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PENGARUH PERTUMBUHAN ASET, LDR, CAR, NPL, DAN BOPO TERHADAP ROA PERBANKAN INDONESIA 2020-2024

Febdwi Suryani[1*], Nicholas Renaldo[2], Jennie Dea Cheria[3], Arfah Piliang[4]
[1,2,&3]Institut Bisnis dan Teknologi Pelita Indonesia
[4]STIE Mahaputra
Email: febdwi.suryani@lecturer.pelitaindonesia.ac.id

ABSTRAK

Studi ini bertujuan untuk meneliti pengaruh Pertumbuhan Aset, Rasio Pinjaman terhadap Simpanan (LDR), Rasio Kecukupan Modal (CAR), Kredit Macet (NPL), dan Beban Operasional terhadap Pendapatan Operasional (BOPO) terhadap Return on Asset (ROA) pada perusahaan perbankan yang terdaftar di Bursa Efek Indonesia selama periode 2020-2024. Penelitian ini menggunakan pendekatan kuantitatif dengan data sekunder yang diperoleh dari laporan keuangan tahunan dan menerapkan purposive sampling. Data dianalisis menggunakan regresi linier berganda. Hasil penelitian menunjukkan bahwa LDR, CAR, dan BOPO memiliki pengaruh signifikan terhadap ROA, sedangkan Pertumbuhan Aset dan NPL tidak berpengaruh. BOPO merupakan variabel yang paling dominan mempengaruhi ROA. Temuan ini menunjukkan bahwa efisiensi operasional dan manajemen modal memainkan peran penting dalam meningkatkan profitabilitas perbankan.

***Kata Kunci**: Pertumbuhan Aset; LDR; CAR; NPL; BOPO; ROA*

THE INFLUENCE OF ASSET GROWTH, LDR, CAR, NPL, AND BOPO ON INDONESIAN BANKING ROA 2020-2024

ABSTRACT

This study aims to examine the effect of Asset Growth, Loan to Deposit Ratio (LDR), Capital Adequacy Ratio (CAR), Non-Performing Loan (NPL), and Operating Expenses to Operating Income (BOPO) on Return on Asset (ROA) in banking companies listed on the Indonesia Stock Exchange during the 2020-2024 period. The research uses a quantitative approach with secondary data obtained from the annual financial reports and applies purposive sampling. The data were analyzed using multiple linear regression. The result show that LDR, CAR, and BOPO have a significant effect on ROA, while Asset Growth and NPL do not. BOPO is the most dominant variable affecting ROA. These findings indicate that operational efficiency and capital management play an important role in improving banking profitability.

Keywords: Asset Growth; LDR; CAR; NPL; BOPO; ROA

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INTRODUCTION

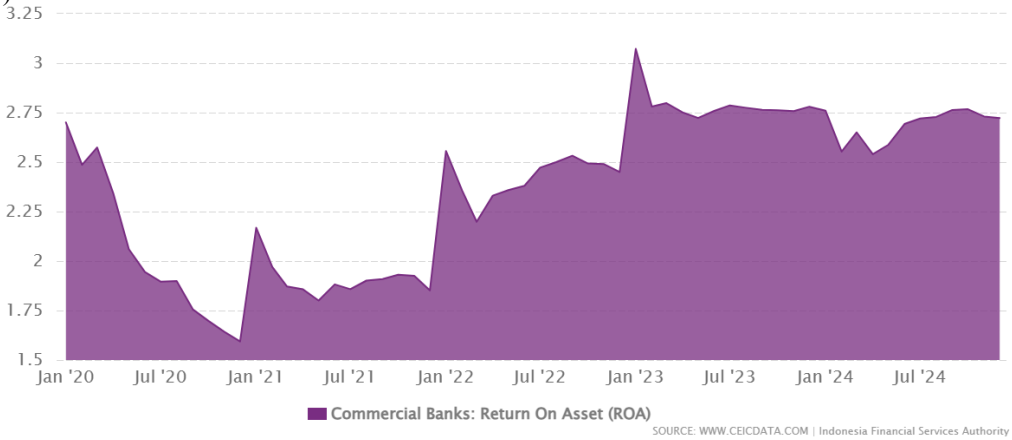
Background of the Issue

A country's economy is a cornerstone of sustainable development and public welfare. In Indonesia, economic stability is strongly reflected in the movements of the rupiah exchange rate. However, between 2020 and 2024, the rupiah faced significant pressure due to global dynamics. The fluctuations in the Rupiah exchange rate have been quite sharp, with the Rupiah depreciating significantly in early 2020 and reaching its peak in 2024, when the weakening became increasingly pronounced as the exchange rate approached the Rp16,000 per U.S. dollar range.

Sumber : Trading View, 2025

Figure 1. USD/IDR Exchange Rate 2020–2024

The weakening of the rupiah, as shown in Figure 1, has had a broad impact on the economic structure, particularly by increasing import costs, which ultimately erodes consumer purchasing power. The sector most sensitive to this phenomenon is banking. However, an interesting phenomenon emerges when comparing the exchange rate with banking performance for the 2020–2024 period. Although the Rupiah has continued to weaken, the banking sector's profitability, as reflected by Return on Assets (ROA), has demonstrated solid resilience. Return on Assets is a profitability indicator that measures a company's—particularly a bank's—effectiveness in utilizing all its assets to generate net profit (Supriantikasari & Utami, 2019). A high ROA value indicates sound management, while a decline in this ratio may signal operational inefficiency or increased credit risk (Taliwuna et al., 2019).



Source: CEIC Data, 2025 (CEIC Data, n.d.)

Figure 2. Commercial Bank ROA Rates for 2020–2024

The data in Figure 2 shows that the banking sector's ROA briefly hit a low of 1.55% in 2020 but surged significantly to reach a peak of 3.07% in early 2023. In theory, a weakening exchange rate should have a negative impact on profitability. However, the fact that the Indonesian banking sector was able to maintain and even increase its ROA indicates the crucial role of internal management factors in minimizing external risks.

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Focusing on internal factors is crucial because improved efficiency and risk management can maintain bank stability. Key internal factors believed to strongly influence ROA during this volatile period include Asset Growth, Loan-to-Deposit Ratio (LDR), Capital Adequacy Ratio (CAR), Non-Performing Loans (NPL), and Operating Expenses to Operating Income (BOPO).

One of the main challenges in maintaining the stability of banking ROA is the decline in asset growth, as evidenced by the slowdown in credit expansion during the pandemic. Positive asset growth indicates a bank's ability to expand its revenue capacity. However, previous research findings show inconsistencies; a study conducted by (Priatna et al., 2023) found that Asset Growth does not have a significant effect on ROA, while the findings of a study (Subekti & Wardana, 2022) actually revealed a significant positive relationship between Asset Growth and ROA.

Furthermore, liquidity ratios measured by the Loan-to-Deposit Ratio (LDR) also play a crucial role in balancing deposit mobilization and credit disbursement. An suboptimal LDR can disrupt interest income or even pose liquidity risks. In this regard, research conducted by (Anton et al., 2021) found that the LDR does not have a significant effect on ROA, whereas the findings of (Prayogi, 2024) show a different result, namely a significant positive effect.

Capital adequacy, as measured by the Capital Adequacy Ratio (CAR), is also a crucial factor in covering potential asset losses. Although Indonesian banks maintain healthy CAR levels, its impact on profits remains a subject of debate. Research conducted by (Abdurrohman et al., 2020) found a significant negative effect, whereas the findings of (Anton et al., 2021) concluded that CAR does not have a significant impact on ROA.

On the other hand, credit quality, as measured by Non-Performing Loans (NPLs), remains a serious threat. High NPL levels indicate weak credit risk management, which can reduce a bank's profits and ROA. Conversely, low NPLs reflect a healthy loan portfolio, enabling banks to maximize interest income. However, research conducted by(Setyarini, 2020) found that NPLs do not have a significant effect on ROA, whereas the findings of (Mandala et al., 2023) indicate the opposite—namely, a significant negative effect on ROA.

Finally, operational efficiency, measured by the Operating Expense to Operating Income Ratio (BOPO), is a key focus, particularly in managing operational costs amid economic volatility. A high BOPO indicates low company efficiency, which has the potential to reduce net profit. The findings of the study (Dewantara & Amelia, 2025) support the existence of a significant effect of BOPO on ROA, whereas the study conducted by (Emilia et al., 2025) found that BOPO has no significant effect on ROA.

This study limits its scope to conventional commercial banks listed on the Indonesia Stock Exchange (IDX) for the period 2020–2024. This limitation is imposed due to fundamental differences in operational principles, funding structures, and interest mechanisms between conventional banks and Islamic banks, which employ a profit-sharing system. Given the research gap identified in previous studies and the observed anomalies between macroeconomic conditions and Return on Assets (ROA) performance, this study aims to analyze the impact of Asset Growth, Loan-to-Deposit Ratio (LDR), Capital Adequacy Ratio (CAR), Non-Performing Loans (NPL), and Operating Expenses to Operating Income (BOPO) on Return on Assets (ROA) for banking companies listed on the Indonesia Stock Exchange (IDX) during the 2020–2024 period.

LITERATURE REVIEW

The Effect of Asset Growth on ROA

Asset growth reflects changes in a bank's total assets, indicating the bank's ability to expand its operational activities. Effectively managed asset growth, particularly in productive assets, can increase revenue and drive an increase in Return on Assets (ROA). Conversely, asset growth that is not accompanied by efficient management can actually add to the burden and risk, thereby potentially suppressing ROA (Rohmasari et al., 2023).

This study aligns with research conducted by (Subekti & Wardana, 2022) which indicates that Asset Growth has a positive and significant effect on ROA. However, these findings differ from the results of the study by (Priatna et al., 2023) which states that Asset Growth has no effect on ROA.

H_1 : *Asset Growth* memiliki pengaruh positif terhadap *Return on Asset*

The Impact of LDR on ROA

The Loan-to-Deposit Ratio (LDR) reflects a bank's ability to channel public funds into income-generating loans. An optimal LDR indicates effective use of funds, which can improve ROA. Conversely, an excessively high LDR may lead to liquidity pressures, while an excessively low LDR reflects suboptimal fund allocation. Therefore, the impact of LDR on ROA can be either positive or negative, depending on the bank's ability to manage loans and liquidity (Irman & Nurwita, 2025).

This study aligns with research conducted by (Setyarini, 2020) which showed that the LDR has a positive and significant effect on ROA. However, these findings differ from the results of the study by (Abdurrohman et al., 2020), which stated that the LDR has no effect on ROA.

H2: The Loan to Deposit Ratio has a positive effect on Return on Assets

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The Impact of CAR on ROA

The Capital Adequacy Ratio (CAR) reflects a bank's ability to absorb the risk of losses on its assets. A high CAR indicates strong capitalization, which supports operational stability and enhances ROA. However, a CAR that is too high may indicate that capital is not being optimally utilized to generate productive assets, while a CAR that is too low increases solvency risk. Therefore, CAR can influence ROA positively or negatively depending on the effectiveness of the bank's capital management (Salsabila & Hasrina, 2023).

This study aligns with research conducted by (Arnanda et al., 2025), which shows that the CAR has a positive and significant effect on ROA. However, these findings differ from the results of the study by (Anton et al., 2021), which states that the CAR has no effect on ROA.

H3: The Capital Adequacy Ratio has a positive effect on Return on Assets

The Impact of NPLs on ROA

Non-Performing Loans (NPLs) represent the level of problem loans held by a bank. An increase in NPLs indicates a growing number of uncollectible loans, leading to a decline in interest income and an increase in provisioning costs, which ultimately depresses ROA. Conversely, low NPLs reflect good credit quality and can support an increase in the bank's profitability (Cahyani & Amirudin, 2024).

This study aligns with research conducted by (Mandala et al., 2023), which shows that NPL has a negative and significant effect on ROA. However, these findings differ from the results of a study by (Setyarini, 2020), which states that NPL has no effect on ROA.

H4: Non-Performing Loans have a negative effect on Return on Assets

The Effect of BOPO on ROA

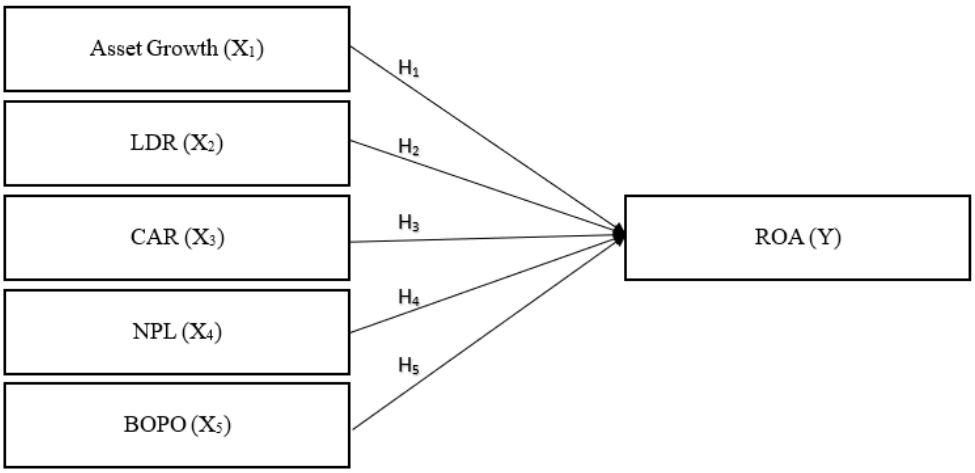
The ratio of operating expenses to operating income (BOPO) reflects a bank's efficiency in managing operating expenses relative to operating income. A high BOPO indicates higher operating expenses, which reduces profits and leads to a decline in ROA. Conversely, a low BOPO reflects better operational efficiency, which can enhance the bank's profitability (Fadhilah et al., 2025).

This study aligns with the research by (Wibowo et al., 2025), which demonstrates that BOPO has a negative and significant impact on ROA. However, these findings differ from the results of a study conducted by (Mandala et al., 2023)**,** which stated that BOPO has no effect on ROA.

H5: Operating Expenses as a Percentage of Operating Income have a negative effect on Return on Assets

Theoretical Framework

Based on the theoretical foundation, previous research findings, and the issues described above, the relationship between Asset Growth, Loan-to-Deposit Ratio (LDR), Capital Adequacy Ratio (CAR), Non-Performing Loans (NPL), and Operating Expenses to Operating Income (BOPO) and Return on Assets (ROA) can be explained through the following conceptual framework.



Source: Data Analysis, 2025

Figure 3. Conceptual Framework

RESEARCH METHODOLOGY

Research Location and Timeframe

This study was conducted on companies operating in the banking sector and listed on the Indonesia Stock Exchange (IDX) during the 2020–2024 period. Data was obtained from the IDX's official website, https://www.idx.co.id/id , IDN Financials, and several other relevant sources used to gather information regarding companies in the banking sector. The research process was carried out from September 2025 to February 2026.

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Population and Sample

The population in this study comprises companies operating in the banking sector and listed on the Indonesia Stock Exchange (IDX) during the 2020–2024 period. Based on data obtained from the IDX's official website, there are 47 banking sector companies that constitute the study population. The criteria used to determine the sample in this study are as follows:

Table 1. Research Sample Criteria

No	Sampling Criteria	Number of Companies
1	Banking sector companies listed on the IDX during the 2020–2024 period	47
2	Banking sector companies that went public during the study period	(4)
3	Banking companies not classified as conventional commercial banks	(3)
	Sample Size	**40**

Source: Processed Data, 2025

Research Variables

This study involves a number of variables classified into independent variables and dependent variables as follows:

Asset Growth (X1)

This indicator is calculated based on the difference between total assets in the current year and total assets in the previous year, which is then divided by total assets in the previous year. This ratio illustrates the percentage increase or decrease in the bank's business scale over a specific period. Based on research conducted by(Pamuji et al., 2025), the calculation of Asset Growth in this study is performed using the following formula:

$$Asset\ Growth = \frac{Total\ Aset - Total\ Aset_{(t-1)}}{Total\ Aset_{(t-1)}} \times 100\%$$

Loan-to-Deposit Ratio (X2)

The LDR is measured by comparing the volume of loans disbursed to borrowers against the amount of public funds successfully mobilized, such as checking accounts, savings accounts, and time deposits. This ratio indicates the bank's level of effectiveness in performing its intermediary function. Based on research conducted by (Setyarini, 2020), the LDR calculation in this study was performed using the following formula:

$$LDR = \frac{Total\ Credit}{Total\ Third - Party\ Funds} \times 100\%$$

Capital Adequacy Ratio (X3)

This capital variable is measured by the ratio of equity capital (core and supplementary capital) to Risk-Weighted Assets (RWA). This indicator reflects the banking sector's resilience in providing a capital buffer to anticipate potential asset losses. Based on research conducted by (Al-fadzar et al., 2021), the CAR calculation in this study was performed using the following formula:

$$CAR = \frac{Bank\ Capital}{Risk - Weighted\ Assets\ (RAW)} \times 100\%$$

Non-Performing Loans (X4)

This credit risk indicator is measured by comparing the total amount of non-performing loans (substandard, doubtful, and loss) to the total amount of loans granted. This ratio serves as a measure of the quality of earning assets and the success of credit risk management. Based on research conducted by (Mandala et al., 2023), the NPL calculation in this study was performed using the following formula:

$$NPL = \frac{Non - performing\ Loans\ (Substandard\ +\ Doubtful\ +\ Loss)}{(Total\ Loans\ Outstanding)} \times 100\%$$

Operating Expenses to Operating Income (X5)

This efficiency ratio is measured by comparing total operating expenses incurred to total operating income earned. The smaller this ratio, the more efficient the bank is in managing its routine expenses. Based on research conducted by (Khamisah et al., 2020), the OIR calculation in this study was performed using the following formula:

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$$BOPO = \frac{Operating\ Expenses}{Operating\ Revenue} \times 100\%$$

Return on Assets (Y)
A bank's profitability is measured by comparing net income after taxes to the average total assets held. This ratio provides an indication of the extent to which each rupiah of managed assets is able to generate profit for the company. Based on research conducted by (Pratama et al., 2024), the ROA calculation in this study was performed using the following formula:

$$ROA = \frac{Net\ Income\ After\ Tax}{Total\ Aset} \times 100\%$$

Data Analysis Techniques
This method was chosen because PLS has the advantage of analyzing relationships between variables simultaneously and does not require overly strict assumptions regarding data distribution, unlike parametric statistical methods used in other applications, such as IBM SPSS Statistics. Additionally, the use of SmartPLS allows researchers to analyze relationships between variables in the research model more comprehensively. Although the sample size in this study reached 200 data points, the PLS method was still chosen because it is considered more flexible in estimating parameters and more tolerant of potential multicollinearity and the possibility of non-normally distributed data.

Descriptive Analysis
Descriptive analysis is used to provide an initial overview of the characteristics and general patterns of the research data distribution. According to Santoso (2019), descriptive statistics are analytical techniques used to present data in the form of numerical measures that describe the distribution, dispersion, and central tendency of a research variable. Through these statistical summaries, researchers can comprehensively understand the data profile before proceeding to more in-depth analysis.

Multicollinearity Test
The multicollinearity test aims to detect strong relationships among independent variables in a regression model, which can cause coefficient estimates to be unstable and less accurate. According to Gujarati dan Porter (2009), multicollinearity is detected using the Tolerance and Variance Inflation Factor (VIF) values, where the Tolerance value indicates the extent to which one independent variable is explained by another, while the VIF measures the increase in variance. A regression model is considered free of this issue if it has a Tolerance value greater than 0.10 and a VIF value less than 10. Conversely, if these values exceed the specified limits, it indicates the presence of multicollinearity in the research model.

Model Validity Test
The model validity test in this study uses the coefficient of determination (R^2) to measure the extent to which the independent variables can explain changes in the dependent variable. The R^2 value ranges from 0 to 1; the higher the value, the greater the proportion of variation in the dependent variable that can be explained by the model. According to Gujarati and Porter (2009), a high R^2 value does not necessarily indicate a good model overall; therefore, in multiple regression analysis, it is recommended to use the Adjusted R^2 value. This value is considered more accurate because it accounts for the number of independent variables and sample size, thereby providing a more precise picture of the model's ability to explain relationships among variables.

Multiple Linear Regression Analysis
Multiple linear regression analysis is used to determine the direction and magnitude of the influence of more than one independent variable on a single dependent variable, as well as to understand the extent to which changes in the dependent variable can be explained both simultaneously and partially. According to Gujarati and Porter (2009), this functional relationship is expressed in the equation:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon$$

Notes:
Y = ROA
β0 = Constant, i.e., the value of Y when all independent variables are 0
β1, β2, …, β5 = Regression coefficients, which indicate the magnitude of the change in Y resulting from a one-unit change in each of the X variables
X1 = Asset Growth, X2 = LDR, X3 = CAR, X4 = NPL, X5 = BOPO
ε = Error term or residual, i.e., other factors outside the X variables that influence Y

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These regression coefficients indicate the direction of the relationship, where a positive value indicates a positive relationship and a negative value indicates an inverse relationship between the independent and dependent variables. Thus, this model provides a clear picture of the contribution of each banking indicator to profitability performance.

Partial Test (t-Test)

The t-test is used to determine the magnitude of the effect of each independent variable on the dependent variable in isolation, assuming that the other variables remain constant, in order to identify which variables contribute to the regression model. According to Gujarati and Porter (2009), the basis for decision-making in the t-test involves examining the significance level (Sig.) or comparing the calculated t-value with the critical t-value. If the significance level is less than 0.05 (Sig. < 0.05) or the calculated t-value is greater than the critical t-value, then the independent variable has a significant effect on the dependent variable. Conversely, if the significance value is greater than 0.05 or the calculated t-value is less than the critical t-value, then the variable does not have a significant effect. Thus, the t-test plays a crucial role in determining which variables have the greatest influence on changes in the dependent variable's value in this study.

RESULT AND DISCUSSION

Descriptive Analysis

A summary of the descriptive analysis results for the variables in this study is presented in Table 2 below.

Table 2. Descriptive Analysis

Variable	Minimum	Maximum	Avarage	Standard Deviation
Asset Growth	-0,8751	4,6482	0,1337	0,214
LDR	0,1235	1,6229	0,8603	0,2331
CAR	0,105	1,6992	0,3396	0,1818
NPL	0	0,273	0,0321	0,0237
BOPO	0,417	2,8786	0,9228	0,2641
ROA	-0,1371	0,0476	0,0065	0,0204

Source: Processed Data, 2026

Asset Growth

The lowest Asset Growth value is -0.8751, recorded by PT Bank Nationalnobu Tbk, while the highest Asset Growth value is 4.6482, recorded by PT Bank Jago Tbk. The average Asset Growth value is 0.1337, meaning that, in general, the banking companies studied were able to record an average asset growth of 13.37% per period. The standard deviation of 0.214 indicates that the distribution of Asset Growth data among conventional commercial banks on the IDX for the 2020–2024 period exhibits significant variation. This is reflected in the standard deviation being higher than the average value, indicating a fairly wide disparity in asset growth among the banks in the study sample. This standard deviation reflects a fairly dynamic data distribution but remains within reasonable limits for further analysis.

LDR

The lowest LDR ratio was 0.1235, recorded by PT Bank Capital Indonesia Tbk, while the highest LDR ratio was 1.6229, recorded by PT Bank Woori Saudara Indonesia 1906 Tbk. The average LDR value is 0.8603, which means that, in general, the banking companies studied have credit disbursement levels within the ideal range as stipulated by regulators. The standard deviation of 0.2331 indicates that the distribution of LDR data among conventional commercial banks on the IDX for the 2020–2024 period exhibits significant variation. This is reflected in the standard deviation being higher than the average value, indicating differences in liquidity strategies among the banks in the study sample..

CAR

The lowest CAR value is 0.105, held by PT Bank Mayapada Internasional Tbk, while the highest CAR value is 1.6992, held by PT Bank Jago Tbk. The average CAR value is 0.3396, indicating that, overall, the banks under study possess very strong capital adequacy to absorb operational risks. The standard deviation of 0.1818 indicates that the distribution of CAR data among conventional commercial banks on the IDX for the 2020–2024 period is quite diverse. This standard deviation reflects a reasonable data distribution, suggesting that the data shows stable results.

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NPL
The lowest NPL ratio is 0, held by PT Bank Jago Tbk and PT Bank Capital Indonesia Tbk, while the highest NPL ratio is 0.273, held by Bank Artha Graha Internasional Tbk. The average NPL value is 0.0321, meaning that the average level of non-performing loans in the banking sector remains below the safe threshold of 5%. The standard deviation of 0.0237 indicates that the distribution of NPL data among conventional commercial banks on the IDX for the 2020–2024 period is fairly even. A standard deviation lower than the average reflects that credit risk deviations among banks tend to be low and stable.

BOPO
The lowest BOPO ratio is 0.417, held by Bank Central Asia Tbk, while the highest BOPO ratio is 2.8786, held by PT Bank Raya Indonesia Tbk. The average BOPO ratio is 0.9228, which means that, in general, banks use approximately 92% of their operating income to cover expenses. The standard deviation of 0.2641 indicates that the efficiency levels of conventional commercial banks on the IDX during the 2020–2024 period exhibit significant variation. This suggests differences in management capabilities among banks in controlling their operating costs during the observation period.

ROA
The lowest ROA value is -0.1371, held by PT Bank Neo Commerce Tbk, while the maximum ROA value is 0.0476, held by PT Allo Bank Indonesia Tbk. The average ROA is 0.0065, meaning the average ability of banks to generate profit from total managed assets remains at a positive but marginal level. The standard deviation of 0.0204 indicates that the distribution of profitability among conventional commercial banks on the IDX during the 2020–2024 period exhibits relatively high volatility. A standard deviation higher than the mean reflects a significant disparity in profit performance among the banks under study.

Multicollinearity Test

Table 3. Results of the Multicollinearity Test

No	Variable	*Colinearity Statistics* VIF	Note
1	*Asset Growth*	1,364	There is no multicollinearity
2	LDR	1,071	There is no multicollinearity
3	CAR	1,401	There is no multicollinearity
4	NPL	1,140	There is no multicollinearity
5	BOPO	1,115	There is no multicollinearity

Source: SmartPLS Processed Data, 2026 Dependent : ROA (Y)

The results of the multicollinearity test show that the model with ROA (Y) as the dependent variable and Asset Growth, LDR, CAR, NPL, and BOPO as independent variables has VIF values that are all below 10 and Tolerance values above 0.1. This indicates that the regression model used is free from multicollinearity issues. In other words, there are no overly strong relationships among the independent variables, so the estimated regression coefficients obtained can be considered more reliable, stable, and unbiased.

Model Fit Test

Table 4. Model Fit Test Results (R-Square)

No	Variabel	*Adjusted R Square*
1	ROA	0,923

Source: SmartPLS Processed Data, 2026

Based on the results of the model's validity testing, an Adjusted R-Square value of 0.923—equivalent to 92.3%—was obtained for the influence of Asset Growth, LDR, CAR, NPL, and BOPO on ROA. Meanwhile, 7.7% of the variation in ROA is attributed to factors other than those examined in this study.

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Multiple Linear Regression Analysis

Table 5. Summary of Coefficients

Variabel	Unstandardized Coefficients	Standardized Coefficients	SE	T Value	P Value	Conclusion
Asset Growth → ROA	-0,001	-0,009	0,002	0,039	0,697	Not Significant
LDR → ROA	0,004	0,043	0,002	2,112	0,036	Significant
CAR → ROA	-0,007	-0,060	0,003	2,587	0,010	Significant
NPL → ROA	-0,019	-0,023	0,018	1,082	0,281	Not Significant
BOPO → ROA	-0,073	-0,954	0,002	45,92	0	Significant

Source: SmartPLS Processed Data, 2026 Signifikan P Value < 0,05

Based on the data in Table 5, it can be concluded that the analytical model used in this study is as follows:

$$Y = -0{,}009X_1 + 0{,}043X_2 + -0{,}060X_3 + -0{,}023X_4 + -0{,}954X_5$$

Partial Test (t-Test)

The Effect of Asset Growth on ROA

Based on the results of the multiple linear regression test in Table 5, it is found that the Asset Growth variable has a significance value (P-value) of 0.697 at a significance level of 0.05. Since the P-value is greater than 0.05, the alternative hypothesis (Ha) is rejected and the null hypothesis (Ho) is accepted. Thus, it can be concluded that Asset Growth does not have a significant effect on ROA.

The Effect of LDR on ROA

Based on the results of the multiple linear regression test in Table 5, it is found that the LDR variable has a significance value (P-value) of 0.036 with a significance level of 0.05. Since the P-value is less than 0.05, H0 is rejected and H1 is accepted. Thus, it can be concluded that LDR has a significant effect on ROA.

The Effect of CAR on ROA

Based on the results of the multiple linear regression test in Table 5, it is found that the CAR variable has a significance value (P-value) of 0.010 with a significance level of 0.05. Since the P-value is less than 0.05, H0 is rejected and H1 is accepted. Thus, it can be concluded that CAR has a significant effect on ROA.

The Effect of NPL on ROA

Based on the results of the multiple linear regression test in Table 5, it is found that the NPL variable has a significance value (P-value) of 0.281 with a significance level of 0.05. Since the P-value is greater than 0.05, H_a is rejected and H_o is accepted. Thus, it can be concluded that NPL does not have a significant effect on ROA.

The Effect of BOPO on ROA

Based on the results of the multiple linear regression test in Table 5, it is known that the BOPO variable has a significance value (P-value) of 0 at a significance level of 0.05. Since the P-value is less than 0.05, H0 is rejected and H1 is accepted. Thus, it can be concluded that BOPO has a significant effect on ROA.

DISCUSSION

The Effect of Asset Growth on ROA

Based on the results of the hypothesis testing, this study indicates that Asset Growth does not have a significant effect on ROA. This means that the magnitude of a company's asset growth does not directly determine its ability to generate profits. An increase in assets does not necessarily lead to an increase in the company's profitability.

The results of the descriptive statistical tests also indicate that the average Asset Growth in this study varies across companies. This suggests that not all companies experience stable asset growth every year. Among all the companies in the study sample, some exhibit high asset growth, while others have low asset growth. This finding further supports the research result that Asset Growth does not significantly influence a company's ROA.

This aligns with the findings of a study conducted by (Priatna et al., 2023), which showed that Asset Growth does not affect ROA. However, these results differ from the study conducted by (Rohmasari et al., 2023), which found that Asset Growth does affect ROA.

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The Effect of LDR on ROA

Based on the results of the hypothesis testing, this study indicates that LDR has a positive and significant effect on ROA. This means that the higher the level of credit disbursement reflected in the LDR, the greater the company's ability to generate profits. An increase in LDR indicates that funds raised from third parties are effectively channeled in the form of credit, thereby contributing to the company's improved profitability.

The results of the descriptive statistical analysis also show that the average LDR in this study is at a fairly high level and has increased in recent years. This indicates that most companies in the sample possess strong intermediation capabilities. Thus, this condition further reinforces the study's findings that LDR has a positive and significant effect on a company's ROA.

This is consistent with the results of a study conducted by (Prayogi, 2024), which showed that the LDR affects ROA. However, these results differ from the study conducted by (Anton et al., 2021), which found that the LDR does not affect ROA.

The Effect of CAR on ROA

Based on the results of the hypothesis testing, this study indicates that CAR has a negative and significant effect on ROA. This means that the higher a company's capital adequacy ratio, the more likely it is to experience a decline in profitability. This may occur because the large amount of capital set aside to meet capital adequacy requirements can reduce the efficiency of fund utilization for profit-generating productive activities.

The results of the descriptive statistical tests also indicate that the average CAR in this study is at a relatively high level and tends to increase year over year, although there was a slight decline in the final period. This condition suggests that the companies in the sample possess strong capital adequacy. However, the amount of capital held does not necessarily ensure optimal profitability. Thus, the findings of this study reinforce that CAR has a negative and significant effect on a company's ROA.

This aligns with the findings of a study conducted by (Wibowo et al., 2025), which showed that CAR influences ROA. However, these results differ from those of a study by (Aprianti & Sidiq, 2022, which found that CAR does not influence ROA.

The Effect of NPL on ROA

Based on the results of the hypothesis testing, this study indicates that NPL does not have a significant effect on ROA. This means that the level of non-performing loans held by a company—whether high or low—does not directly influence the level of profitability generated. A decrease in NPL does not necessarily automatically lead to a significant increase in ROA during the study period.

The results of the descriptive statistical tests also indicate that the average NPL in this study is at a relatively low level and fluctuates from year to year. This suggests that not all companies in the sample have the same level of credit risk. Consequently, these conditions support the study's finding that NPL does not have a significant impact on a company's ROA.

This is consistent with the findings of a study conducted by (Setyarini, 2020), which showed that NPLs do not affect ROA. However, these results differ from those of a study conducted by (Fajriani & Janudin, 2025), which found that NPLs do affect ROA.

The Effect of BOPO on ROA

Based on the results of hypothesis testing, this study indicates that BOPO has a negative and significant effect on ROA. This means that the higher the BOPO value—which reflects high operating expenses relative to operating revenue—the lower the company's profitability. Conversely, when a company is able to reduce operating costs, thereby lowering the BOPO value, profitability as reflected in ROA tends to increase.

The results of the descriptive statistical test also show that the average BOPO in this study varied from year to year, with a downward trend toward the end of the study period. This indicates an improvement in operational efficiency among most companies in the sample. Thus, this condition further reinforces the study's findings that BOPO has a negative and significant effect on a company's ROA.

This is consistent with the findings of a study conducted by (Aprianti & Sidiq, 2022), which showed that BOPO affects ROA. However, these results differ from those of a study conducted by (Siagian et al., 2021), which found that BOPO does not affect ROA.

CONCLUSION

Based on the results of testing on banking companies listed on the Indonesia Stock Exchange for the 2020–2024 period, this study concludes that the variables Loan-to-Deposit Ratio (LDR), Capital Adequacy Ratio (CAR), and Operating Expenses to Operating Income (BOPO) have a significant effect on Return on Assets (ROA). This indicates that liquidity levels, capital adequacy, and operational efficiency are among the key determinants of fluctuations in banking profitability. Conversely, Asset Growth and Non-Performing Loans (NPL) do not show a

significant influence on ROA. The lack of significance of NPL is likely due to the banking sector's success in minimizing credit risk through adequate provisions, while asset growth does not necessarily lead to a direct increase in profit if not managed efficiently.

This study has several limitations, including the low influence of some independent variables on ROA, indicating the presence of other factors outside this research model that are more dominant in influencing profitability. Additionally, the data collection process was hindered by limited information disclosure in the annual reports of some companies, necessitating further investigation through other secondary sources.

Based on these findings, it is recommended that bank management continue to maintain cost efficiency (BOPO) and capital ratios to ensure stable profitability. For investors, these results provide insight into the need to analyze efficiency and liquidity ratios more carefully before making investment decisions. For future research, it is recommended to expand the scope of variables by including external factors such as macroeconomic variables (inflation or interest rates) or other internal variables such as Net Interest Margin (NIM) and firm size to obtain a more comprehensive picture of banking financial performance.

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