



THE IMPACT OF CAPITAL ADEQUACY RATIO (CAR) AND NON PERFORMING LOAN (NPL) ON THE PROFITABILITY OF STATE OWNED BANKS LISTED ON THE INDONESIA STOCK EXCHANGE DURING 2015-2024

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Abstract

This study aims to evaluate and analyze the impact of non-performing loans (NPLs) and the capital adequacy ratio (CAR) on the profitability of state-owned banks listed on the Indonesia Stock Exchange during the period from 2015 to 2024. This study uses secondary data obtained from the annual financial reports of these banks. In a purposive sampling process, four banks with a ten-year observation period and a total of forty observations were included. The analysis was conducted using multiple linear regression with SPSS version 26. The results of the study show that the “non-performing loans” (NPL) variable is the most important factor influencing the return on assets (ROA), while the capital adequacy ratio (CAR) has a positive and significant effect on ROA. This study indicates that business management should optimize their financial ratios by maintaining credit quality and limiting the proportion of non-performing loans. To improve a bank’s profitability, credit risk management is crucial.

PENGARUH CAPITAL ADEQUACY RATIO (CAR) DAN NON PERFORMING LOAN (NPL) TERHADAP PROFITABILITAS PADA BANK BUMN YANG TERDAFTAR DI BURSA EFEK INDONESIA PERIODE 2015-2024

Abstrak

Keywords:

CAR, NPL, ROA, Bank

Penelitian ini bertujuan untuk mengevaluasi dan menganalisis dampak kredit macet (NPL) dan rasio kecukupan modal (CAR) terhadap profitabilitas bank-bank milik negara yang terdaftar di Bursa Efek Indonesia selama periode 2015 hingga 2024. Penelitian ini menggunakan data sekunder yang diperoleh dari laporan keuangan tahunan bank-bank tersebut. Melalui proses pengambilan sampel purposif, empat bank dengan periode pengamatan sepuluh tahun dan total empat puluh pengamatan dimasukkan ke dalam penelitian ini. Analisis dilakukan menggunakan regresi linier berganda dengan SPSS versi 26. Hasil penelitian menunjukkan bahwa variabel “kredit macet” (NPL) merupakan faktor terpenting yang memengaruhi laba atas aset (ROA), sedangkan rasio kecukupan modal (CAR) memiliki pengaruh positif dan signifikan terhadap ROA. Penelitian ini menunjukkan bahwa manajemen perusahaan sebaiknya mengoptimalkan rasio-rasio keuangannya dengan menjaga kualitas kredit dan membatasi proporsi kredit macet. Untuk meningkatkan profitabilitas bank, manajemen risiko kredit sangatlah penting.



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INTRODUCTION

The banking sector in Indonesia functions as an intermediary between those with surplus funds and those in need of additional capital (Wiranti & Deny, 2024). Specifically, state-owned banks such as BRI, BNI, Mandiri and BTN serve as financial institutions that positively impact Indonesia's economy and support government programmes as they are able to transform deposited funds into investment capital (Muhammad & Diah, 2023).

The theory of financial intermediation emphasises the role of banks as intermediaries in the collection and allocation of funds (Pardamean & Prasetyono, 2024; Rachmawati et al., 2025). By supporting proper resource allocation, effective financial intermediation promotes economic growth (Gusganda & Rina, 2020). Initially, the financial intermediation theory developed by Gurley and Shaw (1973) emphasised the importance of maintaining optimal bank operations, enhancing customers' and investors' trust, and ensuring financial stability and smooth market liquidity (Adedeji, 2024; Cong & Nguyen, 2026; Ridene et al., 2026).

This study is important because the profits of state-owned banks heavily rely on the stability and growth of Indonesia's banking industry. Knowing how CAR and NPL affect profits gives bank management crucial insights to improve risk management procedures and financial performance. This study is especially intriguing since it examines a ten-year observation period (2015–2024) and concentrates on state-owned banks, which are crucial to Indonesia's financial system. This allows for a more thorough assessment of banking performance over time. In addition, this study provides a better understanding of the relative contribution of each independent variable to return on assets (ROA) by identifying the dominant variables that influence profitability through an effective contribution analysis. This contrasts with several previous studies that focused on the relationship between profitability, the capital adequacy ratio (CAR), and the nonperforming loan (NPL) ratio.

Profitability is an indicator used to measure how capable a bank is of achieving profits through its business operations (Duah et al., 2026; Vinh et al., 2026). Essentially, every company has a primary objective in its operational activities, which is to obtain profit or gain, whether in the short term or long term, with a solid company working system (Asriany, 2021). Return on assets (ROA), a ratio used to assess the financial performance of the banking industry, is used to determine profitability. This is because the ROA ratio can indicate how much net profit is generated per rupiah of funds invested in total assets (Dina & Nana, 2022; Samto et al., 2024). For banks, ROA is very important because this ratio is used to evaluate how effectively a company can generate

profit through the utilisation of available assets (Cahyani & Amirudin, 2024; Ummi & Randy, 2023).

Return on assets (ROA) is calculated by assessing a bank's ability to generate profit based on its total assets. To calculate this ratio, we must compare net profit after tax with total assets, which indicates how well management manages existing resources to generate profit (Sabila et al., 2021). According to Gregorius et al., (2023) an indication of strong financial performance is more evident if the ROA value is higher, as the return obtained also increases. In the banking industry, the ROA serves as an important benchmark for investors, company executives, and supervisory bodies like the Financial Services Authority (OJK) to evaluate operational efficiency, financial stability, and the bank's resilience to various risks. The return on assets (ROA) must be above 1.5 percent, according to Otoritas Jasa Keuangan, (2020) data.

Analysis of financial ratios, such as the capital adequacy ratio and the nonperforming loan ratio, can be used to assess the efficiency of bank financing. CAR is a capital indicator that shows the bank's ability to provide funds to cover potential losses arising from operational activities and business development needs (Edin et al., 2025). The minimum CAR level for banks considered healthy by Bank Indonesia is 8%. A higher CAR indicates that the bank has a strong capital buffer to anticipate potential losses (Putu & I, 2025).

Based on capital structure theory, the relevance of the capital adequacy ratio (CAR) in banking can be understood as an illustration of how banks balance the use of equity and borrowed funds (debt) to achieve an optimal level of risk and performance (Ghenimi et al., 2025). In this context, CAR is highly relevant as it serves as a safety limit to ensure that the bank's own capital proportion remains sufficient to absorb the risks caused by high leverage (Ivan & RA, 2021; Tangngisalu et al., 2020).

Banks with sufficient capital can be more flexible in distributing credit and developing their business, which in turn increases profitability (Hananta & Hersugondo, 2022). a result, the correlation between the CAR ratio and return on assets (ROA) is generally positive. Research by Cahyani & Amirudin (2024) shows that CAR has a positive and significant effect on ROA in banking companies listed on the IDX, indicating that strong capital improves profits. Gregorius et al. (2023) also found a positive and significant relationship between CAR and profitability in commercial banks listed on the IDX for the 2018-2020 period, where high CAR indicates that banks better protect their customers and enhance their trust.

However, the research by Dina & Nana (2022) yielded different results, stating that CAR does not have a significant effect on ROA. Similarly, the study by Andriansyah et al., (2025) stated that the capital adequacy ratio (CAR) does not have a

significant impact on Return on Assets (ROA). Given the CAR (minimum capital adequacy ratio) of 8 percent, this may indicate that banks are being very cautious in protecting their capital. The results show that CAR generally supports profitability, but its impact varies depending on the economic conditions and asset management strategies of each bank.

The next ratio to measure bank performance is the non-performing loan, non-performing loan (NPL) indicates the level of problematic loans within a bank and serves as an indicator showing how many loans are uncollectible (Apriani et al., 2025). As interest income declines and provisions to cover losses increase, this will have a negative impact on the bank's profitability, which is calculated based on return on assets (ROA). This ratio is used to measure the bank's ability to handle debtor defaults in repaying credit (Héctor & Kenna, 2025). Problematic loans refer to substandard, doubtful, and bad debts (Samto et al., 2024). A higher NPL amount indicates that the bank's credit quality is deteriorating, leading to an increase in problematic loans, which in turn worsens the bank's condition (Susilawati & Nurulrahmatiah, 2021).

In banking and financial literature, non-performing loans (NPLs) of banks are very important. Essentially, NPLs are connected to banks, which function as providers of credit and holders of deposits. Banks provide loans to customers considered credible with the expectation that they will repay the loan. These loans are categorised as non-performing when this does not occur. Instability in the financial system can be caused by an increase in NPLs (Ira & Supramono, 2021; Ozili, 2025).

Bank Indonesia sets a maximum limit for non-performing loans (NPLs) at 5%, and if NPLs exceed this, it will affect the assessment of the bank's health rating (Admadja et al., 2023; Herlambang & Adler, 2025). The relationship between nonperforming loans and return on assets (ROA) is typically negative because a bank's credit risk is correlated with its ability to generate a return on its assets. Research by Mahdaniyyah & Catur (2021) shows that Non-Performing Loans (NPL) have a negative and significant impact on profitability in commercial banks listed on the IDX. This means that when the non-performing loan (NPL) ratio rises, the bank's ability to generate profits from its assets also declines. Research by Adinda & Achmad (2021) also found that Non-Performing Loans (NPL) have a negative and significant effect on bank profitability measured by Return on Assets (ROA). Similarly, research by Cahyani & Amirudin (2024) shows that Non-Performing Loans (NPL) have a significant negative effect on Return on Assets (ROA) and that the Capital Adequacy Ratio (CAR) significantly affects Return on Assets (ROA).

However, there is a differing study according to Pardamean & Prasetyono (2024) which states that Non Performing Loans (NPLs) have a positive but not significant effect on Return on Assets (ROA). Consequently, this analysis shows that the amount

of nonperforming loans does not actually affect a bank's profitability. This is because credit risk management can help by minimizing the negative impact of nonperforming loans on profits through the establishment of adequate reserves for potential loan defaults, as well as by reducing the negative impact of nonperforming loans on return on assets (ROA).

The capital adequacy ratio (CAR) and the nonperforming loan (NPL) ratio are two key indicators of a bank's financial health and the effectiveness of its risk management. The CAR reflects the amount of capital sufficient to cover various risks, while the NPL ratio indicates the proportion of nonperforming loans that can affect a bank's ability to generate profits. This study focuses on state-owned commercial banks (BUMN) whose shares are listed on the Indonesia Stock Exchange (BEI). This is due to the important role played by BUMN in maintaining the stability of the national financial system. SOE banks such as BRI, BNI, Mandiri and BTN are responsible for providing productive funding and promoting economic progress, particularly through financing for business actors.

Hypothesis Development

The Impact of the Capital Adequacy Ratio (CAR) on Profitability

To protect against risks associated with income-generating assets, the Capital Adequacy Ratio (CAR) is an indicator used to assess a bank's capital adequacy. The CAR affects the return on assets (ROA) because a strong capital base enables a bank to conduct its intermediary activities more efficiently, expand lending, and mitigate credit, market, and operational risks. A high CAR indicates that the bank has sufficient capital to bear the risks of loss from risky assets, which positively impacts ROA (Pardamean & Prasetyono, 2024).

According to Cahyani & Amirudin, (2024), the capital adequacy ratio has a positive and significant effect on profitability (ROA), indicating that a high capital adequacy shows the bank's ability to manage assets and capital effectively to increase profits, Gregorius et al., (2023) also found a positive and significant relationship between CAR and profitability in commercial banks listed on the Indonesia Stock Exchange during 2018-2020, where a high CAR indicates that the bank better protects customers and increases their confidence. On the other hand, Helmalia, (2021) stated that CAR (capital adequacy ratio) negatively affects profitability because a high CAR may indicate that capital in productive assets is not used effectively. As a result, its contribution to boosting profitability becomes ineffective.

H1: The Capital Adequacy Ratio (CAR) has a positive impact on the return on assets (ROA) of state-owned banks listed on the Indonesia Stock Exchange during the period from 2015 to 2024.

How do NPLs affect profits

NPLs indicate how problematic a bank's loans are because the debtor cannot fulfil their obligations. As more loans become problematic, interest income decreases, impairment loss provisions increase, and bank operating costs rise, NPLs impact ROA. Banks with high NPLs must incur additional losses and create provisions for bad debts, negatively affecting profitability because high NPLs indicate increased credit risk and lower interest income, which negatively affects ROA (Pardamean & Prasetyono, 2024).

According to Mahdaniyyah & Catur, (2021), non-performing loans (NPLs) have a negative and significant effect on profitability, indicating that an increase in problem loans significantly reduces bank profits due to higher provisioning costs and lower interest income. Research by Adinda & Achmad, (2021) also found that non-performing loans (NPLs) have a negative and significant effect on bank profitability measured by return on assets (ROA). Similarly, the study by Cahyani & Amirudin, (2024) found that non-performing loans (NPLs) have a significant negative effect on return on assets (ROA). Meanwhile, Putu & I, (2025) stated that non-performing loans (NPLs) have a positive but insignificant effect on profitability (ROA), indicating that the increase in NPLs has not yet had a significant impact on ROA because banks are still able to manage credit risk and maintain profit performance.

H2: NPLs had a negative impact on the return on assets (ROA) of state-owned banks listed on the Indonesia Stock Exchange from 2015 to 2024.

Study conducted by (Intan et al., 2020) found that non-performing loans (NPLs) have a significant negative impact on return on assets (ROA). In addition, this study shows that the capital adequacy ratio (CAR) has a significant effect on return on assets (ROA), indicating that credit quality and capital adequacy levels are important factors in the profitability of state-owned banks.

These findings are further supported by a study conducted by (Tangngisalu et al., 2020) which examined ten conventional banks listed on the Indonesia Stock Exchange. The results of the study show that the non-performing loan (NPL) ratio has a significant negative impact on return on assets (ROA), while the capital adequacy ratio (CAR) affects return on assets (ROA). This is because there is a direct relationship between the NPL ratio and a bank's ability to generate profits.

Compared to the CAR (capital adequacy ratio), nonperforming loans (NPLs) have a greater and more sustained impact on return on assets (ROA), according to two studies. The results indicate that credit risk is more important to bank profitability than capital adequacy. Therefore, in this study, nonperforming loans are considered a more important factor for bank profitability than capital adequacy.

H3: From 2015 to 2024, nonperforming loans (NPLs) had a significant impact on the return on assets (ROA) of state-owned banks listed on the Indonesia Stock Exchange.

Profitability (Y) is the dependent variable; the conceptual diagram below illustrates the relationship between the independent variables: capital adequacy ratio (X1) and nonperforming loans (X2).

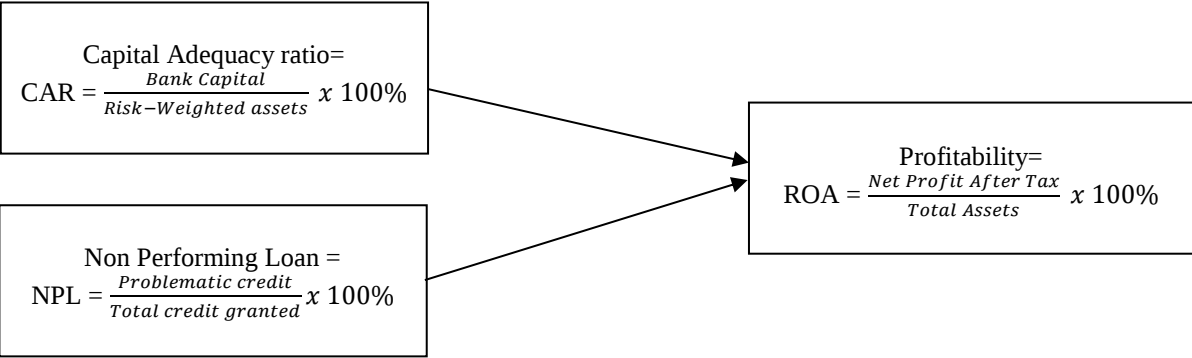


Figure 1
Conceptual Framework

METHOD

This study aims to identify the relationship or impact between two or more variables. The association method was used in this quantitative methodology. This study examines all state-owned banking institutions listed on the Indonesia Stock Exchange from 2015 to 2024, and the sample was carefully selected based on the following criteria: (1) the bank was consistently listed on the Indonesia Stock Exchange from 2015 to 2024; (2) the bank has published complete annual financial reports during the study period; and (3) complete information on the capital adequacy ratio (CAR), non-performing loans (NPL), and return on assets (ROA) can be found in the bank’s annual financial reports. Four banks—Bank Rakyat Indonesia (BRI), Bank Negara Indonesia (BNI), Bank Mandiri, and Bank Tabungan Negara (BTN)—were selected as the research sample to conduct 40 observations based on the criteria mentioned earlier. The annual reports and annual financial statements of each bank, as well as information obtained from the official website of the Indonesia Stock Exchange, served as the secondary data sources used in this study. The collection, recording, and evaluation of relevant documents constituted the documentation process included in this data collection method.

RESULTS AND DISCUSSION

Classical Assumption Test:

Normality Test

In this study, the Kolmogorov-Smirnov test was used to test the normality of the data distribution to ensure that the regression model residuals are normally distributed.

If the significance value is greater than 0.05, the data is considered normal, but if the significance value is less than 0.05, the data is considered not normal (Ghozali, 2021).

Table 1
One-Sample Kolmogorov-Smirnov Test Normality Results

		Unstandar dized Residual
N		40
Normal Parameter S ^{a,b}	Mean	.0000000
	Std.	.5352071
	Deviation	2
Most Extreme Differenc es	Absolute	.126
	Positive	.069
	Negative	-.126
Test Statistic		.126
Asymp. Sig. (2- tailed)		.110
a. Test distribution is Normal.		
b. Calculated from data.		
c. Liliefors Significance Correction		

Source: SPSS v.26 Data Processing (2026)

The results of the normality test are shown in Table 1, where the asymptotic significance value of 0.110—which is greater than 0.05—indicates that the regression model residuals follow a normal distribution. These results show that the assumption of a normal distribution is met, meaning that other hypotheses can be tested.

Multicollinearity test

To determine whether the independent variables in the regression model are correlated with one another, a multicollinearity test is conducted. Ideally, there should be no correlation among the independent variables in the regression model. The variance inflation factor (VIF) and the tolerance value can be evaluated to determine whether multicollinearity is present. If the VIF is less than 10 and the tolerance value is greater than 0.1, the regression model is considered free from multicollinearity (Ghozali, 2021)

Table 2
Multicollinearity Test Results

Coefficients^a							
Model		Unstandardize d Coefficients		Standard ized Coeffici ents	t	Sig.	Collinearity Statistics
		B	Std. Error	Beta			Tolerance VIF
(Constant)		-.511	1.038		-.492	.625	
1	CAR	.260	.045	.480	5.843	.000	.936 1.068
	NPL	-.844	.112	-.621	-7.559	.000	.936 1.068

a. Dependent Variable:ROA

Source: SPSS v.26 Data Processing (2026)

The results of the multicollinearity test are presented in Table 2. The tolerance value is 0.936, which is greater than 0.10, and the VIF value is 1.068, which is less than 0.10. The results indicate that the regression model does not exhibit multicollinearity.

Autocorrelation Test

In an ideal linear regression model, there is no autocorrelation; however, an autocorrelation test is still conducted to determine whether there is a correlation between the errors in period t and period $t-1$ in the linear regression model. To identify the presence of autocorrelation, the Durbin-Watson (DW) statistic can be used. If the data meets the requirement $du < d < 4-du$, the data can be considered free from autocorrelation (Ghozali, 2021).

Table 3
Durbin-Watson Autocorrelation Test Results

Model Summary^b					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin- Watson
1	.875 ^a	.766	.754	.54948	1.204

a. Predictors: (Constant), NPL, CAR

b. Dependent Variable: ROA

Source: SPSS v.26 Data Processing, (2026)

Table 3 shows the results of the Durbin-Watson test with a d value of 1.204. The dL value is 1.391 and the dU value is 1.600 at a significance level of 0.05, with 40 observations and 2 independent variables. The 4-dU value is 2.400 and the 4-dL value is 2.609. Since the condition $du < d < 4-du$ holds: $1.600 < 1.204 < 2.400$, the regression model may exhibit positive autocorrelation.

Heteroskedasticity Test

A heteroscedasticity test is conducted to determine whether the variances of the residuals between two observations in a regression model are equal. A good regression model should exhibit homoscedasticity, or the absence of heteroscedasticity. The Glejser test is used to test for statistical heteroskedasticity. The results indicate that heteroskedasticity does not occur if the p value > 0.05 , but occurs if the p value < 0.05 (Ghozali, 2021).

Table 4
Glejser Test Result

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.322	.539		.598	.553
1 CAR	.007	.023	.053	.311	.757
NPL	-.006	.058	-.019	-.112	.912

a. Dependent Variable: abs_RES

Source: SPSS v.26 Data Processing, (2026)

Table 4 presents the Glazer test coefficients, which are used to identify heteroscedasticity. The absolute residual values (abs_RES) were used to perform a regression analysis on the independent variables. The results show that the CAR variable has a significance level of 0.757, and the NPL variable has a significance level of 0.912. Both variables show significance levels above 0.05. These results indicate

that there is no heteroscedasticity in the regression model, meaning that the assumption of homoscedasticity is met.

Linearity Test

The purpose of a linearity test is to determine whether the relationship being studied between the independent variable (X) and the dependent variable (Y) is linear. For high-quality data, the relationship between the two variables is considered linear if the significance value for linearity is greater than 0.05 and the significance value for deviation from linearity is less than 0.05. On the other hand, the relationship between the two variables is linear if the linearity significance value is less than 0.05 and the linearity deviation significance is larger than 0.05 (Ghozali, 2021).

Table 5
Results of the Linearity Test of X1 Against Y

ANOVA Table			Sum of Squares	df	Mean Square	F	Sig.
ROA CAR	(Combined)		44.824	36	1.245	1.261	.494
	Between Groups	Linearity	19.362	1	19.362	19.606	.021
		Deviation from Linearity	25.462	35	.727	.737	.728
	Within Groups		2.963	3	.988		
	Total		47.787	39			

Source: SPSS v.26 Data Processing, (2026)

There is a linear relationship between CAR and ROA with a significance level of 0.021 (<0.05), according to the results of the linearity analysis using ANOVA for variables X1 and Y listed in Table 5. Furthermore, the significance of the linearity deviation of 0.728 (>0.05) indicates that there is no linear deviation. Thus, the linear relationship between CAR and ROA is consistent with the assumption of linearity.

Table 6
Results of the Linearity Test of X2 Against Y

ANOVA Table			Sum of Squares	df	Mean Square	F	Sig.
ROA	Between	(Combined)	44.681	34	1.314	2.116	.206
NPL		Linearity	26.307	1	26.307	42.358	.001

Groups	Deviation from Linearity	18.374	33	.557	.896	.629
Within Groups		3.105	5	.621		
Total		47.787	39			

Source: SPSS v.26 Data Processing, (2026)

Table 6 shows the ANOVA test results for variable X2 against Y. There was no linear deviation, based on a significance value of 0.629 (> 0.05). Therefore, the relationship between NPL and ROA is consistent with the assumption of linearity.

Analysis Method:

Descriptive Statistical Analysis

Using descriptive statistics, the data for each variable is put into a table. This table shows all observed values, including the minimum and maximum values, the mean, and the standard deviation. Profitability, CAR, and NPL are the variables under study.

Table 7
Descriptive Statistical Analysis Results

Descriptive Statistic					
	N	Minimum	Maximum	Mean	Std. Deviation
CAR	40	16.80	25.28	204.315	204.086
NPL	40	.97	4.78	27.973	.81399
ROA	40	.13	4.19	24.458	110.693
Valid N (listwise)	40				

Source: SPSS v.26 Data Processing, (2026)

In this study, the sample size (N) consisted of forty data sets. The results of the descriptive statistical analysis are presented in Table 7. The data for the descriptive analysis of each independent and dependent variable are listed below. Recorded parameters include standard deviation, minimum, maximum, and average:

1. CAR (X1)

The average CAR is 204.3, with a standard deviation of 204. The lowest value is 16.80, and the highest value is 25.28. Although the amount of data for the period under review is relatively moderate, this bank's capital adequacy ratio falls into the "good" category. This indicates the bank's ability to absorb potential losses.

2. NPL (X2)

For non-performing loans (NPLs), the minimum value is 0.97, and the maximum value is 4.78. The mean is 27.9, and the standard deviation is 0.81. The results show that the data distribution during the research period is not very high and the NPL level is relatively low. This indicates that the problem loan conditions in the studied bank are still under control.

3. Profitability (ROA) (Y)

The average return on assets (ROA) ratio is 24.45, with a standard deviation of 110.6. The maximum value is 4.19. Although there is relatively little variation in the data, the results of the study indicate that the banks' profitability levels during the study period were quite high.

Inferential Statistical Analysis

The relationship between independent and dependent variables in multiple linear regression is explained. This study uses the SPSS 26 program.

Table 8
Multiple Linear Regression Test Results

Coefficients ^a					
Model		Unstandardized Coefficients		Standardized Coefficients	t
		B	Std. Error	Beta	
(Constant)		-.511	1.038		-.492
1	CAR	.260	.045	.480	5.843
	NPL	-.844	.112	-.621	-7.559

a. Dependent Variable: ROA

Source: SPSS v.26 Data Processing, (2026)

The equations for multiple linear regression are listed in Table 8:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$$

$$ROA = -0,511 + 0,260 - 0,844 + \varepsilon$$

An explanation of the multiple linear regression equation mentioned earlier can be found here:

1. The ROA value excluding the CAR and NPL variables stands at -0.511 and is considered constant, consistent with the constant (α) of -0.511.
2. Return on assets (ROA) will increase by 0.260 percent if the CAR ratio increases by 1%, providing all other factors stay the same, according to the CAR regression coefficient of 0.260. Stated differently, a higher CAR value signifies the bank's ability to manage possible losses.
3. A bank's ability to generate profits will decline as the proportion of nonperforming loans increases; if the proportion of nonperforming loans increases by 1 percent, return on assets (ROA) will decrease by 0.844 percent, which is equivalent to a regression coefficient of -0.844 for the proportion of nonperforming loans.

Hypothesis Test :

Partial Test (t-test)

The t-criterion, also known as the partial test criterion, is used to measure the effect of each independent variable on each dependent variable. The decision criterion is based on a significance level of less than 0.05; H_0 is rejected and H_1 is accepted if the significance value of the t-test is less than 0.05. The results of the t-test indicate a significant relationship between the independent and dependent variables.

Table 9
Partial Test Results

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-.511	1.038		-.492	.625
1 CAR	.260	.045	.480	5.843	.000
NPL	-.844	.112	-.621	-7.559	.000

a. Dependent Variable: ROA

Source: SPSS v.26 Data Processing, (2026)

Table 9 shows how Y (ROA) is influenced by the independent variables X1 (CAR) and X2 (NPL):

1. Results of the hypothesis test on how CAR (X1) affects ROA (Y)
Regarding the effect of variable X1 (CAR) on variable Y (ROA), a significance value of $0.000 < 0.05$ indicates that hypothesis H1 is accepted; this suggests that the CAR variable has a significant effect on ROA.
2. Results of the hypothesis test on how NPL (X2) affects ROA (Y)
Regarding the effect of variable X2 (NPL) on variable Y (ROA), a significance value of $0.000 < 0.05$ indicates that hypothesis H2 is accepted; this suggests that the NPL variable has a significant effect on ROA.

Dominant Test

A dominance test has been used to determine which independent variable has the greatest influence on the dependent variable. Effective contribution (EC) and relative contribution (RC) analyses are used to determine the most important research variables. Before this, correlation analysis is carried out to see how the variables are related to each other. Next, the effect of the independent variables on the dependent variable was assessed using multiple linear regression analysis. The actual contribution of each independent variable to the dependent variable is represented by the effective contribution (EC) value.

Table 10
Regression Coefficients

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-.511	1.038		-.492	.625
1 CAR	.260	.045	.480	5.843	.000
NPL	-.844	.112	-.621	-7.559	.000

a. Dependent Variable: ROA

Source: SPSS v.26 Data Processing, (2026)

Table 11
Correlation Analysis Results

Correlations				
		CAR	NPL	ROA
CAR	Pearson Correlation	1	-.252	.637
	Sig. (2-tailed)		.116	.000
	N	40	40	40
NPL	Pearson Correlation	-.252	1	-.742
	Sig. (2-tailed)	.116		.000
	N	40	40	40
ROA	Pearson Correlation	.637	-.742	1
	Sig. (2-tailed)	.000	.000	
	N	40	40	40

.Correlation is significant at the 0.01 level (2-tailed).

Source: SPSS v.26 Data Processing, (2026)

Table 12
Summary of Regression and Correlation Analysis Results

Variabel	Koefisien Regresi	Koefisien Korelasi	R Square
	Beta		
X1	480	637	766
X2	-621	-742	

Source: SPSS v.26 Data Processing, (2026)

1. Calculation of Effective Contribution (EC)

The CAR variable (X1) makes an effective contribution to return on assets (ROA) (Y)

$$\text{Effective Contribution} = \text{BetaX1} \times r_{xy} \times 100\%$$

$$\text{Effective Contribution} = 0.480 \times 0.637 \times 100\%$$

$$\text{Effective Contribution} = 30.57\%$$

The NPL variable (X2) makes an effective contribution to return on assets (ROA) (Y)

$$\text{Effective Contribution} = \text{BetaX2} \times r_{xy} \times 100\%$$

$$\text{Effective Contribution} = -0.621 \times (-0.742 \times 100\%)$$

$$\text{Effective Contribution} = 46.07\%$$

To calculate total efficiency (TEC), use the following formula:

$$\text{Total Effective Contributions} = \text{SE(X1)\%} + \text{SE(X2)\%}$$

$$\text{Total Effective Contributions} = 30.57\% + 46.07\%$$

$$\text{Total Effective Contributions} = 76.64\%$$

CONCLUSION : The analysis results show that variable X1 (CAR) contributes 30.57% to ROA (Y), while variable X2 (NPL) contributes 46.07% to ROA (Y). This indicates that, compared to variable X1 (CAR), variable X2 (NPL) makes a greater contribution to variable Y (ROA). These two variables account for 76.64% of the total variance.

2. Calculation of Relative Contribution (RC)

Relative Contribution of CAR Variable (X1) to ROA (Y)

$$\text{Relative Contribution} = \text{SE(X1)\%/R}^2$$

$$\text{Relative Contribution} = 30.57\%/76.64\%$$

$$\text{Relative Contribution} = 39.9\%$$

Relative Contribution of NPL Variable (X2) to ROA (Y)

$$\text{Relative Contribution} = \text{SE(X2)\%/R}^2$$

$$\text{Relative Contribution} = 46.07\%/76.64\%$$

$$\text{Relative Contribution} = 60.1\%$$

The Total Relative Contribution (TRC) Can be Calculated as Follows:

$$\text{Total Relative Contribution} = \text{SR(X1)\%} + \text{SR(X2)\%}$$

$$\text{Total Relative Contribution} = 39.9\% + 60.1\%$$

$$\text{Total Relative Contribution} = 100\%$$

CONCLUSION : The analysis results show that the relative contribution (SR) of the CAR (X1) variable to ROA (Y) is 39.9% and the NPL (X2) variable to ROA (Y) is 60.1%. Overall, the total relative contribution of each variable is 100%, or equal to 1.

Determination Coefficient Test (R²)

The coefficient of determination is used in regression models to measure how well the independent variables explain the variance in the dependent variable. A higher R² value indicates that the independent variables better explain the variance in the dependent variable.

Table 13
Results of the Determination Coefficient Test (Adjusted R2)

Model Summary^b					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.875 ^a	.766	.754	.54948	1.204
c. Predictors: (Constant), NPL, CAR					
d. Dependent Variable: ROA					

Source: SPSS v.26 Data Processing, (2026)

Table 13 shows that the adjusted R-squared value is 0.754. This indicates that the independent variables X1 (CAR) and X2 (NPL) account for 75.4% of the variation in return on assets (ROA), while other factors not included in the research model account for 24.6% of the total variation. The ability of the independent variables to explain the dependent variable decreases as the adjusted R-squared value approaches zero. Conversely, this ability increases as the adjusted R-squared value approaches one.

Discussion

Partial Effect

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

The t-test results show, with a significance level of 0.000 (< 0.05) and a t-value of 5.843, that the capital adequacy ratio (CAR) has a positive and significant effect on return on assets (ROA). This is because a higher CAR indicates better capital adequacy, which allows banks to take on greater risks, boosts public confidence, and improves financial ratios.

This study shows that the capital adequacy ratio (CAR) has a significant impact on return on assets (ROA). In other words, profits are higher when a bank has a higher CAR. Banks must maintain an ideal level of capital to absorb risks, increase credit distribution, and optimise the management of productive assets. Adequate capital also reflects financial stability and can enhance public confidence, ultimately driving consistent improvement in bank performance and profitability.

The results of this study are in line with the research of Cahyani & Amirudin (2024) and Gregorius et al. (2023), which explain that CAR positively and significantly affects profitability (ROA). This situation shows that the higher a bank's capital adequacy ratio, the greater its ability to conduct business, mitigate potential risks, and

boost public confidence in the banking sector. Banks can easily expand loans and develop productive assets with strong capital adequacy. As a result, profits increase, as seen from the rising return on assets (ROA).

The Influence of the Non Performing Loans (NPL) on Return On Assets (ROA) A significance level of 0.000 (below 0.05) and a negative t-value of 7.559 indicate that non-performing loans (NPLs) have a negative and statistically significant effect on return on assets (ROA). A 1 percent increase in the NPL ratio can lead to a 0.844 percentage point decrease in ROA, based on the estimated regression coefficient of -0.844. This assumes that all other variables remain constant. This suggests that asset quality declines as NPLs rise, loan loss reserves increase, and interest income drops. As a result, bank profits decrease.

This study shows that nonperforming loans (NPLs) have a significant negative impact on return on assets (ROA). Therefore, it can be concluded that an increase in nonperforming loans leads to a decline in a bank's profitability. This suggests that for banks to maintain ideal profits, credit risk management needs to be improved, credit analysis should be stricter, and loan supervision should be tighter.

The results of this study are in line with the research by (Cahyani & Amirudin, 2024), (Mahdaniyyah & Catur, 2021) and (Adinda & Achmad, 2021), which explain that NPL has a negative and significant effect on profitability (ROA). This situation indicates that banks are more likely to incur losses due to an increase in nonperforming loans. As a result, banks' ability to generate profits declines, which in turn leads to a decrease in return on assets (ROA).

Dominant Influence

According to empirical data, nonperforming loans (NPLs) have the greatest impact on return on assets (ROA). With an effective contribution (EC) of 46.07 percent, this contribution exceeds that of the capital adequacy ratio (CAR), which stands at 30.57 percent. Together, CAR and NPL explain 76.6% of the variation in ROA, indicating that both variables make a substantial contribution to bank profitability. A higher EC value indicates that NPL is the most important predictor of ROA in this study, as the effective contribution reflects the actual contribution of each independent variable to the dependent variable.

According to empirical data obtained from a relative contribution (SR) analysis, nonperforming loans (NPLs) are the single largest factor affecting return on assets (ROA). The capital adequacy ratio (CAR) accounts for 39.9% of this relative contribution, while nonperforming loans account for 60.1%, bringing the total relative contribution to 100%. These findings reinforce the effective contribution (EC) analysis, confirming that NPL plays a more substantial role in explaining variations in ROA than CAR. This is due to the fact that the number of nonperforming loans directly reflects

the quality of a bank's loan portfolio; an increase in the number of nonperforming loans will raise credit risk, require additional provisions to anticipate loan defaults, reduce interest income, and ultimately diminish the bank's profitability. Credit risk, represented as the percentage of nonperforming loans, has a more direct and dominant impact on the business's profits.

The study found that the nonperforming loan (NPL) ratio has a greater impact on return on assets (ROA) than the capital adequacy ratio (CAR). These results indicate that credit quality is a key component of a bank's profitability, as an increase in the number of nonperforming loans can raise the risk of losses and lead to a decline in profits.

CONCLUSION

One of the key indicators of a bank's profitability is non-performing loans (NPLs). Empirical data confirm the proposed hypothesis, as they show that the capital adequacy ratio (CAR) has a positive and statistically significant effect on return on assets (ROA), while non-performing loans (NPLs) have a negative and statistically significant effect on ROA. These results indicate that capital adequacy enhances a bank's ability to bear risk and preserve its assets. This study has significant implications for the banking industry. Banks must improve their credit risk management strategies and ensure adequate capital adequacy (CAR) to reduce their non-performing loan (NPL) portfolios. Enhancing credit evaluation processes, improving loan monitoring systems, and maintaining sufficient capital reserves are key ways to boost profitability and ensure long-term financial sustainability. Even so, this study has a few limitations. These include the small sample size, the use of variables still focused on CAR and NPL, and reliance on secondary data that doesn't fully capture all elements affecting profitability. In future studies, additional factors such as liquidity, bank size, operational efficiency, and macroeconomic factors need to be taken into account. To test causal relationships, it is also recommended to apply more comprehensive panel modeling methods. From an institutional perspective, this study suggests that banks should prioritize the control of non-performing loans, capital adequacy management, and monitoring of non-performing loans to improve profitability and the efficiency of banking policies.

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