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ANALYSIS OF EFFICIENCY LEVEL IN INDONESIAN BANKING COMPANIES LISTED ON THE INDONESIAN STOCK EXCHANGE FOR THE 2019-2022 PERIOD

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ABSTRACT

This study analyzes the efficiency levels of Indonesian banking companies listed on the Indonesian Stock Exchange (IDX) during the period of 2019-2022, encompassing the impact of the Covid-19 pandemic. Efficiency in banking is crucial for maintaining competitive advantage and ensuring financial stability, especially in the face of global challenges such as economic globalization and digitalization. The research evaluates the efficiency of banks using indicators like the CAMEL method, BOPO, NIM, NPL, LDR, and CAR ratios. The study finds that the pandemic significantly affected banks' efficiency, with notable declines in NIM and ROA ratios due to economic uncertainty and operational cost challenges. Post-pandemic, these ratios have shown signs of stabilization. The study uses descriptive quantitative methods, analyzing secondary data from annual financial reports of eight banking companies listed on IDX. The results indicate that strategic measures in risk management and cost efficiency are imperative for banks to navigate future uncertainties.

KEYWORDS *Banking Efficiency, Indonesian Banking Sector, Covid-19 Impact, Financial Ratios, CAMEL Method*

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INTRODUCTION

In the era of economic globalization, the banking industry has become a key pillar of the global economy, providing crucial financial services that support economic growth and business activities. To maintain their presence in the global economy, banks need to implement various strategies, including cost efficiency to remain competitive. This efficiency is foundational for the stability of financial systems.

As globalization and digitalization advance, the banking landscape becomes increasingly complex. Commercial banks face challenges to offer more efficient

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and innovative services while ensuring security and high-quality service for their customers. Efficiency in the banking sector requires strategic actions due to heightened competition and increased risks, which can be mitigated over time with proper measures.

The Covid-19 pandemic from 2019 to the end of 2022 significantly impacted many industries, including banking. The financial sector suffered substantial losses, prompting government policies that differed from usual business activities, leading to reduced production and consumption. The pandemic highlighted the need to reassess banking efficiency in Indonesia, measuring the ability of banks to maintain optimal output with available input.

Bank Indonesia classifies banks based on core capital into groups known as BUKU, and during the pandemic, new regulations (KBMI) were introduced by the Financial Services Authority (OJK) to further categorize banks. These groups have minimum core capital requirements, affecting each bank's development and performance evaluation based on efficiency.

Efficiency benchmarks are set by Bank Indonesia and OJK using the CAMEL method and other ratios like BOPO and NIM. These indicators help assess the banks' operational efficiency, with the aim of achieving stability and effectively managing resources, especially during the pre- and post-pandemic periods.

The pandemic led to a decline in key efficiency ratios such as NIM and ROA due to economic uncertainty. Operational costs remained high while income decreased, posing challenges for banks to enhance economic activities through strategies like digital transaction expansion. Post-pandemic, these ratios started to stabilize, indicating a return to normalcy (Priatna, 2017).

Risk management during and after the pandemic is crucial, focusing on credit, liquidity, and capital adequacy risks. These risks are measured using NPL, LDR, and CAR ratios. A healthy NPL ratio is below 5%, LDR between 80%-90%, and CAR above 8%. The pandemic necessitated a re-evaluation of banking efficiency to ensure stability and effective resource management.

Overall, the Covid-19 pandemic emphasized the need for efficient cost management and risk mitigation in banking. The study aims to evaluate and compare the efficiency levels during and after the pandemic, assessing whether Indonesian banks can maintain their efficiency in facing future challenges.

In connection with the level of banking efficiency during the Covid-19 pandemic and after the Covid-19 pandemic. So, this research is related to analyzing the level of banking efficiency in Indonesia by comparing the efficiency carried out between Conventional Banks and State-Owned Commercial Banks (BUMN). Based on the description above, the author is interested in choosing the title "Analysis of Efficiency Levels in Banking Companies in Indonesia Listed on the Indonesian Stock Exchange for the Period 2019 - 2022"

RESEARCH METHOD

This type of assessment is a descriptive quantitative assessment. The study data used to prove the hypothesis of this study is secondary data financial reports. The data source is in the form of annual financial reports reported and published by

relevant agencies from 2019 to 2022 which can be accessed from the Indonesia Stock Exchange (BEI) website.

In this study, the population group used as the object of study was all banking companies listed on the Indonesia Stock Exchange during the period 2019 to 2022, a total of 8 banking companies (Budiansyah, 2023). The sampling method in this study was carried out by purposive sampling with the criteria of banks whose complete annual financial reports were available for four years from 2019 to 2022. Based on the following criteria:

a) Banking financial services sector companies that have been listed on the Indonesia Stock Exchange from 2019 to 2022.
b) Throughout the research period, banks listed on the Indonesia Stock Exchange routinely report annual financial reports starting from 2019 - 2022 and have complete data throughout the observation period.
c) The selection of this sample was based on the completeness of the data contained in www.idx.co.id/id/usaha-terputar/report-keuangan-dan-ananan/ annual financial reports of banking companies, especially information regarding the variables that will be used in this research .
d) The banking sector companies used as samples experienced losses or profits throughout the research period so that there would be no bias in the research results as a result of the selected variables.
e) The banking companies used as samples are banking companies that have been registered on the Indonesia Stock Exchange and are in Core Capital Bank Group IV before POJK No. 12/POJK.03/2021.

In this research, the data collection that will be used in this research is the documentation method, namely the data collection method by studying, classifying and using secondary data such as notes, reports, especially bank financial reports that are relevant to the research. After the data is collected, it is then checked and tabulated to produce an analysis, thereby producing quality and accountable analysis.

RESULTS AND DISCUSSION

Descriptive Statistics

Table 4.1 Descriptive statistics

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
NPLs	32	1.34	4.78	2.8253	.79487
LDR	32	61.96	113.50	83.0300	11.31524
CAR	32	16.78	35.67	23.0178	4.74100
BOPO	32	46.54	98.12	76.5541	12.44780
ROA	32	.13	4.02	2.0250	1.11566
Valid N (listwise)	32				

From the descriptive statistical test results in the table above for the non-performing loan (NPL) variable, it shows a minimum value of 1.34 and a maximum

value of 4.78. Meanwhile, the average value of the non-performing loan (NPL) variable is 2.82 with a standard deviation value of 0.79. Furthermore, the loan to deposit ratio (LDR) variable based on the results of descriptive statistical tests shows a minimum value of 61.96 and a maximum value of 113.50. Meanwhile, the average value of the loan to deposit ratio (LDR) variable is 83.03 with a standard deviation of 11.31. Then, the capital adequacy ratio (CAR) variable based on the results of descriptive statistical testing shows a minimum value of 16.78 and a maximum value of 35.67. Meanwhile, the average value of the capital adequacy ratio (CAR) variable is 23.01 with a standard deviation of 4.74.

The variable operating expenses, operating income (BOPO) based on descriptive data shows a minimum value of 46.54 and a maximum value of 98.12. Meanwhile, the average value for the operating expenses and operating income (BOPO) variable is 76.55 with a standard deviation of 12.44. Then, in variables*return on assets*(ROA) based on the results of descriptive statistical tests shows a minimum value of 0.13 and a maximum value of 4.02. Meanwhile, the average value of return on assets (ROA) is 2.02 with a standard deviation of 1.11.

Classic Assumption Test

Normality Test

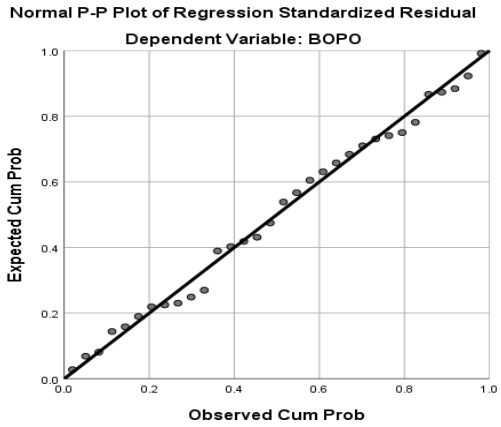

Figure 4.1
P-Plots Normality Test Results on BOPO

It can be seen in the normality test using the probability plot method with the dependent variable BOPO. The results of the P-Plots distribution of normally distributed residues spread around the diagonal line and follow the direction of the diagonal line, meaning that the residual values are normally distributed.

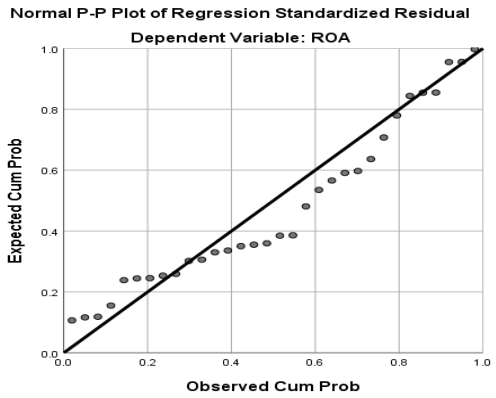

Figure 4.2
P-Plots Normality Test Results on ROA

It can be seen in the normality test using the probability plot method with the dependent variable ROA. The results of the P-Plots distribution of normally distributed residues spread around the diagonal line and follow the direction of the diagonal line, meaning that the residual values are normally distributed.

Table 4.2
Normality Test Results*Kolmogrov-Smirnov On BOPO*

One-Sample Kolmogorov-Smirnov Test		
		Unstandardized Residuals
N		32
Normal Parameters, b	Mean	.0000000
	Std. Deviation	.58038774
Most Extreme Differences	Absolute	,097
	Positive	,097
	Negative	-.056
Statistical Tests		,097
Asymp. Sig. (2-tailed)		,200c,d
a. Test distribution is Normal.		
b. Calculated from data.		
c. Lilliefors Significance Correction.		
d. This is a lower bound of the true significance.		

It can be seen from the table above, the results of the normality test using the dependent variable operating expenses operating income (BOPO) using the Kolmogorov-Smirnov method that sig (2-tailed) is 0.200, it is known that the

requirement for sig (2-tailed) > 0.05 on the standardized residual value , then the company data sample can be said to be normal.

Table 4.3
Kolmogrov-Smirnov Normality Test Results on ROA

One-Sample Kolmogorov-Smirnov Test		
		Unstandardized Residuals
N		32
Normal Parameters, b	Mean	.0000000
	Std. Deviation	.08653647
Most Extreme Differences	Absolute	.144
	Positive	.144
	Negative	-.097
Statistical Tests		.144
Asymp. Sig. (2-tailed)		.088c
a. Test distribution is Normal.		
b. Calculated from data.		
c. Lilliefors Significance Correction.		

It can be seen from the table above, the results of the normality test using the dependent variable return on assets (ROA) using the Kolmogorov-Smirnov method are that sig (2-tailed) is 0.088, it is known that the requirement for sig (2-tailed) is >0.05 on the standardized residual value, then the company data sample can be said to be normal.

Multicollinearity Test

Table 4.4
Multicollinearity Test Results on BOPO

Coefficientsa								
		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	5,253	16,614		,316	,754		
	NPLs	10,521	2,022	,672	5,204	,000	,720	1,390
	LDR	,313	,160	,284	1,961	,060	,570	1,753
	CAR	,678	,330	,258	2,055	,049	,759	1,317
a. Dependent Variable: BOPO								

Based on the multicollinearity test table on operating expenses, operating income (BOPO) above, a regression can be said to have detected or not detected multicollinearity, which can be seen based on the multicollinearity test results table above. If the tolerance value is > 0.1 and VIF (Variance Inflation Factor) < 10, then there is no multicollinearity in the multicollinearity test results. It can be seen that the tolerance of each variable is 0.720, 0.570, and 0.759 > 0.1 and the VIF of each

variable is 1.390, 1.753, and 1.317 < 10. So there is no multicollinearity and there are no problems in the sample data regression model used.

Table 4.5
Multicollinearity Test Results on ROA

Coefficientsa								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	6,062	,921		6,579	,000		
	NPLs	-.089	,157	-.063	-.567	,576	,366	2,734
	LDR	,030	,009	,306	3,202	,003	,502	1,994
	CAR	,030	,020	.128	1,534	.137	,660	1,516
	BOPO	-.091	,010	-1.018	-8,717	,000	,336	2,978
a. Dependent Variable: ROA								

Based on the multicollinearity test table on return on assets (ROA) above, a regression can be said to have detected or not detected multicollinearity, which can be seen based on the multicollinearity test results table above. If the tolerance value is > 0.1 and VIF (Variance Inflation Factor) < 10, then there is no multicollinearity in the multicollinearity test results. It can be seen that the tolerance of each variable is 0.366, 0.502, 0.660, and 0.336 > 0.1 and the VIF of each variable is 2.734, 1.994, 1.516, and 2.978 < 10. So there is no multicollinearity and there are no problems in the sample data regression model. used.

Heteroskedasticity Test

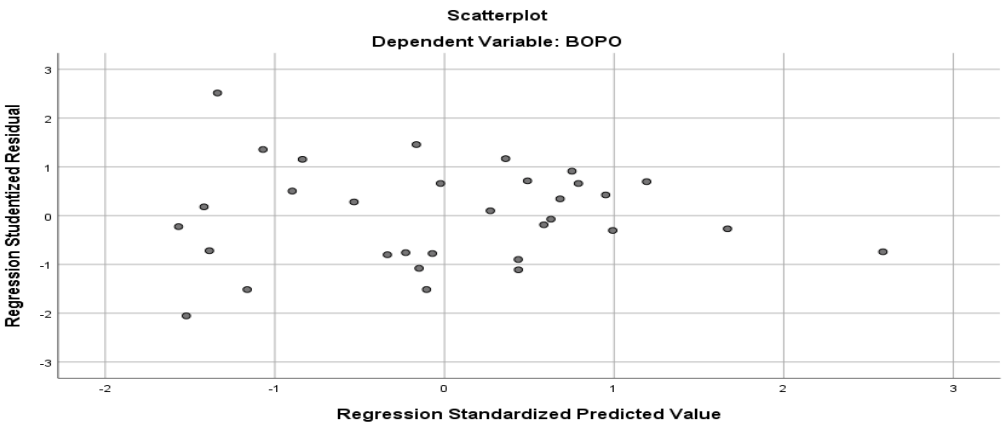

Figure 4.3
Multicollinearity Test Results on BOPO

In the image of the heteroscedasticity test results with the dependent variable BOPO, it can be seen that the distribution of points does not form a particular pattern. The spreading points are below and above the number 0. The points do not

gather only above and below. So it can be concluded that the regression is free from cases of heteroscedasticity and meets the test requirements.

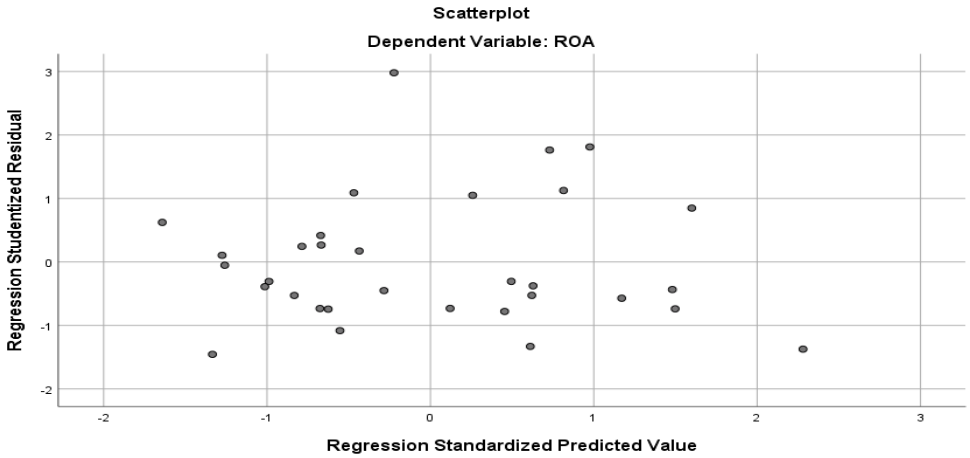

Figure 4.4
Multicollinearity Test Results on ROA

Then, in the image of the heteroscedasticity test results with the dependent variable ROA, it can be seen that the distribution of the points does not form a particular pattern. The spreading points are below and above the number 0. The points do not gather only above and below. So it can be concluded that the regression is free from cases of heteroscedasticity and meets the test requirements.

Autocorrelation Test

Table 4.6
Autocorrelation Test Results on BOPO

Model Summary b					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.815a	,664	,628	7.58993	1,839
a. Predictors: (Constant), CAR, NPL, LDR					
b. Dependent Variable: BOPO					

Based on the results of the autocorrelation test in BOPO table 4.6 above, it shows that using the Durbin-Watson test on the residual regression equation the figure is 1.839. With the Durbin-Watson autocorrelation test of 3 (three) independent variables with a sample of n = 32, the values = 1.2437 and = 1.6505. So it can be said that the research regression similarity does not have an autocorrelation problem with decision making < d < 4 - , with a value of 1.6505 < 1.839 < 2.3495.$d_L d_U d_u d_u$

Table 4.7
Autocorrelation Test Results on ROA

Model Summary b					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson

1	.936a	,876	,858	.42022	1,932
a. Predictors: (Constant), BOPO, CAR, LDR, NPL					
b. Dependent Variable: ROA					

Based on the results of the autocorrelation test in ROA table 4.7 above, it shows that using the Durbin-Watson test on the residual regression equation the figure was 1.932. With the Durbin-Watson autocorrelation test of 3 (three) independent variables with a sample of n = 32, the values = 1.2437 and = 1.6505. So it can be said that the research regression similarity does not have an autocorrelation problem with decision making < d < 4 - , with a value of 1.6505 < 1.932 < 2.3495.$d_L d_U d_u d_u$

Multiple Regression Analysis

Table 4.8
Results of Multiple Regression Analysis on BOPO

Coefficientsa								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	5,253	16,614		,316	,754		
	NPLs	10,521	2,022	,672	5,204	,000	,720	1,390
	LDR	,313	,160	,284	1,961	,060	,570	1,753
	CAR	,678	,330	,258	2,055	,049	,759	1,317
a. Dependent Variable: BOPO								

From the results of developing the general equation for sub-structure path 1, multiple linear regression analysis can be developed as follows:

$$Z = 5.253\beta + 10{,}521X_1 + 0.313 + 0.678X_2X_3$$

Information:
Z = Operating Expenses Operating Income
X_1=Non Performing Loans(NPL)
X_2=Loan to Deposit Ratio(LDR)
X_3=Capital Adequacy Ratio(CAR)

From the results of the analysis of the multiple linear regression equation above, it produces a constant value of 5.253 if the non-performing loan (NPL), loan to deposit ratio (LDR), capital adequacy ratio (CAR) are zero or non-existent. The coefficient on the non-performing loan (NPL) variable is 10.521, indicating that a one unit increase in the NPL value will increase BOPO by 10.521. Then, the loan to deposit ratio (LDR) variable coefficient of 0.313 shows that a one unit increase in the LDR value will increase BOPO by 0.313. Furthermore, the capital adequacy ratio (CAR) variable coefficient of 0.678 shows that an increase in the value of one CAR unit will increase BOPO by 0.678.

Table 4.9
Results of Multiple Regression Analysis on ROA

Coefficientsa

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.310E-15	.016		,000	1,000
	NPLs	-.075	,027	-.080	-2,738	.011
	LDR	,282	.023	,298	12,224	,000
	CAR	.101	,020	.107	5,088	,000
	BOPO	-1,009	,029	-1,069	-35,173	,000
a. Dependent Variable: ROA						

From the results of developing the general equation for sub-structure path 2, multiple linear regression analysis can be developed as follows:

$$Y = -2.310\beta + (-0.075)X_1 + 0.282 + 0.101 + (-1.009)Z + X_2X_3$$

Information:

Y = ROA

β = Coefficient

X_1=*Non Performing Loans*(NPL)

X_2=*Loan to Deposit Ratio*(LDR)

X_3=*Capital Adequacy Ratio*(CAR)

Z = Operating Expenses Operating Income (BOPO)

From the results of the analysis of the multiple linear regression equation above, it produces a constant value of 6.062 if the non-performing loan (NPL), loan to deposit ratio (LDR), capital adequacy ratio (CAR), and operating expenses and operating income (BOPO) are zero or non-existent. The coefficient on the non-performing loan (NPL) variable is -0.075, indicating that a decrease in one unit of non-performing loan will reduce ROA by -0.075. Then, with the loan to deposit ratio (LDR) variable coefficient of 0.282 and capital adequacy ratio (CAR) of 0.101, an increase of one unit each in LDR and CAR will increase ROA by 0.282 and 0.101. Furthermore, the variable coefficient for operating expenses and operating income (BOPO) is -1.009, indicating that a decrease in each unit of BOPO will reduce ROA by 1.009.

F Test (ANOVA)

Table 4.10
F Test Results (ANOVA) on BOPO

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3190.377	3	1063.459	18,461	,000b
	Residual	1612,999	28	57,607		
	Total	4803.376	31			
a. Dependent Variable: BOPO						
b. Predictors: (Constant), CAR, NPL, LDR						

Ho : = = …… = 0 (There is no influence of the difference between the independent variables on the dependent variable)$\beta_1\beta_2\beta_k$

Ha: Not all = 0 (At least one ≠ 0)$\beta_J\beta_J$

Based on the results of the F test (Anova) in table 4.10 above, it shows a sig. 0.000 and is 18.461 with 3 (three) independent variables with a sample of n = 32, so it is 2,901. With the decision making criteria if the sig value. 0.000 < 0.05 and (18.461) > (2.947) then Ho is rejected and Ha is accepted. Shows that the results of the F (Anova) test on BOPO in this study show the influence of the difference between the independent variables and the dependent variable at least one ≠ 0. In this study the variables are non-performing loans (NPL), loan to deposit ratio (LDR), capital adequacy ratio (CAR) has proven the effect of the feasibility test on operating expenses and operating income (BOPO).$F_{hitung}F_{tabel}F_{hitung}F_{tabel}\beta_J$

Table 4.11
F Test Results (ANOVA) on ROA

ANOVAa						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	33,818	4	8,454	47,879	,000b
	Residual	4,768	27	,177		
	Total	38,585	31			
a. Dependent Variable: ROA						
b. Predictors: (Constant), BOPO, CAR, LDR, NPL						

Ho : = = …… = 0 (There is no influence of the difference between the independent variables on the dependent variable)$\beta_1\beta_2\beta_k$
Ha: Not all = 0 (At least one ≠ 0)$\beta_J\beta_J$

Based on the results of the F test (Anova) in table 4.11 above, it shows a sig. 0.000 and is 47.879 with 4 (four) independent variables with a sample of n = 32, so it is 2,901. With the decision making criteria if the sig value. 0.000 < 0.05 and (47.879) > (2.714) then Ho is rejected and Ha is accepted. Shows that the results of the F (Anova) test on ROA in this study have an influence on the difference between the independent variable and the dependent variable, at least one ≠ 0. In this study, the variables are non-performing loans (NPL), loan to deposit ratio (LDR), capital adequacy ratio (CAR), operating expenses and operating income (BOPO) have proven the effect of due diligence on return on assets (ROA).$F_{hitung}F_{tabel}F_{hitung}F_{tabel}\beta_J$

T Test (Partial Test)

Table 4.12
T Test Results on BOPO

Coefficientsa						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	Q	Sig.
1	(Constant)	5,253	16,614		,316	,754

	NPLs	10,521	2,022	,672	5,204	,000
	LDR	,313	,160	,284	1,961	,060
	CAR	,678	,330	,258	2,055	,049
a. Dependent Variable: BOPO						

Based on the results of the T test in BOPO table 4.12 above, it shows the value and sig value. in each variable NPL 5.204 and sig. 0.000, LDR 1.961 and sig. 0.060, and the CAR variable 2.055 and sig. 0.49. For 3 (three) independent variables with a sample of n = 32, df = 32 – 3 - 1 = df 28, then the value = 1.70113. So it can be proxied into the following hypothesis:$T_{hitung} T_{hitung} T_{hitung} T_{hitung} T_{tabel}$

First Hypothesis (H1)

Ho: Non-performing loans (NPL) do not have a negative effect on operating expenses, operating income (BOPO).

H_1 :Non-performing loans (NPL) has a negative effect on operating expenses, operating income (BOPO).

The T test results in BOPO table 4.12 above show a value of 5.204 > 1.70113 and a sig. 0.000 < 0.05. So it can be concluded that the non-performing loan (NPL) variable has a positive and significant effect on operating expenses, operating income (BOPO). So Ho is accepted and$T_{hitung} T_{tabel} H_1$rejected.

Second Hypothesis (H2)

Ho: Loan to deposit (LDR) does not have a positive effect on operating expenses, operating income (BOPO).

H_2:Loan to deposit(LDR) has a positive effect on operating expenses, operating income (BOPO).

The T test results in BOPO table 4.12 above show a value of 1.961 > 1.70113 and a sig. 0.060 > 0.05. So it can be concluded that the loan to deposit ratio (LDR) variable has a positive effect on operating expenses, operating income (BOPO) but is not statistically significant. So Ho is rejected and$T_{hitung} T_{tabel} H_2$accepted.

Third Hypothesis (H3)

Ho: Capital adequacy ratio (CAR) has no negative effect on operating expenses, operating income (BOPO).

H_3 :Capital adequacy ratio(CAR) has a negative effect on operating expenses, operating income (BOPO).

The T test results in BOPO table 4.12 above show a value of 2.055 > 1.70113 and a sig. 0.049 < 0.05. So it can be concluded that the capital adequacy ratio (CAR) variable has a positive and significant effect on operating expenses, operating income (BOPO). So Ho is accepted and$T_{hitung} T_{tabel} H_3$rejected.

Table 4.13
T Test Results on ROA

Coefficientsa				
Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.

		B	Std. Error	Beta		
1	(Constant)	-2.310E-15	.016		,000	1,000
	NPLs	-.075	,027	-.080	-2,738	.011
	LDR	,282	.023	,298	12,224	,000
	CAR	.101	,020	.107	5,088	,000
	BOPO	-1,009	,029	-1,069	-35,173	,000
a. Dependent Variable: ROA						

Based on the results of the T test in ROA table 4.12 above, it shows the value and sig value. in each NPL variable -2.738 and sig. 0.011, LDR 12.224 and sig. 0.000, and the CAR variable is 5.088 and sig. 0.000, and BOPO -35.173 and sig. 0,000. With 4 (four) independent variables with a sample of n = 32, df = 32 – 4 – 1 = 27, then the value = 1.70329. So it can be proxied into the following hypothesis:$T_{hitung} T_{hitung} T_{hitung} T_{hitung} T_{hitung} T_{tabel}$

Fourth Hypothesis (H4)

Ho: Non-performing loans (NPL) do not have a negative effect on return on assets (ROA).

H_4:Non-performing loans(NPL) has a negative effect on return on assets (ROA).

The T test results in ROA table 4.13 above show a value of -2.738 < -1.70329 and a sig. 0.011 < 0.05. So it can be concluded that the non-performing loan (NPL) variable has a negative and significant effect on return on assets (ROA). So Ho is rejected and$T_{hitung} T_{tabel} H_4$accepted.

Fifth Hypothesis (H5)

Ho: Loan to deposit ratio (LDR) does not have a negative effect on return on assets (ROA).

H_5:Loan to deposit ratio (LDR) has a negative effect on return on assets (ROA).

The T test results in ROA table 4.13 above show a value of 12.224 > 1.70329 and a sig. 0.000 < 0.05. So it can be concluded that the loan to deposit ratio (LDR) variable has a positive and significant effect on return on assets (ROA). So Ho is accepted and$T_{hitung} T_{tabel} H_5$rejected.

Sixth Hypothesis (H6)

Ho: Capital adequacy ratio (CAR) has no negative effect on return on assets (ROA).

H_6:Capital adequacy ratio(CAR) has a negative effect on return on assets (ROA).

The T test results in ROA table 4.13 above show a value of 5.088 > 1.70329 and a sig. 0.000 < 0.05. So it can be concluded that the capital adequacy ratio (CAR) variable has a positive and significant effect on return on assets (ROA). So Ho is accepted and$T_{hitung} T_{tabel} H_6$rejected.

Seventh Hypothesis (H7)

Ho: Operating expenses, operating income (BOPO) does not have a positive effect on return on assets (ROA).

H_7: Operating expenses, operating income (BOPO) has a positive effect on return on assets (ROA).

The T test results in ROA table 4.13 above show a value of -35.173 < -1.70329 and a sig. 0.000 < 0.05. So it can be concluded that the variable operating expenses, operating income (BOPO) has a negative and significant effect on return on assets (ROA). So Ho is rejected and$T_{hitung} T_{tabel} H_7$accepted.

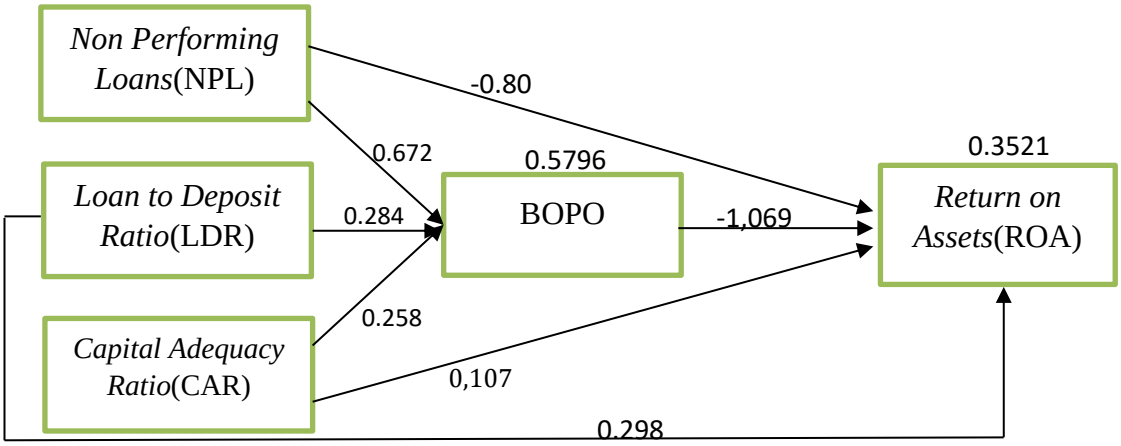

Figure 4.5
Framework Path Analysis

The Effect of Non-Performing Loans (NPL) on Return on Assets (ROA) through Operating Expenses Operating Income (BOPO) as a mediating variable.

The direct effect of non-performing loans (NPL) on return on assets (ROA) with a coefficient of -0.80. The indirect effect of non-performing loans (NPL) on return on assets (ROA) through operating expenses, operating income (BOPO) has a coefficient value of -0.718 (0.672 x -1.069). Meanwhile, the effect of non-performing loans (NPL) on return on assets (ROA) is through operating expenses, operating income (BOPO) with a coefficient value of -1.518 ((-0.80 + (-0.718)).

The Effect of Loan to Deposit Ratio (LDR) on Return on Assets (ROA) through Operating Expenses Operating Income (BOPO) as a mediating variable.

The direct effect of loan to deposit ratio (LDR) on return on assets (ROA) with a coefficient of 0.298. The indirect effect of loan to deposit ratio (LDR) on return on assets (ROA) through operating expenses, operating income (BOPO) has a coefficient value of -0.303 (0.284 x -1.069). Meanwhile, the effect of loan to deposit ratio (LDR) on return on assets (ROA) is through operating expenses, operating income (BOPO) with a coefficient value of -0.005 ((0.298 + (-0.303)).

The Influence of Capital Adequacy Ratio (CAR) on Return on Assets (ROA) through Operating Expenses Operating Income (BOPO) as a mediating variable.

The direct effect of capital adequacy ratio (CAR) on return on assets (ROA) with a coefficient of 0.107. The indirect effect of loan to deposit ratio (LDR) on return on assets (ROA) through operating expenses, operating income (BOPO) has

a coefficient value of -0.275 (0.258 x -1.069). Meanwhile, the effect of loan to deposit ratio (LDR) on return on assets (ROA) is through operating expenses, operating income (BOPO) with a coefficient value of -0.168 ((0.107 + (-0.275)).

Coefficient of Determination Test (R2)

Table 4.14
Coefficient of Determination Test Results (R2) on BOPO

Model Summary b					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.815a	,664	,628	7.58993	1,839
a. Predictors: (Constant), CAR, NPL, LDR					
b. Dependent Variable: BOPO					

Based on the results of the coefficient of determination test (R2) in BOPO table 4.14, it can be seen that the value of the coefficient of determination(R2) is 0.664. This states that 66.4% of the data variance in operational income operating expenses (BOPO) can be explained by the non-performing loan (LDR), loan to deposit ratio (LDR), and capital adequacy ratio (CAR) variables and 23.6% is explained due to reasons other than the model.

Table 4.15 . Coefficient of Determination Test Results (R2) on ROA

Model Summary b					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.936a	,876	,858	.42022	1,932
a. Predictors: (Constant), BOPO, CAR, LDR, NPL					
b. Dependent Variable: ROA					

Based on the results of the coefficient of determination test (R2) in ROA table 4.15, it can be seen that the value of the coefficient of determination(R2) is 0.876. This states that 87.6% of the data variance in return on assets (ROA) can be explained by the variables non-performing loan (LDR), loan to deposit ratio (LDR), capital adequacy ratio (CAR), and operating expenses, operating income (BOPO).) and 12.4% is explained by other causes outside the model.

Mediation Test (Sobel Test)

Table 4.16. Sobel Test Analysis Results

Coefficientsa						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	50,418	10,095		4,995	,000
	NPLs	2,039	1,435	,130	1,421	,167
	LDR	,326	,083	,296	3,919	,001

	CAR	,421	,175	,160	2,412	.023
	ROA	-8,090	,928	-.725	-8,717	,000
a. Dependent Variable: BOPO						

Based on the results of the regression analysis of the variable return on assets (ROA) on operating expenses, operating income (BOPO), the return on assets (ROA) was -8,090 (a) and std. error 0.928 (Sb).β.

Table 4.17. Description of Sobel Test Calculations

Variable	Unstadardized	Std. Error
Non Performing Loans (NPL) Against Return on Assets(ROA)	10,521(a)	2,022 (Sa)
Loan to Deposit Ratio (LDR) Against Return on Assets(ROA)	0.313(a)	0.160 (Sa)
Capital Adequacy Ratio (CAR) To Return on Assets(ROA)	0.678(a)	0.330 (Sa)
Return on Assets (ROA) to Operating Expenses Operating Income (BOPO)	-8,090 (b)	0.928 (Sb)

Table 4.18. Z Sobel Test Results

Variable	Statistical Tests	P-Value
Non Performing Loans(NPL)	-4,467	0,000
Loan to Deposit Ratio(LDR)	-1,908	0.057
Capital Adequacy Ratio(CAR)	-1,999	0.045

Eighth Hypothesis (H8)

Ho: Operating expenses and operating income (BOPO) cannot mediate the negative influence of non-performing loans (NPL) on return on assets (ROA).

H_8: Operating expenses and operating income (BOPO) can mediate the negative influence of non-performing loans (NPL) on return on assets (ROA).

Based on the results of the t test (partial) in ROA table 4.13. The direct effect of non-performing loans (NPL) on return on assets (ROA) is that non-performing loans (NPL) have a negative effect on return on assets (ROA) with a value of -2.738 < -1.70329. Meanwhile, based on the results of the BOPO t (partial) test in table 4.12. The indirect effect of non-performing loans (NPL) on operating expenses on operating income (BOPO) is that non-performing loans (NPL) have a positive effect on operating expenses on operating income (BOPO) with a value of 5.204 > 1.70113. In the results of the sobel test in table 4.16, the total value of the direct and indirect influence of non-performing loans (NPL) on return on assets (ROA) which is mediated by operating expenses, operating income (BOPO) based on the z test is $T_{hitung}T_{tabel}T_{hitung}T_{tabel}$-4,467 and*p-value* 0.000 z value -4.467 < -1.96 and 0.000 > 0.05. So, operating expenses, operating income (BOPO) can mediate the negative influence of non-performing loans (NPL) on return on assets (ROA). So Ho is rejected andH_8accepted.

Ninth Hypothesis (H9)

Ho: Operating expenses and operating income (BOPO) cannot mediate the positive influence of loan to deposit ratio (LDR) on return on assets (ROA).

H_9: Operating expenses and operating income (BOPO) can mediate the positive influence of loan to deposit ratio (LDR) on return on assets (ROA).

Based on the results of the t test (partial) in ROA table 4.13. The direct effect of loan to deposit ratio (LDR) on return on assets (ROA) is that loan to deposit ratio (LDR) has a positive effect on return on assets (ROA) with a value of 12.224 > 1.70329. Meanwhile, based on the results of the BOPO t (partial) test in table 4.12. The indirect effect of non-performing loans (NPL) on operating expenses on operational income (BOPO) is that non-performing loans (NPL) have a positive effect on operating expenses on operating income (BOPO) with a value of 2.055 > 1.70113. In the results of the sobel test in table 4.18, the total value of the direct and indirect influence of loan to deposit ratio (LDR) on return on assets (ROA) which is mediated by operating expenses, operating income (BOPO) based on the z test is $T_{hitung} T_{tabel} T_{hitung} T_{tabel}$ -1,908and p-value 0.057, z value-1,908> -1.96 and 0.057 > 0.05. So, operating expenses, operating income (BOPO) cannot mediate the positive influence of loan to deposit ratio (LDR) on return on assets (ROA). So Ho is accepted andH_9rejected.

Tenth Hypothesis (H10)

Ho: Operating expenses and operating income (BOPO) cannot mediate the negative influence of capital adequacy ratio (CAR) on return on assets (ROA).

H_9: Operating expenses and operating income (BOPO) can mediate the negative influence of capital adequacy ratio (CAR) on return on assets (ROA).

Based on the results of the t test (partial) in ROA table 4.13. The direct effect of capital adequacy ratio (CAR) on return on assets (ROA) is that capital adequacy ratio (CAR) has a positive effect on return on assets (ROA) with a value of 5.088 > 1.70329. Meanwhile, based on the results of the BOPO t (partial) test in table 4.12. The indirect effect of capital adequacy ratio (CAR) on operating expenses, operating income (BOPO) is that the capital adequacy ratio (CAR) has a positive effect on operating expenses, operating income (BOPO) with a value of 2.055 > 1.70113. In the results of the sobel test in table 4.18, the total value of the direct and indirect influence of capital adequacy ratio (CAR) on return on assets (ROA) which is mediated by operating expenses, operating income (BOPO) based on the z test is$T_{hitung} T_{tabel} T_{hitung} T_{tabel}$-1.999 and 0.045, z value-1,999< -1.96 and 0.045 < 0.05. So, operating expenses, operating income (BOPO) can mediate the negative influence of capital adequacy ratio (CAR) on return on assets (ROA). So Ho is rejected andH_{10}accepted.

Discussion

Based on the results of the research tests above, the influence of the non-performing loan (NPL), loan to deposit ratio (LDR), and capital adequacy ratio (CAR) variables on return on assets (ROA) with the mediating variable operating

expenses, operating income (BOPO) in banking companies in Indonesia listed on the Indonesian Stock Exchange in 2018-2022 as follows:

The Effect of Non-Performing Loans (NPL) on Operating Expenses Operating Income (BOPO)

Based on the first hypothesisthat is*non-performing loans*(NPL) has a negative effect on operating expenses, operating income (BOPO). Ont test results (partial)found that value T_{hitung} 5.204 > 1.70113 and sig value. 0.000 < 0.05. T_{tabel} ThenIt can be concluded that non-performing loans (NPL) have a positive and significant effect on operating expenses and operating income (BOPO). So Ho is accepted andH_1rejected.This shows that the higher the value of non-performing loans (NPL), the greater the value of operating expenses, operating income (BOPO). The results of this research are supported by the theory stated in Bank Indonesia Circular Letter No. 15/15/PBI/2013 dated 24 December 2013 stipulates that the ideal BOPO ratio ranges between 50%-75% in accordance with provisions and is not greater than 85%. This shows that the size of the non-performing loan (NPL) influences the operational burden on the bank which becomes greater. The results of this research are supported by previous research by (Lobiua et al., 2022; Midfi et al., 2021; Pratama, 2021) which stated that non-performing loans (NPL) have a positive effect on operating expenses, operating income (BOPO).

The Effect of Loan to Deposit Ratio (LDR) on Operating Expenses Operating Income (BOPO)

Based on the second hypothesisthat is*loan to deposit ratio*(LDR) has a positive effect on operating expenses, operating income (BOPO). Ont test results (partial)found that value T_{hitung} 1.961 > 1.70113 and sig value. 0.060 > 0.05. T_{tabel} ThenIt can be concluded that the loan to deposit ratio (LDR) has a positive effect on operating expenses and operating income (BOPO) but is not statistically significant. So Ho is rejected andH_2accepted.This shows that the higher the value of the loan to deposit ratio (LDR), the higher the value of operating expenses and operating income (BOPO). The results of this research are supported by the theory stated by (Hadi, (2023), loan to deposit ratio (LDR) is the overall ratio between the amount of credit disbursed and the funds received for repaying loans by debtors to the bank. Loan to deposit ratio (LDR) measures the extent of a bank's ability to obtain refunds from debtors as a source of liquidity. The safe limit for loan to deposit ratio (LDR) is between 80%-110%. Indicates that the bank must balance the funds received with the distribution of funds issued in the form of credit so that these funds can generate income for the bank. The results of this research are supported by previous research by (Pratomo & Ramdani, 2021; Sholihah, 2021; Supeno, 2021) which stated that the loan to deposit ratio (LDR) has a positive effect on operating expenses and operating income (BOPO).

The Effect of Capital Adequacy Ratio (CAR) on Operating Expenses and Operating Income (BOPO)

Based on the third hypothesisthat is*capital adequacy ratio*(CAR) has a negative effect on operating expenses, operating income (BOPO). Ont test results (partial)found that value T_{hitung} 2.055 > 1.70113 and sig value. 0.049 < 0.05.T_{tabel}ThenIt can be concluded that the capital adequacy ratio (CAR) has a positive effect on operating expenses and operating income (BOPO). So Ho is accepted and H_3rejected. This shows that the higher the value *capital adequacy ratio*(CAR) will be higher as well as the value of operating expenses and operating income (BOPO). The results of this research are supported by the stated theoryAccording to (Polympung & Irawan, 2021), capital adequacy ratio (CAR) is a bank ratio that measures the adequacy of a bank's capital to support assets that have risk value. However, please note that supporting these assets requires additional operational costs so that the assets are maintained. So it needs to be redistributed to generate income, so that capital adequacy is not only used to support assets which makes the bank's financial work performance less efficient. With high capital adequacy owned by banks, it can also be used as a source of financing for short-term or long-term business operations that contribute to generating income or as a source of investment from banks to obtain income. Capital adequacy provisions by banks also aim to avoid liquidity risks in credit financing. However, please note that supporting these assets requires additional operational costs so that the assets are maintained. So it needs to be redistributed carefully to generate income, so that high capital adequacy is not only to support asset risks which makes the bank's financial work performance less efficient. The results of this research are supported by previous research by (Fahlevi et al., 2023; Fauzi & Daud, 2020; Handayani et al., 2023; Himmawan & Firdausi, 2021) which stated that the capital adequacy ratio (CAR) had a negative effect on operating expenses, operating income (BOPO).

The Effect of Non-Performing Loans (NPL) on Return on Assets (ROA)

Based on the fourth hypothesisthat is*non-performing loans*(NPL) has a negative effect on*return on assets*(ROA). Ont test results (partial)found that valueT_{hitung}-2.738 < -1.70329 and sig value. 0.011 < 0.05.T_{tabel}ThenIt can be concluded that non-performing loans (NPL) have a negative and significant effect on return on assets (ROA). So Ho is rejected andH_4accepted. This shows that the higher the value*non-performing loans*(NPL) will further reduce the value*return on assets*(ROA). The results of this research are supported by the theory stated by Rafinur et al., (2023), non-performing loan (NPL) is a ratio used to measure a bank's ability to bear the risk of loss due to failure to repay credit funds by debtors. If there is an increase in the value of credit failure, the bank will use the loss reserve fund assets, where the loss reserve will not cover all the money given to the debtor. The results of this research are supported by previous research by (Damar et al., 2021; Fahlevi et al., 2023; Handayani et al., 2023; Sochib et al., 2022; Wendha & Alteza, 2020) which states that non-performing loans (NPL) have a negative effect on return on assets (ROA).

The Effect of Loan to Deposit Ratio (LDR) on Return on Assets (ROA)

Based on the fifth hypothesis that is *loan to deposit ratio* (LDR) has a negative effect on *return on assets* (ROA). Ont test results (partial)found that value T_{hitung}12.224 > 1.70329 and sig value. 0.000 < 0.05.T_{tabel}Then It can be concluded that the loan to deposit ratio (LDR) has a positive and significant effect on return on assets (ROA). So Ho is accepted andH_5rejected. This shows that the higher the value*loan to deposit ratio*(LDR), the higher the value will be*return on assets*(ROA). The results of this research are supported by the theory stated bySochib et al., (2023), the loan to deposit ratio (LDR) has a dual function, namely it is used to measure Third Party Funds (DPK) disbursed in the form of loans, and to measure the level of the bank's ability to meet short-term needs. The bank's ability to collect funds and distribute them back to the community is a function of increasing liquidity and increasing the bank's assets. The results of this research are supported by previous research by Anindiansyah et al. (2020),Sochib LS and Yulianti, F (2023). Ahman LB (2023), Suryani S. et, al. (2023), and Shilvy MH (2023) which states that the loan to deposit ratio (LDR) has a positive effect on return on assets (ROA).

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

Based on the sixth hypothesisthat is*capital adequacy ratio*(CAR) has a negative effect on*return on assets*(ROA). Ont test results (partial)found that valueT_{hitung}5.088 > 1.70329 and sig value. 0.000 < 0.05.T_{tabel}ThenIt can be concluded that the capital adequacy ratio (CAR) has a positive and significant effect on return on assets (ROA). So Ho is accepted andH_6rejected. This shows that the higher the value*capital adequacy ratio*(CAR) will affect the increase in value*return on assets*(ROA). The results of this research are supported by the stated theory Rafinur et al., (2023), capital adequacy ratio (CAR) is the ratio used by banks to meet bank capital with a regulated CAR safe limit of at least 8%. This is used to protect customers when entrusting their investment funds to the bank. Based on the minimum capital adequacy limit, it will affect the bank's ability to generate bank business income, the higher the capital adequacy, the greater the opportunity for higher income with the risks that the bank can bear. This research is supported by previous research by (Nuryanto et al., 2020; L. Polimpung & Irawan, 2021; Sholihah, 2021; Supeno, 2021) which states that the capital adequacy ratio (CAR) has a positive effect on return on assets (ROA).

The Effect of Operating Expenses on Operating Income (BOPO) on Return on Assets (ROA)

Based on the seventh hypothesisthat is operating expenses operating income (BOPO) has a positive effect on*return on assets* (ROA). Ont test results (partial) found that valueT_{hitung}-35.173 < -1.70329 and sig value. 0.000 < 0.05.T_{tabel}Thenit can be concluded thatoperating expenses operating income (BOPO) has no significant negative effect on return on assets (ROA). So Ho is accepted and H_7 rejected. This shows that the higher the value of operating expenses, operating income (BOPO), the lower the value *return on assets* (ROA). This

research is supported by theory. According to Syafaat (2021), operating expenses, operating income is a value used to measure the level of success of a bank in generating profits. This value can also be used as a ratio, where the smaller the BOPO ratio, it can be said that the bank is more efficient in carrying out financial activities between operational expenses and operating income. If the BOPO value increases beyond the reasonable limit of 85%, then it can be said that the bank is less efficient in managing the bank's finances, thereby reducing the value of return on assets (ROA) that the bank should produce. This research is supported by previous research by Kumala S. et al. (2021) and Wildan N. et, al. (2020) which states that operating expenses, operating income (BOPO) has a negative effect on return on assets (BOPO).

The Effect of Operating Expenses on Operating Income (BOPO) in Mediating Non-Performing Loans (NPL) on Return on Assets (ROA)

Based on the eighth hypothesis, namely that operating expenses and operating income (BOPO) can mediate the negative influence of non-performing loans (NPL) on return on assets (ROA).Onsobel test results (mediation test)found that valuez test of-4,467 and*p-value*0.000 z value -4.467 < -1.96 and 0.000 > 0.05.Thenit can be concluded that operating expenses operating income (BOPO) can mediate the negative influence of non-performing loans (NPL) on return on assets (ROA). So Ho is rejected and H_8 accepted. This shows that the higher the value of operating expenses, operating income (BOPO) can mediate the negative effect*non-performing loans*(NPL) against*return on assets*(ROA).

The Influence of Operating Expenses on Operating Income (BOPO) in mediating Loan to Deposit Ratio (LDR) on Return on Assets (ROA)

Based on the ninth hypothesis, namely that operating expenses and operating income (BOPO) can mediate the positive influence of loan to deposit ratio (LDR) on return on assets (ROA).Onsobel test results (mediation test)found that valuez test of-1,908and p-value 0.057, z value-1,908> -1.96 and 0.057 > 0.05.Thenit can be concluded thatoperating expenses operating income (BOPO) cannot mediate the positive influence of loan to deposit ratio (LDR) on return on assets (ROA). So Ho is accepted and H_8 rejected. This shows that the higher the value of operating expenses, operating income (BOPO) cannot mediate the positive effect*loan to deposit ratio*(LDR) against*return on assets*(ROA).

The Influence of Operating Expenses on Operating Income (BOPO) in mediating the Capital Adequacy Ratio (CAR) on Return on Assets (ROA)

Based on the tenth hypothesis, namely that operating expenses and operating income (BOPO) can mediate the negative influence of capital adequacy ratio (CAR) on return on assets (ROA).Onsobel test results (mediation test)found that valuez test of-1.999 and 0.045, z value-1,999< -1.96 and 0.045 < 0.05.Thenit can be concluded thatoperating expenses operating income (BOPO) can mediate the negative and significant influence of capital adequacy ratio (CAR) on return on assets (ROA). So Ho is rejected andH_{10}accepted. This shows that the higher the

value of operating expenses, operating income (BOPO) can mediate the negative effect*capital adequacy ratio*(CAR) against*return on assets*(ROA).

CONCLUSION

Based on the results of the analysis and discussion carried out in this research, it can be concluded that: 1. Non-performing loans (NPL), loan to deposit ratio (LDR), and capital adequacy ratio (CAR) partially have a positive effect on operating expenses, operating income (BOPO). 2. Non-performing loans (NPL) and operational expenses and operating income (BOPO) partially have a negative effect on return on assets (ROA). Meanwhile, Loan to deposit ratio (LDR) and Capital adequacy ratio (CAR) partially have a positive effect on return on assets (ROA). 3. Operating expenses, operating income (BOPO) can mediate the negative influence of non-performing loans (NPL) on return on assets (ROA). 4. Operating expenses, operating income (BOPO) cannot mediate the positive influence of loan to deposit ratio (LDR) on return on assets (ROA). 5. Operating expenses, operating income (BOPO) can mediate the negative influence of capital adequacy ratio (CAR) on return on assets (ROA).

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