



The Effect of CAR, NPL and NIM on PT Bank Negara Indonesia (Persero) Tbk for the Period 2011–2025

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Keywords: *Capital Adequacy Ratio (CAR); Non Performing Loan (NPL); Net Interest Margin (NIM); Return On Asset (ROA)*

Abstract: *This study aims to examine the effects of Capital Adequacy Ratio (CAR), Non-Performing Loans (NPL), and Net Interest Margin (NIM) on Return on Assets (ROA) at PT Bank Negara Indonesia (Persero) Tbk during the 2011–2025 period. This study employs a quantitative approach using secondary data with 15 observations obtained from the company's annual reports and financial statements. Data were analyzed using descriptive statistics, classical assumption tests, multiple linear regression analysis, t-tests, F-tests, and the coefficient of determination. The results indicate that CAR has no significant effect on ROA ($t = -0.523$; $p = 0.612$), NPL has a significant effect on ROA ($t = -4.050$; $p = 0.002$), and NIM has no statistically significant effect on ROA at the 5% significance level ($t = 2.175$; $p = 0.052$). Simultaneously, CAR, NPL, and NIM have a significant effect on ROA ($F = 9.383$; $p = 0.002$). The Adjusted R^2 of 0.642 indicates that approximately 64.2% of the variation in ROA is explained by the variables included in the model, while the remaining variation is explained by other factors not included in the study.*

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Introduction

The banking sector is one of the most important sectors in the Indonesian economy because it plays a role in mobilizing public funds and channeling them back in the form of loans, as well as providing various financial services. The financial health and performance of banks are important factors to consider because they reflect a bank's ability to conduct its operations and generate profits. One indicator that can be used to assess a bank's profitability is Return on Assets (ROA), a ratio that illustrates a company's ability to generate profits by utilizing its assets.

A bank's profitability can be influenced by various financial ratios, including the Capital Adequacy Ratio (CAR), Non Performing Loans (NPL), and Net Interest Margin (NIM). The Capital Adequacy Ratio (CAR) indicates a bank's ability to provide capital to support risk-bearing assets. The

more adequate the capital, the greater the bank's ability to manage risks and support its operations. In this study, Capital Adequacy Ratio (CAR) is used as one of the independent variables hypothesized to be related to Return on Assets (ROA).

Non Performing Loans (NPL) is a ratio that reflects the level of nonperforming loans held by a bank. An increase in nonperforming loans can raise credit risk and potentially reduce a bank's ability to generate profits. Meanwhile, Net Interest Margin (NIM) reflects a bank's ability to generate net interest income through the management of earning assets. Theoretically, the higher the Net Interest Margin (NIM), the greater the interest income earned by the bank, which can support increased profitability.

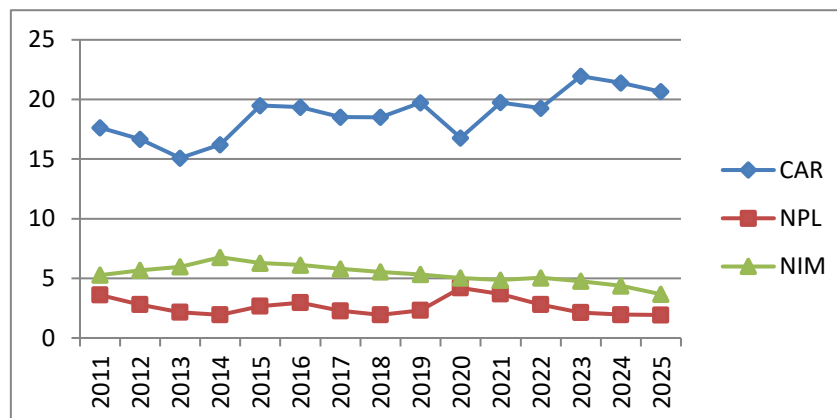


Figure 1. CAR, NPL and NIM Charts

The data for PT Bank Negara Indonesia (Persero) Tbk shows that these three ratios changed over the study period. The Capital Adequacy Ratio (CAR) tended to increase from 17.63% in 2011 to 20.66% in 2025. The Non Performing Loans (NPL) rate rose to 4.20% in 2020 before declining to 1.93% in 2025. Meanwhile, the Net Interest Margin (NIM) reached 6.77% in 2014 and declined to 3.67% in 2025. These changes reflect the dynamics of BNI's capital position, credit risk, and ability to generate interest income.

This study aims to determine the effect of the Capital Adequacy Ratio (CAR) on Return on Assets (ROA), to determine the effect of Non Performing Loans (NPL) on Return on Assets (ROA), to determine the effect of the Net Interest Margin (NIM) on Return on Assets (ROA), and to examine the simultaneous effects of Capital Adequacy Ratio (CAR), Non Performing Loans (NPL), and Net Interest Margin (NIM) on Return on Assets (ROA) at PT Bank Negara Indonesia (Persero) Tbk for the period 2011-2025.

Research Methods

This study employs a quantitative approach using secondary data. The subject of the study is PT Bank Negara Indonesia (Persero) Tbk, with an observation period spanning 2011–2025, resulting in 15 data points. The research data were sourced from the annual reports and financial statements of PT Bank Negara Indonesia (Persero) Tbk, which were published through the Indonesia Stock Exchange and the company's official website. The research sample consists of the company's statements of financial position, income statements, and notes to the financial statements.

The data collection methods used were a literature review and documentation. The literature review involved gathering theories and information from books, articles, journals, and other relevant literature, while the documentation involved recording and analyzing secondary data from the company's annual reports for the period 2011-2025.

Table 1. Operational Variables

Variable	Indicators/Formulas	Scale
ROA (Y)	Profit Before Tax / Total Assets × 100%	Ratio
CAR (X1)	Capital / Risk Weighted Assets × 100%	Ratio
NPL (X2)	Non Performing Loans / Total Credit × 100%	Ratio
NIM (X3)	Net Interest Income / Earning Assets × 100%	Ratio

The independent variables in this study consist of the Capital Adequacy Ratio (CAR), Non-Performing Loans (NPL), and Net Interest Margin (NIM), while the dependent variable is Return on Assets (ROA). Data analysis was conducted using descriptive quantitative methods with the aid of SPSS version 27.

Data analysis techniques include descriptive statistics, classical assumption tests, multiple linear regression analysis, t-tests, F-tests, and the coefficient of determination. The regression models used

$$ROA = \beta_0 + \beta_1 CAR + \beta_2 NPL + \beta_3 NIM + \varepsilon \quad (1)$$

Result and Discussion

Descriptive Statistical Analysis

Descriptive statistical analysis is used to provide an understanding of the characteristics of each variable, ranging from the lowest value (minimum), the highest value (maximum), and the average (mean), to the degree of data dispersion as reflected in the standard deviation.

Table 2. Results of Descriptive Statistical Tests

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
CAR	15	15,09	21,95	18,7320	1,95294
NPL	15	1,93	4,20	2,6280	,72081
NIM	15	3,67	6,77	5,3667	,79178
ROA	15	,57	3,24	2,2427	,63749
Valid N (listwise)	15				

The descriptive statistical analysis of 15 observations for the 2011–2025 period shows that CAR ranged from 15.09 to 21.95, with a mean of 18.7320 and a standard deviation of 1.95294. NPL ranged from 1.93 to 4.20, with a mean of 2.6280 and a standard deviation of 0.72081. NIM ranged from 3.67 to 6.77, with a mean of 5.3667 and a standard deviation of 0.79178. Meanwhile, ROA ranged from 0.57 to 3.24, with a mean of 2.2427 and a standard deviation of 0.63749.

Normality Test

For this data, the Kolmogorov-Smirnov normality test was used with the assumption that the data is normally distributed if the p-value (asymptotic significance) is greater than 0.05. The following are the results of the test using the one-sample Kolmogorov-Smirnov test.

Table 3. Normality Test

One-Sample Kolmogorov-Smirnov Test		
		Unstandardized Residual
N		15
Normal Parameters ^{a,b}	Mean	,0000000
	Std. Deviation	,33791700
Most Extreme Differences	Absolute	,144
	Positive	,139
	Negative	-,144
Test Statistic		,144
Asymp. Sig. (2-tailed) ^c		,200 ^d

Based on Table 3, it can be seen that the significance value is 0.200, which means that this value is greater than 0.05 (0.200 > 0.05). Therefore, it can be concluded that the residual data are normally distributed and that the assumption of normality in the regression model has been met.



Multicollinearity Test

The multicollinearity test aims to determine whether there is a high correlation among the independent variables in a regression model. A regression model is considered free of multicollinearity if the Tolerance value is > 0.10 and the VIF is < 10 , whereas a Tolerance value < 0.10 and a VIF > 10 indicate the presence of multicollinearity in the research model.

Table 4. Multikolnearity Test Results

Model		Coefficients ^a		T	Sig.	Collinearity Statistics	
		Unstandardized Coefficients	Standardized Coefficients			Tolerance	VIF
		B	Std. Error				
1	(Constant)	2,562	2,135	1,200	,255		
	CAR	-,036	,069	-,111	,612	,569	1,758
	NPL	-,602	,149	-,680	,002	,905	1,105
				4,050			
	NIM	,361	,166	,449	,052	,600	1,668

The results of the multicollinearity test in Table 4.8 show that the VIF values for the three independent variables Capital Adequacy Ratio (CAR), Non Performing Loan (NPL), and Net Interest Margin (NIM) are all less than 10, and their tolerance values are all greater than 0.10. These results indicate that there is no evidence of multicollinearity

Heteroscedasticity Test

The heteroscedasticity test is used to determine whether or not there is heteroscedasticity in the residuals for all observations in the regression model. In this study, the results of the heteroscedasticity test can be seen in the scatterplot below.

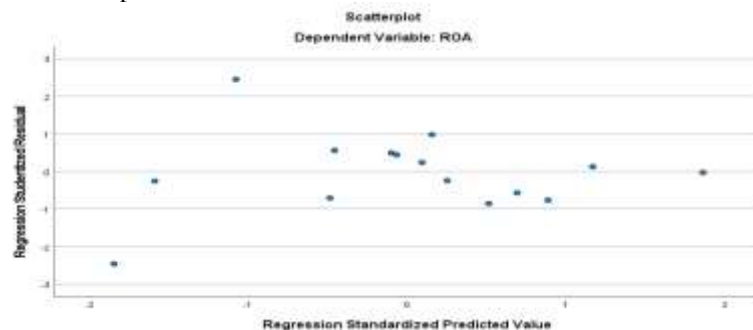


Figure 2. Scatterplot Test for Heteroscedasticity

Autocorrelation Test

An effective regression model is one that has no autocorrelation. To determine this, the autocorrelation test in this study used the Run test.

Table 5. Run Test

Runs Test	
	Unstandardized Residual
Test Value ^a	-,00906
Cases $<$ Test Value	7
Cases $\geq$ Test Value	8
Total Cases	15
Number of Runs	6
Z	-1,059
Asymp. Sig. (2-tailed)	,290

Based on the results of the statistical test in Table 5 above, a significance value of $0.290 > 0.05$ was obtained. Since the significance value is greater than 0.05, it can be concluded that the data do not exhibit autocorrelation or satisfy the classical assumption of autocorrelation, and thus the study can proceed.

Multiple Linear Regression

This study uses multiple linear regression analysis to determine the extent to which the Capital Adequacy Ratio (X1), Non Performing Loans (X2), and Net Interest Margin (X3) influence Return on Assets.

Table 6. Multiple Linier Regression

		Coefficients ^a			t	Sig.
Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta		
1	(Constant)	2,562	2,135		1,200	,255
	CAR	-,036	,069	-,111	-,523	,612
	NPL	-,602	,149	-,680	-4,050	,002
	NIM	,361	,166	,449	2,175	,052

$$ROA = 2,562 - 0,036 \text{ CAR} - 0,602 \text{ NPL} + 0,361 \text{ NIM} + \epsilon \quad (2)$$

Based on the test results in the table, the following multiple linear regression equation is obtained:

1. The constant (β_0) is 2.562.

If the variables Capital Adequacy Ratio (CAR), Non Performing Loans (NPL), and Net Interest Margin (NIM) are zero (0), then the value of Return on Assets (ROA) is 2.562.

2. Regression coefficient for the Capital Adequacy Ratio variable ($\beta = -0.036$, Sig. = 0.612)

This means that every 1% increase in the CAR will actually decrease ROA by 0.036%, assuming all other variables remain constant.

3. Regression coefficient for the Non-Performing Loan variable ($\beta = -0.602$, Sig. = 0.002)

This means that a 1% increase in NPL will actually result in a 0.602% decrease in ROA, assuming all other variables remain constant.

4. Regression coefficient for the Net Interest Margin variable ($\beta = 0.361$, Sig. = 0.052)

This means that a 1% increase in NIM will increase ROA by 0.361%, assuming all other variables remain constant.

Partial Hypothesis Testing (t-Test)

Partial tests (t) were conducted to determine the effect of each independent variable on the dependent variable individually. The results are determined based on the significance value: if the value is less than 0.05, the hypothesis is accepted, indicating a significant partial effect. Conversely, if the significance value exceeds 0.05, the hypothesis is rejected, meaning the independent variable is deemed to have no significant effect on the dependent variable.

Table 7. t-Test (Partial)

		Coefficients ^a			t	Sig.
Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta		
1	(Constant)	2,562	2,135		1,200	,255
	CAR	-,036	,069	-,111	-,523	,612
	NPL	-,602	,149	-,680	-4,050	,002
	NIM	,361	,166	,449	2,175	,052

Based on the results of the data analysis above, the following findings were obtained:

1. The CAR variable has a significance value of $0.612 > 0.05$ and a calculated T-value (-0.523) < table T-value (2.200). This indicates that CAR does not have a significant effect on ROA



2. The NPL variable has a significance value of $0.002 < 0.05$ and a calculated T-value of $(-4.050) >$ the critical T-value (2.200). This indicates that NPL has a significant effect on ROA.
3. The NIM variable has a significance value of $0.052 > 0.05$ and a calculated T-value $(2.175) <$ the critical T-value (2.200). This indicates that NIM does not have a significant effect on ROA

Simultaneous Hypothesis Testing (F-Test)

A simultaneous (F) test was used to determine whether the variables CAR, NPL, and NIM collectively have an effect on ROA. The test results were determined based on the calculated F-value and the significance level; specifically, if the calculated F-value $>$ table F-value and the significance level < 0.05 , this indicates that the three independent variables simultaneously affect ROA. Conversely, if the calculated F-value is less than the table F-value and the significance level is greater than 0.05, then CAR, NPL, and NIM collectively do not influence ROA.

Table 8. F-Test (Simultaneous)

		ANOVA ^a				
	Model	Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	4,091	3	1,364	9,383	,002 ^b
	Residual	1,599	11	,145		
	Total	5,689	14			

The test results show that the calculated F-value (9.383) is greater than the table F-value (3.587), with a significance level of $0.002 < 0.05$. Thus, it can be concluded that the variables CAR, NPL, and NIM simultaneously have a significant effect on ROA.

Coefficient of Determination (R²)

The coefficient of determination (R²) test is used to determine the extent to which independent variables can explain variations in the dependent variable. The interpretation of this test is based on the R-squared value; the closer the value is to 1, the greater the ability of the independent variables to provide the information needed to predict the dependent variable. The following presents the results of the R² test, analyzed using SPSS version 27:

Table 9. Test of the Coefficient of Determination

Model Summary ^b				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,848 ^a	,719	,642	,38122

Based on the table, an R value of 0.848 indicates a very strong relationship between NIM, NPL, and CAR and ROA. An Adjusted R-Square value of 0.642 means that approximately 64% of the variation in ROA can be explained by these three variables, while the remaining 36% is influenced by other factors. Thus, the model used is quite effective in explaining ROA.

Conclusion

1. The Effect of the Capital Adequacy Ratio (CAR) on Return on Assets (ROA)

Based on the test results, the CAR variable has a significance value of $0.612 > 0.05$ and a calculated T-value $(-0.523) <$ table T-value (2.200). This indicates that CAR does not have a significant effect on ROA.

These findings are consistent with a study (Fadli & Samudra, 2023) that found that the Return on Assets (ROA) of PT Bank Tabungan Negara (Persero) Tbk is not significantly influenced by the Capital Adequacy Ratio (CAR). Similar results were also found in a study by (Saputra & Angriani, 2023), which concluded that the Return on Assets (ROA) of private credit banks in Batam is not significantly influenced by the Capital Adequacy Ratio (CAR). This indicates that a bank's return on assets is not significantly influenced by its capital adequacy level.

2. The Effect of Non-Performing Loans (NPLs) on Return on Assets (ROA)

Based on the test results, the NPL variable has a significance value of $0.002 < 0.05$ and a calculated T-value $(-4.050) < \text{table T-value } (2.200)$. This indicates that NPLs have a significant effect on ROA.

The results of this study are consistent with a previous study by Ratnasari et al. (2025), titled “The Effect of NPL and LDR on ROA at PT Bank Negara Indonesia (Persero) Tbk,” which revealed that non-performing loans (NPL) have a significant effect on return on assets (ROA). This is in line with the findings of (Saputra & Angriani, 2023), who stated that NPLs affect ROA at Rural Credit Banks (BPRs) in Batam City.

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

Based on the test results, the NIM variable has a significance value of $0.052 > 0.05$ and a calculated T-value $(2.175) < \text{table T-value } (2.200)$. This indicates that NIM does not have a significant effect on ROA.

These findings were also reported in a study (Siagian et al., 2021) titled “The Effect of BOPO, LDR, and NIM on ROA in the Indonesian Banking Industry,” which stated that NIM has no effect on ROA. Similar results were further supported by a study (Nufus & Munandar, 2021), which found that CAR and NIM do not affect ROA at Bank Muamalat Indonesia Tbk.

4. The Effect of the Capital Adequacy Ratio (CAR), Non-Performing Loans (NPL), and Net Interest Margin (NIM) on Return on Assets (ROA)

The test results show that the calculated F-value (9.383) is greater than the table F-value (3.587), with a significance level of $0.002 < 0.05$. Thus, it can be concluded that the variables CAR, NPL, and NIM simultaneously have a significant effect on ROA.

The results of this study indicate that internal factors reflecting capital stability, asset quality, operational efficiency, liquidity, and a bank’s ability to generate interest income all interact with one another and influence the return on total capital. A bank’s ability to generate profits from its total assets can be enhanced through effective management of these three factors.

The findings of this study are consistent with those of Saputra & Angriani (2023), who examined how Return on Assets (ROA) at private credit banks (BPRs) in Batam is simultaneously influenced by the CAR, NPL, NIM, LDR, and BOPO ratios. The Capital Adequacy Ratio, Loan-to-Deposit Ratio, Non-Performing Loans, Net Interest Margin, and Operating Expenses and Operating Income all have an impact on financial performance (ROA) at State-Owned Enterprises (SOEs) listed on the Indonesia Stock Exchange between 2013 and 2022, according to a similar study (Ababiel & R. Nasution, 2024)

Recommendation

1. For the Company

It is recommended that PT Bank Negara Indonesia (Persero) Tbk continue to improve its operational effectiveness and financial performance through optimal asset and credit management. Based on the research findings, non-performing loans (NPLs) have a significant negative impact on return on assets (ROA). Therefore, the company must closely monitor non-performing loans (NPLs), as an increase in NPLs can threaten profitability. In addition, the company must ensure adequate capital availability and maximize interest income, because although the Capital Adequacy Ratio (CAR) and Net Interest Margin (NIM) may not have a major impact on ROA individually, the combined effect of CAR, NPL, and NIM has a significant impact on ROA.

2. For Investors

Before making an investment decision, investors are advised to conduct in-depth research and consider a company’s financial indicators and trends, particularly its Non-Performing Loans (NPLs). This is because research findings indicate that NPLs have a statistically significant and detrimental impact on Return on Assets (ROA). To make more accurate and logical investment decisions, investors should consider macroeconomic variables such as inflation, the benchmark interest rate, and exchange rate stability in addition to the CAR and NIM ratios when evaluating a company’s performance and prospects.



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