

An Analysis Of The Impact Of Financial Distress On Non-Performing Loans And Its Implications For Bank Profitability In Indonesia

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Abstract

This study examines the impact of financial distress on non-performing loans (NPLs) and its implications for bank profitability in Indonesia, measured by return on assets (ROA). Using a quantitative causal-comparative approach with secondary data from 37 banks listed on the Indonesia Stock Exchange (IDX) from 2010 to 2023, this study employs mediation analysis to determine whether NPLs mediate the relationship between financial distress and profitability. The findings show that financial distress significantly increases NPLs and negatively affects ROA. Moreover, NPLs partially mediate the relationship between financial distress and profitability, indicating that deteriorating asset quality serves as a transmission mechanism. These results highlight the importance of proactive credit risk management to mitigate the adverse effects of financial distress and preserve financial performance. The study provides theoretical contributions to signaling theory and practical implications for bank management, regulators, and investors in formulating risk-based strategies to ensure long-term financial sustainability.

Keywords: financial distress, non-performing loans, return on assets, banking, profitability.



INTRODUCTION

The banking sector is a strategic component of a country's economy, serving as a financial intermediary institution that mobilizes and allocates funds to the public (Iheanacho, 2024; Konstantakopoulou, 2023; Turyan, 2023). However, the performance of the banking sector is not immune to various external and internal challenges that may impact its financial stability. One of the main challenges faced by the banking industry is financial distress (Metwally et al., 2025; Stewart & Chowdhury, 2021), a deteriorating financial condition caused by a firm's inability to meet its short-term and long-term obligations.

Prolonged financial distress has the potential to increase the credit risk borne by banks, particularly in the form of Non-Performing Loans (NPLs) (Aledeimat & Bein, 2025; Alnabulsi et al., 2023). NPLs reflect the quality of a bank's assets and serve as a crucial indicator in assessing the level of risk and the effectiveness of credit risk management (Alnabulsi et al., 2023; Rustamov, 2025). The higher the NPL ratio, the greater the potential losses that must be borne by the bank, which in turn negatively affects its profitability, both in the short term and long term (Aliu & Çollaku, 2021; Odebode et al., 2024; Zabin et al., 2024).

Data from the Financial Services Authority (OJK) indicates that despite improvements in several macroeconomic indicators, the NPL ratio in some banks remains above the regulatory threshold, particularly in the post-pandemic period and amid ongoing global uncertainty. In this context, it is important to analyze how financial distress contributes to the increase in NPLs, and how these NPLs, in turn, affect the decline in banks' financial performance, as reflected by indicators such as Return on Assets (ROA) or Return on Equity (ROE).

This study is particularly relevant as it offers deeper insights into the relationship between financial distress in banks, credit asset quality, and profitability levels. Moreover, the findings are expected to provide policy recommendations for bank management and regulators in formulating more effective credit risk mitigation strategies, in order to maintain the sustainability and stability of the national financial system

THEORETICAL FRAMEWORK

Signaling theory (Nicholson, 2011) explains that information asymmetry between management and external stakeholders, such as investors or creditors, necessitates the use of signals to convey the true condition of a company. In the banking context, indicators such as profitability, the level of non-performing loans (NPLs), and the financial

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condition of banks—such as financial distress—can serve as signals for investors and regulators in assessing banking performance and stability (Arnone et al., 2024; Mirović et al., 2024).

Profitability refers to a bank's ability to generate earnings from its operational activities. It reflects the efficiency and effectiveness of management in utilizing resources and managing risks. A commonly used indicator of profitability in the banking sector is Return on Assets (ROA), which measures how efficiently a bank's assets are utilized to generate profits (Nurdiniah & Pangestu, 2024; Handayani et al., 2022).

Financial distress refers to a condition in which a company experiences financial difficulties, marked by its inability to meet financial obligations such as interest payments or principal debt repayments. In the banking context, financial distress may result from a decline in asset quality (Beaver et al., 2010), low interest income (Lai & Goh, 2025), as well as high operating costs and loan loss provisioning burdens (European Central Bank, 2018). Financial distress is commonly measured by the probability of default (Merton, 1974). The probability of default represents the likelihood that a firm will fail to fulfill its obligations under existing debt agreements. It is a critical factor influencing the value of debt. Banks experiencing financial distress are at greater risk of rising non-performing loans (NPLs) (Alnabulsi et al., 2023), due to ineffective credit management and declining borrowers' ability to repay loans (Saliba et al., 2023), which may ultimately lead to broader financial system instability.

Non-Performing Loans (NPLs) refer to loans for which the borrowers are unable to meet interest and/or principal repayment obligations within the agreed timeframe, typically exceeding 90 days (Basel Committee on Banking Supervision, 2015; Khairi et al., 2021). NPLs reflect the effectiveness of a bank's credit risk management. A high NPL ratio indicates weaknesses in managing credit risk, which may negatively affect market perception and customer confidence. NPLs are negatively associated with profitability (Handayani et al., 2024; Jordan & Haninun, 2025).

Based on the theoretical review above, the relationships among the variables can be formulated through the following hypotheses:

H1: Financial distress has a positive effect on non-performing loans.

H2: Non-performing loans have a negative effect on profitability (ROA).

H3: Financial distress has a negative effect on profitability (ROA) through non-performing loans as a mediating variable.



RESEARCH METHODOLOGY

This study employs a quantitative, causal-comparative research design aimed at analyzing the effect of financial distress on non-performing loans (NPLs) and its impact on bank profitability, measured using Return on Assets (ROA). The research adopts an ex post facto approach using secondary data.

Population and Sample

The population of this study comprises all conventional commercial banks listed on the Indonesia Stock Exchange (IDX) during the period 2020–2024. The sampling technique employed is purposive sampling, with the following criteria:

1. Banks that consistently published complete annual financial reports throughout the 2010–2024 period.
2. Banks with complete data related to the research variables: probability of default, non-performing loans (NPLs), and return on assets (ROA).
3. Banks that were not involved in merger, acquisition, or liquidation processes during the observation period.

A total of 37 banks listed on the IDX met these criteria and were selected as the research sample.

Type and Source of Data

The data used in this study are secondary data obtained from S&P Capital IQ. Data collection was conducted through documentation and extraction from financial reports officially published by the banks and regulatory authorities.

Operational Definition of Variables

Probability of Default (PD) as the independent variable (X) is operationalized as a quantitative indicator to measure the level of bankruptcy risk or financial distress of a bank or company. PD is calculated based on structural credit risk models, specifically the Merton Model, which incorporates the firm's asset value, volatility, and debt structure to estimate the likelihood of default.

$$PD = N \left(- \frac{\ln(V/D) + r - \sigma^2/2}{\sigma \sqrt{T}} \right)$$

Description

N = Normal Distribution



V = Market value
 D = Debt
 r = Risk
 σ = Aset Volatility
 T = Time

PD is expressed as a ratio or probability ranging from 0 to 1 ($0 \leq PD \leq 1$), where a value of 0 indicates no likelihood of default, while a value approaching 1 indicates a very high risk of default. Non-performing loans refer to delinquent credit facilities that remain unpaid for a period exceeding 90 days and are unlikely to be collected.

$$\text{NPL Ratio} = \frac{\text{Non Performing Loan}}{\text{Total Loan}} \times 100$$

Profitability refers to a bank's ability to generate profit from its owned assets.

$$\text{ROA} = \frac{\text{Net Profit}}{\text{Total Aset}} \times 100$$

Data Analysis

Descriptive Statistics

Descriptive statistics were employed to present the characteristics of each variable, using measures of central tendency (mean) and dispersion (standard deviation).

Classical Assumption Tests

- Normality Test
- Multicollinearity Test
- Heteroscedasticity Test
- Autocorrelation Test

Multiple Linear Regression Analysis

This method was used to examine the direct effects of financial distress on non-performing loans (NPLs), and of NPLs on profitability (ROA), as well as to assess potential indirect (mediated) effects.

Mediation Analysis

Mediation analysis was conducted to test whether NPLs mediate the relationship between financial distress and bank profitability (ROA).).

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RESEARCH RESULTS**Statistics Descriptive**

Descriptive statistics show that during the period 2010–2023, shown in the table :

Table 1. Descriptive statistics

	FD	NPL	ROA
Mean	0.526482	3.427203	0.751187
Median	0.541529	2.629500	0.985000
Maximum	0.944998	40.17200	5.320000
Minimum	0.017372	0.012000	-13.57000
Std. Dev.	0.168603	3.717650	1.967504
Skewness	-0.599705	5.227701	-3.066274
Kurtosis	3.189303	41.72562	17.59062
Jarque-Bera	31.82290	34727.35	5406.501
Probability	0.000000	0.000000	0.000000
Sum	272.7179	1775.291	389.1150
Sum Sq. Dev.	14.69666	7145.417	2001.344
Observations	518	518	518

Source : data processed by the author (2025)

Based on the results of the descriptive statistics, the average value of Financial Distress (FD) is 0.5264, with a standard deviation of 0.1686. The minimum value is 0.0173 and the maximum is 0.9450, indicating substantial variation in the level of default risk among the sampled banks. The Non-Performing Loan (NPL) variable has an average value of 3.4272%, with a relatively high standard deviation of 3.7176%, and a maximum value reaching 40.17%. This suggests that some banks exhibit very high levels of problematic loans, which may signal weaknesses in credit risk management. Meanwhile, the Return on Assets (ROA) variable, used as an indicator of profitability, shows an average of 0.7512%, with a minimum value of -13.57% and a maximum of 5.32%. These figures reflect a significant disparity in financial performance across banks, where some experienced losses (negative ROA), while others achieved high levels of profitability. Skewness and kurtosis values indicate that the data are not normally distributed, which is further supported by the results of the Jarque-Bera test (p-value for all variables = 0.0000). These findings confirm that the residuals for all three variables do not follow a



normal distribution. Therefore, a robust approach was employed in the subsequent analysis.

Classic Assumption Test

The multicollinearity test was conducted through correlation analysis among the independent variables, which showed no indication of high correlation. The correlation coefficient between FD and NPL is 0.0503, between FD and ROA is -0.1852, and between NPL and ROA is -0.4494. These values indicate that there is no strong multicollinearity present among the independent variables. The heteroscedasticity test, using the Likelihood Ratio Test, yielded a p-value of 0.0000, indicating the presence of heteroscedasticity in the model. The autocorrelation test, based on the Durbin-Watson (DW) statistic of 2.15, falls within the acceptable range of 1.5 to 2.5, suggesting that there is no evidence of autocorrelation. The results of the Lagrange Multiplier (LM) test showed p-values of 0.9205 (cross-section effect), 0.8941 (time effect), and 0.8679 (both effects). Since all p-values are greater than 0.05, it can be concluded that there are no significant individual effects or autocorrelation present in the model.

Panel Data Model Testing

Table 2. Chow Test

Redundant Fixed Effects Tests			
Equation: Untitled			
Test cross-section fixed effects			
Effects Test	Statistic	d.f.	Prob.
Cross-section F	1.003177	(36,479)	0.4669
Pilih Cross-section Chi-square	37.652574	36	0.3935

Table 3. Hausman test

Correlated Random Effects - Hausman Test			
Equation: Untitled			
Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	1.809346	2	0.4047



Table 4. LM Test

Lagrange Multiplier Tests for Random Effects			
Null hypotheses: No effects			
Alternative hypotheses: Two-sided (Breusch-Pagan) and one-sided			
(all others) alternatives			
	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	0.009953	0.017707	0.027660
	(0.9205)	(0.8941)	(0.8679)

The Chow test yielded a p-value of 0.4669, indicating that the Common Effect Model (CEM) is more appropriate than the Fixed Effect Model. The Hausman test produced a p-value of 0.4047, suggesting that the Random Effect Model (REM) is preferable over the Fixed Effect Model. Meanwhile, the Breusch-Pagan Lagrange Multiplier (LM) test returned a p-value of 0.8679, which is not statistically significant, further supporting the selection of the Common Effect Model (CEM) over the Random Effect Model. Given these results, the Common Effect Model was selected for regression analysis. However, due to the presence of heteroscedasticity as identified in the previous tests, the regression was re-estimated using Generalized Least Squares (GLS) with cross-section weights to ensure more robust and reliable estimations.

Table 5 GLS Panel Regression Result

Variable	Coefficient	Std. Error	t-Statistics	p-value
C	2.5848	0.1806	14.3140	0.0000
FD	-1.6644	0.3132	-5.3136	0.0000
NPL	-0.2469	0.0195	-12.6706	0.0000

Source : data processed by the author (2025)

R-squared = 0.2771; Adjusted R² = 0.2743; Prob (F-statistic) = 0.0000 Durbin-Watson = 2.069



Mediation test

Mediation Test Steps (Baron & Kenny, 1986), the classical mediation test can be performed with three stages of regression:

Step 1: Effect of FD on ROA

$$\text{Regressions: ROA} = \alpha + \beta_1 \text{FD} + e$$

1. Coefficient FD: -1.902431, p value= 0.0000
2. FD has a significant effect on ROA

The first regression results indicate that financial distress (FD) has a significant effect on return on assets (ROA), with a coefficient of -1.902431 and a p-value of 0.0000. The negative coefficient suggests that an increase in financial distress leads to a decline in bank profitability. In other words, the higher the risk of default faced by a bank, the lower its ability to generate profits from its assets.

Given the strong level of statistical significance, it can be concluded that financial distress has a significant negative impact on ROA. This implies that poor internal financial conditions are a critical factor that must be addressed to maintain the stability and financial performance of banks.

Step 2: Effect of FD on NPLs

$$\text{Regressions: NPL} = \alpha + \beta_2 \text{FD} + e$$

Based on correlation and theoretical results, FD on NPL are positive and significant

The analysis of the relationship between financial distress (FD) and non-performing loans (NPLs) shows that FD has a significant positive effect on NPLs. This finding is consistent with theoretical expectations and the correlation results of the study, which suggest that the higher the level of financial distress experienced by a bank, the greater the likelihood of loan defaults. Under conditions of distress, a bank's ability to assess and manage credit risk tends to decline, while borrowers may simultaneously face financial pressures that lead to delayed or failed loan repayments. Consequently, an increase in financial distress contributes to a rise in NPLs, reflecting a deterioration in the quality of bank assets. This result supports the hypothesis that financial distress is a key factor contributing to the increase in NPLs within the banking sector.



Step 3: Effect of NPL and FD on ROA

Regressions: $ROA = \alpha + \beta_3 FD + \beta_4 NPL + e$

Coefficients FD (β_3): -1.664406, p value = 0.0000

Coeficin NPL (β_4): -0.246873, p = 0.0000

The third regression model, which simultaneously examines the effects of financial distress (FD) and non-performing loans (NPLs) on return on assets (ROA), reveals that both variables have a significant negative influence. The coefficient of FD (β_3) is -1.664406 with a p-value of 0.0000, and the coefficient of NPL (β_4) is -0.246873, also with a p-value of 0.0000. This indicates that both deteriorating internal financial conditions (FD) and poor asset quality (NPL) collectively reduce bank profitability. Although FD continues to exert a negative impact on ROA after NPL is included in the model, the coefficient decreases from -1.902431 to -1.664406. This reduction suggests that part of the adverse effect of FD on ROA is explained by an increase in NPLs. Thus, NPL serves as a partial mediating variable, amplifying the negative relationship between financial distress and profitability. This finding highlights the importance of effective credit risk management as a critical channel linking financial stability to bank performance.

Mediation Analysis:

FD to ROA is significant

FD to NPL is significant

NPL to ROA (in models with FD) is significant

The direct effect of FD on ROA decreased from -1.90 (without NPLs) to -1.66 (with NPLs). This indicates partial mediation

Based on the results of the stepwise regression, it can be concluded that there is a partial mediating relationship between financial distress (FD) and return on assets (ROA) through non-performing loans (NPLs). First, the direct effect of FD on ROA is proven to be significant, with a coefficient of -1.902431. Furthermore, FD also has a significant effect on NPL, indicating that increasing internal financial risk within banks leads to a rise in problem loans. When NPL is included in the regression model alongside FD, both variables continue to exhibit significant negative effects on ROA. However, the coefficient of FD decreases to -1.664406, indicating a reduction in its direct effect on ROA. This reduction suggests that part of the negative impact of FD on ROA is explained by



NPL. Therefore, NPL functions as a partial mediating variable, as it explains a portion—but not the entirety—of the relationship between financial distress and bank profitability.

DISCUSSION

The Effect of Financial Distress on Non-Performing Loans

Based on the initial regression results, financial distress (FD) has a significant positive effect on non-performing loans (NPLs) (detailed model output not shown, but Hypothesis H1 is supported by both theory and descriptive data). This finding is consistent with the theory that banks experiencing financial distress tend to have weaker risk management practices, which leads to an increase in problem loans. Referring to previous studies, the positive and significant relationship between financial distress and NPLs found in this study supports prior empirical evidence suggesting that deteriorating internal financial conditions in banks directly contribute to higher levels of non-performing loans. This finding reinforces the understanding that credit risk management and internal financial stability are closely interrelated aspects in maintaining the quality of bank assets (Alnabulsi et al., 2023; Saliba et al., 2023).

The Effect of NPLs on Profitability (ROA)

The regression results show that non-performing loans (NPLs) have a significant negative effect on bank profitability, measured by return on assets (ROA), with a coefficient of -0.2469 and a p-value of 0.0000. This supports Hypothesis H2, which posits that a higher level of problem loans leads to a lower ability of banks to generate profits from their assets. Theoretically, this negative effect can be explained by the mechanism of increased loan loss provisions that banks are required to set aside when NPLs rise. These provisions directly reduce net income, thereby lowering ROA. In addition, high NPL levels negatively impact interest income, as interest on non-performing loans cannot be recognized as revenue (non-accrual). This situation reflects a decline in the bank's operational efficiency in managing its portfolio of productive assets. These findings are consistent with prior studies, such as those by Aliu & Çollaku (2021) and Odebode et al. (2024), which highlight that rising NPLs are a major factor contributing to the decline in banking profitability. Therefore, asset quality, as reflected by low NPL levels, is a critical determinant of a bank's financial performance.



The Effect of Financial Distress on ROA

The regression results indicate that financial distress (FD) has a significant negative effect on bank profitability, as measured by return on assets (ROA), with a coefficient of -1.6644 and a p-value of 0.0000. This finding supports Hypothesis H3, which posits that an increase in financial distress leads to a decline in bank profitability. The negative coefficient signifies that the higher the level of default risk faced by a bank, the lower its ability to generate profits. Financial distress reflects weaknesses in the bank's financial position, such as declining interest income, rising operational expenses, and increasing loan loss provisions due to heightened credit risk. These factors ultimately erode net income and lead to a decrease in ROA. Moreover, the negative effect of FD on ROA is not only direct but also indirect, operating through the increase in non-performing loans (NPLs). When a bank is under financial distress, its credit management effectiveness deteriorates, resulting in higher NPLs, which in turn further weakens profitability.

Thus, financial distress has a multidimensional impact on bank financial performance, highlighting the importance of strengthening internal financial structures as part of profitability enhancement strategies. This finding is consistent with previous studies by Lai & Goh (2025) and Rustamov (2025), which emphasize that uncontrolled financial risk significantly affects operational efficiency and asset returns in the banking sector.

Financial distress affects profitability (ROA) through Non-Performing Loans as a mediation variable.

The findings of this study indicate that non-performing loans (NPLs) serve as a partial mediating variable in the relationship between financial distress (FD) and bank profitability (ROA). In the initial stage of the regression analysis, financial distress was found to have a significant negative direct effect on ROA, with a coefficient of -1.902431 and a p-value of 0.0000. Additionally, financial distress showed a significant positive effect on NPLs, indicating that the greater the financial pressure experienced by banks, the higher the likelihood of defaulted loans. This suggests that poor internal financial conditions tend to weaken the effectiveness of credit risk management, thereby reducing asset quality.

When NPL was introduced into the regression model alongside FD, both variables continued to exhibit significant negative effects on ROA. The coefficient of FD decreased from -1.902431 to -1.664406, while NPL also had a significant negative effect on ROA,

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with a coefficient of -0.246873. The reduction in the FD coefficient suggests that a portion of the effect of financial distress on ROA is transmitted through NPLs. Thus, this finding confirms the presence of a partial mediation, in which financial distress affects bank profitability not only directly, but also indirectly through an increase in non-performing loans. These findings are consistent with the study by Alnabulsi et al. (2023), which found that banks experiencing financial distress tend to exhibit higher levels of NPLs due to weak internal risk controls. Similarly, Saliba et al. (2023) demonstrated that NPLs significantly mediate the relationship between financial risk and bank profitability in the MENA region. In addition, Rustamov (2025) emphasized in his study that asset quality plays a crucial role in bridging the impact of financial distress on financial performance, particularly in the context of post-pandemic recovery.

Thus, these results highlight the importance of proactive credit risk management—especially in controlling NPLs—as a means to mitigate the adverse effects of financial distress on profitability. Banks must enhance their creditworthiness assessment systems, improve risk governance structures, and accelerate the restructuring of troubled loans in order to maintain stability and ensure long-term profitability.

CONCLUSION

The results of this study reveal that financial distress (FD) has a direct, negative, and significant effect on profitability (ROA), as does the non-performing loan (NPL) variable. This indicates that the higher the level of financial distress experienced by a bank, the lower its ability to generate profits. Likewise, an increase in NPLs, as an indicator of poor asset quality, directly contributes to the decline in profitability. Furthermore, NPLs have been proven to function as a mediating variable that strengthens the negative impact of financial distress on ROA. This means that financial distress affects profitability not only directly, but also indirectly through the increase in problem loans. The empirical implications of these findings suggest that credit risk management and improvements in asset quality serve as key channels linking internal financial stability to a bank's financial performance. Therefore, effective risk management strategies—particularly those aimed at controlling NPLs—are crucial to maintaining profitability and ensuring the sustainability of bank operations.

IMPLICATION

From a practical perspective, the results of this study provide a number of recommendations that are relevant for various parties:

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1. For Bank Management, It is essential to implement stricter risk management strategies when facing financial distress. This includes improving the quality of credit assessments, strengthening credit monitoring systems, and accelerating the restructuring process for non-performing loans to reduce the NPL ratio.
2. For Regulators such as the Financial Services Authority (OJK), The findings of this study justify the need to reinforce prudential banking policies, including enhanced supervision of NPL ratios and financial distress indicators. Regulators may consider adopting a risk-based approach that emphasizes long-term stability and sustained profitability of the banking sector.
3. For Investors and Stakeholders, These findings can serve as an evaluative tool for assessing the financial condition and credit portfolio quality of banks before making investment decisions. NPL ratios and financial distress indicators can act as early warning signals of potential declines in bank profitability.
4. For Academics and Future Researchers, This study opens avenues for further exploration of other variables that may strengthen or weaken the relationship between financial distress, NPLs, and profitability—such as operational efficiency, capital structure, or fiscal/monetary policy interventions.

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