

The Effect of Capital Adequacy Ratio (Car), Non-Performing Loan (NPL), and Net Interest Margin (NIM) on Return on Assets (ROA) At PT Bank Rakyat Indonesia (Persero) Tbk Period 2016-2025

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Abstract: This study examines the individual and joint associations of the Capital Adequacy Ratio (CAR), Non-Performing Loan (NPL), and Net Interest Margin (NIM) with Return on Assets (ROA) at PT Bank Rakyat Indonesia (Persero) Tbk during 2016–2025. Using a quantitative descriptive approach, the study analyzes secondary data obtained from the bank's annual financial statements over ten annual observations. Multiple linear regression was conducted using SPSS version 27, supported by descriptive statistics and diagnostic tests. The results indicate that CAR ($t = -0.194$, $p = 0.853$), NPL ($t = 0.209$, $p = 0.841$), and NIM ($t = 1.744$, $p = 0.132$) are not individually statistically significant predictors of ROA at the 5% significance level. The joint F-test also indicates that the three variables are not statistically significant as a group ($F = 3.085$, $p = 0.112$). The adjusted coefficient of determination is 0.410, indicating an adjusted explanatory proportion of 41% for the fitted model. The study contributes context-specific evidence on banking profitability during a period encompassing the COVID-19 pandemic and subsequent recovery, while highlighting the need to interpret the findings cautiously given the limited number of annual observations. These results suggest that further research using longer time series, additional explanatory variables, or comparative data from multiple banks may provide a more comprehensive understanding of the determinants of bank profitability.

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Introduction

The banking industry plays a crucial role in the economy because it performs an intermediary function by collecting public funds and redistributing them in the form of credit. This situation makes bank financial performance a crucial aspect to consider, particularly the bank's ability to generate profits through asset management. One indicator used to measure bank profitability is Return on Assets (ROA). According to Kasmir (2022), ROA is the rate of return on an investment, indicating how quickly the assets used to make the investment can generate returns. In this study, ROA is used as the dependent variable to measure the ability of PT Bank Rakyat Indonesia (Persero) Tbk to generate profits based on its total assets. Thus, changes in ROA can provide an overview of the bank's ability to effectively manage its assets to generate profits.

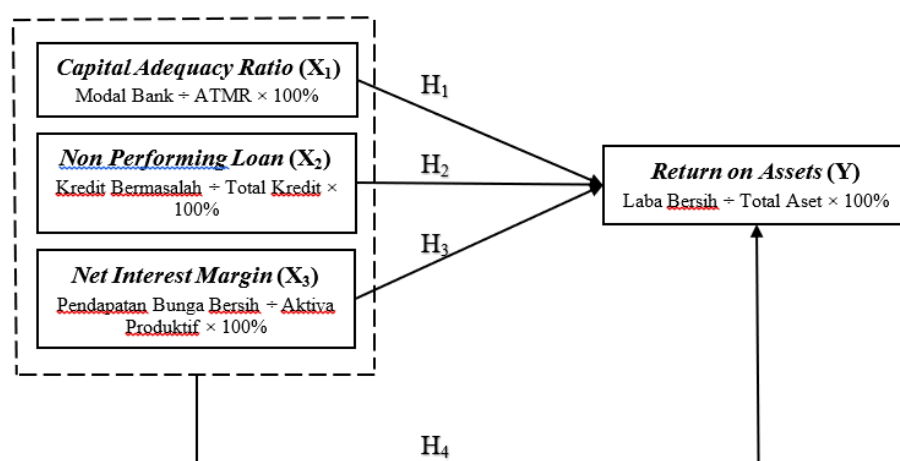
Bank profitability in generating profits is inseparable from internal conditions related to capital, credit quality, and the ability to generate interest income. The three ratios used in this study are the Capital Adequacy Ratio (CAR), Non-Performing Loans (NPL), and Net Interest Margin (NIM). According to Wenno and Laili (2019), CAR is the ratio of a bank's capital to its risk-weighted assets and indicates the extent to which a bank's risky assets are financed by its own capital. Meanwhile, NPL is the percentage of non-performing loans, which include substandard, doubtful, and loss loans, to total loans. According to Kesuma et al. (2025), NIM is the ratio of net interest income to average earning assets. These three ratios have different characteristics in describing a bank's condition: CAR reflects capital adequacy in facing risks, NPL reflects credit quality, while NIM indicates the bank's ability to generate net interest income from managed earning assets.

PT Bank Rakyat Indonesia (Persero) Tbk was chosen as the research object due to its large business scale and strong business characteristics in the micro, small, and medium enterprise segment. BRI was founded on December 16, 1895, in Purwokerto and later developed into a public company listed on the Indonesia Stock Exchange with the stock code BBRI. In 2025, BRI had total assets of Rp2,135.37 trillion and a net profit of Rp57.13 trillion. Despite its large scale of assets and profits, BRI's ROA development during the 2016–2025 period showed fluctuations. BRI's ROA was recorded at 2.61% in 2016, then decreased to 1.81% in 2018 and decreased again to 1.23% in 2020. After experiencing this pressure, ROA increased to 1.83% in 2021, 2.76% in 2022, and reached 3.08% in 2023. Furthermore, ROA decreased slightly to 3.04% in 2024 and 2.68% in 2025. These changes indicate that the increase in BRI's profits and assets is not always followed by a consistent increase in ROA.

These fluctuations in ROA also coincided with changes in CAR, NPL, and NIM during the study period. From 2016–2019, BRI's condition was relatively stable, with CAR above 20%, NPL below 3%, and NIM above 6%. This situation changed in 2020 when the COVID-19 pandemic put pressure on banking activities. In that year, NPL increased along with increasing credit risk, NIM came under pressure, while BRI's ROA fell to its lowest point of 1.23%. Meanwhile, BRI's CAR remained above 20%, indicating a relatively strong capital position in the face of risks. Entering the recovery period, improvements in credit quality, service digitization, and optimization of the funding structure went hand in hand with improvements in financial ratios and ROA. These dynamics indicate that changes in BRI's profitability cannot be seen solely from asset and profit growth but also need to be examined through capital conditions, credit quality, and the bank's ability to generate interest income.

This issue becomes increasingly relevant because previous research on the effect of CAR, NPL, and NIM on ROA has shown inconsistent results. Wenno and Laili (2019) found that CAR had no significant effect on ROA, while NIM had a positive and significant effect. Setyarini (2020) found that CAR and NIM had a significant positive effect, while NPL had no significant effect. Ramadanti and Setyowati (2022) showed that NPL had no significant effect, while NIM had a significant effect on ROA. Different results were shown by Humairoh and Agustina (2022), who found that CAR had a significant positive effect, while NPL had no significant effect. Wicaksono and Debora (2020) found that NPL and NIM had significant effects, while CAR had no significant effect. Rahman and Isyнуwardhana (2019) showed that CAR had no significant effect, while NPL had a negative and significant effect. Meanwhile, Saputri and Hasanuh (2022) found that CAR had no significant effect, while NPL had a significant effect on ROA. The difference in results indicates an inconsistency in empirical findings regarding the influence of CAR, NPL, and NIM on ROA, so further testing is needed

on different research objects and periods. Based on the phenomenon of BRI's ROA fluctuations and the differences in previous research results, this study was conducted to analyze the influence of Capital Adequacy Ratio (CAR), Non-Performing Loan (NPL), and Net Interest Margin (NIM) on Return on Assets (ROA) at PT Bank Rakyat Indonesia (Persero) Tbk for the period 2016–2025. This period covers conditions before the pandemic, the pandemic period, and the recovery period so that it can provide an overview of the relationship between the three financial ratios and BRI's profitability in different economic conditions. This study aims to determine the influence of CAR, NPL, and NIM on ROA both partially and simultaneously. The results of the study are expected to provide academic contributions to the study of factors related to banking profitability and provide information for management and investors in evaluating capital conditions, credit risk, the ability to generate interest income, and BRI's profitability performance.



Picture 1. Research Paradigm

Based on the research paradigm that has been prepared, the hypothesis in this study is that Capital Adequacy Ratio (CAR) affects Return on Assets (ROA) at PT Bank Rakyat Indonesia (Persero) Tbk for the period 2016–2025. Non Performing Loan (NPL) affects Return on Assets (ROA) at PT Bank Rakyat Indonesia (Persero) Tbk for the period 2016–2025. Net Interest Margin (NIM) affects Return on Assets (ROA) at PT Bank Rakyat Indonesia (Persero) Tbk for the period 2016–2025. Furthermore, Capital Adequacy Ratio (CAR), Non Performing Loan (NPL), and Net Interest Margin (NIM) simultaneously affect Return on Assets (ROA) at PT Bank Rakyat Indonesia (Persero) Tbk for the period 2016–2025.

Research Methods

This study uses a quantitative descriptive method to analyze the effect of Capital Adequacy Ratio (CAR), Non-Performing Loan (NPL), and Net Interest Margin (NIM) on Return on Assets (ROA) at PT Bank Rakyat Indonesia (Persero) Tbk for the period 2016–2025. According to Reza and Kusmawati (2025), quantitative descriptive techniques are carried out by collecting, processing, and interpreting the data obtained so that it can provide an overview of the company's condition based on financial report figures. The data used are secondary data in the form of annual financial reports of PT Bank Rakyat Indonesia (Persero) Tbk for the period 2016–2025. The research population consists of all annual financial reports of PT Bank Rakyat Indonesia (Persero) Tbk that have been published since the company was listed on the Indonesia Stock Exchange, while the sample was determined using a purposive sampling technique, namely Notes to Financial Statements, Profit and Loss Statements, and Financial Position Statements for the period 2016–2025.

Data collection was conducted through documentation and literature review. Documentation was used to obtain data from the annual financial report of PT Bank Rakyat Indonesia (Persero) Tbk for the 2016–2025 period, published on the company's official website and the Indonesia Stock Exchange. According to Hasan (2022), documentation is the activity of providing documents based on accurate evidence from various sources. Furthermore, literature review was conducted by reviewing theories

related to financial management, banking, profitability, as well as previous research on CAR, NPL, NIM, and ROA. Magdalena (2021) explained that literature review is necessary to develop both theoretical and practical aspects of the research. The research variables consist of CAR as the first independent variable, NPL as the second independent variable, NIM as the third independent variable, and ROA as the dependent variable.

The data analysis technique was carried out using SPSS version 27 through several stages, namely descriptive statistical analysis, classical assumption test, multiple linear regression analysis, coefficient of determination analysis, and hypothesis testing. Descriptive analysis was used to describe the characteristics of CAR, NPL, NIM, and ROA data through the average, minimum, maximum, and standard deviation values. Next, classical assumption tests were carried out which included normality, multicollinearity, heteroscedasticity, and autocorrelation tests to ensure the feasibility of the regression model. After the model met the requirements, multiple linear regression was carried out to determine the effect of CAR, NPL, and NIM on ROA, then the coefficient of determination was used to determine the ability of the independent variables to explain variations in ROA. Hypothesis testing was carried out through a t-test to determine the effect of each variable partially and an F-test to determine the effect of CAR, NPL, and NIM simultaneously on ROA.

Results and Discussion

Based on the results of data processing using SPSS version 27, this study analyzes the effect of Capital Adequacy Ratio (CAR), Non-Performing Loan (NPL), and Net Interest Margin (NIM) on Return on Assets (ROA) at PT Bank Rakyat Indonesia (Persero) Tbk for the period 2016–2025. The analysis was conducted through descriptive statistics, classical assumption tests including normality, multicollinearity, heteroscedasticity, and autocorrelation, multiple linear regression analysis, coefficient of determination, and hypothesis testing through t-test and F-test.

Table 1. Descriptive Statistical Test Results

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
CAR	10	20.61	25.28	22.9540	1.67032
NPL	10	1.10	3.14	1.8510	.73781
NIM	10	5.91	8.12	7.4570	.73488
ROA	10	1.23	3.08	2.4050	.59620
Valid N (listwise)	10				

Source: Data processed by the author, 2026

Descriptive statistics show the characteristics of CAR, NPL, NIM, and ROA data for the period 2016–2025. ROA fluctuated throughout the study period, with a low of 1.23% in 2020 and an increase to 3.08% in 2023. This indicates a change in BRI's profitability during the observation period.

Normality Test Results

According to Sujarweni (2022), the normality test aims to determine whether the confounding variables or residuals in a regression model are normally distributed. The normality test is necessary to ensure that the regression model meets one of the assumptions in regression analysis. The results of the normality test indicate that the research data meets the assumption of normality, so the data is suitable for use in regression analysis. Furthermore, the multicollinearity test shows a tolerance value of CAR of 0.458, NPL of 0.607, and NIM of 0.323, while the VIF values are 2.182, 1.646, and 3.098, respectively. All tolerance values are > 0.10 and $VIF < 10$, so there are no symptoms of multicollinearity. The heteroscedasticity test using Breusch-Pagan shows a significance value of CAR of 0.089, NPL of 0.881, and NIM of 0.260, all > 0.05 , so there is no heteroscedasticity.

Multicollinearity Test Results

The multicollinearity test is used to determine whether there is a high correlation between independent variables in a regression model. According to Hair et al. (2019), multicollinearity occurs when independent variables have a strong relationship with each other, thus affecting the accuracy of the regression coefficient estimate. The results of the multicollinearity test show that the CAR Tolerance value is 0.458, NPL is 0.607, and NIM is 0.323, while the VIF values are 2.182, 1.646, and 3.098, respectively. All Tolerance values are greater than 0.10 and the VIF value is less than 10, so it can be concluded that there are no symptoms of multicollinearity between the independent variables.

Heteroscedasticity Test Results

According to Kasmir (2022), the heteroscedasticity test is a test to assess the inequality of residual variance from one observation to another. The results of the heteroscedasticity test using the Breusch-Pagan method showed a significance value of 0.089 for CAR, 0.881 for NPL, and 0.260 for NIM. All significance values were greater than 0.05, thus concluding that the regression model did not exhibit heteroscedasticity.

Autocorrelation Test Results

According to Ghazali (2021), the autocorrelation test aims to determine whether there is a correlation between the confounding error in period t and the confounding error in period $t-1$ (previously) in a linear regression model. If a correlation occurs, it is said to be an autocorrelation problem. The results of the autocorrelation test using Durbin-Watson showed a DW value of 2.101 with a dL of 0.5253 and a dU of 2.0163. Because these results did not provide a definite conclusion, further testing was carried out using the Run Test. The Run Test results showed an Asymp. Sig. (2-tailed) value of $1.000 > 0.05$, so it can be concluded that there are no symptoms of autocorrelation in the research model.

Results of Multiple Linear Regression Analysis

According to Rifkhan (2023), the multiple linear regression equation is an equation model that describes the relationship between two or more independent/predictor variables ($X_1, X_2, X_3, \dots, X_n$) with one dependent/response variable (Y) which can be called Multiple Linear Regression (MLR). The results of multiple linear regression analysis show the relationship between the Capital Adequacy Ratio (CAR), Non-Performing Loans (NPL), and Net Interest Margin (NIM) and Return on Assets (ROA). This analysis is used to determine the direction and magnitude of the relationship between each independent variable and ROA before conducting partial and simultaneous hypothesis testing. The regression results are then used as the basis for t-tests and F-tests.

Table 2. Partial Test Results (t-Test)

Coefficients ^a						
		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Model		B	Std. Error	Beta		
1	(Constant)	-1.852	2.122		-.873	.416
	CAR	-.026	.135	-.073	-.194	.853
	NPL	.055	.265	.069	.209	.841
	NIM	.638	.366	.786	1.744	.132

a. Dependent Variable: ROA

Source: Data processed by the author, 2026

The t-test results show that CAR has no significant effect on ROA, with a t-count of -0.194 and a significance of $0.853 > 0.05$. Thus, H1 is rejected. NPL also has no significant effect on ROA, with a t-count of 0.209 and a significance of $0.841 > 0.05$, so H2 is rejected. Meanwhile, NIM has no significant

effect on ROA, with a t-count of 1.744 and a significance of $0.132 > 0.05$, so H3 is rejected.

The insignificant effect of CAR on ROA indicates that BRI's capital adequacy level during the study period was not a significant factor in determining profitability. This finding aligns with Wenno and Laili (2019) and Kurnia et al. (2025). The insignificant NPL also indicates that changes in non-performing loans have not significantly impacted BRI's ROA. These results align with Setyarini (2020) and Ramadanti and Setyowati (2022). Meanwhile, the insignificant NIM indicates that changes in the ability to generate net interest income have not directly affected ROA, consistent with research by Anggraeni and Citarayani (2022) and Kurnia et al. (2025).

Table 2. Simultaneous Test Results (F Test)

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.941	3	.647	3.085	.112 ^b
	Residual	1.258	6	.210		
	Total	3.199	9			

a. Dependent Variable: ROA

b. Predictors: (Constant), NIM, NPL, CAR

Source: Data processed by the author, 2026

The F-test results show a calculated F value of $3.085 < F_{table} 4.76$ with a significance of $0.112 > 0.05$, so H4 is rejected. This means that CAR, NPL, and NIM simultaneously do not have a significant effect on ROA at PT Bank Rakyat Indonesia (Persero) Tbk for the 2016–2025 period.

Table 4. Results of the Determination Coefficient Analysis Test (Adjusted R2)

Model Summary ^b					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.779 ^a	.607	.410	.45791	2.101

a. Predictors: (Constant), NIM, NPL, CAR

b. Dependent Variable: ROA

Source: Data processed by the author, 2026

The coefficient of determination results demonstrate the ability of CAR, NPL, and NIM to explain variations in ROA, while the remaining parts are influenced by factors outside the research model. This indicates that BRI's profitability is not only influenced by these three ratios but can also be related to other factors such as operational efficiency, fee-based income, BOPO, LDR, company size, interest rates, and inflation.

The Influence of Capital Adequacy Ratio (CAR) on Return on Assets (ROA)

With a t-value of -0.194 and a significance level of $0.853 > 0.05$, H1 is rejected. These results indicate that capital adequacy does not necessarily lead to changes in bank profitability, as existing capital must be utilized and optimized effectively to generate profits. This finding aligns with Kurnia et al. (2025) on Bank Mandiri, Wenno and Laili (2019) on conventional commercial banks, and Anggraeni and Citarayani (2022), all of which showed that CAR had no significant effect on ROA.

The Effect of Non-Performing Loans (NPL) on Return on Assets (ROA)

With a t-value of 0.209 and a significance level of $0.841 > 0.05$, H2 is rejected. These results

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indicate that BRI's low non-performing loan proportion has not significantly impacted profitability, suggesting that ROA may be influenced by factors other than NPLs. This finding aligns with Setyarini (2020), Ramadanti and Setyowati (2022), and Dwi Putri and Bella (2025), which show that NPLs have no significant effect on ROA.

The Effect of Net Interest Margin (NIM) on Return on Assets (ROA)

With a t-value of 1.744 and a significance level of $0.132 > 0.05$, H3 is rejected. This condition indicates that an increase in NIM is not always followed by an increase in ROA because net interest income does not necessarily optimally increase net profit, and other factors such as operational efficiency and costs still affect profitability. These results align with Kurnia et al. (2025), Anggraeni & Citarayani (2022) and Yughi & Lestari (2023).

The Influence of CAR, NPL, and NIM on Return on Assets (ROA)

With an F-value of 3.085, an F-table of 4.76, and a significance level of $0.112 > 0.05$, H4 is rejected. This condition indicates that BRI's profitability during the 2016–2025 period is not only influenced by these three ratios, but can also be influenced by digital transformation, increased fee-based income, credit restructuring, operational efficiency, and other factors outside the model such as BOPO, LDR, company size, interest rates, and inflation.

Conclusion and Recommendation

Based on the results of research on the influence of Capital Adequacy Ratio (CAR), Non Performing Loan (NPL), and Net Interest Margin (NIM) on Return on Assets (ROA) at PT Bank Rakyat Indonesia (Persero) Tbk for the period 2016–2025, it can be concluded that partially CAR has no effect and is not significant on ROA, with a calculated t value of $-0.194 < t \text{ table } 2.447$ and a significance of $0.853 > 0.05$. NPL also has no effect and is not significant on ROA, with a calculated t value of $0.209 < t \text{ table } 2.447$ and a significance of $0.841 > 0.05$. Similarly, NIM has no effect and is not significant on ROA, with a calculated t value of $1.744 < t \text{ table } 2.447$ and a significance of $0.132 > 0.05$. Simultaneously, CAR, NPL, and NIM also do not have a significant effect on ROA, which is indicated by the F count value of $3.085 < F \text{ table } 4.76$ with a significance of $0.112 > 0.05$.

Based on the research results, BRI is advised to continue to pay attention to other factors that have the potential to increase profitability, particularly operational efficiency, reducing BOPO (Loan to Equity Ratio), developing digital services, and increasing fee-based income, while maintaining credit quality, especially in the MSME segment. For investors, BRI's performance assessment should not only be based on CAR, NPL, and NIM, but also consider BOPO, LDR, ROE, credit growth, macroeconomic conditions, the development of digital banking services and the impact of extraordinary conditions such as the COVID-19 pandemic. For future researchers, the study can be expanded by adding other banks such as Bank Mandiri, BNI, or BTN, using additional variables such as BOPO, LDR, inflation, the BI Rate, and GDP, extending or separating the research period before and after the pandemic, and using more diverse analysis methods such as panel data regression, moderation, or mediation to provide more in-depth and generalizable research results.

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