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ANALYSIS OF THE EFFECT OF NON PERFORMING LOAN (NPL), LOAN DEPOSIT RATIO (LDR), OPERATING EXPENSES (BOPO), AND NET INTEREST MARGIN (NIM) ON RETURN ON ASSET (ROA) (CASE STUDY OF BANK NEGARA INDONESIA 2002-2023)

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Abstract. This study aims to analyze the effect of Non-Performing Loan (NPL), Loan to Deposit Ratio (LDR), Operational Costs to Operating Income (BOPO), and Net Interest Margin (NIM) on Bank Negara Indonesia (BNI), as measured by Return On Asset (ROA) The research uses data obtained from the Annual Financial Statements of Bank Negara Indonesia from 2022 to December 2023, with 86 samples. The analysis technique used is multiple linear regression analysis. Before applying multiple linear regression, classical assumption tests were conducted first. The results of the study show that NPL has a negative and significant effect on ROA. Meanwhile, LDR has a negative and significant effect on ROA, BOPO also has a negative and significant effect on ROA, and NIM has a positive and significant effect on ROA.

Keywords: *NPL; LDR; BOPO; NIM; ROA*.

I. INTRODUCTION

According to Zavadska (2018), banking functions as an intermediary institution between parties in need of funding and those with excess funds, with the goal of improving the living standards of society. Purnamasari (2019) added that banking is important for increasing national income, supporting financial stability, economic growth, and reducing social inequality through credit policies and capital injections.

Banks must have good financial performance, as stated by Parathon et al. (2013), which is periodically measured through financial reports to assess the bank's financial position, profits, and changes in its conditions. Alhempi (2022) stated that financial performance can be analyzed using financial ratios such as NPL, LDR, and ROA. This study also includes the BOPO and NIM ratios as additional measures to assess the performance of banks, specifically PT Bank Negara Indonesia Tbk.

In credit distribution, banks must manage and analyze credit well to achieve profitability. ROA is used to measure a bank's financial performance, where an increase in ROA indicates higher profits (Ekinci, 2018). Poudel (2012) mentioned that profitability is the main goal of banks, and research on the relationship between ROA and internal financial factors of companies shows a gap that needs to be filled.

Credit distribution must be carried out cautiously to avoid the risk of Non-Performing Loans (NPL), which can be detrimental and threaten the bank's survival (Boot et al., 2020). Data from the OJK shows that the NPL ratio of Indonesian banks in 2022 was less than 5%, with the highest NPL peak in May at 2.13%, and the lowest in December and June at 1.70%.

According to Akroman (2017), the Non-Performing Loan (NPL) ratio can be used as an indicator for decision-making by investors, as a high NPL creates a negative image that can reduce public confidence in banks. Anisa's (2021) study also showed that NPL negatively affects credit profitability. This finding is supported by Alhempi (2022), who stated that NPL negatively affects the profitability of a company. However, Vernanda's (2016) study showed that NPL does not affect Return on Assets (ROA), despite the decline in NPL.

Banks play a significant role in the economy, especially in credit distribution. However, Third-Party Funds (DPK) accumulated by banks are often not optimally channeled. Prananta (2020) stated that the Loan Deposit Ratio (LDR) can be used to measure the optimization of credit distribution against DPK. If a bank's liquidity is high, then credit distribution and DPK collection will proceed hand in hand. Haryanto's (2021) study found that LDR has a significant positive effect on profitability, while Azad (2019) found that LDR has a negative effect on credit disbursed.

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BOPO (Operating Costs to Operating Income) measures the operational efficiency of banks in carrying out their main activities. Mawardi (2005) stated that BOPO affects bank performance, and Hernawati (2023) found that BOPO has a significant negative effect on ROA. In contrast, Rasyid's (2012) research showed that BOPO has a positive effect on ROA.

Net Interest Margin (NIM) reflects market risk caused by changes in market variables, measured by the difference between funding and loan interest rates. According to Mawardi (2005), NIM measures market risk at banks. Mahardian (2008) showed that NIM has a positive effect on ROA, where the higher the NIM, the higher the ROA. However, Winarso & Salim's (2017) and Hastalona's (2020) studies found that NIM does not affect ROA.

Previous research has extensively discussed the impact of NPL, LDR, BOPO, and NIM on ROA, but few have specifically examined the profitability of banking in a particular bank. Furthermore, most studies focus on periods of less than 10 years, leading to differences in results. Therefore, further research on this topic is important to investigate and find solutions.

Based on the above explanation, the researcher proposes a study titled "The Effect of NPL, LDR, BOPO, and NIM on ROA (Case Study of Bank Negara Indonesia 2002-2023)."

The research aims to examine the effect of NPL, LDR, ROA, and inflation on the process of credit distribution within the Group of Banks in Accordance with Core Capital (KBMI), based on the background and problem formulation discussed earlier. The purpose of this study is to understand the profitability of PT Bank Negara Indonesia Persero Tbk from 2002 to 2023, empirically test the effect of NPL on ROA, understand empirically how LDR affects ROA, understand empirically how BOPO affects ROA, and understand empirically how NIM affects ROA.

Hypothesis Formulation

The Effect of NPL on Return on Assets

High NPL reflects the low health of the bank and has an impact on the decline in the number of loans disbursed. Banks must maintain a low NPL risk, because increasing non-performing loans can force banks to reduce the credit provided. Research by Anisa et al. (2021), Alhempi (2022), and Viswanadham (2015) shows that NPL has a significant negative effect on ROA and bank credit distribution. Based on this explanation, the hypothesis that can be drawn is:

H1: NPL Has a Significant Negative Effect on Return on Assets

The Effect of Loan Deposit Ratio on Return on Assets

The Loan Deposit Ratio (LDR) measures the bank's ability to meet obligations to depositors when withdrawing funds compared to credit distribution. The higher the LDR, the greater the credit disbursed, but this can reduce the ROA level, because it increases the bank's liquidity risk. Kurniawan (2020) and Merkusiwati (2007) stated that LDR has a negative effect on ROA. Based on this explanation, the hypothesis that can be drawn is:

H2: Loan Deposit Ratio Has a Significant Negative Effect on Return on Assets

The Effect of BOPO on ROA

Efficiency in banking refers to a bank's ability to use resources optimally to produce the desired output, as measured by the BOPO ratio (Operating Costs to Operating Income). The higher the BOPO ratio, the lower the bank's efficiency, which can have an impact on declining financial performance (ROA). Bank Indonesia recommends a BOPO ratio below 90% to reflect good efficiency. Research by Parhan (2020) and Dewanti (2022) shows that BOPO has a negative effect on ROA, which means that the greater the BOPO, the lower the bank's ROA.

H3: BOPO Has a Significant Negative Effect on ROA

The Effect of Net Interest Margin on ROA

Market risk, according to Bank Indonesia Regulation No. 5/2003, arises due to movements in market variables such as interest rates and exchange rates that can cause losses. One indicator of market risk is the Net Interest Margin (NIM), which measures a bank's ability to generate net interest income from loans. The higher the NIM, the more effective the bank is in managing productive assets, which has the potential to improve financial performance and Return on Assets (ROA). Previous studies, such as by Sugianto and Teddy (2002), and Mawardi (2005), showed that NIM has a positive effect on ROA, which reflects better bank performance.

H4: Net Interest Margin (NIM) has a positive effect on Return On Assets (ROA)

Research Framework

According to the research framework, the dependent variables can be seen, namely non-performing loans (NPL), loan deposit ratio (LDR), return on assets (ROA), BI-Rate and inflation and the independent variable is credit distribution. So that a research framework is formed as in Figure 1 below:

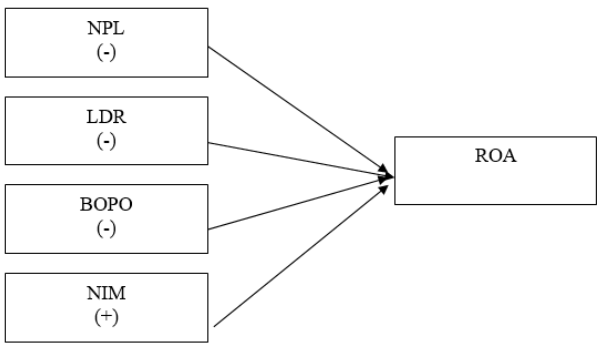

Figure 1. Research Framework

II. RESEARCH METHOD

This study uses secondary data that has been collected and published by other parties, as explained by Sugiyono (2021). The data used in this study were taken from PT Bank Negara Indonesia Persero Tbk (BNI), with an observation period from 2022 to 2023. The data sources used include the bank's quarterly financial reports and reports published by the OJK.

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Data collection techniques were carried out through documentation and historical studies, by tracing published annual reports, and using a checklist to ensure that the required data was available. In selecting the sample, a purposive sampling technique was used, with the criteria that Bank BNI had financial reports available for the period 2002 to 2023 and was still operating during the study period. In this study, there are two types of variables used, namely independent variables and dependent variables. The independent variables consist of NPL (Non-Performing Loan), LDR (Loan to Deposit Ratio), BOPO (Operating Costs to Operating Income), and NIM (Net Interest Margin), which are believed to have an influence on the bank's financial performance. Meanwhile, the dependent variable is ROA (Return on Assets), which is used as an indicator of bank profitability and is influenced by these independent variables.

To analyze the data, a descriptive statistical analysis technique was used which aims to summarize and provide an overview of the relationship between variables. This analysis includes measuring frequency, central tendency, variation, and minimum, maximum, mean, and standard deviation values of each variable studied. Furthermore, a classical assumption test was carried out to ensure that the regression model used meets the required statistical requirements. This classical assumption test includes a normality test to check whether the data is normally distributed, a multicollinearity test to see the relationship between independent variables, a heteroscedasticity test to identify discrepancies in residual variability, and an autocorrelation test to check for relationships between residuals in the model.

After meeting the classical assumptions, a multiple regression analysis was carried out to determine the relationship between the dependent variable (ROA) and the independent variables (NPL, LDR, BOPO, NIM). This regression technique aims to measure the influence of the independent variables on the dependent variable and evaluate the extent to which the relationship between the two is significant.

Hypothesis testing is carried out using the t-test (partial test) to test the effect of each independent variable on the dependent variable separately. If the test significance is less than 0.05, then the alternative hypothesis is accepted, which means that the independent variable has a significant effect on the dependent variable. In addition, an F-test (simultaneous test) is carried out to test the joint effect of the independent variables on the dependent variable. If the F-test value is greater than the F-table value and the significance is less than 0.05, then it can be concluded that the independent variables simultaneously have a significant effect on the dependent variable. Finally, a determination coefficient (R^2) test is carried out to measure how much the independent variables can explain the variability in the dependent variable. The closer to 1 the R^2 value, the better the regression model is in explaining the variability of the dependent variable. This research method is designed to gain a deep understanding of the effect of the variables studied on the bank's financial performance as measured by ROA.

III. RESULT AND DISCUSSION

Data Analysis

Descriptive Statistics

Table 1. Description of Research Variables

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
NPL	86	1,75	26,81	5,2657	4,69034
LDR	86	35,91	96,57	74,4463	16,71812
BOPO	86	66,63	95,12	77,1078	7,88473
NIM	86	3,13	6,53	5,3763	,79823
ROA	86	,50	3,55	2,3159	,74090
Valid N (listwise)	86				

Source: SPSS Output, 2024

Table 1. above shows that the amount of data used in this study is 86 data samples taken from the BNI Financial Report using the pooled data method. The lowest (minimum) ROA ratio data is 0.50%, namely in the 2008 period and the highest (maximum) 3.55%, namely in the 2015 period. While the average ROA is 2.3159%. This shows that during the study period, it can be statistically explained that BNI's profit level is included in the "sufficient" category, in accordance with the ranking criteria set by Bank Indonesia. Meanwhile, the standard deviation of 0.740% shows a relatively small data deviation, because its value is smaller than its mean value, which is 2.3159%. With the large data deviation, it shows that the ROA variable data is quite good. The NPL ratio obtained an average of 5.2657% with the lowest data of 1.75%, which is almost all banking companies listed on the IDX in each period and the highest is 26.81%. Thus, it can be concluded that statistically, during the study period, the NPL level of banking recorded on the IDX exceeded the standard set by BI, which is a maximum of 5%. Meanwhile, the standard deviation of 4,690 looks smaller than the mean value. So that the data deviation in this NPL ratio can be said to be good. The LDR ratio obtained an average of 74.44%, with the lowest data of 35.91% in 2002 and the highest of 96.57% in 2019. This shows that statistically, during the study period, Bank Negara Indonesia's LDR ratio has met the standards set by Bank Indonesia and is included in the category of a very healthy bank where the LDR is less than or equal to 75%. So it can be concluded that the funds distributed are not greater than the placement of customer funds. While the standard deviation is 16.71812%, it is still smaller when compared to the mean value of 74.4463%. Thus, it can be said that the data deviation in LDR Bank Negara Indonesia is relatively good.

The BOPO ratio obtained an average of 77.1078% with the lowest data of 66.63% in 2023 and the highest 95.12% in 2008. Thus, it can be concluded that statistically, during the study period. the level of efficiency of BNI banking operations is already classified as efficient, because the average BOPO ratio is below 80%. Meanwhile, to see how much data deviation is in the BOPO ratio, it can be seen from the standard deviation, which is 7.88473%. In this case, the data deviation can be said to be good, because the standard deviation value is smaller than the mean value.

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The average NIM ratio obtained was 5.3769% with the lowest data of 3.13% in the 2002 period and the highest 6.53% in the 2015 period. Thus, it can be concluded that statistically, during the study period, BNI's NIM level still did not meet Bank Indonesia's standards, which is a minimum of 6%. Meanwhile, the standard deviation value is still smaller when compared to the mean value, which is 0.798232%. Thus, the data deviation in the NIM ratio in this study can be said to be good. Standard deviation (σ) shows how far the value obtained is likely to deviate from the expected value (in this case the variables ROA, LDR, NPL, BOPO, and NIM). The greater the standard deviation value, the greater the possibility of the real value deviating from the expected value (Gujarati, 1995).

Classical Assumption Test

Normality Test

Table 2. Normality Test Results

One-Sample Kolmogorov-Smirnov Test

			Unstandardized Residual
N			86
Normal Parameters[a,b]	Mean		,0000000
	Std. Deviation		,27862607
Most Extreme Differences	Absolute		,115
	Positive		,115
	Negative		-,092
Test Statistic			,115
Asymptotic Significance (2-tailed)			,007[c]
Monte Carlo Significance (2-tailed)	Significance		,197[d]
	99% Confidence Interval	Lower Bound	,186
		Upper Bound	,207

a. Test Distribution is Normal

b. Calculated from data

c. Lilliefors Significance Correction

d. Based on 10000 sampled tables with starting seed 2000000

Source: SPSS Output, 2024

In table 2, it can be concluded that the Asymp. Sig. (2-tailed) value is 0.207, > α = 0.05, meaning that according to decision making using the Kolmogorov-Smirnov test, the data has a normal distribution and has met the normality requirements in the regression model.

Multicollinearity Test

Table 3. Multicollinearity Test Results

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Significance	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	9,869	,481		20,528	,000		
	NPL	-,072	,034	-,189	-2,131	,036	,211	4,742
	LDR	-,020	,003	-,441	-6,376	,000	,346	2,894
	BOPO	-,089	,006	-,944	-14,350	,000	,382	2,617
	NIM	,193	,041	,208	4,723	,000	,851	1,175

a. Dependent Variable: ROA

Source: SPSS Output, 2024

In table 3, the tolerance value of variables X and Y is > 0.10, while the VIF value of variables X and Y is <10, so it can be concluded that there is no Multicollinearity symptom in the regression model.

Heteroscedasticity Test

The following is a display of the scatterplot graph of the regression model in this study which is presented in Figure 2.

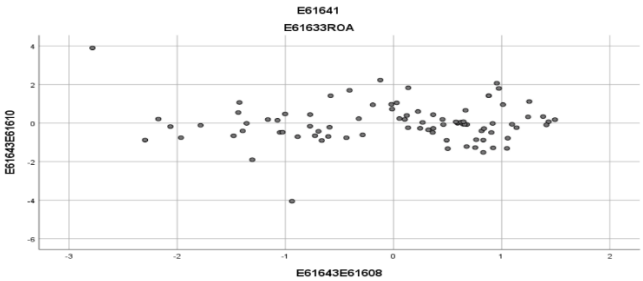

Figure 2. Heteroscedasticity Test Results

A good regression model usually does not experience heteroscedasticity. Through the scatterplot graph, it can be seen whether a regression model experiences heteroscedasticity or not. If there is a certain pattern in the graph, it indicates that heteroscedasticity has occurred. From Figure 4.3 above, it can be seen that the points are spread randomly and are spread both above and below the number 0 on the Y axis. So it can be concluded that there is no heteroscedasticity in the regression model in this study.

Autocorrelation Test

Table 4. Autocorrelation Test Results

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,931[a]	,866	,859	,27774	2,231

a. Predictors: (constant) NIM, BOPO, LDR, NPL...

b. Dependent Variable: ROA

Source: SPSS Output, 2024

Based on the test that has been carried out, the Durbin-Watson test value is 2.231. Then the value is compared with dl and du. The dl value is the durbin-watson statics lower value, while du is the durbin-watson statics upper value. The dl and du values can be seen from the durbin-watson table with _ = 5%, n = number of data, K = number of independent variables. Then the dl value is found = 1.5536 and the du value = 1.7478, K = 4 and n = 86.

Hypothesis Test

Multiple Linear Regression Analysis

Table 5. Multiple Linear Regression Test Results

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Significance
1	(Constant)	9,869	,481		20,528	,000
	NPL	-,072	,034	-,189	-2,131	,036
	LDR	-,020	,003	-,441	-6,376	,000
	BOPO	-,089	,006	-,944	-14,350	,000
	NIM	,193	,041	,208	4,723	,000

a. Dependent Variable: ROA

Source: SPSS Output, 2024

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Based on the calculation results above, the multiple regression line equation is as follows:

Y = 9.869 - 0.072 X1 - 0.020 X2 - 0.089 X3 + 0.193 X4 + e

Based on the regression equation above, the interpretation of the coefficients of each variable is as follows:

1) The constant value (α) of 8.869 with a positive sign states that if the NPL, LDR, BOPO and NIM variables are considered constant, the Y value is 8.869.
2) The regression coefficient value of the NPL variable (X1) of -0.072 with a negative sign states that if the NPL level increases by one unit assuming other independent variables are constant, then ROA will decrease by 0.072.
3) The regression coefficient value of the LDR variable (X3) is -0.020 with a negative sign stating that if the LDR level increases by one unit assuming other independent variables are constant, then ROA will decrease by 0.020.
4) The regression coefficient value of the BOPO variable (X2) is -0.089 with a negative sign stating that if the BOPO level increases by one unit assuming other independent variables are constant, then ROA will decrease by 0.089.
5) The regression coefficient value of the NIM variable (X4) is 0.193 with a positive sign stating that if the NIM level increases by one unit assuming other independent variables are constant, then ROA will increase by 0.193.

Simultaneous Significance Test (F Statistical Test)

Table 6. Simultaneous Test Results (F Statistical Test)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Significance
1	Regression	40,411	4	10,103	130,963	,000[b]
	Residual	6,248	81	,077		
	Total	46,659	85			

a. Dependent Variable: ROA

b. Predictors: (constant) NIM, BOPO, LDR, NPL...

Source: SPSS Output, 2024

Based on the results of the first model F test in table6, the F value of 130.963 is greater than the table f value of 2.82 with a significance level of 0.000 or <0.05, so simultaneously the NPL, LDR, BOPO and NIM variables have a significant effect on the ROA variable.

Significance Test of Individual Parameters (T Statistical Test)

Table 7. Partial Test Results (T Statistical Test)

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Significance
1	(Constant)	9,869	,481		20,528	,000
	NPL	-,072	,034	-,189	-2,131	,036
	LDR	-,020	,003	-,441	-6,376	,000
	BOPO	-,089	,006	-,944	-14,350	,000
	NIM	,193	,041	,208	4,723	,000

a. Dependent Variable: ROA

Source: SPSS Output, 2024

1. Based on table 7 above, the t-value of the NPL variable can be obtained as -2.131 with a significance value of 0.036. This significance value is smaller than the significance limit value, which is 0.05. In addition, by looking at the coefficient value which is negative, the hypothesis stating that the NPL variable has a negative and significant effect on ROA is accepted. This means that if the NPL decreases, the ROA will increase.
2. Based on table 7 above, the t-value of the LDR variable can be obtained as -6.376 with a significance value of 0.000. This significance value is smaller than the significance limit value, which is 0.05. In addition, by looking at the coefficient value which is negative, the hypothesis stating that the LDR variable has a negative and significant effect on ROA is accepted. This means that if the LDR is negative, it indicates that the bank has a more cautious strategy in providing loans, which can lead to a decrease in ROA due to the suboptimal use of funds in generating profits.
3. Based on table 7 above, the t-value of the BOPO variable can be obtained as -14,350 with a significance value of 0.000. This significance value is smaller than the significance limit value, which is 0.05. In addition, by looking at the coefficient value which is negative, the hypothesis stating that the BOPO variable has a negative and significant effect on ROA is accepted. This means that if BOPO decreases, ROA will increase.
4. Based on table 7 above, the t-value of the NIM variable can be obtained as 4,723 with a significance value of 0.000. This significance value is smaller than the significance limit value, which is 0.05, so the hypothesis stating that the NIM variable has a positive and significant effect on ROA is accepted. This means that the higher the Net Interest Margin (NIM), the higher the Return on Assets (ROA) tends to be

Coefficient of Determination Test (R2 Test)

Table 8. Results of the Coefficient of Determination Test

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,931[a]	,866	,859	,27774

a. Predictors: (constant) NIM, BOPO, LDR, NPL...

b. Dependent Variable: ROA

Source: SPSS Output, 2024

Based on the SPSS output table "Model Summary" above, it is known that the coefficient of determination/R Square value is 0.866 or equal to 86%. This figure means that the variables NPL (X1), BOPO (X2), LDR (X3) and NIM (X4) simultaneously (together) affect the ROA variable (Y) by 86%. While the rest (100% - 86% = 14%) is influenced by other variables outside this regression equation or variables that are not studied.

H1: NPL Has a Significant Negative Effect on ROA

The results of the t-statistical test show that Net Performing Loan (NPL) has a significant negative effect on ROA, which means that the first hypothesis (H1) is accepted. This finding indicates that an increase in NPL, which reflects deteriorating credit quality, causes a decrease in bank

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profitability. High NPLs increase operating expenses due to the obligation to provide larger credit loss reserves and reduce interest income from credit assets. NPL is a key indicator of credit risk, which reduces potential income and increases the cost of managing non-performing loans, thereby reducing the efficiency of asset use and bank profitability, which is reflected in ROA.

The results of this study indicate that good credit risk management is essential to maintaining bank profitability. Banks need to improve credit evaluation, conduct strict monitoring of debtors, and develop non-performing loan recovery strategies to control NPL. These steps will not only improve credit quality but also increase the efficiency of asset use and the bank's ability to generate profits sustainably.

This study is in line with previous studies, such as those conducted by Anisa (2021) and Alhempi (2022), which also found that NPL has a significant negative effect on ROA. Both studies revealed that high NPL reflects poor credit risk management, which leads to decreased bank profitability.

H2: LDR Has a Significant Negative Effect on ROA

The results of the t-statistic test show that the Loan Deposit Ratio (LDR) has a significant negative effect on ROA, which means that the second hypothesis (H2) is accepted. This shows that the proportion of credit distribution to third party funds (TPF) collected by banks affects bank profitability, especially ROA. A low LDR indicates excess unproductive liquidity, where deposit funds are not used to provide loans. This results in the loss of potential interest income, which is the main source of bank profits, thus having a direct impact on low ROA.

In addition, a low LDR reflects a conservative approach to credit risk management. Banks that are cautious in providing loans tend to maintain liquidity, but are not aggressive enough in seeking income opportunities from loans, which results in low interest income and negatively affects ROA. Banks with low LDR also rely on non-interest income, which is not significant enough to increase ROA. Therefore, even though bank liquidity is maintained, the inability to use these funds to finance productive loans will reduce ROA.

This study is in line with the findings of Rahmawati et al. (2021) which states that an LDR that is too high reduces the efficiency of asset use and reduces ROA. Another study by Merkusiwati (2007) also found that a low LDR reduces the use of funds for loan financing, which reduces interest income and lowers ROA. Both studies emphasize the importance of effective LDR management to ensure bank profitability.

H3: BOPO Has a Significant Negative Effect on ROA

The results of the t-statistic test show that Operating Costs to Operating Income (BOPO) have a negative effect on ROA, which means that hypothesis H3 is accepted. This finding indicates that operational cost efficiency affects bank profitability as measured by ROA. High BOPO reflects inefficiency in cost management, where the greater the operational costs incurred to generate income, the lower the bank's profitability. Increasing BOPO reduces profit margins, lowers net income, and suppresses the ability of assets to generate profits, which results in lower ROA. Poor operational efficiency also reflects weaknesses in cost management, which can affect bank competitiveness. Banks with high BOPO have difficulty offering products with competitive interest rates or fees, which can reduce market share and worsen financial performance. Therefore, efficient operational cost management is essential to maintain bank profitability and competitiveness.

This study is in line with previous findings, such as Parhan's (2020) study which showed that increasing operational expenses without adequate income caused a decrease in ROA. The findings of Dewanti (2022) and Amalia & Diana (2022) also show that high BOPO worsens profitability and decreases ROA. Overall, this study emphasizes the importance of operational efficiency in improving bank financial performance.

H4: NIM has a significant positive effect on ROA

The results of the t-statistic test show that Net Interest Margin (NIM) has a positive effect on Return on Assets (ROA), which means that the H4 hypothesis is accepted. This finding indicates that the bank's ability to manage assets to generate net interest income significantly affects its profitability. High NIM reflects the bank's efficiency in generating interest income, which contributes directly to increasing net profit and ROA. The better the management of interest income, the greater its contribution to the bank's financial performance.

High NIM usually indicates the bank's efficiency in managing interest income. However, its effect on ROA is also influenced by other factors, such as management of operating costs, credit risk, or asset quality. Banks with high NIM may face higher operating expenses or higher credit risk, which can reduce profitability even though interest income is high. In addition, while NIM reflects interest income efficiency, it does not necessarily reflect overall efficiency, especially if the bank is unable to manage costs or risks effectively. Overall, a high NIM contributes to increased ROA, by indicating the bank's efficiency in utilizing resources to generate optimal income. Banks with high NIM have the ability to adjust pricing strategies and increase profits amidst intense market competition. However, risk management and cost efficiency remain important, because while NIM indicates efficiency in interest income, poor risk and cost management can limit its impact on ROA.

IV. CONCLUSION

This study analyzes the effect of Non-Performing Loan (NPL), Loan Deposit Ratio (LDR), Operating Expenditure (BOPO), and Net Interest Margin (NIM) on Return on Asset (ROA) with a case study at Bank Negara Indonesia (BNI) for the period 2002-2023. Hypothesis testing was conducted using SPSS 20 and multiple regression analysis methods. The sample of this study was data from Bank Negara Indonesia for the period 2002-2023. The results of simultaneous hypothesis testing (F Test) showed an F value of 18.081 with a significance level of 0.000. Because the F value is greater than 2.42 and the significance level is less than 0.05, it can be

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concluded that all independent variables consisting of NPL, LDR, BOPO, and NIM simultaneously affect the dependent variable, namely ROA. Meanwhile, the results of the partial hypothesis test (t-test) can be concluded as follows: The NPL variable obtained a t-value of -2.131 with a significance value of 0.036. This significance value is smaller than the set significance limit, which is 0.05. In addition, by looking at the coefficient value which is negative, the hypothesis stating that the NPL variable has a negative and significant effect on ROA is accepted. The LDR variable obtained a t-value of -6.376 with a significance value of 0.000. This significance value is smaller than the significance limit value, which is 0.05. In addition, by looking at the coefficient value which is negative, the hypothesis stating that the LDR variable has a negative and significant effect on ROA is accepted. The BOPO variable obtained a t-value of -14.350 with a significance value of 0.000. This significance value is smaller than the significance limit value, which is 0.05. In addition, by looking at the coefficient value which is negative, the hypothesis stating that the BOPO variable has a negative and significant effect on ROA is accepted. The NIM variable obtained a t-value of 0.208 with a significance value of 0.000. This significance value is smaller than the significance limit value, which is 0.05, so the hypothesis stating that the NIM variable has a positive and significant effect on ROA is accepted.

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