0.0000. Since this value is below the 0.05 threshold, it suggests that the independent variables jointly have a statistically significant effect on the dependent variable.

The Simultaneous Influence of NPL, BI Rate, Inflation, NIM and CAR on ROA

The findings indicate that NPL, BI Rate, Inflation, NIM, and CAR jointly have a significant influence on the ROA of commercial banks in Indonesia during the 2019 to 2023 period. This supports the financial intermediation theory, which views bank not only as fund intermediaries, but also as institutions that responsible for risk management and maintaining financial system efficiency and stability (Du, 2021; Gbadebo, 2024; Greenbaum et al., 2019). These results align with prior studies (Darmawan, 2020; Fauziah, 2021; Kinanti & Putra, 2024), affirming that both bank-specific and macroeconomic factors jointly determine profitability.

The Partial Influence of NPL, BI Rate, Inflation, NIM, and CAR on ROA

NPL (X_1) has a significant negative effect on ROA. This support traditional intermediation theory, where ineffective credit screening and monitoring increase default risk and reduce profitability (Kurnia, 2023; Simon, 2008). These result is consistent with (Darmawan, 2020; Joshi, 2024; Rizqi & Nasution, 2020; Yughi & Lestari, 2023).

BI Rate (X_2) show a positive but statistically insignificant effect on ROA. This suggests that monetary policy transmission may be dampened by internal bank strategies such as pricing and liquidity management (Garr, 2021). These result aligns with (Fauziah, 2021; Irawan et al., 2019), who also found an insignificant relationship

Inflation (X_3) has a significant positive effect on ROA. Although the initial hypothesis expected a negative effect, the result suggests that banks can benefit from inflation by adjusting lending rates more quickly than deposit rates, widening the interest margin (Almarzoqi & Naceur, 2015). This finding is supported by (Purba et al., 2024; Sarjono et al., 2021; Tërstena et al., 2023).

NIM (X_4) shows a highly significant and positive effect on ROA. This finding reflects the effectiveness of bank's intermediation functions and these result aligns with (Adrian & Shin, 2009; Almarzoqi & Naceur, 2015; Joshi, 2024; Rosandy & Sha, 2022).

CAR (X_5) also has a significant positive effect on ROA. This supports the modern intermediation view, where higher capital buffers strengthen a bank's ability to absorb risks and maintain operational stabilities (Apere, 2016; Paramita & Yudha, 2025). Similar results were found by (Hediati & Hasanuh, 2021; Joshi, 2024; Stefanus et al., 2023).

Implication

The findings of this study contribute to the theoretical understanding of bank profitability by reaffirming and extending existing financial intermediation and banking risk management theories. The significant negative relationship between NPL and ROA provides empirical support for the risk-return trade-off theory, which posits that higher credit risk tends to erode profitability due to increased provisioning and loss exposure. Meanwhile, the positive and significant effects of NIM and CAR confirm the relevance of the intermediation efficiency and capital buffer theories, emphasizing that effective interest margin management and adequate capitalization are central to sustaining bank performance. The positive impact of inflation suggests that, under certain monetary and institutional frameworks, banks may adapt to macroeconomic pressures and maintain profitability, challenging the conventional view that inflation always undermines bank returns. Lastly, the non-significance of the BI Rate highlights the complexity of monetary transmission mechanisms and the potential role of internal bank factors in mediating the effect of interest rate policy on profitability.

Practically, the findings underscore the need for commercial banks to enhance credit risk management systems, optimize NIM through strategic asset-liability management and product innovation, and maintain strong capital buffers beyond regulatory requirements as a long-term profitability strategy. On the policy side, the results reinforce the importance of rigorous supervision by financial authorities such as Bank Indonesia and the OJK, particularly regarding credit quality and capital adequacy. The non-significant influence of the BI Rate suggests that monetary policy transmission to bank profitability may be indirect or moderated by internal bank conditions, while the positive role of inflation reflects the sector's adaptive resilience. Collectively, these insights support the development of a more robust, sustainable, and responsive banking system.

5. Conclusions

1. The Wald test results indicate that, NPL, BI Rate, inflation, NIM, and CAR are simultaneously significant on ROA for commercial banks in Indonesia during the 2019–2023 period.
2. The partial test results reveal that NPL has a significant negative impact on ROA, whereas inflation, NIM, and CAR each exhibit a significant positive influence. Conversely, the BI Rate did not demonstrate a statistically significant effect on ROA during the research period.

References

[1]. Adrian, T., & Shin, H. S. (2009). *Federal Reserve Bank of New York Staff Reports Financial Intermediaries and Monetary Economics*.

[2]. Almarzoqi, R., & Naceur, S. Ben. (2015). *Determinants of Bank Interest Margins in the Caucasus and Central Asia* (15; IMF Working Papers). https://doi.org/10.5089/9781484342817.001

[3]. Anton, A., & Cynthia, C. (2024). Pengaruh Inflasi, Ukuran Perusahaan (Firm Size), Capital Adequacy Ratio (CAR), Dan Loan To Deposit Ratio (LDR) Terhadap Pertumbuhan Laba Pada Perusahaan Perbankan Yang Terdaftar Di Bursa Efek Indonesia Periode 2017-2022. *Jurnal BANSI - Jurnal Bisnis Manajemen Akutansi*, *4*(1), 37–48. https://doi.org/10.58794/bns.v4i1.1004

[4]. Apere, T. O. (2016). Return on Assets and Capital Adequacy of Banks in Nigeria. *Advances in Social Sciences Research Journal*, *3*(12), 139–149. https://doi.org/10.14738/assrj.312.2117

[5]. Bank Indonesia. (2025a). *BI-Rate*. https://www.bi.go.id/id/statistik/indikator/BI-Rate.aspx

[6]. Bank Indonesia. (2025b). *Inflasi*. https://www.bi.go.id/id/fungsi-utama/moneter/inflasi/Default.aspx

[7]. Darmawan, J. (2020). Pengaruh Non Performing Loan dan BI Rate Terhadap Return on Asset Pada Bank Umum. *Indonesian Journal of Economics and Management*, *1*(1), 174–183. https://doi.org/10.35313/ijem.v1i1.2427

[8]. Du, X. (2021). The Evolution of Financial Intermediary Theory and The Redesign of Undergraduate Finance Course Content System. *Frontiers in Educational Research*, *4*(1), 93–96. https://doi.org/10.25236/fer.2021.040119

[9]. Fauziah, H. (2021). Pengaruh NPL, CAR, dan BI Rate Terhadap ROA pada Bank Badan Usaha Milik Negara. *Indonesian Journal of Economics and Management*, *1*(2), 352–365. https://doi.org/10.35313/ijem.v1i2.2503

[10]. Garr, D. K. (2021). The Impact of Financial Intermediation on Bank Performance. *International Journal of Economics, Business and Management Research*, *5*(05), 96–110. www.ijebmr.com

[11]. Gbadebo, A. D. (2024). Theories of Financial Intermediation: Evaluation and Empirical Relevance. *Journal of Law and Sustainable Development*, *12*(9), 01–16. https://doi.org/10.55908/sdgs.v12i9.3950

[12]. Greenbaum, S. I., Thakor, A. V, & Boot, A. (2019). *Contemporary Financial Intermediation* (4th ed.). Academic Press.

[13]. Hediati, N. D., & Hasanuh, N. (2021). Pengaruh Capital Adequacy Ratio, Non Performing Loan dan Biaya Operasional Pendapatan Operasional Terhadap Return on Asset. *Journal of Economic, Business and Accounting*, *4*(2), 580–590. https://doi.org/10.31539/costing.v4i2.1497

[14]. Ikhwal, N. (2016). Analisis ROA dan ROE Terhadap Profitabilitas Bank di Bursa Efek Indonesia. *Al Masraf: Jurnal Lembaga Keuangan Dan Perbankan*, *1*(2), 211–227. https://doi.org/10.15548/al-masraf.v1i2.57

[15]. Irawan, I., Nasution, M. D., & Rossanty, Y. (2019). Does Profitability moderate the relationship of Interest Rate, Ratio Tangible Assets, Firm Size on Capital Structure. *The 2nd International Conference On Advance And Scientific Innovation (ICASI)*. https://doi.org/10.4108/eai.18-7-2019.2288571

[16]. Joshi, K. K. (2024). Effect of Capital Adequacy Ratio, Non-Performing Loan, Operation Efficiency and Bank Size on Profitability of Nepalese Commercial Banks. *Nepalnese Journal of Finance*, *11*(4), 221–241. https://doi.org/10.3126/njf.v11i4.79778

[17]. Khamisah, N., Ayu Nani, D., & Ashsifa, I. (2020). Pengaruh Non-Performing Loan (NPL), BOPO dan Ukuran Perusahaan Terhadap Return on Assets (ROA) Perusahaan Perbankan yang Terdaftar di Bursa Efek Indonesia (BEI). *TECHNOBIZ: International Journal of Business*, *3*(2), 2722–3566. https://doi.org/10.33365/tb.v3i2.836

[18]. Kinanti, A., & Putra, A. (2024). Pengaruh NPL, LDR, dan CAR terhadap ROA pada Bank Umum Konvensional. *Jurnal Pendidikan Tambusai*, *8*(1), 16482–16493. https://doi.org/10.31004/jptam.v8i1.14742

[19]. Kurnia, I. (2023). *Ringkasan Teori Intermediasi Keuangan*. Omera Pustaka.

[20]. Nufus, H., & Munandar, A. (2021). Analisis Pengaruh CAR Dan NIM Terhadap ROA Pada PT Bank Muamalat Indonesia Tbk. *Jurnal Disrupsi Bisnis*, *4*(6), 497. https://doi.org/10.32493/drb.v4i6.12753

[21]. Nugroho, D., Riyanti, & Hakim, L. (2023). Pengaruh Pembiayaan Bagi Hasil, Inflasi, Current Ratio dan Debt to Asset Ratio Terhadap Return on Asset Pada Bank Umum Syariah yang Terdaftar di Otoritas Jasa Keuangan. *Jurnal Muhammadiyah Manajemen Bisnis*, *4*(1), 33–46. https://doi.org/10.24853/jmmb.4.1.33-46

[22]. Otoritas Jasa Keuangan. (2021). *Buletin Riset Kebijakan Perbankan*.

[23]. Paramita, N. K. W., & Yudha, I. M. E. K. (2025). Dampak Kebijakan Moneter Terhadap Profitabilitas Perbankan Konvensional di Indoensia Sebelum dan Sesudah COVID-19. *E-Jurnal Ekonomi Pembangunan Universitas Udayana*, *13*(10), 686–694. www.bi.go.id

[24]. Pujiawan, & Andhani, D. (2024). Pengaruh Tingkat Inflasi, Suku Bunga Bank Indonesia (BI) dan Nilai Tukar Rupiah terhadap Return on Asset (ROA) Perbankan BUMN Periode 2012-2022. *Jurnal Ilmiah Swara Manajemen*, *4*(4), 750–762. https://doi.org/10.32493/jism.v4i4

[25]. Purba, R., Silaban, P., & Sitorus, S. A. (2024). Pengaruh Inflasi Dan Nilai Tukar Rupiah Terhadap Return on Asset Pada Bank Swasta Nasional Yang Terdapat di Bursa Efek Indonesia Periode 2019-2022. *Jurnal Ekonomi Bisnis, Manajemen Dan Akuntansi (Jebma)*, *4*(2), 960–975. https://doi.org/doi.org/jebma.v4n2.4077

[26]. Putra, D. P. W. P. P., & Rahyuda, H. (2021). Pengaruh NIM, LDR, NPL, BOPO, Terhadap ROA Pada Bank Umum Swasta Nasional Devisa di Indonesia. *E-Jurnal Manajemen Universitas Udayana*, *10*(11), 1181–1200. https://doi.org/10.24843/ejmunud.2021.v10.i11.p07

[27]. Rachmawati, S., & Marwansyah, S. (2019). Pengaruh Inflasi, BI Rate, CAR, NPL, BOPO Terhadap Profitabilitas Pada Bank BUMN. *Jurnal Mantik Penusa*, *3*(1), 117–122. https://www.idx.co.id

[28]. Rizqi, N., & Nasution. (2020). The Effect of Non Performing Loan (NPL) and Loan to Deposit Ratio (LDR) On Return on Assets (ROA). *Jurnal Akuntansi, Manajemen Dan Ekonomi*, *22*(4), 16–25. https://web.archive.org/web/20210219203210/http://jos.unsoed.ac.id/index.php/jame/article/download/3234/2030

[29]. Rosandy, N., & Sha, T. L. (2022). Pengaruh CAR, NIM, LDR, dan BOPO Terhadap ROA Pada Perbankan di BEI. *Jurnal Multiparadigma Akuntansi*, *4*(4), 1566–1576. https://doi.org/10.24912/jpa.v4i4.21373

[30]. Saleh, I. (2021). Pengaruh Kinerja Keuangan dan Inflasi Terhadap Return on Asset Pada Bank Umum Syariah di Indonesia. *JPS (Jurnal Perbankan Syariah)*, *2*(2), 212–225. https://doi.org/10.46367/jps.v2i2.369

[31]. Sarjono, E., Titisari, K. H., & Pawenang, S. (2021). Effects of Infrastructure Development, Inflation and Economic Growth to Performance Company (ROA, Tobin's Q, PBV): Study on Registered Infrastructure Support Companies in IDX Period 2014-2019. *Journal of Economics and Business*, *4*(3). https://doi.org/10.31014/aior.1992.04.03.382

[32]. Siagian, S., Lidwan, N., Ridwan, W., Taruna, H. I., & Roni, F. (2021). Pengaruh BOPO, LDR, dan NIM Perbankan Terhadap ROA di Industri Perbankan Indonesia. *Akrab Juara: Jurnal Ilmu-Ilmu Sosial*, *6*(4), 151–171. https://doi.org/10.58487/akrabjuara.v6i4.1579

[33]. Simon, J. E. (2008). *Handbook of Financial Intermediation and Banking*. Elsevier. https://doi.org/10.1016/B978-0-444-51558-2.X5001-6

[34]. Stefanus, D., Lawita, F. I., & Putri, S. E. (2023). Pengaruh CAR, ROA, dan NPL Terhadap Penyaluran Kredit Modal Kerja Pada Bank Umum. *Prosiding Konferensi Ilmiah Akuntansi (KIA)*, *10*. https://jurnal.ftumj.ac.id/index.php/KIA/article/view/18195

[35]. Supardi, H., Suratno, H., & Suyanto. (2016). Pengaruh Current Ratio, Debt to Asset Ratio, Total Asset Turnover dan Inflasi Terhadap Return on Asset. *JIAFE (Jurnal Ilmiah Akuntansi Fakultas Ekonomi)*, *2*(2), 16–27. https://doi.org/10.34204/jiafe.v2i2.541

[36]. Tërstena, A., Deda, G., Todorova, S., Mehmeti, I., & Krasniqi, S. (2023). The Impact of Inflation on the Profitability of Businesses: Evidence from Kosovo. *Journal of Educational and Social Research*, *13*(4), 248–259. https://doi.org/10.36941/jesr-2023-0106

[37]. Utama, M. S. (2016). *Aplikasi Analisis Kuantitatif*. CV Sastra Utama.

[38]. Wooldridge, J. M. . (2021). *Introductory Econometrics: A Modern Approach* (7th ed.). Cengage.

[39]. Yeni, D. P., Purba, P. Y., Tambunan, C. J. M., Marbun, H. A. U., & Putri, T. O. D. S. (2024). Pengaruh NPL dan LDR Terhadap ROA Pada Perbankan Yang Terdaftar di Bursa Efek Indonesia (BEI) Periode 2020-2022. *(JRAM) Jurnal Riset Akuntansi Multiparadigma*, *11*(1), 66–75. https://doi.org/10.30743/akutansi.v11i1.9740

[40]. Yughi, S. A., & Lestari, S. (2023). Pengaruh Non Performing Loan (NPL) dan Net Interest Margin (NIM) Terhadap Return on Asset (ROA) Pada PT Bank BNI Tbk Tahun 2012-2021. *JPIn: Jurnal Pendidik Indonesia*, *06*(01), 1–15. https://doi.org/10.47165/jpin.v6i1.486

[41]. Zulfikri, A. A., Yulinartati, Y., & Halim, M. (2022). Pengaruh Non Performing LOAN (NPL), LDR, dan BOPO terhadap Return on Asset (ROA) Perbankan di Indonesia. *National Multidisciplinary Sciences*, *1*(3), 355–361. https://doi.org/10.32528/nms.v1i3.92