

## THE EFFECT OF NIM, BOPO, CREDIT DISTRIBUTION, AND CREDIT RISK ON PROFITABILITY AT BANK KALTIMTARA

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### ARTICLE INFORMATION

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### ABSTRACT

*Abstract: This study was intended to analyse how the influence of financial ratios consisting of Net Interest Margin (NIM), Operating Costs to Operating Income (BOPO), Loan to Deposit Ratio (LDR), and Non-Performing Loan (NPL) on banking profitability as measured by Return On Assets (ROA) at Bank Kaltimtara. The type of research employed was quantitative research with a causal associative approach. The population in this study was the annual financial report of Bank Kaltimtara for the period 2008–2023, with a sample of 16 data selected using Purposive sampling. The analysis method conducted in this study was multiple linear regression analysis through SPSS version 27. The results of the study indicated that based on the t-test, NIM had a positive but insignificant effect on ROA, BOPO had a negative and significant effect on ROA, LDR had a positive and insignificant effect on ROA and NPL had a negative and insignificant effect on ROA. The value of the Determination Coefficient (Adjusted R<sup>2</sup>) of 0.906, indicated that 90.6% of the variation in ROA could be explained by the variables NIM, BOPO, LDR, and NPL, while the remaining 9.4% was influenced by other factors which were not examined in this study.*

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## 1. Introduction

Banks play a crucial role in collecting and channeling funds to support economic stability and growth, as stipulated in Law No. 10 of 1998 concerning Banking. Facing intense competition, banks must manage their funds professionally, efficiently, and effectively to meet community needs and sustain business growth. Regional Development Banks (BPD) play a strategic role at the provincial level, closely linked to local governments, as they manage and distribute the regional budget (APBD) and collect funds primarily from local government current accounts (Kesumayuda et al., 2016).

The Kalimantan regional government established Regional Development Banks (BPD) as development agents to support strategic sectors such as education, MSMEs, agriculture, and infrastructure. As intermediary institutions, BPDs are required to contribute through working capital and investment projects in accordance

with national banking policies established by Bank Indonesia (Ferly et al., 2023). Credit distribution is a bank's primary function and its most significant source of revenue, so its effectiveness needs to be evaluated through the Loan-to-Deposit Ratio (LDR) (Tani et al., 2019). The LDR is used to assess a bank's liquidity and ability to disburse credit (Kinanti, 2017). However, an increase in the LDR also has the potential to increase credit risk, as measured by Non-Performing Loans (NPLs). A high NPL ratio indicates a high level of non-performing loans and can reduce a bank's profitability. A bank's ability to manage potential credit losses can be assessed through the Non-Performing Loan (NPL) ratio (Dwinanda & Sulistyowati, 2021).

## 2. Literature Review and Hypothesis Development

### 2.1. Signaling Theory

The Signaling Theory, proposed by Spence (1973), explains that companies need to provide signals in the form of financial information to investors and creditors to reduce information asymmetry. Accurate and relevant financial reports are a crucial tool in conveying a company's financial condition, including profits, which reflect operational effectiveness and serve as a basis for informed decision-making by stakeholders (Setiawan, 2017).

Management uses profits as a signal of optimism about the company's prospects, which is expected to increase market perception and company value (Damayanti et al., 2020). One indicator used to measure management effectiveness in achieving profitability is Return on Assets (ROA), which provides a snapshot of a company's ability to generate profits from its assets.

### 2.2. Agency Theory

Agency theory, proposed by Jensen and Meckling (1976), explains the relationship between principals and agents in the context of business decision-making. In this context, there are two main relationships: between managers and lenders, and between management and shareholders (Abidatus Suroya et al., 2024). This theory highlights the existence of risks and conflicts of interest due to limited access to information and differences in views on risk between principals and agents (Eisenhardt, 1989).

Information asymmetry occurs when managers possess more information than owners, potentially allowing them to exploit it for personal gain (Riswandari, 2023). Furthermore, the principal's incomplete knowledge of an agent's performance also creates agency problems (Suhendah & Imelda, 2012). In the banking industry, agency relationships are increasingly complex, involving customers, management, owners, and supervisors. Therefore, regulators, such as Bank Indonesia, are required to regulate these relationships.

### 2.3. Financial Reports

Financial reports reflect a company's financial condition and performance over a period (Erakipia & Gamaliel, 2016). Profit is the primary indicator investors pay attention to (Lamy et al., 2017). Financial ratios are used to evaluate a company's financial condition (Erakipia & Gamaliel, 2016). Financial reports include the balance sheet, profit and loss statement, cash flow statement, and changes in equity (Cindy & Fitriyah, 2020).

### 2.4. Banks

Banks are financial institutions that play a vital role in supporting economic growth through their intermediary function, namely collecting funds from the public and distributing them in the form of credit for productive activities (N. L. Lestari, 2019, 146). According to Law No. 10 of 1998, banks function as collectors and distributors of funds to improve public welfare.

### 2.5. Profitability (ROA)

Profitability reflects management's ability to generate profits through the management of company resources (Nainggolan, 2023). Return on Assets (ROA) is used to assess the effectiveness and efficiency of bank operations in utilizing assets to generate profits (Abdurrohman et al., 2019). Furthermore, ROA is also used by Bank Indonesia to assess the health of a bank's profitability, where a higher ROA reflects good financial performance (Almadany, 2012).

### 2.6. Net Interest Margin (NIM)

The Net Interest Margin (NIM) measures a bank's ability to generate interest income from its earning assets after deducting interest expenses (Abdurrohman et al., 2019). An NIM above 6% indicates good bank performance and reduces financial risk (Dendawijaya, 2009). An increase in NIM reflects growth in interest income and reduces the potential for financial problems (Rohmiati et al., 2019).

### 2.7. Operating Costs to Operating Income (BOPO)

The BOPO ratio measures the relationship between a bank's operating expenses and operating income, assessing operational efficiency and effectiveness (Priyanto et al., 2014). The lower the BOPO, the more

efficient the bank's operations. A bank is considered efficient if the BOPO is in the 70%-80% range, and inefficient if it approaches or exceeds 90%, the maximum limit set by Bank Indonesia.

## 2.8. Credit Distribution (LDR)

Credit distribution is the process by which banks distribute funds to customers, which must be repaid within a specified timeframe, to generate income (Pratiwi & Adriati, 2020). The Loan to Deposit Ratio (LDR) reflects the effectiveness of a bank's use of funds for credit, with a maximum regulatory limit of 110% and LDR/LFR parameters ranging from 78% to 94%, as per Bank Indonesia Regulation No. 17/11/PBI/2015.

## 2.9. Credit Risk (NPL)

Credit risk is the potential loss to a bank due to debtor default, encompassing various risks such as debtor concentration and insolvency (OJK Regulation No. 18/POJK.03/2016). The Non-Performing Loan (NPL) ratio measures the level of credit risk, namely the ratio of non-performing loans to total loans. An ideal NPL is below 5%, indicating low risk, while a high NPL lowers credit quality and increases the bank's potential for losses (Khamisah et al., 2020).

# 3. Research methods

In this study, the researcher used a quantitative approach. A quantitative approach involves using numerical data in statistical analysis. This study employed a quantitative approach because the data processed are numerical (financial ratios), and the focus of this study is to determine the magnitude of the influence between the variables studied. This study aims to determine the relationship between two or more variables (Sugiyono, 2017), namely the independent variable (X) and the dependent variable (Y). The population in this study was Bank Kaltimara's annual financial statements for the period 2008–2023. The sampling technique employed was purposive sampling, based on financial statements that contained the financial ratios used as research variables for that period.

The research instrument used was annual financial report documentation obtained from Bank Kaltimara's official website ([www.bankkaltimara.co.id](http://www.bankkaltimara.co.id)). The variables studied were Net Interest Margin (NIM), Operating Expenses to Operating Income (BOPO), Non-Performing Loans (NPL) and Loan to Deposit Ratio (LDR), which were measured using a ratio scale. This numerical data is then analyzed using SPSS software to determine the extent to which these independent variables influence bank profitability.

# 4. Results and Discussion

## 4.1. Test Results

### Descriptive Statistics Results

| Descriptive Statistics                      |    |         |         |         |                |
|---------------------------------------------|----|---------|---------|---------|----------------|
|                                             | N  | Minimum | Maximum | Mean    | Std. Deviation |
| Return on Asset                             | 16 | 1.13    | 5.23    | 2.5744  | 1.27070        |
| Net Interest Margin                         | 16 | 4.94    | 8.76    | 6.3513  | 1.13623        |
| Biaya Operasional<br>Pendapatan Operasional | 16 | 55.29   | 89.69   | 75.2675 | 11.41809       |
| Loan to Deposit Ratio                       | 16 | 33.68   | 103.54  | 71.6494 | 18.81569       |
| Non-Performing Loan                         | 16 | .45     | 4.30    | 2.0431  | .86063         |
| Valid N (listwise)                          | 16 |         |         |         |                |

The results of the descriptive analysis can be explained as follows:

1. The Return on Assets (ROA) has a standard deviation of 1.27070 and an average of 2.5744, with a maximum value of 5.23 and a minimum value of 1.13.
2. The Net Interest Margin (NIM) has a standard deviation of 1.13623 and an average of 6.3513, with a maximum value of 8.76 and a minimum value of 4.94.
3. The Operating Costs to Operating Income (BOPO) ratio has a standard deviation of 11.41809 and an average of 75.2675, with a maximum value of 89.69 and a minimum value of 55.29.
4. The Loan-to-Deposit Ratio (LDR) has a standard deviation of 18.81569 and an average of 71.6494, with a maximum value of 103.54 and a minimum value of 33.68.
5. The Non-Performing Loan (NPL) has a standard deviation of 0.86063 and an average of 2.0431, with a maximum value of 4.30 and a minimum value of 0.45.

## 4.2. Classical Assumption Test

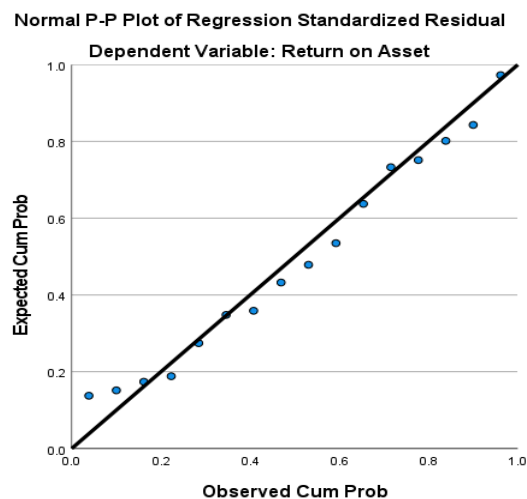
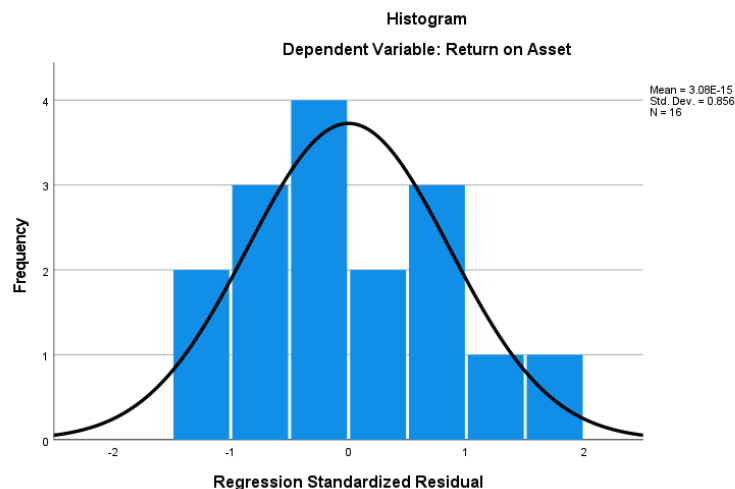
### 4.2.1. Normality Test K-S Normality Test

#### One-Sample Kolmogorov-Smirnov Test

|                                          |                         | Return on Asset   | Net Interest Margin | Biaya Operasional Pendapatan Operasional | Loan to Deposit Ratio | Non-Performing Loan |
|------------------------------------------|-------------------------|-------------------|---------------------|------------------------------------------|-----------------------|---------------------|
| N                                        |                         | 16                | 16                  | 16                                       | 16                    | 16                  |
| Normal Parameters <sup>a,b</sup>         | Mean                    | 2.5744            | 6.3513              | 75.2675                                  | 71.6494               | 2.0431              |
|                                          | Std. Deviation          | 1.27070           | 1.13623             | 11.41809                                 | 18.81569              | .86063              |
| Most Extreme Differences                 | Absolute                | .163              | .137                | .181                                     | .105                  | .153                |
|                                          | Positive                | .163              | .137                | .103                                     | .105                  | .153                |
|                                          | Negative                | -.128             | -.107               | -.181                                    | -.090                 | -.120               |
| Test Statistic                           |                         | .163              | .137                | .181                                     | .105                  | .153                |
| Asymp. Sig. (2-tailed) <sup>c</sup>      |                         | .200 <sup>d</sup> | .200 <sup>d</sup>   | .169                                     | .200 <sup>d</sup>     | .200 <sup>d</sup>   |
| Monte Carlo Sig. (2-tailed) <sup>e</sup> | Sig.                    | .308              | .576                | .172                                     | .910                  | .402                |
|                                          | 99% Confidence Interval | Lower Bound       | .296                | .563                                     | .162                  | .389                |
|                                          |                         | Upper Bound       | .320                | .589                                     | .182                  | .414                |

- a. Test distribution is Normal.  
 b. Calculated from data.  
 c. Lilliefors Significance Correction.  
 d. This is a lower bound of the true significance.  
 e. Lilliefors' method based on 10000 Monte Carlo samples with starting seed 926214481.

From the table above, it can be seen that the Kolmogorov-Smirnov significance value is above 0.05, so it can be concluded that all data is normally distributed.



Based on the histogram and normal P-P Plot, the residuals exhibit a symmetrical pattern, and the distribution of points approaches the diagonal line. Therefore, the residuals in the regression model are normally distributed

#### 4.2.2. Multicollinearity Test

##### Coefficients<sup>a</sup>

| Model |                                          | Collinearity Statistics |       |
|-------|------------------------------------------|-------------------------|-------|
|       |                                          | Tolerance               | VIF   |
| 1     | Net Interest Margin                      | .384                    | 2.602 |
|       | Biaya Operasional Pendapatan Operasional | .365                    | 2.743 |
|       | Loan to Deposit                          | .675                    | 1.482 |
|       | Non-Performing Loan                      | .952                    | 1.051 |

a. Dependent Variable: Return on Asset

The results of the multicollinearity test show that all independent variables have a Tolerance value > 0.10 and VIF < 10, so no symptoms of multicollinearity were found.

#### 4.2.3. Autocorrelation Test Durbin-Watson Test (DW Test)

##### Model Summary<sup>b</sup>

| Model | R                 | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
|-------|-------------------|----------|-------------------|----------------------------|---------------|
| 1     | .965 <sup>a</sup> | .931     | .906              | .38921                     | 2.482         |

a. Predictors: (Constant), Non-Performing Loan, Loan to Deposit, Net Interest Margin, Biaya Operasional Pendapatan Operasional

b. Dependent Variable: Return on Asset

The Durbin-Watson value of 2.482 falls within the doubt zone, specifically in the range  $4 - d_U < DW < 4 - d_L$ , namely  $2.065 < 2.482 < 3.266$ . Therefore, it cannot be confirmed whether there is negative autocorrelation. Therefore, additional tests, such as the Run Test, are needed to confirm the results.

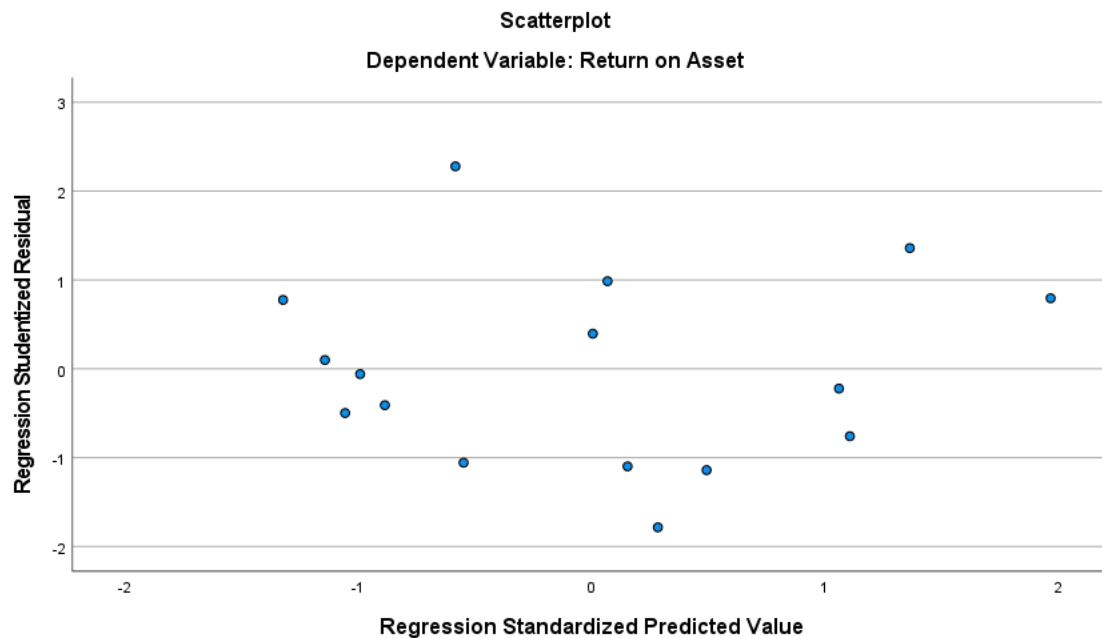
##### Runs Test

|                         | Unstandardized Residual |
|-------------------------|-------------------------|
| Test Value <sup>a</sup> | -.04347                 |
| Cases < Test Value      | 8                       |
| Cases >= Test Value     | 8                       |
| Total Cases             | 16                      |
| Number of Runs          | 10                      |
| Z                       | .259                    |
| Asymp. Sig. (2-tailed)  | .796                    |

a. Median

The Run Test results with a significance of 0.796 (> 0.05) indicate that the residuals are randomly distributed, so the regression model is free from autocorrelation.

#### 4.2.4. Heteroscedasticity Test



On the Y axis, both sides of zero on the graph show a set of points that are randomly distributed without forming a particular pattern; it can be said that there are no symptoms of heteroscedasticity.

#### Glacier Test

**Coefficients<sup>a</sup>**

|       |                                          | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig. |
|-------|------------------------------------------|-----------------------------|------------|---------------------------|--------|------|
| Model |                                          | B                           | Std. Error | Beta                      |        |      |
| 1     | (Constant)                               | 1.439                       | .710       |                           | 2.028  | .067 |
|       | Net Interest Margin                      | -.108                       | .061       | -.664                     | -1.768 | .105 |
|       | Biaya Operasional Pendapatan Operasional | -.014                       | .006       | -.849                     | -2.204 | .050 |
|       | Loan to Deposit Ratio                    | .005                        | .003       | .518                      | 1.828  | .095 |
|       | Non-Performing Loan                      | .091                        | .051       | .425                      | 1.782  | .102 |

a. Dependent Variable: ABS\_RES

The results of the Glejser test show no symptoms of heteroscedasticity because the significance value for all variables is  $> 0.05$ .

#### 4.2.5. Hypothesis Testing

- Individual Parameter Significance Test (t-Statistic Test)  
 Results of the t-Statistical Test

### Coefficients<sup>a</sup>

| Model |                                          | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig.  |
|-------|------------------------------------------|-----------------------------|------------|---------------------------|--------|-------|
|       |                                          | B                           | Std. Error | Beta                      |        |       |
| 1     | (Constant)                               | 8.205                       | 1.657      |                           | 4.952  | <.001 |
|       | Net Interest Margin                      | .169                        | .143       | .151                      | 1.186  | .261  |
|       | Biaya Operasional Pendapatan Operasional | -.095                       | .015       | -.855                     | -6.524 | <.001 |
|       | Loan to Deposit Ratio                    | .009                        | .007       | .138                      | 1.429  | .181  |
|       | Non-Performing Loan                      | -.104                       | .120       | -.071                     | -.870  | .403  |

a. Dependent Variable: Return on Asset

$$ROA = 8.205 + 0.196 \text{ NIM} - 0.095 \text{ BOPO} + 0.009 \text{ LDR} - 0.104 \text{ NPL} + e$$

The following conclusions can be drawn from the regression model equation above:

1. The constant value of 8.205, if all independent variables are set to 0, results in a ROA of 8.205.
2. The NIM regression coefficient of 0.169 indicates that a 1% increase in NIM will increase ROA by 0.169%, assuming other variables remain constant.
3. The BOPO regression coefficient is -0.095. This means that a 1% increase in BOPO will decrease ROA by 0.095%, assuming other variables remain constant.
4. The LDR regression coefficient is 0.009, so a 1% increase in LDR will increase ROA by 0.009%, assuming other variables remain constant.
5. The NPL regression coefficient is -0.104, indicating that a 1% increase in the NPL ratio will result in a 0.104% decrease in ROA. This assumption holds that all other variables remain constant.

The partial test results for each variable are as follows:

#### 1) First Hypothesis Test

The significance level for NIM is 0.261 with a coefficient of 0.169. Since this value is above 0.05, NIM has a positive but insignificant effect on ROA. In short, an increase or decrease in NIM does not necessarily lead to a significant shift in bank profitability. Therefore, NIM has a positive but insignificant effect on ROA; therefore, H1 is rejected.

#### 2) Test of the second hypothesis

BOPO recorded a coefficient of -0.095 with a significance value of less than 0.001. Since the BOPO value is <0.05, it can be concluded that BOPO has a negative and significant effect on ROA. This negative coefficient indicates that high operating costs have a negative impact on profitability. In other words, efficient operational cost management is a crucial factor in maintaining optimal financial performance. Therefore, BOPO has a negative and significant impact on ROA, thereby supporting H2.

#### 3) Test of the Third Hypothesis

LDR has a coefficient of 0.009 with a significance level of 0.181. Because the significance level is still higher than the 0.05 threshold, it can be concluded that LDR has a positive but insignificant effect. Although this ratio reflects the extent of funds disbursed as credit, fluctuations in LDR did not significantly affect bank profitability in this study. Therefore, LDR has a positive but insignificant effect on ROA, thus rejecting H3.

#### 4) Test of the Fourth Hypothesis

NPL has a coefficient of -0.104 and a significance level of 0.403. Because the significance level is above 0.05, it can be concluded that NPL has a negative but insignificant effect. This means that although NPL reflects credit quality, its fluctuations are not sharp enough to significantly affect bank profits. Therefore, NPL has a negative but insignificant effect on ROA, thus rejecting H4.

#### 4.2.6. Coefficient of Determination (R<sup>2</sup> Test)

### Model Summary

| Model | R                 | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------------------|----------|-------------------|----------------------------|
| 1     | .965 <sup>a</sup> | .931     | .906              | .38921                     |

a. Predictors: (Constant), Non-Performing Loan, Loan to Deposit Ratio, Net Interest Margin, Biaya Operasional Pendapatan Operasional

The Adjusted R-Square of 0.906 indicates that 90.6% of the variation in ROA can be explained by the NIM, BOPO, LDR, and NPL variables, while other factors outside the model account for 9.4%. The Standard Error of the Estimate (SEE) of 0.38921 indicates the model has good precision in estimating ROA. In this study, although the model showed a high Adjusted R Square value and a low SEE, the K-Fold Cross Validation results indicated overfitting. The model overfitted the training data, resulting in inconsistent performance on the validation data, primarily due to the limited data set. As a result, the model's ability to generalize to other data is limited..

### 4.3. Discussion

Based on the regression test results, with a significance value of  $0.261 > 0.05$ , the effect of NIM on ROA is positive but insignificant; thus, the hypothesis is rejected. This suggests that while NIM reflects a bank's ability to generate interest income, changes in NIM do not always have a direct impact on profitability, as measured by ROA. The sample data shows an inconsistent trend between increases in NIM and ROA, indicating that other factors, such as operational efficiency and credit risk, are more dominant in influencing Bank Kaltimara's profitability. According to Signaling Theory, NIM serves as financial information, but in this context, its signal is not strong enough to significantly increase ROA. The effectiveness of managing interest expense, operating costs, and interest rate strategy also determines the effect of NIM on profitability. This research aligns with previous studies that found a positive but insignificant effect of NIM on ROA. Therefore, banks need to enhance their financial management and operational efficiency to reinforce this positive signal and boost overall profitability.

Based on the SPSS output, with a regression coefficient of -0.095 and a significance value of  $p < 0.001$ , BOPO has a negative and significant effect on ROA, thus supporting the second hypothesis. This means that the higher the BOPO, which reflects the bank's operational efficiency, the lower the profitability tends to be. Data for 2018-2020 Shows an increase in BOPO followed by a decrease in ROA, indicating low profitability due to high operational costs. According to Agency Theory, high BOPO reflects inefficient cost management. Factors such as management policies, interest expenses, and macroeconomic conditions also influence BOPO and negatively impact profitability. Inefficient use of resources, including technology and credit management systems, exacerbates this condition, so improving banking technology is a solution to reduce operational costs and increase efficiency. This research is consistent with previous studies.

Found a negative and significant effect of BOPO on ROA, requiring banks to optimize cost and revenue efficiency strategies to maintain and improve profitability. Based on the SPSS output, with a significance level of 0.181 ( $p > 0.05$ ) and a regression coefficient of 0.009, the LDR ratio has a positive but insignificant effect on ROA, thus rejecting the third hypothesis. Changes in LDR are not always followed by a consistent increase in ROA, indicating its influence on profitability is less robust. According to Signaling Theory, LDR provides information to stakeholders; however, this signal is less robust because other factors, such as operational efficiency and credit quality, are more dominant in influencing ROA. In the context of Bank Kaltimara, a high LDR does not automatically increase profitability without sound credit risk management and operational efficiency. Therefore, banks need to optimize liquidity management and operational efficiency to strengthen the positive impact of LDR on profitability.

Based on the SPSS output, with a significance level of 0.403 (greater than 0.05) and a regression coefficient of -0.104, NPL has a negative but insignificant effect on ROA; thus, the hypothesis is rejected. Although high NPLs typically decrease profitability due to increased provisioning costs, this study shows that changes in NPLs do not significantly impact ROA. Suggests that banks have implemented effective credit risk mitigation strategies, such as strict supervision and adequate provisioning policies, thereby minimizing the negative impact of NPLs on profitability. Other factors, such as operational efficiency, revenue structure, and economic conditions, are suspected to have a more dominant influence on ROA. Therefore, in addition to credit risk management, banks must also focus on these factors to enhance overall profitability.

## 5. Conclusion And Suggestions

### 5.1. Conclusion

1. Net Interest Margin (NIM) does not significantly affect Return on Assets (ROA), so an increase in NIM does not significantly improve bank profitability.
2. Operating Costs to Operating Income (BOPO) significantly affects ROA, meaning an increase in BOPO will reduce bank profitability.
3. The Loan to Deposit Ratio (LDR) does not significantly affect ROA, so changes in LDR do not significantly impact bank profitability.
4. Non-Performing Loans (NPLs) also do not significantly affect ROA, indicating that NPL fluctuations do not significantly impact bank profitability.

### 5.2. Suggestion

To increase profitability, banks need to optimize revenue strategies by diversifying innovative products and services, rather than relying solely on interest margins. Operational management must focus on cost efficiency by managing BOPO through digitalization and increasing productivity to maintain profitability. Although LDR and NPL do not significantly influence lending, credit risk management remains crucial, with optimal provisioning and restructuring strategies to maintain financial stability. Further research is recommended to utilize broader data sets, thereby avoiding overfitting, enhancing model stability, and improving the generalizability of results for greater accuracy and relevance.

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