The Effect Of CAR, NPL And BOPO On ROA With LDR As Intervening Variable

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Abstract. Banks, as financial institutions, are obligated to be financially viable to fulfill their responsibilities effectively. The measure of profitability, represented by Return On Asset (ROA), reflects a bank's success in generating profits. A higher ROA signifies greater profit-making capacity for a bank. This study aims to assess the impact of CAR, NPL, and BOPO on ROA, with LDR acting as an intervening variable. The research adopts an associative approach, utilizing a sample of 40 banking companies from the years 2019-2021, selected through purposive sampling. Various analysis methods, including classical assumption tests, path analysis, determination coefficient analysis, and partial tests (t-tests), are applied using IBM SPSS 19 software. The findings of this study reveal that CAR, NPL, and BOPO do not significantly influence LDR. Additionally, LDR does not have a significant impact on ROA. CAR does not affect ROA through LDR. However, NPL and BOPO exert a significant influence on ROA through LDR. In conclusion, the results indicate that the LDR variable cannot serve as an intervening variable for the impact of CAR on ROA.

Keywords: CAR, NPL, BOPO, ROA and LDR

1 Introduction

The banking industry plays a vital role in influencing and contributing to a nation's economic development. According to the provisions of Law Number 10 of 1998, banks are entities that collect funds from the public through deposits and subsequently allocate these funds to the public through various methods, such as credit, with the aim of improving the well-being of a large number of individuals [1]. Banks function as financial intermediaries, bridging the gap between entities with surplus funds and those in need, while also facilitating payment transactions. It is imperative to consider policies and regulations to ensure that banks operate effectively in their role as financial intermediaries.

Given their significant role in the economy, banks must maintain good performance to prevent the potential failure of their business. The repercussions of a failed bank underscore the importance of conducting thorough analyses to detect any risks at an early stage. One method of identifying these risks is by closely examining the performance of the banking sector [2]. Darmawi suggests using the CAMELS framework, which comprises six key aspects for assessing banking performance: Capital, Assets, Management, Earnings, Liquidity, and Sensitivity to Market Risk. The Capital aspect involves evaluating the Capital Adequacy Ratio (CAR), the Assets aspect focuses on Non-Performing Loans (NPL), the Earnings aspect considers metrics like Return On Assets (ROA), Net Interest Margin (NIM), and Operational Costs to Operational Revenue (BOPO). Additionally, the Liquidity aspect involves examining the Loan to Deposit Ratio (LDR) to comprehensively evaluate a bank's performance. The study

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employs financial ratios to assess four out of the six aspects outlined by Darmawi, which are capital, assets, earnings, and liquidity. These ratios provide a comprehensive analysis of a bank's performance in terms of its capital adequacy, asset quality, earning potential, and liquidity position [3].

Table 1. Indonesian Banking Financial Performance 2019-2021

Financial Performance	2019	2020	2021
CAR	22,83%	23,89%	25,66%
NPL	2,53%	3,06%	3,00%
BOPO	83,49%	86,58%	83,55%
ROA	2,70%	1,59%	1,85%
LDR	93,39%	82,54%	77,49%

Source: indonesian banking statistics, Processed data 2023

The provided data indicates a consistent annual increase in the Capital Adequacy Ratio (CAR), surpassing the regulatory requirement of 8% set by SE.BI No.6/23/DPNP Year 2004. This suggests a robust and healthy CAR, reflecting high-quality capital for the bank. However, Juniati et al point out that an excessively high CAR may imply idle funds, indicating that the bank's management may not be effectively utilizing these funds to generate additional income. Striking a balance between maintaining a healthy CAR and optimizing fund utilization is essential for effective bank management [4].

The trend in the development of Non-Performing Loans (NPL) shows fluctuations, yielding an average result of 2.86%. Bank Indonesia has established a standard for NPL not to exceed 5%. Consequently, the conclusion can be drawn that the NPL for the past three years remains in a satisfactory condition. This observation aligns with the findings of Sagala et al, suggesting that as NPL increases, the quality of bank credit declines, leading to a higher volume of non-performing loans. [5]. The Operational Costs to Operational Revenue (BOPO) ratio exhibits fluctuations and generally hovers between 94% and 96%. This pattern indicates effective performance by the bank's management team, showcasing efficient utilization of available resources. The observation suggests that as operational scale increases, operating income decreases, potentially impacting the Return On Assets (ROA) by reducing it. Pratama suggests that a favorable BOPO ratio is achieved when banks successfully minimize operational costs while maximizing profits. [6].

The Return On Assets (ROA) based on financial performance remains in a highly favorable condition, aligning with the criteria set by SE.BI No.6/23/DPNP Year 2004, which defines "very good" as exceeding 1.5%. ROA serves as a crucial metric for evaluating a bank's performance, offering insights into how effectively the institution utilizes its resources to generate profits. The fluctuations in ROA can significantly influence overall banking performance. Previous research indicates that an increase in ROA contributes to an enhanced performance for the bank [7]. The Loan To Deposit Ratio (LDR) data in the table meets the ideal standard, as it falls within the range required by Bank Indonesia (75%-100%). LDR serves as an indicator of a bank's liquidity health. A higher LDR suggests that a bank is effectively distributing credit, minimizing the occurrence of bad debts, and potentially leading to increased profits. Sofyan's research emphasizes that financial analysts frequently use LDR as a key metric to assess a bank's performance, particularly in relation to the total amount of credit extended by the bank in comparison to the funds it receives [8].

Considering the background scenario, the researchers are keen on conducting a study titled "Analyzing the Impact of CAR, NPL, and BOPO on ROA, with LDR Serving as an

Intervening Variable."

2 Literature Review and Hypothesis Development

2.1 Capital Adequacy Ratio

The Capital Adequacy Ratio (CAR) represents the ratio of an institution's own capital to Risk Weighted Assets (ATMR) and exerts a positive influence on profit variations [9]. One crucial aspect to support company growth is the level of capital. The Capital Adequacy Ratio (CAR) serves as a metric to evaluate a bank's performance by gauging its capital adequacy in covering risky assets. A higher CAR signifies increased strength for the bank in managing the risks associated with loans or productive assets, thereby enabling effective and secure bank operations. Consequently, a robust CAR can significantly contribute to enhanced profitability [10]. An excessively high CAR value may suggest the presence of idle funds, meaning that these resources are not being optimally utilized by bank management to generate additional income. [4]. Frida asserts that Bank Indonesia has formally established the Capital Adequacy Ratio (CAR) at 8%, signifying the prescribed minimum capital requirement for banks. [11].

2.2 Non Performing Loan

The Non-Performing Loan (NPL) is the ratio of all loans that are not being repaid as agreed to the total loans extended to debtors. It represents one of the risks linked to the possibility that a client may fail to meet their obligations or that a debtor may encounter difficulties in repaying their loan, commonly referred to as non-performing loans [5]. Non-performing loans are loans classified under collectibility categories 3, 4, and 5 out of a total of 5 credit collectibility levels. These specific collectibility levels are identified as substandard, doubtful, and non-performing debtors. [12]. Banks with elevated Non-Performing Loans (NPL) tend to incur increased expenses, encompassing the necessity to set aside funds for unproductive assets and additional costs. In other words, a higher NPL for a bank correlates with a decline in the overall performance of the bank. [13]. Exceeding the maximum threshold of 5% for Non-Performing Loans (NPL) can negatively impact the overall performance of the bank, leading to a decrease in its assessed value [14].

2.3 Operational Costs Operational Revenue

The Operational Costs to Operational Revenue (BOPO) is calculated as the ratio of operational costs to operational revenue [15]. BOPO is a ratio designed to assess the efficiency of a bank's operations. It compares operating income, which includes interest received from consumers, to operational costs, representing the expenses associated with interest paid to customers [16]. The objective is to gauge the company's effectiveness in managing operational costs. A higher operational cost is indicative of a less favorable situation for the banking company, while a smaller operational cost reflects greater efficiency. The BOPO ratio is considered favorable when banks successfully reduce operational costs and maximize profits [6].

2.4 Return On Assets

Return On Assets (ROA) is calculated as the ratio of profit after tax to total assets. This metric serves as a tool for bank management to assess overall profitability, prompting

continuous evaluation and efforts to enhance profitability. A higher level of profitability signifies a more organized and effective performance for the bank [17].

then the bank's performance is more organized [10].

As per Sagala et al, Return On Assets (ROA) or the profitability ratio is a metric utilized to gauge a company's efficient utilization of assets to generate profits within a specified time frame, often on a semester or quarterly basis. This ratio serves as an assessment tool for the company's ability to operate efficiently [5]. As the ROA ratio increases, it signifies that assets are becoming more productive in generating net profit. Consequently, the company becomes more attractive to investors. ROA proves beneficial for companies that have implemented sound accounting practices [18].

2.5 Loan To Deposit Ratio

Loan To Deposit Ratio (LDR) is the proportion of total loans disbursed to external funds (DPK) [20]. LDR is a metric utilized to assess a bank's ability to meet obligations, repay depositors, and fulfill credit requests effectively. [2]. In accordance with Sarlawa et al, LDR is characterized as a measure involving the total loans issued, which are then compared against the funds acquired from the general public and the amount of the bank's own capital. [12]. The Loan To Deposit Ratio (LDR) is assessed based on the premise that a higher ratio indicates increased liquidity capacity for the affected bank, potentially raising the likelihood of financial difficulties. On the contrary, a smaller ratio suggests reduced effectiveness for the bank in channeling credit, thereby missing out on profit-making opportunities [14]. The profitability of a bank is influenced by the magnitude of loans disbursed. Refusing to extend credit when receiving substantial funds can have adverse effects on the bank's overall financial performance. [19].

2.6 Conceptual Framework

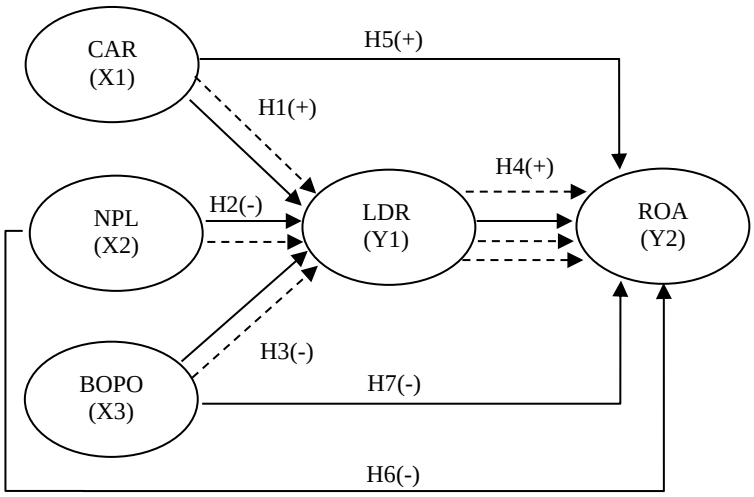

Fig. 1. Conceptual Framework
Source: Processed data, 2023

2.6 Hypothesis

Capital Adequacy Ratio (CAR) is an assessment of the adequacy of capital to cover current and anticipated future risk exposures. The higher the CAR value, the greater the bank's liquidity,

indicating a stronger capital structure. A robust capital structure attracts individuals to seek credit, and the bank will have sufficient reserves to cover it. Additionally, Loan To Deposit Ratio (LDR) tends to increase when CAR does [19]. This outcome is supported by Suhandi, indicating that the results of Capital Adequacy Ratio (CAR) are positive and do not have a significant effect on Loan To Deposit Ratio (LDR) [20]. According to research conducted by Falah et al., it is reported that the relationship between CAR and LDR is positive and lacks statistical significance [7].

H1: CAR has a positive and insignificant effect on LDR

Non-Performing Loans (NPLs) serve as a credit risk indicator, assessing a bank's ability to manage non-performing loans granted by the institution. The NPL ratio is indicative of the credit risk level for the bank. A high NPL ratio can impede the bank's capacity to maintain liquidity, especially if depositors decide to withdraw their funds. [21]. The outcomes of this research are corroborated by Jannah & Gunarso's research, showing that NPL has a negative and significant effect on LDR [22]. In line with the outcomes of Falah et al, the output of NPL have a negative and insignificant direction on LDR [7].

H2: NPL has a negative and significant effect on LDR

The BOPO ratio is used to determine the operating costs incurred by comparing operational cost with operational income. When the bank is in an inefficient state, the liquidity issued will not be maximized, when operating costs are high, the bank will carry out a strategy to reduce this figure by increasing revenue so that the bank has the ability to lower the BOPO ratio and the bank can maximize the liquidity issued [23]. This outcomes is supported Falah et al, explain that BOPO have a negative and significant effect on LDR [7]. in keeping with Istikanah's research, the results of BOPO are negative and insignificant to LDR [10].

H3: BOPO has a negative and significant effect on LDR

Loan to Deposit Ratio is a ratio that can be used by banks to determine how much credit is distributed. An increasing LDR number will indicate an increase in credit. Higher lending to customers will have an impact on high returns as well, so that it will increase profitability [24]. The increase in ROA must also be balanced with good credit quality with non performing loan. The findings of this research are corroborated by Alphamanala & Paramita, that clarify that LDR has a positive and insignificant direction on ROA [17]. In line with Karno et al, from the test results LDR have a positive direction and is insignificant to LDR [18].

H4: LDR has a positive and insignificant effect on ROA

CAR is one of the ratios that assesses the sufficiency of bank capital by comparing bank capital with risk weighted assets. Banks that have large capital will have the possibility to withstand various risks, thus it will increase ROA. However, when a bank's capital is too high and does not utilize the funds owned properly, it will result in a decline in ROA [24]. This research is supported Alphamanala & Paramita that CAR has a positive and insignificant direction on ROA [17]. In line to previous outcomes by Junianti et al, stating that CAR has a positive and no significant direction on ROA [4]. in keeping with by Falah et al, it states that CAR has a positive and no significant direction on ROA [7].

H5: CAR has a positive and insignificant effect on ROA through LDR

According to Bank Indonesia standards, a good non-performing loan can only have a maximum value of 5%. When LDR is too low, the bank's funds raised have not been put to use and have not been efficiently channeled into lending. so that less income is received. According to Junianti, if bank goal management seeks to maximize profits. Then the strategy of increasing credit interest rates will be determined, thus raising the risk of default for debtors. Thus, it is anticipated that increased lending will lower the Loan to Deposit Ratio [4]. This research is supported by Pangestika & Musdholifah, display that NPL has a significant negative value [19].

In line with Alphamanala & Paramita, it shows that NPL have a negative and significant effect on ROA [17]. Similar output was conducted by Sarlawa et al [12].
H6: NPL has a negative and insignificant effect on ROA through LDR
BOPO is a ratio that measure illustrates how effectively banks do their business. While operating income is the interest received from consumers, operating expense is the cost of interest paid to customers [16]. LDR is a ratio that assesses the bank's capacity to meet the planned credit demand, pay off obligations, and return depositors [2]. High lending will have an impact on high returns. This outcomes similar was conducted by Setiyono et al, giving the results that BOPO has a negative and significant effect on ROA [9]. Similar output was by Mirawati et al, stated that BOPO is negative and significant to ROA [23].
H7: BOPO has a negative and insignificant effect on ROA through LDR

3 Research Methods

The study employs an associative method to determine and test the influence of the Capital Adequacy Ratio, Non-Performing Loan, and Operational Costs of Operational Revenue on Return On Assets, as well as to assess whether there is an intervening effect of the Loan to Deposit Ratio variable. The population for this research comprises all banking sector companies listed on the Indonesia Stock Exchange for three consecutive years (2019-2021), totaling 47 companies. The sampling technique adopted is purposive sampling, resulting in a total sample of 40 companies. Data processing is conducted using IBM SPSS 19, with independent variables in the study being Capital Adequacy Ratio (X1), Non-Performing Loan (X2), and Operational Costs of Operational Revenue (X3). Return On Assets (Y2) is the dependent variable, and the intervening variable is Loan to Deposit Ratio (Y1). Data collection involves secondary data obtained from comprehensive annual reports during the study period. The analysis techniques include classical assumption testing, path analysis, determination coefficient analysis, and partial tests (t-tests).

3.1 Research Variables

Capital Adequacy Ratio. Is the ratio proportion total capital and all risk weighted assets. CAR could calculated with the following indicators:

$$\text{CAR} = \frac{\text{Total Capital}}{\text{Risk Weighted Assets}} \text{ x } 100\% \qquad (1)$$

Non Performing Loan. This ratio demonstrates the bank management's capacity to oversee non performing loans made by the relevant bank. The following is the NPL formula:

$$\text{NPL} = \frac{\text{Total NPL}}{\text{Total Loans}} \text{ x } 100\% \qquad (2)$$

Operational Costs and Operational Revenue. The effectiveness and capacity of a bank to carry out its operational tasks are gauged using BOPO ratio. The formula for BOPO:

$$\text{BOPO} = \frac{\text{Operational Expenses}}{\text{Operational Income}} \; x \; 100\% \qquad (3)$$

Return On Assets. Net profit after taxes to total assets as a ratio. Formula ROA:

$$\text{ROA} = \frac{\text{Net Profit}}{\text{Total Assets}}\ x\ 100\% \qquad (4)$$

Loan to Deposit Ratio. the ratio measured by the comparing the entrie amount of loans extended to the total of third party funds. The LDR formula:

$$\text{LDR} = \frac{\text{Total Credit}}{\text{Total DPK}}\ \text{x}\ 100\% \qquad (5)$$

4 Results and Discussion

4.1 Normality Test

This purpose of the normality test is to asceretain the data distribution in the research variables. The Kolmogorov-Smirnov normality test can be used to determine whether data is normal. Following are the results of the normality test of equation 1:

Table 2. Main Regression Normality Test

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		120
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	.30851594
Most Extreme Differences	Absolute	.095
	Positive	.095
	Negative	-.086
Kolmogorov-Smirnov Z		1.040
Asymp. Sig. (2-tailed)		.230

ibution is Normal.

d from data.

Source: Processed data, 2023

The outcomes above show that the equation 1 are normally distributed after transforming the data to the Natural Logarithm (Ln) form. As can be seen the data in the table signifies that data is spread normal. The worth os asymp sig (2-tailed) 0.230 > 0.05.

Table 3. Intervening Regression Normality Test

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		101
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	.89473034
Most Extreme Differences	Absolute	.112
	Positive	.056
	Negative	-.112
Kolmogorov-Smirnov Z		1.126
Asymp. Sig. (2-tailed)		.158

ibution is Normal.

d from data.

Source: Processed data, 2023

The results above show that the in equation 2 are normally distributed after transforming the data to the Natural Logarithm (Ln) form. As can be seen the data in the table signifies that the data is spread normal. The worth os asymp sig (2-tailed) 0.158 > 0.05

4.2 Multicollinearity Test

A multicollinearity test was applied to examine the correlation between the independent variables. In an appropriate regression model, there should be no correlation between the independent variables. A well-constructed regression model should be free from multicollinearity. The following are the outcomes of the multicollinearity equation 1:

Table 4. Main Regression Multicollinearity Test

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	Ln CAR	.992	1.008
	Ln NPL	.941	1.062
	Ln BOPO	.939	1.065

a. Dependent Variable: Ln LDR

: Processed data, 2023

It is observed that the regression model's between variables does not display multicollinearity. This is evident as the values within the tolerance of each variable are greater than 0.10, and the Variance Inflation Factor (VIF) is less than 10. The outcomes of the multicollinearity equation 2 are as follows:

Table 5. Intervening Regression Multicollinearity Test

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	Ln CAR	.986	1.015
	Ln NPL	.801	1.248
	Ln BOPO	.760	1.315
	Ln LDR	.901	1.110

a. Dependent Variable: Ln ROA

Source: Processed data, 2023

It is known that the regression model's between variables do not exhibit multicollinearity. This is indicated by a value within tolerance of each variable > 0.10 and VIF < 10.

4.3 Autocorrelation Test

The autocorrelation test is conducted to determine if there is a deviation from the classical assumption of autocorrelation. It aims to examine whether there is a correlation between the residuals in one observation and those in other observations. To identify the presence or absence of autocorrelation in the regression model, the Run Test testing method is employed. Autocorrelation equation 1 yields the following effects:

Table 6. Main Regression Multicollinearity Test

Runs Test

	Unstandardized Residual
Test Value[a]	.14050
Cases < Test Value	50
Cases >= Test Value	51
Total Cases	101
Number of Runs	52
Z	.101
Asymp. Sig. (2-tailed)	.920

a. Median

Source: Processed data, 2023

The results autocorrelation test's with the Run Test indicate the Asymp. Sig. (2-tailed) 0.920 > 0.05 which means data used is random so the data under investigation do not exhibit any autocorrelation. Autocorrelation equation 2 has the following effects:

Table 7. Intervening Regression Autocorrelation Test

Runs Test

	Unstandardized Residual
Test Value[a]	-.00451
Cases < Test Value	50
Cases >= Test Value	51
Total Cases	101
Number of Runs	51
Z	-.099
Asymp. Sig. (2-tailed)	.921

a. Median

Source: Processed data, 2023

The results autocorrelation test's with the Run Test indicate the Asymp. Sig. (2-tailed) 0.921 > 0.05 which means data used is random so the data under investigation do not exhibit any autocorrelation.

4.4 Heteroscedasticity Test

The test assesses whether there is unequal variance between the residuals of one observation and another in a regression model. A visual inspection of scatterplot patterns can help identify the presence of heteroscedasticity in a model. The outcomes of the heteroscedasticity test for equation 1 are presented in the following figure:

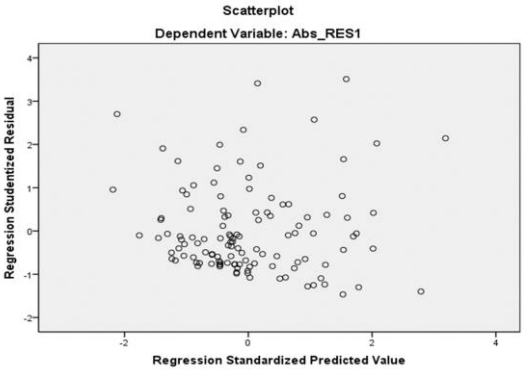

Fig. 2. Main Regression Heteroscedasticity Test
Source: Processed data, 2023

The output indicate that the data points are dispersed and do not exhibit a distinct pattern. The points are seen to be randomly distributed above and the Y axis's value 0. So in this case it can be said that there is no symptom of heteroscedasticity in data used in this study. The results of the heteroscedasticity test of equation 2 can be seen in the following fig:

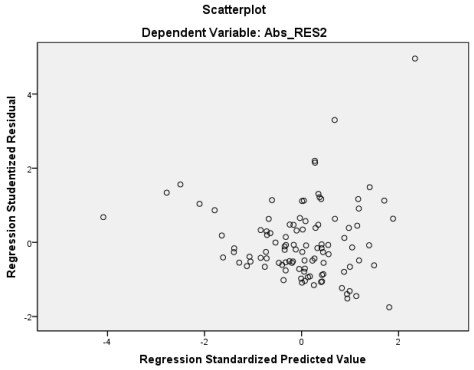

Fig.3. Intervening Regression Heteroscedasticity Test
Source: Processed data, 2023

The output suggests that the data points are scattered and lack a discernible pattern. The points appear to be randomly distributed both above and below the Y-axis value of 0. Consequently, it can be concluded that there are no signs of heteroscedasticity in the data utilized for this study.

4.5 Path Analysis.

In the assessment of the effects of intervening variables, the path analysis method is employed. This analysis utilizes regression analysis to evaluate the qualitative relationships between variables, as established in the causal model based on theory. It serves as an extension of multiple linear analysis. The effects of Path analysis equation 1 are as follows:

Table 8. Test Path Analysis Equation 1

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.892	.501		9.755	.000
	Ln CAR	.032	.068	.043	.475	.636
	Ln NPL	-.044	.029	-.141	-1.504	.135
	Ln BOPO	-.122	.097	-.118	-1.258	.211

a. Dependent Variable: Ln LDR

Source: Processed data, 2023

The unstandardized coefficient can be used to create the following multipe linear regresssion model based on the results shown above.

Y1 = 4,892 + 0,032X1 – 0,044X2 – 0,122X3

Based on the results of the path analysis of equation 1, the regression constant worth is 4.892, therefore, if the value of the CAR, NPL, and BOPO variables is equal to 0 (zero), the LDR variable is 4.892. The worth of the CAR variable is 0.032, to put it another way, when there is a rise in the CAR a unit variable, the worth of the LDR variable will increase by 0.032. The worth of the NPL variable is -0.044, to put in another way, when there is a rise in the NPL a unit variable, the LDR variable's worth will decreases by 0.044. The BOPO variable's value -0.122, to put in another way, if there is a one unit increase in the BOPO variable, the LDR variable's worth will decreases by 0.122.

Table 9. Test Path Analysis Equation 2

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	11.849	3.016		3.929	.000
	Ln CAR	.349	.221	.116	1.576	.118
	Ln NPL	-.384	.106	-.294	-3.612	.000
	Ln BOPO	-3.040	.517	-.492	-5.884	.000
	Ln LDR	.086	.298	.022	.290	.773

a. Dependent Variable: Ln ROA

Source: Processed data, 2023

The unstandardized coefficient can be used to create the following multipe linear regresssion model based on the results shown above.

Y2 = 11,849 + 0,349X1 – 0,384X2 – 3,040X3 + 0,086 Y1

According to the results of the path analysis in equation 2, the constant value is 11.849, indicating that when the CAR, NPL, and BOPO variables through the LDR variable are all set to zero, the ROA variable is 11.849. The CAR variable's value is 0.349, meaning that if there is an increase in the CAR by one unit, the ROA value will increase by 0.349. The NPL variable's value of -0.384 implies that if there is a one-unit increase in the NPL variable, the ROA value will decrease by 0.384. The BOPO variable's value is -3.040, indicating that if there is a one-unit increase in the BOPO variable, the ROA value will decrease by 3.040. The LDR variable's value is 0.086, suggesting that if there is a one-unit increase in the LDR variable, the ROA value will rise by 0.086.

4.6 Test Coeffecient of Determination

Finding out how much of an impact the independent variable have on the dependent variable is done through the analysis of the coefficient of determination (R^2). The following are the outcomes of coefficient of determination test (R^2) equation 1 test:

Table 10. Coeffecient of Determination Equation 1

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.212[a]	.045	.020	.31248

a. Predictors: (Constant), Ln BOPO, Ln CAR, Ln NPL
b. Dependent Variable: Ln LDR
Source: Processed data, 2023

The R-squared value for the coefficient of determination (R^2) test indicates a value of 0.045, signifying 4.5%. This implies that there is an influence on the LDR value, which can be explained by the CAR, NPL, and BOPO variables, accounting for 4.5%, while the remaining 95.5% is explained by other variables not included in the research. Furthermore, the value of e1 is calculated as $\sqrt{}$ (1 - 0.045) = 0.955. The standardized coefficients (Beta values) in Table 4.7 are 0.043 for CAR, -0.141 for NPL, and -0.118 for BOPO. These coefficients provide information on the effect of each variable on the dependent variable LDR. The coefficient of determination test results for equation 2 are thus obtained:

Table 11. Coeffecient of Determination Equation 2

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.700[a]	.490	.469	.91318

a. Predictors: (Constant), Ln LDR, Ln CAR, Ln NPL, Ln BOPO
b. Dependent Variable: Ln ROA
Source: Processed data, 2023

The R square value of the coefficient of determination (R^2) test reveals that the 0.490 means 49.0%. This demonstrates that there is influence the ROA value which is explicable by the CAR, NPL, BOPO, and LDR variables of 49.0% as the remainder 51.0% that explicable by other variables that are not included in the research variables. Meanwhile, for the value of e1 = $\sqrt{}$ (1 - 0.490) = 0.81. And the Standardized Coefficients Beta value in Table 4.8, CAR value is 0.116, NPL is -0.294, BOPO -0.492 and LDR 0.022.

4.7 Partial Test (t Test)

Testing the partial effects of all independent factors on the dependent variable is done adopting the partial influence test (t test). The following are the outcomes of t test equation 1 test:

Table 12. Parsial Test (t Test) Equation 1

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.892	.501		9.755	.000
	Ln CAR	.032	.068	.043	.475	.636
	Ln NPL	-.044	.029	-.141	-1.504	.135
	Ln BOPO	-.122	.097	-.118	-1.258	.211

a. Dependent Variable: Ln LDR
Source: Processed data, 2023

The significance value of the CAR variable is 0.636, which is greater than 0.05, and the calculated t-value is 0.475, which is less than the t-table value of 1.658. This indicates that the CAR variable has a partially insignificant effect on the LDR variable. The significance value of the NPL variable is 0.135, which is greater than 0.05, and the calculated t-value is -1.504, which is less than the t-table value of 1.658. This suggests that the NPL variable is partially insignificantly affected by the LDR variable. The significance value of the BOPO variable is 0.211, which is greater than 0.05, and the t-value is -1.258, which is less than the t-table value of 1.658. This indicates that the BOPO variable has a partially insignificant effect on the LDR variable.

Table 13. Parsial Test (t Test) Equation 2

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	11.849	3.016		3.929	.000
	Ln CAR	.349	.221	.116	1.576	.118
	Ln NPL	-.384	.106	-.294	-3.612	.000
	Ln BOPO	-3.040	.517	-.492	-5.884	.000
	Ln LDR	.086	.298	.022	.290	.773

a. Dependent Variable: Ln ROA

Source: Processed data, 2023

The significance value of the CAR variable through LDR as an intervening variable is 0.118, surpassing the 0.05 threshold, and the t-value is -1.576, falling short of the t-table value of 1.658. This suggests that the CAR variable has a partially insignificant effect on the ROA variable. For the NPL variable through LDR as an intervening variable, the significance value is 0.000, below 0.05, and the t-value is -3.612, which is less than the t-table value of 1.658. This signifies that the NPL variable has a partially significant effect on the ROA variable. Similarly, the significance value of the BOPO variable through LDR as an intervening variable is 0.000, less than 0.05, and the t-value is -5.884, which is below the t-table value of 1.658. This indicates that the BOPO variable has a partially significant effect on the ROA variable. In contrast, the significance on the LDR variable as a variable is 0.773, surpassing 0.05, and the t-value is 0.290, which is less than the t-table value of 1.658. This implies that the LDR variable has a partially insignificant effect on the ROA variable.

5. Discussion

The Effect of CAR on LDR

The outcomes of this study show that the CAR variable is 0.636 > 0.05 and the t value is 0.475 < t table 1.658, showing that the CAR variable partially have insignificant effect on the LDR variable. This situation explains the actual hypothesis is rejected. The findings is supported by Pangestika & Musdholifah, which states that when the CAR value is low, the LDR value will decrease, so that when capital adequacy is inadequate, the LDR will get worse **[19]**. It is possible that banks prefer to strengthen their capital structure to allocate into credit. Because capital adequacy is very important in channeling credit, bank's must meet their minimum capital adequacy of 8% according to Bank Indonesia regulations.

The outcomes of this study are supported by Falah et al, showing the results of CAR is positive and insignificant effect and have a positive effect on LDR **[7]**. In line with Suhadi, CAR

has a positive and no significant direction on LDR **[20]**. However, the challenge with research conducted by Masniyah states that CAR has a positive and significant effect on LDR, where every higher in CAR will also higher LDR **[25]**.

The Effect of NPL on LDR

The outcomes of this study reveal that the NPL variable is 0.135, which is greater than 0.05, and the t-value is -1.504, which is less than the t-table value of 1.658. This indicates that the NPL variable has a partially insignificant effect, with a negative direction, on the LDR variable. Consequently, the actual hypothesis is rejected. NPL, representing a credit ratio, should be capable of regulating non-performing loans granted by the concerned bank. An increase in NPL may impact the loss of abilities to recover money from loans made, leading to reduced earnings and making it harder to extend credit. These results align with Sarlawa et al., who suggest that third-party revenues cannot be maximized when the volume of non-performing loans makes banks hesitant to increase lending, resulting in a negative effect on LDR [12].

In line with the outcomes of Falah et al, the output of NPL have a negative and insignificant direction on LDR [7]. The outcomes of this study are supported by Jannah & Gunarso's research, showing that NPL have a negative and insignificant effect on LDR [22]. However, it goes against the research of Abdurrohman et al, which provides NPL results in a positive and significant direction on ROA [14].

The Effect of BOPO on LDR

The outcomes of this study indicate that the BOPO variable is 0.211, which is greater than 0.05, and the t-count's value is -1.258, which is less than the t-table value of 1.658. This suggests that the BOPO variable has a partially insignificant effect, with a negative direction, on the LDR variable, leading to the rejection of the hypothesis. This observation aligns with the theory proposed by Falah et al., indicating that BOPO has a negative and insignificant impact on LDR. This is because small costs will make the incurred costs certainly less, and they will be inversely proportional to the many costs incurred, leading to losses in financing operational activities for the bank. The greater the operating expenses, the worse the situation for the banking company, affecting bank liquidity accordingly.

The finding of this study have backing by Falah et al, showing the results of BOPO is negative and insignificant to LDR [7]. Similar output Istikanah's giving the output of BOPO is negative and insignificant to LDR [10]. The difference in results from research conducted by Ningsih & Dewi, that BOPO has a positive and significant direction on ROA [13].

The Effect of LDR on ROA

The outcomes reveal that the LDR variable as an intervening variable is 0.773, which is greater than 0.05, and the t-count's value is 0.290, which is less than the t-table value of 1.658. This signifies that the LDR variable is partially not significantly affected by the ROA variable, leading to the rejection of this hypothesis. This can be explained by the findings of Pangelstika Musdholifah, who suggests that in bank liquidity, there are two risks. When the bank has excess funds and fails to optimize their use to meet public credit demand, the raised funds will not rotate properly to generate interest income, resulting in a decline in earned profits. Conversely, if the bank lacks funds, it cannot meet the needs of short-term liabilities, leading to penalties from the central bank [19]. LDR which is quite low is also vulnerable to the inability of banks to distribute credit, when banks are difficult to distribute, banks will have difficulty in increasing funding for operational activities.

The findings of this research are corroborated by Alphamanala & Paramita explaining that

LDR have a positive and insignificant direction on LDR [17]. in keeping with to Karno et al, from the test output LDR has a positive direction and is insignificant to LDR [18]. Not in line with Suhandi, the results show that LDR have a negative and significant effect on ROA [20].

The Effect of CAR on ROA Through LDR As a Intervening Variable

The outcomes of this study indicate that the CAR variable through LDR as an intervening variable is 0.118, which is greater than 0.05, and the t-count's value is 1.576, which is less than the t-table value of 1.658. This suggests that CAR has a positive and insignificant effect on the ROA variable, leading to the rejection of the actual hypothesis. These outcomes imply that the LDR variable cannot mediate the effect of the CAR variable on ROA. The results in the test indicate that the direct effect has a greater value than the indirect effect. It can be concluded that the LDR variable cannot be utilized as an intervening variable to examine how the CAR affects ROA.

The LDR variable cannot be used to mediate the CAR variable's effect on ROA due to a decrease or increase in the CAR value. Bank capital significantly influences bank income as it is a crucial factor in business continuity. When a bank's capital capacity increases, it provides an advantage for the bank to extend credit, resulting in interest income from customers and an increase in ROA. Additionally, increased capital can be utilized if the bank's assets decrease, serving as a form of anticipation in the event of potential losses from risky assets.

The finding of this study have backing by Junianti et al showing that the CAR variable have a positive and no significant effect on ROA [4]. In line with what was done by Falah et al, stating that LDR cannot mediate CAR has an insignificant positive direction [7]. In line with Alphamanala & Paramita's research, explaining CAR is not significant with a positive direction on ROA [17]. But contrary to Masniyah et al, stating that LDR is able to mediate CAR have a positive and significant effect on ROA [21].

The Effect of NPL on ROA Through LDR As a Intervening Variable

The outcomes of this study reveal that the NPL variable through LDR as an intervening variable is 0.000, which is less than 0.05, and the t-count's value is -3.612, which is less than the t-table value of 1.658. This signifies that the NPL variable has a negative and insignificant direction on the ROA variable, leading to the acceptance of this hypothesis. Furthermore, the test outcomes suggest that the direct effect value is smaller than the indirect effect value, indicating that LDR is capable of mediating the NPL variable's impact on ROA. Therefore, the conclusion is that the LDR variable can be used as an intervening variable in the effect of NPL on ROA. Thus, the level of NPL cannot guarantee profitability in banks based on the amount of credit extended to the public. Additionally, the presence of bad debts, even with an increasing trend every year, does not significantly affect or reduce a bank's lending activities. This is because banks will take measures to protect against bad debts, reducing potential losses. Banks typically extend the credit period and installments or provide conveniences to avoid profit loss from customers..

This outcomes is backed by Pangestika & Musdholifah, show that NPL have a significant negative value on ROA which is mediated by LDR [19]. In line with Alphamanala & Paramita, it showing that NPL have a significant and negative value on ROA which mediated by the LDR variable [17]. Similar output was carried out by Sarlawa et al [12]. This research contradicts Abdurrohman et al which states that the LDR variable cannot be used mediate NPL with a positive and insignificant value on ROA [14].

The Effect of BOPO on ROA Through LDR As a Intervening Variable

The outcomes of this investigation reveal that the significance of the BOPO variable, utilizing LDR as an intervening variable, is 0.000, which is below the 0.05 threshold. Furthermore, the t-value of -5.884 is less than the critical t-table value of 1.658. This suggests that the BOPO variable partially has a significant effect with a positive direction on the ROA variable. The tests performed indicate that the direct effect value is smaller than the indirect effect value, meaning that LDR is capable of mediating the impact of the BOPO variable on ROA. It can be concluded that the LDR variable can be used as an intervening variable in the effect of BOPO on ROA. This indicates that an increase in BOPO leads to a decrease in efficiency. Consequently, the ROA obtained by the bank will decrease. This is because the bank's ability to operate efficiently influences the revenue it generates. LDR, as a distributor of credit to the public, is also one of the bank's sources of income. If BOPO and LDR are managed effectively, it will result in increased profits for the bank.

This outcomes is backed by Setiyono et al, giving the results that BOPO have a negative and significant effect on ROA [9]. Similar output were obtained by Mirawati et al, stated that BOPO is negative and significant to ROA [23]. As per the findings of Korri et al, showing the results of BOPO is negative and significant to ROA [26]. The different research according to Nigsih & Dewi suggests that BOPO has a positive and significant direction on ROA [13].

6 Conclusion

The findings from the research discussion and hypothesis testing indicate that the CAR variable has a positive and insignificant impact on LDR. NPL exhibits a negative and insignificant influence on LDR, while BOPO shows a negative and insignificant effect on ROA. Additionally, CAR has a positive and insignificant effect on ROA, and LDR has a positive and insignificant effect on ROA. Both NPL and BOPO exert a negative and significant impact on ROA. In line with the research results, it is clear that the mediation of the CAR variable by LDR is not evident.

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