

The Effect of Non-Performing Loans, Return on Assets, and Operating Expenses to Operating Income on Financial Distress: An Analysis Using the Zmijewski (X-Score) Method

Rollis Ayu Ditasari^{1,*}, Arief Eko Saputro²

^{1,2}Business Management Program, Universitas PGRI Madiun, Madiun, Indonesia

Email: ¹rolisayuditasari@unipma.ac.id

Abstract

Financial Distress is a condition where a company is in financial difficulty and can end in bankruptcy. The object of this study is the People's Credit Banks throughout the Madiun Residency. The purpose of this study is to prove the effect of Non-Performing Loans, Return on Assets and Operating Income Expenses on Financial Distress. The secondary data source used in this study is the company's financial statements. The population in this study is the People's Credit Bank companies throughout the Madiun Residency registered with the OJK for the 2020-2024 period, using the Purposive Sampling method with a sample size of 22 company. The method in this study uses a quantitative approach using SPSS 25 software. The results of this study are that Non Performing Loans have a positive and significant effect on Financial Distress, Return on Assets has a negative and significant effect on Financial Distress, Operating Income Expenses have a positive and significant effect on Financial Distress and Non Performing Loans, Return on Assets and Operating Expenses and Operating Income have a simultaneous effect on Financial Distress.

Keywords: *Non Performing Loan, Return on Asset, Operating Income Expenses, Financial Distress*

INTRODUCTION

Companies in Indonesia operate across various sectors, one of which is the banking industry. Banking institutions play a vital role in supporting other economic sectors, such as trade, manufacturing, and services. By providing loans and various financial products, banks enable these sectors to obtain funding for their business activities while contributing significantly to Indonesia's economic growth. As financial institutions entrusted by the public to manage funds, banks must implement sound financial management strategies to

ensure sustainable operations. This includes the ability to compete with other financial institutions, improve service quality and systems for customer satisfaction, and, most importantly, maintain adequate capital to support banking operations (Azis & Rahardjo, 2020). However, when loan repayments are not made smoothly, banks may face financial losses due to borrowers' inability to fulfill their repayment obligations (Muzaki & Sumawidjaja, 2024).

Various industries may encounter financial challenges, including the banking sector. Assessing the financial health of banks is essential, not only for stakeholders but also for the banks themselves. Therefore, analyzing bank soundness is crucial to preventing financial difficulties from escalating into bankruptcy (Suardika et al., 2023). Banks in Indonesia are generally classified into two categories, namely Commercial Banks and Rural Banks (Bank Perkreditan Rakyat/BPR) (Suardika et al., 2023). Commercial banks primarily function as financial intermediaries by channeling funds from surplus units to deficit units. In contrast, Rural Banks are financial institutions that collect funds in the form of time deposits, savings, and similar instruments, and distribute them through lending activities to improve the welfare of communities engaged in economic activities. According to Nurani (2021), banks are expected to earn substantial profits from the loans they extend. Fundamentally, every business is established to generate profits and ensure its sustainability. Nevertheless, many companies eventually cease operations due to financial problems that lead to bankruptcy (Silanno & Loupatty, 2021).

Figure 1 illustrates the development of Rural Banks (BPRs) in the Madiun Residency during the 2020–2024 period. Based on data obtained from the Financial Services Authority (OJK), the number of operating Rural Banks in the region has declined significantly. Between 2020 and 2024, five Rural Banks ceased operations. Specifically, two banks had already stopped operating in 2020, one additional bank closed in 2021, two more banks went bankrupt in 2022, another bank ceased operations in 2023, and by 2024 the total number of closed or bankrupt Rural Banks had reached five. This condition indicates that many banks failed to effectively manage or monitor their financial ratios. The Madiun Residency consists of Madiun Regency, Ngawi Regency, Ponorogo Regency, Magetan Regency, Pacitan Regency, and Madiun City. The banking sector is one of the most important contributors to the regional economy of the Madiun Residency (Firdiana, 2022).

This study employs the Zmijewski model to measure corporate financial distress. Melina and Susetyo (2021) compared the predictive accuracy of the Altman Z-Score, Springate, and Zmijewski models in identifying financial distress. Their findings indicate that the Zmijewski model provides the highest predictive accuracy, reaching 94.5%. Conducting bankruptcy analysis is important because it enables companies to improve their future

performance. Furthermore, investors should evaluate a company's financial condition since investment decisions largely depend on information obtained from financial statements (Ditasari et al., 2019).

According to Azis and Rahardjo (2020), the financial health of a company, including banking institutions, can be assessed through the evaluation and analysis of financial ratios derived from financial statements. Financial ratio analysis provides insight into a company's ability to conduct its operational activities effectively, allowing management to improve financial performance and avoid severe financial difficulties. Adverse economic conditions may further weaken corporate performance and increase the likelihood of bankruptcy (Azis & Rahardjo, 2020).

Figure 2 presents the development of financial ratios of Rural Banks in the Madiun Residency during the 2020–2024 period. The data indicate that the Non-Performing Loan (NPL) ratio increased significantly, reaching its highest level of 15.8% in 2024. According to Ginting et al. (2024), a high NPL ratio can result in considerable losses for banks because non-performing loans reduce interest income and delay cash inflows, thereby increasing the probability of financial distress and, ultimately, bankruptcy.

The Return on Assets (ROA) ratio experienced fluctuations throughout the observation period. Muzaki and Sumawidjaja (2024) explain that ROA reflects a company's ability to generate profits from its total assets. A higher ROA indicates that management utilizes company assets more efficiently and effectively to maximize profitability. Meanwhile, the Operating Expenses to Operating Income (BOPO) ratio also fluctuated during 2020–2024. According to Ferdiansyah and Widyarti (2022), operating expenses represent expenditures incurred to generate operating income. BOPO is an important indicator for evaluating banking efficiency, financial stability, and the likelihood of financial distress (Muzaki & Sumawidjaja, 2024).

According to Suhartanto et al. (2022), the Non-Performing Loan (NPL) ratio measures the proportion of problematic loans relative to total outstanding loans. Previous studies by Ginting et al. (2024), Suardika et al. (2023), and Suhartanto et al. (2022) found that NPL significantly influences financial distress in banking institutions. In contrast, Azis and Rahardjo (2020) reported that NPL does not significantly affect financial distress. These findings suggest that a higher NPL ratio increases the likelihood of financial distress and potential bankruptcy.

Return on Assets (ROA) is widely recognized as an indicator of profitability. It measures management's effectiveness in generating earnings from total assets (Suardika et al., 2023). Previous studies by Muzaki and Sumawidjaja (2024), Silanno and Loupatty (2021), and Suhartanto et al. (2022) concluded that ROA significantly affects financial distress.

Conversely, Suardika et al. (2023) found no significant relationship between ROA and financial distress. Overall, a lower ROA indicates deteriorating financial performance and a higher risk of financial distress, whereas a higher ROA reflects better financial health.

Ferdiansyah and Widyarti (2022) define the Operating Expenses to Operating Income (BOPO) ratio as an indicator of banking operational efficiency. Previous studies by Suardika et al. (2023) and Ayundasaria and Kurniawati (2024) demonstrated that BOPO has a significant positive effect on financial distress. However, Muzaki and Sumawidjaja (2024) found that BOPO does not significantly influence financial distress.

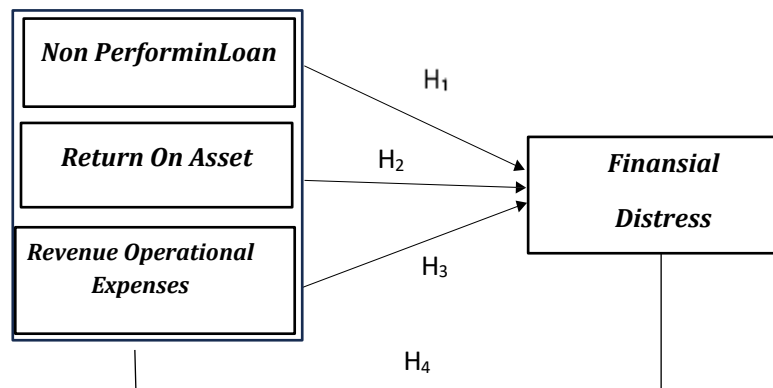
Based on the inconsistencies identified in previous studies (research gaps) and the observed phenomenon, this study aims to examine the factors influencing financial distress by investigating the effects of Non-Performing Loans (NPL), Return on Assets (ROA), and Operating Expenses to Operating Income (BOPO) on the financial distress of Rural Banks (Bank Perkreditan Rakyat) in the Madiun Residency during the 2020–2024 period using the Zmijewski (X-Score) model.

LITERATURE ANALYSIS

Agency Theory, introduced by Jensen and Meckling (1976), explains the contractual relationship between one or more individuals acting as principals and one or more individuals acting as agents. According to Suardika et al. (2023), agency theory describes a contractual arrangement in which the principal delegates authority and decision-making responsibilities to the agent. The agent is entrusted with managing and controlling the company while maintaining transparency and acting in accordance with the principal's interests. One of the primary ways agents demonstrate accountability is through the preparation and presentation of financial statements. Financial statements are prepared to provide an overview of a company's financial condition and performance. Therefore, analyzing a bank's financial health is essential to prevent bankruptcy and financial distress (Silvia & Yulistina, 2022).

Conceptual Framework

Based on the conceptual framework above, the hypotheses of this study are formulated as follows:



H1: Non-Performing Loans (NPL) have a significant effect on Financial Distress.

H2: Return on Assets (ROA) has a significant effect on Financial Distress.

H3: Operating Expenses to Operating Income (BOPO) have a significant effect on Financial Distress.

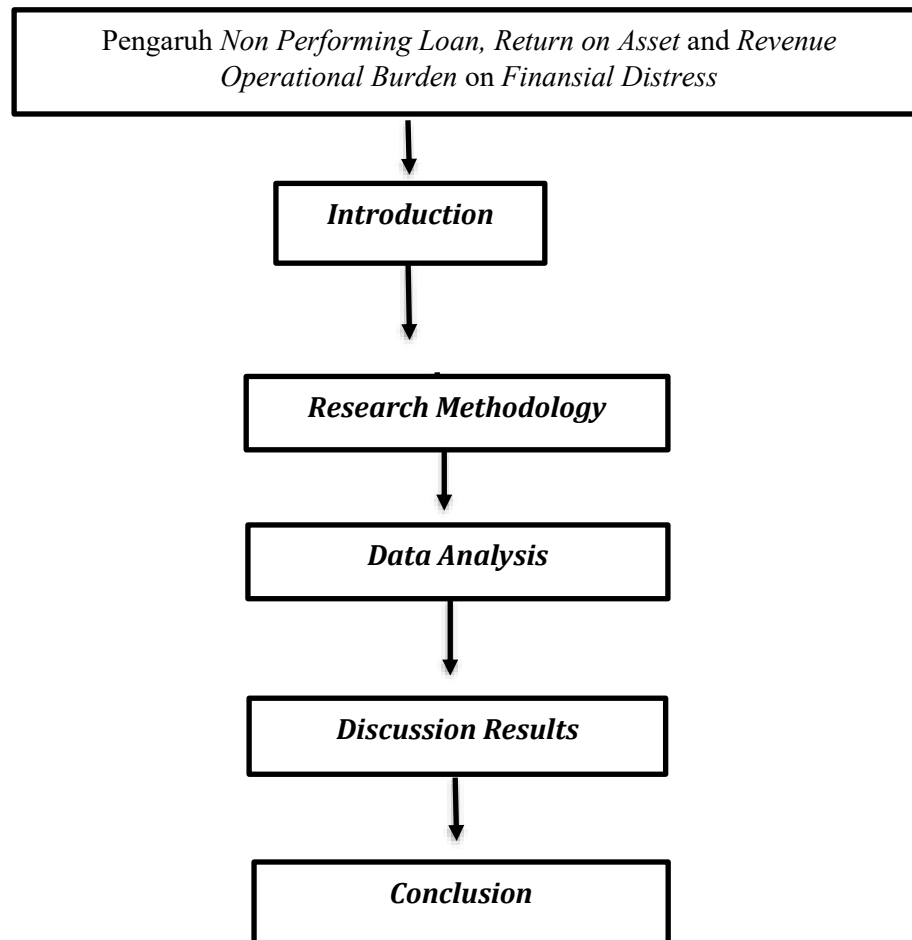
H4: Non-Performing Loans (NPL), Return on Assets (ROA), and Operating Expenses to Operating Income (BOPO) simultaneously have a significant effect on Financial Distress.

METHOD

According to Sekaran (2017), a research design is a plan for collecting and analyzing data to address the research objectives. This study employed a quantitative research method. Quantitative research is a method applied to a population and sample in which data are collected using research instruments and analyzed statistically to test predetermined hypotheses (Sugiyono, 2019).

This study adopted a quantitative research approach, in which the required information consisted of numerical data obtained from the measurement and calculation of each research variable. Specifically, the study examined the effects of Non-Performing Loans (NPL), Return on Assets (ROA), and Operating Expenses to Operating Income (BOPO) on *Financial Distress*.

As for the research design image, it can be seen in Figure 3.1 as follows:



RESULTS

Descriptive Statistics Results

According to Epriliana & Suwandi (2021), descriptive statistical analysis is used to explain the characteristics of variables related to the object being studied through sample data. This analysis includes calculating values such as the mean, standard deviation, maximum and minimum values, as well as the total number of research data, for both dependent and independent variables. The results of the descriptive statistical test can be seen in Table 1 below:

Table 1 Descriptive Statistical Test Results

Descriptive Statistics					
	<i>N</i>	<i>Minimu m</i>	<i>Maximu m</i>	<i>Mean</i>	<i>Std. Deviation</i>
<i>Financial Distress</i>	110	-	.9330	-	10.069614
		48.8960		14.03860	8
				0	
<i>NPL</i>	110	.66	37.18	9.3426	8.01867
<i>ROA</i>	110	1.05	12.03	4.1929	2.13733
<i>BOPO</i>	110	50.13	148.05	82.2274	13.31991
<i>Valid N (listwise)</i>	110				

Source: Processed secondary data, (2025)

Based on Table 1, the results of the descriptive statistical analysis indicate that the study used 110 observations from Rural Banks (Bank Perkreditan Rakyat/BPRs) in the Madiun Residency during the 2020–2024 period. Each variable is described by its minimum value, maximum value, mean, and standard deviation. The detailed results of the descriptive statistics are presented as follows:

- The Non-Performing Loan (NPL) variable has a minimum value of 0.66% and a maximum value of 37.18%, with a mean of 9.34% and a standard deviation of 8.02%.
- The Return on Assets (ROA) variable has a minimum value of 1.05% and a maximum value of 12.03%, with a mean of 4.19% and a standard deviation of 2.13%.
- The Operating Expenses to Operating Income (BOPO) variable has a minimum value of 50.13% and a maximum value of 148.05%, with a mean of 82.22% and a standard deviation of 13.318%.
- The Financial Distress variable has a minimum value of –48.896% and a maximum value of 0.933%, with a mean of –14.04% and a standard deviation of 10.069%.

Normality Test Results

According to Ghozali (2019), the normality test is carried out to find out whether, in a regression model, the disturbance variable or residual has a normal data distribution. The testing criterion is that normality occurs when the significance value of the Kolmogorov-Smirnov test is greater than 0.05. The normality test results can be seen in Table 2 below:

916

Tabel 2. Normality Test Results

One-Sample Kolmogorov-Smirnov Test			
			Unstandar dized Residual
N			110
Normal Parameters ^{a, b}	Mean		.0000000
	Std. Deviation		.7164607
			6
Most Extreme Differences	Absolute		.099
	Positive		.070
	Negative		-.099
Test Statistic			.099
Asymp. Sig. (2-tailed)			.010 ^c
Monte Carlo Sig. (2- tailed)	Sig.		.209 ^d
	99% Confidence Interval	Lower	.198
		Bound	
		Upper	.219
		Bound	

Source: Processed secondary data, (2025)

Based on Table 2 of the Normality Test results above, it is known that the normality test using Kolmogorov-Smirnov with a Monte Carlo Sig value of 0.209 is greater than 0.05, which means that the regression model is normally distributed because $0.209 > 0.05$.

Multicollinearity Test Results

According to Ghazali (2019), the multicollinearity test is carried out to find out whether there is a strong correlation or relationship among the independent variables in the regression model. One way to detect multicollinearity is by looking at the tolerance value above 0.10 and $VIF < 10$, which means there is no multicollinearity. The results of the Multicollinearity Test can be seen in Table 3 below:

Tabel 3. Multicollinearity Test Result

Coefficients ^a								
		Unstandardized Coefficients		Standardized Coefficients	t		Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	4.359	.496		8.782	.000		
	NPL	.019	.009	.015	2.015	.046	.887	1.127
	ROA	-	.034	-.990	-	.000	.917	1.091
		4.665			137.185			
	BOPO	.012	.006	.016	2.174	.032	.894	1.119

a. Dependent Variable: Financial Distress

Source:

Processed secondary data, (2025)

Based on Table 3 Results of the Multicollinearity Test above, it can be seen that the tolerance values in this study are above 0.10 and the VIF is less than 10. Therefore, the regression model in this study does not show any signs of multicollinearity.

Results of the Autocorrelation Test

According to Epriliana & Suwandi (2021), the autocorrelation test is a hypothesis test for regression where the dependent variable is not correlated with itself. In research, autocorrelation testing usually uses the Durbin-Watson (DW) method. The results of the autocorrelation test can be seen in Table 4 below:

Tabel 4. Results of the Autocorrelation Test

Model Summary ^b					
Model	R	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson	
1	.997 ^a	.995	.7265286	1.770	

a. Predictors: (Constant), BOPO, ROA, NPL

b. Dependent Variable: Finansial Distress

Source: Processed secondary data, (2025)

Based on Table 4 Autocorrelation Test Results above, it can be seen that the Durbin Watson value is 1.770, then in the Durbin Watson table the DU value obtained is 1.7455. Since the Durbin Watson value (1.770) > upper limit DU (1.7455) and $1.770 < 2.2545$ (4 - DU), the result falls between DU and 4 - DU, so the conclusion is that there is no sign of autocorrelation.

Heteroscedasticity Test Results

According to Epriliana & Suwandi (2021), heteroscedasticity testing is one of the assumptions that must be met in regression analysis. The basis for decision-making in the heteroscedasticity test is that if the significance value < 0.05, heteroscedasticity occurs, and if the significance value > 0.05, heteroscedasticity does not occur. The results of the heteroscedasticity test can be seen in Table 5 below:

Tabel 5. Heteroscedasticity Test Results

Coefficients ^a					
		Unstandardized Coefficients	Standardized Coefficients		
		B	Beta	t	Sig.
Model					
1	(Constant)	.611		1.949	.054
	NPL	.008	.140	1.384	.169
	ROA	.030	.138	1.384	.169
	BOPO	-.003	-.093	-.920	.360

a. Dependent Variable: abs_res

Source: Processed secondary data, (2025)

Based on Table 5 above, it can be seen that the significance value of the independent variables shows a sig value greater than 0.05, which means that in this study there is no heteroscedasticity problem.

Multiple Linear Regression Analysis

According to Silvia & Yulistina (2022), Multiple Linear Regression Analysis is used to measure or estimate the influence or relationship between two or more independent variables on one dependent variable, processed using SPSS 25. The results of the Multiple Linear Regression analysis in this study can be seen in Table 6 below:

Tabel 6. Multiple Linear Regression Analysis

		Coefficients ^a		Standardized		
		Unstandardized Coefficients		Coefficient		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	4.359	.496		8.782	.000
	NPL	.019	.009	.015	2.015	.046
	ROA	-4.665	.034	-.990	-	.000
					137.185	
	BOPO	.012	.006	.016	2.174	.032

a. Dependent Variable: Financial Distress

Source: Processed secondary data, (2025)

Multiple Linear Regression Analysis

Based on Table 6, the multiple linear regression equation can be formulated as follows:

$$Y = 4.359 + 0.019X_1 - 4.665X_2 + 0.012X_3$$

Based on the regression equation above, the results can be interpreted as follows:

1. Constant (Intercept) If the values of the Non-Performing Loan (NPL), Return on Assets (ROA), and Operating Expenses to Operating Income (BOPO) variables remain constant, the Financial Distress, measured using the Zmijewski X-Score, is predicted to increase by 4.359.

2. Effect of Non-Performing Loan (NPL) The regression coefficient for the NPL variable is 0.019, indicating a positive relationship. This means that a one-unit increase in the NPL variable will increase the Financial Distress score by 0.019, assuming the other variables remain constant. Therefore, a higher NPL ratio is associated with a higher level of Financial Distress.
3. Effect of Return on Assets (ROA) The regression coefficient for the ROA variable is -4.665, indicating a negative relationship. This means that a one-unit increase in the ROA variable will decrease the Financial Distress score by 4.665, assuming the other variables remain constant. Therefore, a higher ROA is associated with a lower level of Financial Distress.
4. Effect of Operating Expenses to Operating Income (BOPO) The regression coefficient for the BOPO variable is 0.012, indicating a positive relationship. This means that a one-unit increase in the BOPO variable will increase the Financial Distress score by 0.012, assuming the other variables remain constant. Therefore, a higher BOPO ratio is associated with a higher level of Financial Distress.

Hypothesis Testing

a. Partial t-Test

According to Ghozali (2019), the t-test is used to determine the individual effect of each independent variable on the dependent variable. The test is conducted by comparing the calculated t-value (t-statistic) with the critical t-value (t-table) at a 5% significance level. The results of the partial t-test are presented in Table 7.

Tabel 7. Partial t-Test

Coefficients ^a					
		Unstandardized Coefficients		Standardized Coefficients	
		B	Std. Error	Beta	t
Model					Sig.
1	(Constant)	4.359	.496		8.782
	NPL	.019	.009	.015	2.015

ROA	-4.665	.034	-.990	-	.000
				137.18	
				5	
BOPO	.012	.006	.016	2.174	.032

a. Dependent Variable: Financial Distress

Source: Processed secondary data, (2025)

Based on Table 7, the decision for the partial t-test was made by comparing the calculated t-value (t-statistic) with the critical t-value (t-table). In addition, the p-value (significance value) must be less than 0.05. The results are interpreted as follows:

1. Effect of Non-Performing Loan (NPL) on Financial Distress

The NPL variable obtained a t-statistic of 2.015, which is greater than the t-table value of 1.982, with a p-value of 0.046. Since the t-statistic (2.015) > t-table (1.982) and the p-value (0.046) < 0.05, H1 is accepted. These findings indicate that Non-Performing Loans (NPL) have a positive and statistically significant effect on Financial Distress. This implies that a higher NPL ratio increases the likelihood of Financial Distress.

2. Effect of Return on Assets (ROA) on Financial Distress

The ROA variable obtained a t-statistic of -137.185 with a p-value of 0.000. Since the absolute value of the t-statistic (137.185) is greater than the t-table value (1.982) and the p-value (0.000) < 0.05, H2 is accepted. These findings indicate that Return on Assets (ROA) has a negative and statistically significant effect on Financial Distress. This implies that a higher ROA reduces the likelihood of Financial Distress.

3. Effect of Operating Expenses to Operating Income (BOPO) on Financial Distress

The BOPO variable obtained a t-statistic of 2.174, which is greater than the t-table value of 1.982, with a p-value of 0.032. Since the t-statistic (2.174) > t-table (1.982) and the p-value (0.032) < 0.05, H3 is accepted. These findings indicate that Operating Expenses to Operating Income (BOPO) have a positive and statistically significant effect on Financial Distress. This implies that a higher BOPO ratio increases the likelihood of Financial Distress.

b. F-Test Results (Simultaneous)

According to Ghazali (2019), the F-test is used to show whether all independent variables together have an effect or influence on the dependent variable simultaneously. The F-test (simultaneous) is conducted by comparing the calculated F value with the F-

922

table value determined at a 5% significance level. The results of the F-test can be seen in Table 8 below:

Tabel 8. F-Test Results (Simultaneous)

ANOVA ^a					
Model		Sum of Squares	df	Mean Square	F
1	Regression	10996.337	3	3665.446	6944.186
	Residual	55.951	106	.528	
	Total	11052.289	109		
a. Dependent Variable: Financial Distress					
b. Predictors: (Constant), BOPO, ROA, NPL					
Source: Processed secondary data, (2025)					

Based on Table 8, it can be seen that the calculated F is 6944.184 > F-table (3.08) with a significant value of 0.000 < 0.05, which means H4 is accepted. This result shows that the variables Non-Performing Loan, Return on Assets, and Operating Expense of Operational Income together have a significant simultaneous effect on Financial Distress.

Results of the Determination Coefficient (R²) Test

According to Silvia & Yulistina (2022), the determination coefficient (R²) is used to measure how well the model explains the variation in the dependent variable. The higher the R², the better the ability of the dependent variable to be explained. The value of the determination coefficient ranges from zero to one. The table for the Determination Coefficient R² test can be seen in Table 9 below:

Tabel 9. Results of the Determination Coefficient (R²) Test

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.997 ^a	.995	.995	.7265286
a. Predictors: (Constant), BOPO, ROA, NPL				

Source: Processed secondary data, (2025)

Based on the table 9 above, the results of the Determination Coefficient Test show that the adjusted R² is 0.995 or 99.5%. This means that 99.5% represents the ability of the regression model in this study to explain the dependent variable, which can be explained by the independent variables, namely NPL, ROA, and BOPO.

CONCLUSION

The results from the data analysis led to the following conclusions:

1. Non-Performing Loan has a positive and significant effect on Financial Distress
2. Return on Assets has a negative and significant effect on Financial Distress
3. Operating Expenses to Operating Income has a positive and significant effect on Financial Distress.
4. NPL, ROA, and BOPO together simultaneously affect Financial Distress

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