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Capital Adequacy, Loan to Deposit Ratio, and Financial Distress Risk in the Banking Sector

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ABSTRACT

This study aims to evaluate and determine the extent to which the capital adequacy ratio (CAR) and the loan to deposit ratio (LDR) affect the potential for financial distress faced by banking companies listed on the IDX during the period 2021 to 2024. This study is based on concerns about the potential for increasing the risk of financial distress in the banking environment, especially as a consequence of post pandemic global economic uncertainty and volatility in bank operational performance. The two main independent variables tested are CAR and LDR, while the dependent variable, financial distress, is measured through a dummy variable approach (0 and 1) classified based on profitability thresholds. A review of previous research identified that CAR tends to show an inverse (negative) relationship on financial distress. It's hoped that the findings of this study can provide practical contributions for bank managers and investors as a basis for evaluate the level of financial health of the bank and estimate the risk of bankruptcy the may occur.

Keywords: : *Banking Sector; CAR; Financial Distress; Indonesian Stock Exchange; LDR*

1. INTRODUCTION

The banking sector plays a vital role as the backbone of a country's financial system, performing a crucial function as an intermediary between parties with surplus funds and those requiring investment. Consequently, the stability and sustainability of banking performance are key determinants of macroeconomic conditions. In this context, the regular measurement of financial performance and evaluation of banks' financial soundness are imperative to prevent the occurrence of financial distress, a condition in which an institution's ability to meet its financial obligations deteriorates significantly.

Over the past four years (2021–2024), the Indonesian banking industry has faced a series of significant challenges. The impact of the COVID-19 pandemic substantially suppressed economic activity and led to a decline in banks' profitability. This situation was further

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exacerbated by increasing credit risk, liquidity pressures, and fluctuations in exchange rates and interest rates, all of which directly affected banks' capital stability. These pressures often manifested in the form of liquidity difficulties and a deterioration in the Capital Adequacy Ratio (CAR), which serve as early indicators of potential financial distress (Eddo, 2022; Putra et al., 2024).

The financial soundness and performance of banks can be assessed through a set of fundamental ratios, among which the Capital Adequacy Ratio (CAR) and the Loan-to-Deposit Ratio (LDR) are two of the most critical indicators. CAR serves as a measure of a bank's capital capacity to absorb potential operational losses. Meanwhile, LDR reflects the effectiveness of banks in channeling public funds (deposits) into loans. These two ratios constitute key parameters in diagnosing banks' financial health.

Previous studies (Margaretha & Wijaya, 2023; Inka Latif, 2021) consistently indicate that a solid Capital Adequacy Ratio (CAR) reflects a bank's capital resilience in managing credit risk and enhances investor confidence. In contrast, an excessively high Loan-to-Deposit Ratio (LDR) may serve as a warning signal of declining liquidity reserves and increased exposure to financial risk. Based on these arguments, this study is highly relevant in providing an in-depth analysis of how the dynamics of these two key ratios (CAR and LDR) can predict or influence the likelihood of financial distress in Indonesian banking companies during the 2021–2024 period.

Signaling theory explains how business entities convey information regarding their internal conditions to external parties, particularly investors, through the disclosure of financial information. In this context, the Capital Adequacy Ratio (CAR) and the Loan-to-Deposit Ratio (LDR) function as primary signals reflecting the financial health status of banks. A high CAR sends a positive signal to the market, indicating that a bank possesses a strong capital foundation to absorb potential risks. Conversely, a sharp increase in LDR may be perceived as a negative signal, suggesting potential liquidity problems (Margaretha & Wijaya, 2013).

Principles of banking financial management place liquidity and capitalization as two main pillars supporting banks' stability and resilience. In accordance with regulatory standards (referring to Basel III), Bank Indonesia requires banks to maintain a minimum Capital Adequacy Ratio (CAR) of 8%. Banks that fail to meet this threshold are considered to face a high risk of bankruptcy. Meanwhile, liquidity thresholds are regulated by the Financial Services

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Authority (Otoritas Jasa Keuangan/OJK) through Regulation No. 18/POJK.03/2016, which stipulates that a bank's liquidity condition is deemed sound when the Loan-to-Deposit Ratio (LDR) does not exceed 110%. When the LDR surpasses this ideal range, it indicates an overly aggressive lending strategy that may threaten a bank's ability to maintain adequate liquidity. Financial distress refers to a condition in which a bank experiences difficulties in meeting its financial obligations in a timely manner and represents an early phase leading to bankruptcy (Platt & Platt, 2002). Therefore, this study assesses financial distress by referring to profitability (performance) aspects as a more relevant operational indicator. Losses, reflected in negative net income, constitute the most explicit and fundamental manifestation of financial distress (FD).

Several previous studies have reinforced the existence of a relationship between the Capital Adequacy Ratio (CAR), the Loan-to-Deposit Ratio (LDR), and financial distress risk. Eddo (2022) finds that CAR has a significant negative effect on financial distress, indicating that stronger capital adequacy reduces the likelihood of financial difficulties. Margaretha and Wijaya (2023) demonstrate that CAR, Return on Assets (ROA), and LDR jointly exert a significant influence on financial distress, highlighting the combined role of capital strength, profitability, and liquidity management. Similarly, Putra et al. (2024) report that CAR and liquidity risk significantly affect financial distress, emphasizing the importance of capital and liquidity resilience in mitigating financial vulnerability. In contrast, Latif (2021) provides evidence that the Loan-to-Deposit Ratio (LDR) has a significant positive effect on financial risk, suggesting that excessive lending relative to deposits increases exposure to financial distress.

From a theoretical and empirical perspective, capital adequacy and liquidity management are central determinants of banks' financial stability. A higher Capital Adequacy Ratio (CAR) reflects a bank's stronger capacity to absorb potential losses arising from credit and operational risks, thereby reducing its vulnerability to financial distress. Conversely, the Loan-to-Deposit Ratio (LDR) captures the extent to which banks rely on deposits to finance lending activities. An excessively high LDR indicates aggressive lending practices and heightened liquidity risk, which may weaken a bank's ability to meet short-term obligations and increase the likelihood of financial distress. These arguments provide a logical basis for the formulation of the following hypotheses:

H1: The Capital Adequacy Ratio (CAR) is expected to have a negative and significant effect on financial distress in banking companies listed on the Indonesia Stock Exchange during the 2021–2024 period.

H2: The Loan-to-Deposit Ratio (LDR) is predicted to have a positive and significant effect on financial distress.

2. RESEARCH METHOD

This study employs a quantitative approach with a causal associative research design to examine the cause-and-effect relationship between the independent variables, Capital Adequacy Ratio (CAR) and Loan-to-Deposit Ratio (LDR), and the dependent variable, financial distress. The quantitative method is appropriate because the data are numerical and can be statistically analyzed to test the hypotheses formulated in advance. Secondary data were utilized, obtained from official sources such as the Indonesia Stock Exchange and the annual reports of banking companies. Data analysis was conducted using logistic regression on panel data, as the study incorporates both time-series and cross-sectional dimensions.

The study population consists of all banking companies listed on the Indonesia Stock Exchange (IDX) during the 2021–2024 period, totaling 47 banks. Purposive sampling was applied based on specific criteria, including active listing status, availability of audited annual reports, completeness of data on CAR, LDR, and net income/loss for financial distress classification, and absence of delisting, mergers, or major acquisitions during the study period. Based on these criteria, 27 banks were selected as the final sample, resulting in a panel data set of 108 observations over the four-year period.

In this study, the Capital Adequacy Ratio (CAR) serves as the independent variable X1, representing a bank's capacity to absorb potential losses. The Loan-to-Deposit Ratio (LDR) is the independent variable X2, reflecting the bank's effectiveness in converting third-party funds into loans. Financial distress is the dependent variable Y, measured as a binary (dummy) variable based on profitability performance to ensure its independence from CAR and LDR. A bank is classified as distressed (Y = 1) if it reports a negative net income (< 0), and as non-distressed (Y = 0) if it reports a positive net income (> 0).

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3. RESULTS AND DISCUSSION

The descriptive statistics indicate that the average Capital Adequacy Ratio (CAR) is 38.91%, suggesting that Indonesian banks generally maintain a high level of capital adequacy, well above the minimum regulatory requirement set by OJK (8%–12%). The relatively large standard deviation of 39.24% reflects considerable variation in capital adequacy across banks. The Loan-to-Deposit Ratio (LDR) has an average of 103.94%, indicating that credit distribution is relatively aggressive yet still within a reasonable range. The high standard deviation of 64.99% highlights substantial differences in intermediation capacity among banks. Regarding Financial Distress (FD), the data are predominantly classified as non-distress (0), while distressed banks (1) are very few. This imbalance may affect the predictive performance of the regression model in accurately identifying instances of financial distress (Table 1).

Table 1 . Descriptive Statistics

Variable	N	Minimum	Maximum	Mean	Std. Deviation
CAR	108	10.50	283.88	38.9160	39.2378
LDR	108	39.08	527.91	103.9409	64.9892

Source: Researcher-processed data

Table 2. Multicollinearity Test

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics
	B	Std. Error	Beta			
(Constant)	0.035	0.049			0.717	0.475
CAR	-0.002	0.001	-0.232	-1.518	0.132	
LDR	0.001	0.001	0.237	1.548	0.125	

Source: Researcher-processed data

The multicollinearity test indicates that all independent variables have Variance Inflation Factor (VIF) values below 10 and tolerance values above 0.10, suggesting that there is no multicollinearity problem (Table 2). This implies that CAR and LDR do not excessively influence each other and are therefore suitable to be included simultaneously in the logistic regression model.

The logistic regression model has a significance value of 0.151, which is greater than 0.05 (Table 3). This indicates that the model is not statistically significant, and overall, it is not yet able to explain the variation in financial distress conditions. Furthermore, the independent variables, CAR and LDR, are not sufficiently strong to improve the overall fit of the model.

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Table 3. Omnibus Tests of Model Coefficients

Test Type	Chi-square	df	Sig.
Step	3.785	2	0.151
Block	3.785	2	0.151
Model	3.785	2	0.151

Source: Researcher-processed data

The Nagelkerke R² value of 0.084 indicates that only 8.4% of the variation in financial distress can be explained by CAR and LDR, while the remaining 91.6% is influenced by other factors outside the model, such as profitability, non-performing loans (NPL), and other variables. This suggests that CAR and LDR alone have limited explanatory power in predicting financial distress among the sampled banks (Table 4).

Table 4. Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	53.250	0.034	0.084

Source: Researcher-processed data

The Nagelkerke R² value of 0.084 indicates that only 8.4% of the variation in financial distress can be explained by CAR and LDR, while the remaining 91.6% is influenced by other factors outside the model, such as profitability, non-performing loans (NPL), and other variables. This suggests that CAR and LDR alone have limited explanatory power in predicting financial distress among the sampled banks.

The Hosmer and Lemeshow test is used to assess the goodness-of-fit of the logistic regression model. The test shows a Chi-square value of 8.695 with 8 degrees of freedom and a significance level of 0.369 (Table 5). Since the p-value is greater than 0.05, the model is considered to have a good fit, indicating that there is no significant difference between the predicted values and the observed outcomes.

Table 5. Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	8.695	8	0.369

Source: Researcher-processed data

The classification table indicates that the model predicts non-distress cases with 100% accuracy but fails to correctly predict distress cases, with 0% accuracy (Table 6). The overall accuracy of the model is 92.6%. However, a critical interpretation reveals that the model's predictive

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ability is biased due to the imbalanced data distribution. While it reliably identifies non-distress banks, it cannot predict financial distress because the number of distress cases in the sample is very low. Consequently, although the overall accuracy appears high, it is misleading, as the model predominantly predicts a single category (non-distress) and fails to capture the critical instances of financial distress.

Table 6. Classification Table

Observed \ Predicted	Non-Distress (0)	Distress (1)	Percentage Correct
Non-Distress (0)	100%	0%	100%
Distress (1)	100%	0%	0%
Overall Accuracy			92.6%

Source: Researcher-processed data

The results in Table 7 indicate that CAR is not statistically significant (Sig. = 0.138 > 0.05). Although the coefficient is negative, suggesting a decreasing probability of financial distress with higher CAR, this effect is not statistically proven. The Exp(B) value of 0.945 implies that each 1-unit increase in CAR reduces the odds of distress by 5.5%, but this effect is not significant.

Similarly, LDR is not significant (Sig. = 0.092 > 0.05). The positive coefficient aligns with liquidity risk theory, indicating that higher LDR increases the likelihood of distress. The Exp(B) value of 1.021 suggests that each 1-unit increase in LDR increases the odds of distress by 2.1%, yet this effect is not statistically significant.

Overall, the model fails to predict financial distress effectively. This limitation is primarily due to the imbalanced distribution of FD cases in the sample rather than a methodological flaw.

Table 7 . Variables in the Equation

Variable	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for Exp(B)
							Lower
CAR	-0.057	0.038	2.195	1	0.138	0.945	0.876
LDR	0.021	0.013	2.843	1	0.092	1.021	0.997
Constant	-2.893	0.627	21.307	1	0.000	0.055	

Source: Researcher-processed data

Effect of CAR on Financial Distress

The findings show that the Capital Adequacy Ratio (CAR) has a negative but statistically insignificant effect on financial distress, indicating that high capital adequacy alone does not directly determine whether a bank experiences distress. This may be attributed to the fact that Indonesian banks maintained very high CAR levels during the study period (average >38%),

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which limits the variability of risk associated with capital. Moreover, financial distress appears to be more strongly influenced by factors such as operational profitability, asset quality, and managerial efficiency rather than capital adequacy. As a result, Hypothesis H1 is rejected, since CAR does not have a significant effect on financial distress.

Effect of LDR on Financial Distress

The results indicate that the Loan-to-Deposit Ratio (LDR) has a positive but statistically insignificant effect on financial distress. While a high LDR is theoretically associated with increased liquidity risk, the findings suggest that banks are generally able to manage credit distribution in a stable manner. Furthermore, a high LDR does not automatically lead to losses that could trigger financial distress, as credit quality and loss reserves play a more decisive role in determining distress than the level of intermediation. Consequently, Hypothesis H2 is rejected, as LDR does not have a significant impact on financial distress.

Overall Implications of the Findings

The predictive power of the model for financial distress is limited, primarily due to the imbalance between distressed and non-distressed cases in the data. During the 2021–2024 period, CAR and LDR were not strong explanatory factors for financial distress. Instead, financial distress appears to be more strongly influenced by other factors, such as core profitability indicators like ROA, non-performing loans (NPL), operational efficiency (BOPO), liability structure, and the growth of problematic loans. These findings are consistent with existing literature, which emphasizes that banking distress is more sensitive to asset quality and profitability than to capital adequacy.

4. CONCLUSION

In conclusion, both hypotheses are rejected, as neither CAR nor LDR has a significant effect on financial distress among banking companies. The logistic regression model also shows indications of overfitting, primarily because it only predicts the non-distress category. This outcome highlights that CAR and LDR alone are insufficient to explain the variation in financial distress. Future research is recommended to incorporate additional variables and address data imbalance to improve the predictive accuracy and representativeness of the model.

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