THE IMPACT OF CAR, LDR, BOPO, SIZE, AND NIM ON BANKS FINANCIAL PERFORMANCE

Aris Sugiarto[1]*

Faculty of Economy and Business, Sumbawa University of Technology, Indonesia
aris.sugiarto@uts.ac.id

Sriyatun[2]

Faculty of Economy and Business, Sumbawa University of Technology, Indonesia
sriyatun@uts.ac.id
(*Corresponding Author)

Abstract- Banking Return on Assets (ROA) measures operational efficiency and profitability by measuring how well a bank uses its assets to generate cash. ROA is also influenced by macroeconomic conditions, related regulations, and the competitiveness of the banking sector. In an increasingly competitive market, banks must understand these phenomena to improve their profitability and competitiveness. This study seeks to examine the impact of the variables Capital Adequacy Ratio (CAR), Loan to Deposit Ratio (LDR), Operating Costs and Operating Income (BOPO), bank size (SIZE), and Net Interest Margin (NIM) on Return on Assets (ROA). The study population comprises all conventional banks registered on the Indonesia Stock Exchange (IDX) from 2019 to 2023, totaling 47 banks. The employed sampling approach is total sampling, indicating that the entire population is surveyed, resulting in a sample size of 47 banks across a five-year period. The total data analysed in this study is 235. The employed analytical method is multiple linear regression, supplemented by traditional assumption checks encompassing normality, heteroscedasticity, multicollinearity, and autocorrelation assessments. Hypothesis testing uses t-statistics to evaluate partial regression coefficients and F-statistics to assess simultaneous effects, with a significance threshold of 5% (0.05). The study's results demonstrate that CAR, LDR, BOPO, SIZE, and NIM significantly influence ROA both partially, as the significance value (sig) is below 0.05, and simultaneously on ROA.
Keywords: CAR; LDR; BOPO; SIZE; NIM

1. INTRODUCTION
1.1 Research Background

The financial performance of conventional banking in Indonesia shows dynamics that continue to develop in line with national economic growth and global challenges. In recent years, conventional banking in Indonesia has recorded significant growth in terms of assets, profits, and credit distribution (Wesso, Manafe, & Man, 2022). According to data from the Financial Services Authority (OJK), the banking industry in Indonesia will continue to experience an increase in total assets, reaching more than IDR 9,000 trillion in 2023. Various factors, such as increasing financial inclusion, domestic economic growth, and the increasing digitalization of banking services, influence this growth (Otoritas Jasa Keuangan, 2023). Conventional banking also recorded excellent performance in terms of net profit, with major banks such as Bank Central Asia (BCA), Bank Rakyat Indonesia (BRI), and Bank Mandiri continuing to dominate the market. However, the financial performance of conventional

banking is not free from a number of significant challenges and problems. One of the main problems faced by the banking industry is credit risk, where the quality of credit disbursed is still a serious concern (Chandra & Anggraini, 2020). The increasing ratio of non-performing loans (NPL) in several sectors, particularly after the COVID-19 pandemic, reflects the decline in credit quality. According to the OJK, while the NPL of Indonesian banking remains below the safe limit of 3%, certain sectors, such as the trade and transportation sectors, are experiencing difficulties in economic recovery, leading to an increase in NPL (OJK, 2023). This condition can burden bank profitability and increase provisioning costs for non-performing loans.

Furthermore, the accelerating pace of digitalization has facilitated the rise of technology-driven financial services that provide enhanced accessibility and greater efficiency, making competition from digital banking and fintech a significant challenge (Siagian, Lidwan, Ridwan, Taruna, & Roni, 2021). Fintech and neobanks, which are digital banks lacking physical branches, have effectively captured market share from specific demographics, particularly the youth and individuals underserved by traditional financial institutions. This rivalry compels traditional banks to innovate, enhance their digital services, and modify strategy to maintain relevance amid technological upheaval (Yasmir, Widyastuti, & Marlina, 2024). Regulation presents a significant challenge for traditional banking. Progressively rigorous requirements on capital and governance necessitate that banks enhance their capital structure and adhere to elevated prudential norms. The introduction of Basel III mandates that banks keep a greater capital buffer to mitigate potential global financial risks, hence intensifying pressure on the banking sector to uphold a sufficient capital adequacy ratio (CAR) (Dini & & Manda, 2020). Financial institutions, on the other hand, need to improve their governance and adjust to laws that safeguard consumers. Conventional banking must continue to innovate, increase capital capacity, and solve technological and regulatory concerns quickly and effectively if it wants to achieve sustainable development.

Capital Adequacy Ratio (CAR) and Return on Assets (ROA) are two important financial indicators that are interrelated in the banking sector. CAR measures the adequacy of a bank's capital in facing operational and financial risks and shows the extent to which a bank's capital can cover potential losses (Kurniasari & Zunaidi, 2022). A high CAR reflects that the bank has sufficient capital to bear the risk, which also reflects the bank's financial stability. On the other hand, ROA measures the efficiency of bank management in generating profits from its total assets. Banks with high ROA tend to be more efficient in utilising their assets to generate profits. The relationship between CAR and ROA often indicates a balance between capital security and profitability. A high CAR can contribute to a stable ROA because the bank has sufficient buffer to face risks so that it can protect its profitability (Mirawati, Putra, & Fitri, 2021). However, a CAR that is too high can also indicate that the bank is holding too much capital, which can reduce the bank's ability to optimally utilise its assets to generate profits. Conversely, if the CAR is too low, the risk of loss increases and can depress ROA. Therefore, a good balance between CAR and ROA is important for banks in maintaining their profitability and financial stability.

In addition to ROA, the Loan to Deposit Ratio (LDR) measures a bank's liquidity by comparing the total credit provided with the total funds collected in the form of deposits. An ideal Loan to Deposit Ratio (LDR) demonstrates the bank's ability to efficiently allocate customer funds into credit, thereby potentially generating income (Kurniawan, Munawar, & Amwila, 2020). On the other hand, ROA measures how effective the bank is in generating profits from its total assets, including credit provided to customers. The relationship between LDR and ROA is very close, with an optimal LDR supporting an increase in ROA. When the

LDR is in a healthy range (generally between 80% and 92%, in accordance with Indonesian regulatory policies), banks can maximize their assets in the form of credit, which usually provides a higher interest margin than other investments. (Alfian & Pratiwi, 2021) assert that a well-managed increase in credit can boost net interest income, thereby positively influencing ROA. However, a low LDR could suggest ineffective use of deposits to generate income, potentially reducing the bank's profitability. Conversely, a high LDR could suggest liquidity issues, as the bank might struggle to meet customer withdrawal obligations if it allocates too much of its funds to long-term credit (Putra, 2020).

According to (Yuliana & Listari, 2021), BOPO measures the extent to which a bank's operational costs are in relation to the operating income generated. A bank's operational efficiency increases with a lower BOPO ratio, indicating lower costs per unit of income earned. On the other hand, ROA measures a bank's ability to generate profits from its assets, thus becoming an important benchmark for bank profitability. The relationship between BOPO and ROA is negative, with a decrease in BOPO reflecting increased efficiency, which in turn tends to increase ROA (Azizah & Manda, 2021). When a bank successfully controls its operational costs well by managing labour costs, administrative costs, and other costs, the remaining operating income after covering these costs will be greater. This condition will drive higher profitability, which ultimately increases ROA. On the other hand, a high BOPO indicates excessive operational spending by the bank, resulting in a smaller amount of remaining income available for net profit. This will have a negative impact on ROA, as low efficiency leads to decreased profitability. According to (Maulana, Dwita, & Helmayunita, 2021), high BOPO often indicates that the bank is facing problems in operational efficiency, such as uncontrolled operating costs or a lack of ability to generate sufficient income from assets owned. If the bank is unable to manage operating costs well, this can erode profits and reduce overall financial performance. This will result in a depressed ROA for the bank, which will reflect lower profitability compared to the managed assets.

In addition to BOPO, bank size also plays an important role in influencing ROA (Return on Assets), according to Parawansa et al. (2021), larger banks tend to have more resources and capacity to diversify their credit portfolios, investments, and products and services offered. Large SIZE allows banks to achieve economies of scale, namely reducing the average cost per unit of service due to the large volume of activity. This has the potential to increase operational efficiency and profitability, which ultimately has a positive impact on ROA. In the relationship between SIZE and ROA, larger banks tend to have a better ability to utilize their assets to generate income. With larger assets, banks can channel larger amounts of credit or make investments with more significant returns (Agam and Pranjoto, 2021). Large banks also have the ability to spread risk more effectively, which can help them maintain financial performance stability despite economic fluctuations. Therefore, an increase in SIZE is often associated with an increase in ROA, as long as the bank is able to manage its assets well. However, there is a point where SIZE growth can face diminishing returns, where the larger the bank, the more difficult it is for them to maintain efficiency and profitability. Large banks may face more complex management challenges and higher operating costs, which can have an impact on increasing BOPO. If operating costs are not controlled, increasing SIZE can actually reduce efficiency, which ultimately depresses ROA. According to Hananto & Amijaya (2021), although large SIZE can support increased ROA through scale efficiency, banks must still maintain tight operational management to ensure that size growth does not sacrifice profitability. In this context, effective BOPO control and optimization of asset use are key for large banks to continue to achieve high ROA.

In addition to BOPO, bank size also plays an important role in influencing ROA (return on assets). According to (Parawansa, Rahayu, & Sari, 2021), larger banks tend to have more resources and capacity to diversify their credit portfolios, investments, and products and services offered. Large banks are able to achieve economies of scale by reducing the average cost per unit of service due to their large volume of activity. This has the potential to increase operational efficiency and profitability, which ultimately has a positive impact on ROA. In the relationship between SIZE and ROA, larger banks tend to have a better ability to use their assets to generate income. With larger assets, banks can channel larger amounts of credit or make investments with more significant returns (Agam & Pranjoto, 2021). Large banks also have the ability to spread risk more effectively, which can help them maintain financial performance stability despite economic fluctuations. Therefore, an increase in SIZE is often associated with an increase in ROA, as long as the bank is able to manage its assets well. However, there comes a point where SIZE growth may encounter diminishing returns, as the larger the bank, the more challenging it becomes to maintain efficiency and profitability. Large banks may face more complex management challenges and higher operating costs, which can have an impact on increasing BOPO. If operatiIf we fail to control operating costs, scaling up can actually decrease efficiency, leading to a decline in ROA. to (Hananto & Amijaya, 2021), although large sizes can support increased ROA through scale efficiency, banks must still maintain tight operational management to ensure that size growth does not sacrifice profitability, effective BOPO control and optimization of asset use are keys for large banks to continue to achieve a high ROA.

After discussing bank size, or SIZE, it is also important to understand the relationship between Net Interest Margin (NIM) and Return on Assets (ROA) in banking. (Rembet & Baramuli, 2020) define Net Interest Margin (NIM) as the percentage of average productive assets that represents the difference between interest income earned and interest expense paid. Meanwhile, return on assets (ROA) is a financial performance indicator that measures how efficiently a bank uses its assets to generate profits. A high NIM usually indicates that the bank has managed to make substantial profits from lending activities compared to deposit costs. When NIM increases, banks have a greater opportunity to increase net profits, which will ultimately increase ROA. This is because higher net interest income contributes positively to profit before tax and interest (Nufus & Munandar, 2021). However, maintaining a high NIM amidst fierce competition and strict regulations is not an effortless task. Banks that are able to maintain a stable NIM while also managing operating costs efficiently tend to have better ROA. This shows that they can maximize the use of their assets to generate profits. However, focusing on NIM alone is not enough. Banks must also consider credit risk factors so as not to sacrifice asset quality for the sake of higher profit margins (Ramadanti & Setyowati, 2022). Banks must balance between obtaining healthy interest margins and managing risk and operational efficiency so that they can increase profitability and support long-term growth while creating value for shareholders.

Previous studies have analyzed the impact of various factors, including capital adequacy ratio (CAR), loan-to-deposit ratio (LDR), operating costs and operating income (BOPO), bank size (SIZE), and net interest margin (NIM), on bank financial performance. However, there is currently a dearth of literature that comprehensively analyzes the interaction between these variables and their impact on return on assets (ROA), which is the primary indicator of financial performance. This study aims to bridge this gap by integrating various factors that impact bank performance. CAR, which reflWe expect CAR, a measure of bank capital health, to positively impact financial performance, while LDR demonstrates the bank's capacity to use deposits for loan provision. icator of operational efficiency, also plays an important role in determining

bank profitability, while SIZE and NIM are crucial variables that need further analysis. Through data analysis from banks listed on the Indonesia Stock Exchange (IDX), this study not only seeks to identify the influence of each variable on ROA but also to explore the dynamics of interaction between these variables. Therefore, we anticipate that the research results will offer deeper understanding to practitioners and stakeholders, enabling them to make strategic decisions that enhance bank financial performance and contribute to the development of banking sector policies.

1.2 Literature Review

1. *Capital Adequaty Ratio* (CAR)

    Capital Adequacy Ratio (CAR) is a ratio used to measure how much capital a bank has compared to the risks it faces, expressed in terms of risk-weighted assets. CAR is important to ensure that banks have enough capital to absorb losses and keep operating in unfavorable situations. International regulations, such as Basel III, set minimum standards for CAR to maintain the stability of the global financial system. CAR is calculated by dividing a bank's total capital by its total risk-weighted assets, and this ratio must meet the minimum requirements set by the banking supervisory authority to maintain the soundness and sustainability of the bank (Bank for International Settlements (BIS), 2019).

2. *Loan to Deposit Ratio* (LDR)

    Loan to Deposit Ratio (LDR) is a ratio used to measure the liquidity of a bank by comparing total loans granted with total deposits received. This ratio is important because it shows how well the bank is able to use deposits to make loans, which in turn affects the bank's profitability and liquidity risk. An LDR that is too high may indicate that the bank may face liquidity risk, while an LDR that is too low may indicate that the bank is not optimally utilizing deposits to generate income. Ideally, LDR should be within a healthy range, typically between 80% to 100%, to ensure a balance between loan growth and funds availability (Sullivan & Warren, 2020).

3. *Operating Expenses Operating Income* (BOPO)

    Operating Expenses Operating Income (BOPO) is a ratio used to measure the efficiency of bank operations by comparing total operating expenses to total operating income generated. This ratio is important because it gives an idea of how well the bank manages its operating expenses in generating income. A low BOPO indicates that the bank is more efficient in its operations, while a high BOPO may indicate a problem in cost management, which in turn may affect the bank's profitability. In the context of banking, BOPO is often used as a performance indicator to assess a bank's ability to control costs and maximize revenue (Sukirno, 2018).

4. *Company Size* (SIZE)

    Company size refers to the scale or capacity of a company that can be measured through various indicators, such as total assets, total revenue, number of employees, or market capitalization. Company size often affects business performance and strategy, with larger companies usually having better access to resources, technology and markets. In addition, firm size can also influence bargaining power in negotiations with suppliers and customers, as well as the ability to invest in product innovation and development. Research shows that firm size can be positively related to profitability and growth, although there are also challenges faced by large firms, such as management complexity and bureaucracy (Brealey & Myers, 2016).

5. *Net Interest Margin* (NIM)

   Net interest margin (NIM) is a measure used to assess the profitability of a bank or other financial institution, which is calculated by comparing the net interest income generated from loans with the interest expenses paid to depositors, relative to total interest-earning assets. NIM is expressed as a percentage and gives an idea of how effective a bank is in using its capital to generate income. This ratio is important as it shows the bank's ability to manage interest rate risk and its operational efficiency. A high NIM indicates that the bank is able to generate more income from loans than it costs to raise funds, while a low NIM may indicate problems in asset and liability management (Sukirno, 2018).

6. *Financial Performance* (ROA)

   Financial performance as measured by Return on Assets (ROA) is an indicator that shows how effective a company is in using its assets to generate profits. ROA is calculated by dividing net income by total assets, and expressed as a percentage. This ratio is important because it provides an overview of management efficiency in managing the resources owned by the company. The higher the ROA value, the better the company's financial performance, because it shows that the company is able to generate greater profits from each unit of assets owned. ROA is often used by investors and analysts to compare the performance of companies within the same industry and to assess the potential profitability of the company in the future (Sullivan & Warren, 2020).

1.3 Research Model

The research model to be used is a proposed replication research model from research by (Rembet & Baramuli, 2020). This research model explains the effect of CAR, LDR, BOPO, SIZE, AND NIM ON The Financial Performance (ROA) of Banks Listed On The IDX From 2019-2023.
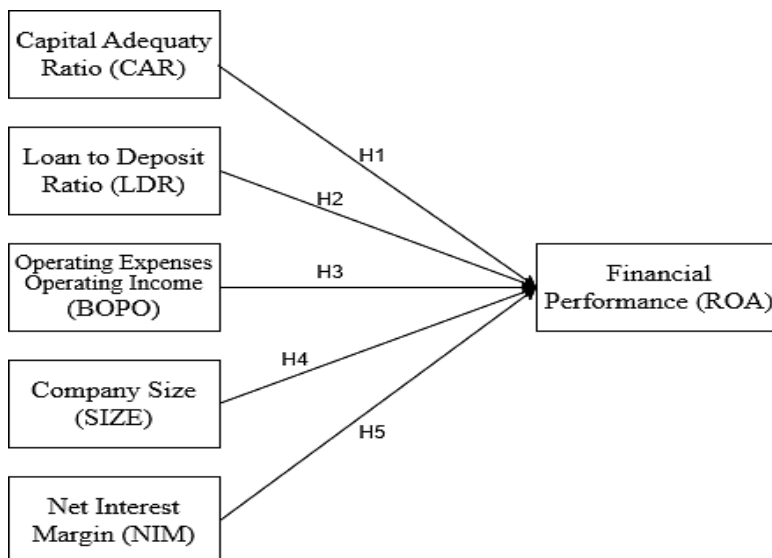

Figure 1. Research Model
Source: (Rembet & Baramuli, 2020)

2. RESEARCH METHODOLOGY
2.1 Methodology

This study utilises quantitative research, emphasising the analysis of numerical data through appropriate statistical methods (Sugiyono, 2020). The questionnaire for this study was created in Bahasa Indonesia, the respondents' native language, on a Likert scale ranging from 1 to 4. The measuring design encompasses enquiries into demographics, including gender, age, and monthly expenditures. The research population comprises banking entities listed on the Indonesia Stock Exchange (IDX) during periods I-IV from 2019 to 2023, totaling 47 banks. The study employed a total sampling technique, whereby the entire population served as the sample for analysis. This study had 47 respondents (banks) over a period of 5 years, resulting in a total of 235 data points (47 x 5 = 235).

2.2 Analytical Method

Descriptive statistics enable researchers to present succinct and informative data, facilitating interpretation and the formulation of preliminary conclusions conclusions (Jogiyanto, 2020). A high mean value for a variable may signify a favorable tendency within the study's context, whereas a high standard deviation may reflect considerable variability among the respondents or samples examined. Descriptive statistics are essential for preliminary data analysis, establishing a basis for comprehensive inferential analysis and enabling researchers to formulate more precise hypotheses grounded in observed characteristics. Regression analysis's classical assumptions are a set of requirements that must be satisfied for the estimation of the regression model to be valid and reliable. According to Jogiyanto (2020), these classical assumptions include several main points:

1. Normality Test

   The objective of the normality test is to assess the regression model by determining if the residuals conform to a normal distribution. Two approaches exist to ascertain if the residuals follow a normal distribution. This study employed the Kolmogorov-Smirnov Non-Parametric Statistical Test for analysis. The conventional criterion for this test is that if the p-value exceeds 0.05, it can be inferred that the residuals follow a normal distribution. If the p-value is less than or equal to 0.05, it signifies that the residuals are not normally distributed, potentially compromising the validity of the regression model (Jogiyanto, 2020).

2. Heteroscedasticity Test

   The heteroscedasticity test seeks to assess the disparity in the variance of residuals across different observations in the regression model. This study use the Glacier Test as a methodological approach for analysis. The prevailing standard dictates that if the p-value exceeds 0.05, there is no evidence of heteroscedasticity, indicating that the residual variance remains constant. If the p-value is less than or equal to 0.05, it signifies heteroscedasticity, potentially compromising the trustworthiness of the regression model estimate (Sugiyono, 2020).

3. Autocorrelation Test

   This test aims to ascertain the association between the error in period t and the error in the preceding period, t-1. The presence of such a connection suggests that the linear regression model exhibits an autocorrelation issue (Jogiyanto, 2020). This study employs the Run Test as one of several approaches to detect autocorrelation. The established criterion dictates that a p-value below 0.05 signifies the presence of autocorrelation, while a p-value beyond 0.05 suggests the absence of autocorrelation in the model.

4. Multicollinearity Test

The purpose of this test is to identify whether there is a correlation between the independent variables. A suitable model should not show any correlation between the independent variables. To measure the level of multicollinearity, one of the commonly used standards is the variance inflation factor (VIF). A VIF value greater than 10 indicates significant multicollinearity, which can be detrimental to the stability and interpretation of the regression model (Jogiyanto, 2020). Conversely, a VIF value below 5 is generally considered to indicate that there is no significant multicollinearity problem, so the variables can be considered orthogonal.

2.3 Hypothesis Testing

1. F-test

The F test is a statistical method used to simultaneously test the significance of several independent variables in a regression model on the dependent variable. This test aims to determine whether at least one of the independent variables has a significant effect on the dependent variable. The level of significance used is 0.05. If the p-value (probability) of the F test is less than 0.05, then H_0 is rejected, which means that there is a significant effect of the independent variable on the dependent variable (Sugiyono, 2020).

2. T-test

The t-test is a statistical technique employed to assess the significance of the impact of each independent variable on the dependent variable within a regression model. This test seeks to ascertain if the regression coefficient of the independent variable is significantly distinct from zero. After calculating the t value, compare it with the critical t value from the t distribution table at a certain level of significance (e.g., $\alpha = 0.05$) with the appropriate degrees of freedom, the level of significance used is 0.05. If the p value (probability) of the t test is less than 0.05, then H_0 is rejected, which means that the independent variable has a significant effect on the dependent variable (Sugiyono, 2020).

3. R-Square

The R-Square (R^2) test is a statistical measure to assess how well a regression model explains variation in the dependent variable. R^2 indicates the proportion of variation that can be explained by the independent variables, ranging from 0 to 1. Values close to 1 indicate the model can explain most of the variation, while values close to 0 indicate the model is less effective in explaining variation. A good R^2 value varies depending on the context and field of study. However, in general, an R^2 value above 0.7 is considered good, while values between 0.5 and 0.7 are acceptable, depending on the complexity of the model and the nature of the data (Jogiyanto, 2020).

3. RESULT AND DISCUSSION
3.1 Descriptive Statistics

Descriptive statistics is a data analysis strategy that seeks to summarise the features of the obtained data. This strategy does not seek to draw conclusions or generalise from a broader population, but instead aims to elucidate and illustrate current facts.

Tabel 1. Descriptive Statistics Test Result

	N	Minimum	Maximum	Mean	Std. Deviation
CAR	47	0,12	0,32	0,2118	0,1812
LDR	47	72,21	138,24	95,5214	9,82641
BOPO	47	68,18	108,52	89,6823	9,72874
SIZE	47	7,71	9,87	8,2623	2,26145
NIM	47	4,18	8,33	5,7834	2,35721
ROA	47	0,27	4,18	3,3217	1,28741
Valid N (listwise)	47				

Source: processed data, 2024

Data from descriptive statistical analysis of the performance of conventional banks listed on the Indonesia Stock Exchange (IDX) during the 2019-2023 period includes 47 banks. For the Capital Adequacy ratio (CAR), the minimum value was recorded as 0.12, maximum 0.32, with an average of 0.2118 and a standard deviation of 0.1812, showing significant variation but the average CAR is at a healthy level. The Loan to Deposit Ratio (LDR) shows a minimum value of 72.21, a maximum of 138.24, with an average close to 100% (95.5214), signaling efficiency in the use of deposits for loans. Operating Expenses to Operating Income (BOPO) has a minimum value of 68.18, maximum of 108.52, with an average of 89.6823, indicating efficient cost management although there are some banks with low efficiency. Bank size (SIZE) varies with a minimum value of 7.71 and a maximum of 9.87, averaging 8.2623, reflecting significant differences in the scale of operations. Net Interest Margin (NIM) shows a minimum value of 4.18, maximum of 8.33, with an average of 5.7834, reflecting the bank's ability to generate interest income despite high variation. Return on Assets (ROA) shows a minimum value of 0.27, maximum of 4.18, average of 3.3217, indicating efficiency in generating profit relative to assets, although some banks show below average performance.

3.2 Classical Assumption Test Results
3.2.1 Normality Test

Tabel 2. Normality Test Result

One-Sample Kolmogorov-Smirnov Test		
		Unstandardized Residual
N		47
Normal Parametersa, b	Mean	0,0000000
	Std. Deviation	0,13182963
Test Statistic		0,125
Asymp. Sig. (2-tailed)		0,062c
a. Test distribution is Normal.		
b. Calculated from data.		
c. Lilliefors Significance Correction.		

Source: processed data, 2024

The findings from the Kolmogorov-Smirnov (K-S) Non-Parametric Statistical test, as indicated in Table 2, are 0.178 with a significance value of 0.173. This result indicates a value over 0.05, allowing the conclusion that the data is regularly distributed and does not contravene the assumption of normality.

3.2.2 Heteroscedasticity Test

Tabel 3. Heteroscedasticity Test Result

Coefficients^a					
Model	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
	B	**Std. Error**	**Beta**		
1 (Constant)	0,542	0,182		1,362	0,598
CAR	0,571	0,452	0,712	0,321	0,521
LDR	0,219	0,126	0,416	0,614	0,506
BOPO	0,637	0,303	0,149	0,532	0,617
SIZE	0,278	0,125	0,173	0,572	0,569
NIM	0,178	0,131	0,197	0,581	0,682
a. Dependent Variable: ABS_RES					

Source: processed data, 2024

According to Table 3, the significant values are as follows, CAR is 0.521, LDR is 0.506, BOPO is 0.617, SIZE is 0.569, and NIM is 0.682. All of these values exceed 0.05. Therefore, we can deduce that all independent variables in this study demonstrate significance values exceeding 0.05, suggesting the absence of heteroscedasticity in the used regression model.

3.2.3 Autocorrelation Test

Tabel 4. Autocorrelation Test Result

Runs Test	
	Unstandardized Residual
Test Value	0,04218
Total Cases	47
Number of Runs	26
Z	0,298
Asymp. Sig. (2-tailed)	0,683

Source: processed data, 2024

According to Table 4, the significance analysis yielded a result of 0.683, which above 0.05, indicating the absence of autocorrelation in this investigation.

3.2.4 Multicollinearity Test

Tabel 5. Multicollinearity Test Result

Coefficients^a			
Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	CAR	0,618	2,782
	LDR	0,723	3,621
	BOPO	0,421	3,106
	SIZE	0,831	3,629
	NIM	0,227	4,712
a. Dependent Variable: ROA			

Source: processed data, 2024

Based on table 5 above, it can be seen that the VIF value for each variable in this study is less than 10 (VIF<10), so it can be concluded that all variables in this study do not experience symptoms of multicollinearity.

3.3 Hypothesis Test Results

Hypothesis testing is a statistical technique employed to evaluate certain assumptions or assertions on a population utilizing sample data. This approach seeks to ascertain if the sample data provides sufficient evidence to either support or refute the stated hypothesis.

1. F-test

Tabel 6. Regression Results-F-test

Model	Sum of Squares		df	Mean Square	F	Sig.
1	Regression	41,268	6	8,758	162,728	,000b
	Residual	0,812	40	0,142		
	Total	46,879	46			
a. Dependent Variable: ROA						
b. Predictors: (Constant), CAR, LDR, BOPO, SIZE, NIM						

Source: processed data, 2024

According to Table 6, a significant value of 0.000 is recorded, which is less than 0.05 or 5%. The independent factors (CAR, LDR, BOPO, SIZE, NIM) significantly influence ROA concurrently. The elevated F value (162.728) and the minimal p value (0.000) signify that this model is both valid and suitable for further investigation about the impact of these factors on ROA.

2. R-Square

Tabel 7. R-square test Result

Model Summary[b]			
Model	R Square	Adjusted R Square	Std. Error of the Estimate
1	0,853	0,827	0,28237

Source: processed data, 2024

Based on the data in table 7 above, the results of the correlation coefficient (R) and the coefficient of determination (R square) show the relationship between the independent and dependent variables. The analysis reveals a correlation coefficient value of 0.853, indicating an influence of 85.3% on the relationship between the independent and dependent variables. Other variables not included in the studied model explain the remaining 14.7%.

3. T-test

Tabel 8. Regression Results - T-test

Coefficients[a]					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	2,213	2,156		2,827	0,006
CAR	1,146	1,134	0,137	2,918	0,005
LDR	0,137	0,172	0,267	4,182	0,000
BOPO	-0,193	0,425	-0,928	-4,754	0,000
SIZE	0,379	0,187	0,729	5,630	0,000
NIM	0,218	0,292	0,145	4,873	0,000
a. Dependent Variable: ROA					

Source: processed data, 2024

The analysis results indicate a positive and significant impact of CAR on ROA. This conclusion is supported by the magnitude of the significance value of 0.005, indicating that the sig value is less than 0.05. Therefore, the hypothesis (H1) is accepted. This means that an increase in CAR, which reflects the adequacy of bank capital, contributes to an increase in financial performance as measured by ROA. In other words, banks that have a higher capital adequacy ratio tend to be more efficient in utilizing their assets to generate profits. This finding shows the importance of effective capital management in improving bank operational performance, as well as providing positive implications for investors and other stakeholders regarding the stability and financial health of banks. The results of this study align with the findings of previous studies by Mirawati, Putra & Fitri (2021), which indicate that banks with higher Capital Adequacy Ratio (CAR) are not only better equipped to handle risks, but also have the ability to utilize resources more efficiently to generate profits. Therefore, we expect an increase in CAR to lead to improved ROA, a measure of the health and sustainability of bank operations. This relationship further emphasizes the importance of good capital management in the banking context, as well as providing a basis for policies that support the strength of bank capital and achieve optimal performance. These results also support research (Kurniasari & Zunaidi, 2022)., where banks with a higher capital adequacy ratio have greater flexibility in dealing with economic uncertainty. Sufficient capital not only protects banks from potential losses but also allows them to be more aggressive in taking profitable investment and credit distribution opportunities, which then contributes to increasing ROA.

The analysis results indicate a positive and significant impact of LDR on ROA. This conclusion is supported by a significance value of 0.000, indicating that the sig value is less than 0.05. Therefore, we accept the hypothesis (H2). This means that the higher the loan to deposit ratio, the greater the bank's potential to generate profits from the assets it owns. When banks utilize deposits effectively to provide loans, they can increase interest income, which contributes to increased ROA. This finding shows the importance of a successful loan management strategy in supporting the bank's financial performance. In addition, these results provide an illustration that banks that are able to manage LDR optimally can not only meet liquidity needs but can also increase their profitability, which ultimately reflects better financial stability and attractiveness to investors. Kurniawan, Munawar, & Amwila's (2020) research confirms this finding, demonstrating that a healthy increase in LDR signifies more efficient use of funds. By maximizing credit distribution, banks can increase interest income, which is one of the main sources of profitability for conventional banks. Optimal LDR management allows banks to increase efficiency in using their assets. When LDR increases within a safe limit, banks are able to maximize income from loan assets, which then increases ROA. The reason for this is that the interest income from disbursed loans surpasses the costs associated with deposit collection, including deposit interest. Alfian & Pratiwi's (2021) research reinforces this perspective, demonstrating that banks with higher loan-to-deposit ratios (LDRs) and effective management typically exhibit higher profitability levels. This is due to the ability of credit income to offset operating costs and boost net profit.

From the results of the analysis that has been carried out, it shows that BOPO has a negative and significant effect on ROA. This is based on the magnitude of the significance value of 0.000, which means that the sig value <0.05, therefore the hypothesis is accepted (H3 is accepted). This implies that an increase in the BOPO

ratio, which represents the ratio of operating costs to income, results in a decrease in the bank's profit performance relative to its assets. An increase in operating costs without a corresponding increase in income puts pressure on the bank's profitability. This finding emphasizes the importance of operational efficiency in bank management, where banks that are able to control their operating costs tend to have better ROA. Thus, these results indicate that effective cost management is the key to improving financial performance, providing important implications for bank management in formulating strategies to improve efficiency and profitability. This study aligns with Azizah & Manda's (2021) research, demonstrating that banks with lower BOPO typically have higher ROA. Their ability to control operating costs, including labor, administrative, and infrastructure costs, enables them to convert more revenue into net income. In the banking industry, operational efficiency is one of the main factors that affect profitability, and banks that are able to reduce or control operating costs will be superior in terms of financial performance. Furthermore, Maulana, Dwita, & Helmayunita's research from 2021 demonstrates that inadequate operational cost management not only lowers net income but also limits the bank's ability to adapt to external financial pressures like market instability or growing competition. Therefore, banks with high BOPO face challenges in maintaining their profitability, especially in the midst of fluctuating economic conditions. Decreased efficiency can cause profit margins to erode further, which in turn worsens ROA performance.

The results of the analysis that has been carried out, it shows that SIZE has a positive and significant effect on ROA, this is based on the magnitude of the significance value of 0.000 which means that the sig value <0.05, therefore the hypothesis is accepted (H4 is accepted). This means that larger banks, as measured by total assets owned, tend to have better ability to generate profits from existing assets. Larger size is often associated with better economies of scale, wider access to markets, and the ability to invest in technology and innovation that can improve operational efficiency. This finding confirms that banks with larger sizes are not only able to increase profitability, but are also better able to face market challenges and financial risks. Thus, these results provide insight for bank management and other stakeholders that growth and expansion in size can be an effective strategy to improve financial performance and competitiveness in the banking industry. The results of this study support research conducted by Hananto & Amijaya (2021) which shows that banks with larger assets have more flexibility in dealing with financial risks and market uncertainty. Wider access to capital allows large banks to take more calculated risks and invest in technological innovations that improve operational efficiency, such as the use of sophisticated digital banking systems. This not only increases profitability by reducing operational costs but also helps banks maintain their competitiveness in an increasingly competitive market. In addition to economies of scale and market access, research by Parawansa et al. (2021) found that large banks are better able to face external challenges such as economic fluctuations or market uncertainty because they have larger capital buffers and better risk management structures. This ability to face financial risks makes large banks more financially stable than smaller banks, which are often more vulnerable to market shocks.

The results of the analysis that has been carried out, it shows that Net interest margin (NIM) has a positive and significant effect on ROA, this is based on the magnitude of the significance value of 0.000 which means that the sig value <0.05,

therefore the hypothesis is accepted (H5 is accepted). This means that the higher the net interest margin obtained by the bank, the greater the bank's ability to generate profits from the assets it owns. NIM, which measures the difference between interest income received and interest expenses paid, reflects the bank's efficiency in managing its assets and liabilities to generate income. When NIM increases, banks can better utilize loans and deposits to generate income, which contributes directly to increasing ROA. These findings indicate that effective management of the loan portfolio and the right interest rate setting strategy are essential to increasing bank profitability. Therefore, these results provide an illustration that focusing on increasing NIM can be a strategic step for banks in an effort to achieve better financial performance. The results of this study are in line with research by Nufus & Munandar (2021) which shows that NIM reflects the bank's efficiency in managing its assets and liabilities to generate income. When NIM increases, banks are able to take advantage of a larger interest spread from lending and funding activities, which directly impacts bank profitability through increased Return on Assets (ROA). Then a study conducted by Ramadanti & Setyowati (2022) also supports this view, where they found that higher NIM contributes to increased bank profits, because a larger interest spread allows banks to earn more income from each asset managed. When banks can set higher lending rates compared to the cost of funds, they get a larger margin, which directly strengthens their financial performance. Effective management of the loan portfolio and a careful interest rate setting strategy allow banks to optimize the use of funds and maximize interest income.

4. CONCLUSION
4.1 Conclusion

Based on the results of the analysis and discussion that have been presented previously, it can be concluded that partially CAR, LDR, SIZE, and NIM have a positive and significant effect on ROA, while BOPO has a negative and significant effect on ROA in the banking industry listed on the IDX in 2019-2023. Simultaneously, the variables CAR, LDR, BOPO, SIZE, and NIM impact ROA in the banking industry listed on the IDX from 2019 to 2023. Efficient capital management is very important for banks, where a high capital adequacy ratio (CAR) encourages banks to strengthen capital reserves, reduce financial risks, and increase investor confidence. In addition, with a favorable Loan to Deposit Ratio (LDR), banks need to maintain a balance between loans given and deposits received to ensure liquidity and financial health. The size of a bank also influences its ability to generate profits, with larger banks typically achieving higher profits due to the efficiency of economies of scale. The increase in Net Interest Margin (NIM) shows that the bank is getting a higher profit margin from each unit of money lent, so management must focus on credit distribution efficiency. Finally, with high operating costs to operating income (BOPO), banks need to reduce operating costs to increase profitability, making operational efficiency a top priority.

4.2 Implications/Limitations and Suggestions for Future Research

This study has several limitations, including not controlling for external factors such as global economic conditions or government policies that can affect bank financial performance. In addition, the study period covers years during the COVID-19 pandemic, which may distort the data and significantly affect bank financial performance. Therefore, further researchers who want to study the same theme are expected to include external control variables in the analysis to obtain more accurate and relevant results. In addition, they are also advised to conduct

additional analysis to separate the impact of the pandemic from the influence of the variables studied

3   REFERENSI

Agam, D. K., & Pranjoto, G. H. (2021). Pengaruh CAR, LDR, BOPO, dan Size Terhadap ROA pada Sektor Perbankan yang Terdaftar di BEI 2015-2019. *Jurnal Kajian Ilmu Manajemen (JKIM), 1(2)*.

Alfian, M., & Pratiwi, A. (2021). Pengaruh CAR, BOPO, NPL dan LDR terhadap ROA pada PT BANK RAKYAT INDONESIA (Persero) TBK. *Jurnal Ekonomi dan Bisnis Dharma Andalas, 23(2)*, 299-307.

Azizah, A. N., & Manda, G. S. (2021). Pengaruh CAR dan BOPO Terhadap Return On Assets Bank Umum Syariah Tahun 2015-2019. *Jurnal Ekonomi Manajemen Perbankan, 3(2)*, 79-88.

Bank for International Settlements (BIS). (2019). *Basel III: A global regulatory framework for more resilient banks and banking systems*. Basel Committee on Banking Supervision.

Brealey, R. A., & Myers, S. C. (2016). *Principles of Corporate Finance*. New York: McGraw-Hill Education.

Chandra, S., & Anggraini, D. (2020). Pengaruh CAR, BOPO, LDR, NIM dan NPL terhadap profitabilitas bank yang terdaftar di BEI tahun 2012-2018. *Bilancia: Jurnal Ilmiah Akuntansi, 4(3)*, 298-309.

Dini, N., & & Manda, G. S. (2020). Pengaruh Car, Npl, Nim, Bopo, Ldr Dan Suku Bunga Sbi Terhadap Roa Bank Bumn Periode Tahun 2009-2018. *E-Jurnal Ekonomi Dan Bisnis Universitas Udayana, 9(1)*, 8-19.

Hananto, B., & Amijaya, S. (2021). Pengaruh Ukuran Perusahaan, Ratio Kecukupan Modal, Dana Syirkah Temporer, dan BOPO Terhadap Profitabilitas Bank Syariah Di Indonesia. *Jurnal Ekonomi Syariah Pelita Bangsa, 6(02)*, 138-151.

Jogiyanto. (2020). *Metode penelitian: Pendekatan kuantitatif dan kualitatif.* Yogyakarta: Andi Offset.

Kurniasari, R., & Zunaidi, A. (2022). Analisa Pengaruh Capital Adequacy Ratio (CAR) Terhadap Return On Asset (ROA). *Proceedings of Islamic Economics, Business, and Philanthropy, 1(2)*, (pp. 708-742).

Kurniawan, M., Munawar, A., & Amwila, A. Y. (2020). Analisis Pengaruh CAR, NPL, dan LDR Terhadap ROA: Studi kasus pada Bank Kategori Buku Empat Periode 2014-2018. *Jurnal Ilmiah Manajemen Kesatuan, 8(2)*, 149-158.

Maulana, P., Dwita, S., & Helmayunita, N. (2021). Pengaruh CAR, NPL, LDR dan BOPO Terhadap Return ON Assets (ROA) pada Bank yang Terdaftar di Bursa Efek Indonesia Tahun 2017-2019. *Jurnal Eksplorasi Akuntansi, 3(2)*, 316-328.

Mirawati, M., Putra, R. A., & Fitri, M. D. (2021). Pengaruh Car, Fdr, Bopo Terhadap Roa Dengan Npf Sebagai Variabel Intervening Pada Btpn Syariah 2015-2019. *MABIS: Jurnal Manajemen Bisnis Syariah, 1(1)*, 63-71.

Nufus, H., & Munandar, A. (2021). Analisis Pengaruh CAR Dan NIM Terhadap ROA Pada PT Bank Muamalat Indonesia Tbk. *Jurnal Disrupsi Bisnis, 4(6)*, 497-511.

Otoritas Jasa Keuangan. (2023). *Laporan Kinerja Perbankan Nasional 2023.* Jakarta: OJK.

Parawansa, D. S., Rahayu, M., & Sari, B. (2021). Pengaruh ROA, DER, dan SIZE terhadap Return Saham pada Perusahaan yang terdaftar di BEI. *IKRAITH-EKONOMIKA, 4(2)*, 1-10.

Putra, H. M. (2020). Pengaruh Car, Npf, Bopo Dan Ldr Terhadap Roa Bank Umum Syariah Yang Terdaftar Di Bank Indonesia. *Jurnal Ilmu Manajemen (JIMMU), 5(1)*, 23-30.

Ramadanti, F., & Setyowati, E. (2022). Pengaruh NPL, LDR, BOPO dan Nim Terhadap Roa Pada PT. Bank Mandiri (Persero) Tbk Tahun 2013-2021. *EKOMBIS REVIEW: Jurnal Ilmiah Ekonomi Dan Bisnis, 10(2)*, 695-706.

Rembet, W. E., & Baramuli, D. N. (2020). Pengaruh Car, Npl, Nim, Bopo, Ldr Terhadap Return on Asset (Roa)(Studi Pada Bank Umum Swasta Nasional Devisa Yang Terdaftar Di Bei). *Jurnal EMBA: Jurnal Riset Ekonomi, Manajemen, Bisnis Dan Akuntansi, 8(3)*.

Siagian, S., Lidwan, N., Ridwan, W., Taruna, H. I., & Roni, F. (2021). Pengaruh BOPO, LDR dan NIM perbankan terhadap ROA di industri perbankan Indonesia. *Akrab Juara: Jurnal Ilmu-ilmu Sosial, 6(4)*, 151-171.

Sugiyono. (2020). *Metode penelitian: Pendekatan kuantitatif, kualitatif, dan R&D.* Bandung: Alfabeta.

Sukirno, S. (2018). *Dasar-Dasar Ekonomi Manajerial*. Jakarta: Prenadamedia Group.

Sullivan, A., & Warren, E. (2020). *Financial Institutions Management: A Risk Management Approach*. New York: McGraw-Hill Education.

Wesso, M. V., Manafe, H. A., & Man, S. (2022). analisis pengaruh CAR, NPL, LDR dan NIM terhadap profitabilitas perbankan di Indonesia (literature review manajemen keuangan perusahaan). *Jurnal Manajemen Pendidikan Dan Ilmu Sosial, 4(1), 1-9.*, 1-9.

Yasmir, Y., Widyastuti, I., & Marlina, E. (2024). Pengaruh Rasio CAR, LDR, ROA, ROE, NIM, BOPO Terhadap NPL di Bank Pembangunan Daerah di Sumatera. Indo-Fintech Intellectuals. *Journal of Economics and Business, 4(2)*, 555-569.

Yuliana, I. R., & Listari, S. (2021). Pengaruh CAR, FDR, Dan BOPO Terhadap ROA Pada Bank Syariah Di Indonesia. *Jurnal Ilmiah Akuntansi Kesatuan, 9(2)*, 309-334.