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THE EFFECT OF *CAPITAL ADEQUACY RATIO* (CAR), *LOAN TO DEPOSIT RATIO* (LDR), AND *NON-PERFORMING LOAN* (NPL) ON *RETURN ON ASSETS* (ROA) OF BANKING SECTOR COMPANIES LISTED ON THE INDONESIA STOCK EXCHANGE IN 2021-2025

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Abstract

This study aims to determine and analyze the effect of Capital Adequacy Ratio (CAR), Loan to Deposit Ratio (LDR), and Non-Performing Loan (NPL) on Return On Assets (ROA) in banking sector companies listed on the Indonesia Stock Exchange in 2021–2025. This study uses a quantitative descriptive method with multiple linear regression analysis techniques. The research population is financial sector companies listed on the Indonesia Stock Exchange, with samples determined using the purposive sampling method so that 28 banking companies were obtained during the five-year observation period, or 140 observation data. The data used is secondary data in the form of annual financial statements. The results showed: (1) CAR had a positive but insignificant effect on ROA with a significance value of 0.821; (2) LDR has a positive and significant effect on ROA with a significance value of 0.018; (3) NPLs have a negative and significant effect on ROA with a significance value of 0.000; and (4) CAR, LDR, and NPL simultaneously had a significant effect on ROA with a significance value of 0.000 and the ability to explain the variation in ROA (adjusted R square) of 15.8%.

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INTRODUCTION

The banking sector has a strategic role in supporting economic growth through the intermediation function, which is collecting funds from the community and redistributing them in the form of credit to those in need (Kasmir, 2018). *Return On Assets* (ROA) is one of the main indicators to assess the bank's ability to generate profits through the

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utilization of all assets owned, so this ratio is often used as a benchmark for the health and performance of banking companies (Kasmir, 2018).

The level of banking profitability is allegedly influenced by a number of internal factors, including *Capital Adequacy Ratio* (CAR) which describes the bank's capital adequacy in bearing business risks, *Loan to Deposit Ratio* (LDR) which describes the effectiveness of credit disbursement, and *Non-Performing Loans* (NPL) which reflects the level of non-performing loans. The average data of banking companies listed on the Indonesia Stock Exchange shows the movement of the four ratios during 2021–2025 as presented in Table 1.

Table 1. Average CAR, LDR, NPL, and ROA of Banking Companies 2021–2025

Year	CAR (%)	LDR (%)	NPL (%)	LENGTH (%)
2021	41,00	81,63	2,67	1,68
2022	42,34	92,55	2,50	1,84
2023	38,47	103,26	2,16	1,92
2024	33,50	90,25	2,03	1,88
2025	31,71	85,60	2,10	1,79

Source: www.idx.co.id, processed 2026

The movement of ROA is not always in the direction of the change in the three ratios. In 2023, for example, CAR decreased but ROA actually increased, while in 2025 an increase in NPL was followed by a decrease in ROA. This inconsistent pattern suggests the relationship between CAR, LDR, NPL, and ROA still requires empirical proof.

Previous research on this topic has also not shown uniform results. Fauziah and Febriyanti (2026) and Iklin (2024) found that CAR had a positive and significant effect on ROA, while Pratama and Kurniasari (2023) found a positive but not significant influence. Simanjuntak et al. (2026) concluded that LDR has a positive and significant effect on ROA, in contrast to the findings of Kenzen and Afandy (2023) who stated that LDR has no effect on ROA. These differences in results indicate the need for further studies in more recent periods and samples, so this study was conducted to obtain empirical evidence on the influence of CAR, LDR, and NPL on ROA in banking sector companies listed on the Indonesia Stock Exchange for the 2021–2025 period.

LITERATURE REVIEW AND HYPOTHESES

Theory Keagenan

Agency theory describes the relationship between the principal and the management (*agent*), which was first proposed by Jensen and Meckling (1976). Differences in interests between the two parties have the potential to cause agency conflicts, so financial ratios such as CAR, LDR, and NPL can function as a monitoring tool for the performance of bank management in managing capital, liquidity, and credit risk to increase profitability reflected through ROA.

Return On Assets, Capital Adequacy Ratio, Loan to Deposit Ratio, dan Non Performing Loan

ROA is a profitability ratio that measures the bank's ability to generate profit from the utilization of its assets, with the formula of profit before tax divided by the average total assets multiplied by 100%. CAR measures the ability of banks to provide capital to

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bear business risks, calculated from the ratio of capital to risk-weighted assets. LDR describes the bank's ability to channel third-party funds into credit, calculated from the comparison of total credit to third-party funds. NPL measures the level of non-performing loans, calculated from the ratio of non-performing loans to total loans disbursed. These four ratios are routinely used by banking regulators, such as the Financial Services Authority and Bank Indonesia, as an indicator of assessing the health level of banks.

Previous Research

Several previous studies have shown mixed results regarding the influence of CAR, LDR, and NPL on ROA. Fauziah and Febriyanti (2026) and Simanjuntak et al. (2026) found that CAR and LDR have a positive and significant effect on ROA. Pradigdo et al. (2025) through a systematic literature review concluded that CAR, LDR, and NIM generally have a positive effect, while NPL has a negative effect on ROA. Tahu et al. (2025) found that CAR and LDR have a positive and significant effect, while NPLs have a significant negative effect on ROA. Iklin (2024) found that CAR, NPL, and LDR both had a positive and significant effect on ROA in regional development banks, while Pakaya et al. (2024) only found that LDR had a significant effect, while NPLs had no effect. Murtiningrum and Cahaya (2024) found that CAR and LDR had a significant positive effect, while NPLs had a significant negative effect on ROA. Nikmah et al. (2023) found that the three ratios had an effect on profitability partially. Pratama and Kurniasari (2023) found that CAR and LDR had a positive but not significant effect, while NPL had a negative and significant effect. Kenzen and Afandy (2023) found that CAR had a positive effect, LDR had no effect, and NPLs had a partial effect on ROA. Hidayat et al. (2022) found that LDR had a positive effect, while NPL had a negative effect on ROA. The variation in findings confirms the need for more up-to-date sample retesting and periods.

Research Hypothesis

Based on theoretical studies and previous research, the hypothesis of this research is formulated as follows:

H1: CAR affects ROA in banking sector companies listed on the Indonesia Stock Exchange in 2021–2025.

H2: LDR affects ROA in banking sector companies listed on the Indonesia Stock Exchange in 2021–2025.

H3: NPLs affect ROA in banking sector companies listed on the Indonesia Stock Exchange in 2021–2025.

H4: CAR, LDR, and NPL simultaneously affect ROA in banking sector companies listed on the Indonesia Stock Exchange in 2021–2025.

RESEARCH METHODS

This study uses a quantitative descriptive method to test the influence of CAR, LDR, and NPL on ROA. The research population is all financial sector companies listed on the Indonesia Stock Exchange. The sample was determined using *a purposive sampling technique* with the following criteria: the company is a banking sector listed on the Indonesia Stock Exchange, issued complete financial statements for 2021–2025, and was in profit condition during the period. The sample selection process is presented in Table 2.

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Table 2. Sample Selection Criteria

Description	Quantity
Financial sector companies listed on the IDX	106
Non-banking financial sector companies	(58)
Incomplete financial statement data 2021–2025	(6)
Banking companies are not in a profit condition	(15)
Number of research samples	28
Number of years of research	5
Total samples (28 × 5)	**140**

Source: data processed, 2026

It was obtained from 28 banking companies with 140 observation data over five years. The data used is secondary data in the form of annual financial statements obtained from the official website of the Indonesia Stock Exchange (www.idx.co.id) and the official website of each company. Data analysis was carried out through descriptive statistical tests, classical assumption tests (normality using *one sample Kolmogorov-Smirnov test*, multicollinearity using *tolerance* and VIF values, heteroscedasticity using *Spearman rho test*, and autocorrelation using Durbin-Watson test) (Ghozali, 2016, 2018, 2021), followed by multiple linear regression analysis and hypothesis test through t-test, F test, and determination coefficient (R^2).

RESULTS AND DISCUSSION

Descriptive Statistics

The results of descriptive statistical testing of 140 observation data are presented in Table 3.

Table 3. Descriptive Statistical Test Results

Variabel	N	Minimum	Maximum	Mean	Std. Deviation
CAR (X1)	140	10,10	283,38	37,4042	34,37726
LDR (X2)	140	12,35	527,91	90,6571	52,34937
NPL (X3)	140	0,00	7,99	2,2926	1,27808
ROA (Y)	140	0,03	5,16	1,8214	1,27420

Source: SPSS data processing results, 2026

The average value of CAR of 37.40% shows that the level of capital adequacy of the sample companies in general is far above the minimum requirements of the regulator. The average LDR value of 90.66% indicates that credit distribution is quite optimal, while the average NPL of 2.29% is relatively low, and the average ROA of 1.82% indicates that the profitability level of the sample bank is in the fairly healthy category.

Classic Assumption Test

The normality test using *a one-sample Kolmogorov-Smirnov test* yielded a significance value of 0.200, greater than 0.05, so that the residual model was declared to be normally distributed. Multicollinearity testing showed that all independent variables had a *tolerance* value above 0.10 and VIF below 10 as presented in Table 4, so that no symptoms of multicollinearity between independent variables were found.

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Table 4. Multicollinearity Test Results

Variabel	Tolerance	LIVE	Remarks
CAR (X1)	0,530	1,887	Multicollinearity does not occur
LDR (X2)	0,549	1,821	Multicollinearity does not occur
NPL (X3)	0,942	1,062	Multicollinearity does not occur

Source: SPSS data processing results, 2026

Heteroscedasticity testing using *the Spearman rho* test resulted in a correlation significance value between residual and CAR, LDR, and NPL which was all above 0.05, so that the regression model was declared free of heteroscedasticity. Autocorrelation testing using the Durbin-Watson test yielded a value of 0.536, in the range of -2 to +2, so the model was declared free of autocorrelation symptoms. With the fulfillment of all classical assumptions, regression models are feasible to use for hypothesis testing.

Multiple Linear Regression Analysis and Hypothesis Testing

The results of multiple linear regression analysis along with individual significance tests (t-test) are presented in Table 5.

Table 5. Results of Multiple Linear Regression Analysis and t-Test

Variabel	B	Std. Error	Beta	t	Say.
(Constant)	1,955	0,270		7,229	0,000
CAR (X1)	0,001	0,004	0,024	0,227	0,821
LDR (X2)	0,006	0,003	0,252	2,401	0,018
NPL (X3)	-0,315	0,080	-0,315	-3,931	0,000

Source: SPSS data processing results, 2026

Based on Table 5, the regression equation is obtained: ROA = 1.955 + 0.001 CAR + 0.006 LDR − 0.315 NPL + e. A significance value of CAR of 0.821 (>0.05) indicates that CAR has a positive but insignificant effect on ROA, so H1 is rejected. The significance value of LDR of 0.018 (<0.05) indicates that LDR has a positive and significant effect on ROA, so that H2 is accepted. An NPL significance value of 0.000 (<0.05) indicates that NPL has a negative and significant effect on ROA, so H3 is accepted. The results of the simultaneous test (F test) and the determination coefficient are presented in Table 6.

Table 6. F Test Results and Coefficient of Determination

Model	Sum of Squares	df	Mean Square	F	Say.	R	R Square	Adjusted R Square
Back	39,905	3	13,302	9,685	0,000	0,420	0,176	0,158
Residual	186,776	136	1,373					
Total	226,680	139						

Source: SPSS data processing results, 2026

The calculated F value of 9.685 is greater than the F of the table of 2.67 with a significance of 0.000 (<0.05), so that CAR, LDR, and NPL simultaneously have a significant effect on ROA and H4 are received. The *adjusted R square value* of 0.158

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indicates that the three independent variables are able to explain 15.8% of the ROA variation, while the remaining 84.2% is explained by other factors outside the model, such as *net interest margin*, operating costs to operating income, company size, and macroeconomic conditions.

Discussion

CAR has a positive and insignificant effect on ROA, in line with the findings of Pratama and Kurniasari (2023) but contrary to Fauziah and Febriyanti (2026), Simanjuntak et al. (2026), Tahu et al. (2025), Murtiningrum and Cahaya (2024), and Kenzen and Afandy (2023). Most of the sample banks have CARs that are well above the regulator's minimum limit, so the difference in CAR values between banks no longer affects the bank's ability to generate profits, which is likely to be more determined by the effectiveness of credit disbursement and operational efficiency.

LDR has a positive and significant effect on ROA, consistent with the findings of Fauziah and Febriyanti (2026), Simanjuntak et al. (2026), Tahu et al. (2025), Murtiningrum and Cahaya (2024), and Pakaya et al. (2024), but contrary to Kenzen and Afandy (2023). Optimal credit distribution increases bank interest income, thereby encouraging an increase in ROA.

NPL has a negative and significant effect on ROA, in line with Tahu et al. (2025), Murtiningrum and Cahaya (2024), Pratama and Kurniasari (2023), and Hidayat et al. (2022), but contrary to Fauziah and Febriyanti (2026), Simanjuntak et al. (2026), and Pakaya et al. (2024). High non-performing loans lower interest income and increase the burden of reserves for impairment losses, thereby depressing bank profitability.

Simultaneously, CAR, LDR, and NPL have a significant effect on ROA, in line with the findings of Iklin (2024) and Nikmah et al. (2023). These findings confirm that a bank's profitability is not determined by a single financial ratio, but by a combination of capital management, liquidity, and credit quality at the same time.

CONCLUSION

This study concludes that CAR has a positive but not significant effect on ROA in banking companies listed on the Indonesia Stock Exchange in 2021–2025. LDR has a positive and significant effect on ROA, which means that the more optimal the distribution of credit to the public, the higher the bank's interest income and profitability. NPLs have a negative and significant effect on ROA, which means that the higher the level of non-performing loans, the lower the bank's profitability due to a decrease in interest income and an increase in the burden of loss reserves. Simultaneously, CAR, LDR, and NPL had a significant effect on ROA with the ability to explain the variation of 15.8%.

Banks are advised to maintain capital adequacy, optimize credit disbursement, and control non-performing loans in a balanced manner to increase profitability. Investors are advised not only to base on ROA, but also consider CAR, LDR, and NPLs as indicators of the bank's financial condition. The next study is suggested to expand the study period and sample and add other variables, such as *net interest margin*, operating costs to operating income, company size, or macroeconomic variables, considering that 84.2% of ROA variations are still explained by factors outside this research model.

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