The Effect of Non-Performing Loans and Capital Adequacy Ratio on Return on Assets of Banking Institutions Listed on The Indonesia Stock Exchange (2020–2023)

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Abstract
This study aims to examine the extent to which the non-performing loan ratio and the capital adequacy ratio affect the return on assets of the banking sector listed on the Indonesia Stock Exchange during the 2020–2023 period. The research employs a quantitative approach using the multiple linear regression method. The data were obtained from secondary financial statements of 22 banks over four years of observation. The results reveal that non-performing loan ratio has a negative and significant effect on the return on assets, indicating that an increase in non-performing loans tends to reduce the bank's ability to generate profits from its assets. Meanwhile, the capital adequacy ratio shows no significant effect on the return on assets, implying that a larger amount of capital does not necessarily enhance profitability. These findings suggest that bank performance is more influenced by the effectiveness of asset management and credit quality rather than the amount of available capital, particularly during periods of crisis and economic recovery. The study is limited by the relatively short observation period and the small number of independent variables, as it focuses solely on quantitative analysis without considering qualitative aspects. Practically, the findings provide insights for bank management to strengthen credit risk control and maintain asset quality as strategic measures to sustain profitability amid economic uncertainty. Overall, this research contributes to the empirical literature on factors affecting banking financial performance in the post–COVID-19 recovery era.

Keywords: *Banking Performance, Capital Adequacy Rasio, Indonesia, Non-Performing Loan, Return on Assets*

1. INTRODUCTION

Banking institutions play a vital role in supporting a nation's economic stability by performing financial intermediation functions. The public funds collected by banks in the form of savings are redistributed as loans to various business sectors, thereby stimulating economic activity. The overall financial health of a country largely depends on the stability and performance of its banking institutions. Therefore, effective risk management and adequate capital are key factors in maintaining the resilience of the banking sector amid economic uncertainty. Return on Assets (ROA) is often used as a primary indicator to assess a bank's ability to manage its assets efficiently to generate profit (A. Wulandari et al., 2024). However, the value of ROA is significantly influenced by several risk variables and internal strategies, including Non-Performing Loans (NPL), which reflect the level of problematic credit, and the Capital Adequacy Ratio (CAR), which represents the strength of a bank's capital (Hernadi Moorcy & Nur Rizki, 2023). In Indonesia, the period between 2020 and 2023 marked a phase of intense pressure and significant transformation for the banking sector. The crisis triggered by the COVID-19 pandemic and the subsequent post-pandemic recovery posed severe challenges to the national financial system, particularly in maintaining credit quality and navigating market volatility. Therefore, it is highly relevant to explore the impact of non-performing loans and the capital adequacy ratio on return on assets during this turbulent period to better understand the dynamics of banking financial performance.

This study is designed to empirically examine the role of non-performing loans as a measure of credit risk and the capital adequacy ratio as a reflection of capital sufficiency in relation to return on assets, which represents a bank's financial performance. The research focuses on banks listed on the Indonesia Stock Exchange during the 2020–2023 period—a timeframe that encapsulates the challenges of the COVID-19 pandemic and the initial phase of national economic recovery—providing a significant context for assessing the resilience and effectiveness of the banking sector. The study also observes the differences in non-performing loan levels and capital adequacy ratios

between large and small banks, as well as their effects on achieving return on assets, including potential trends of significant changes during and after the crisis period. Furthermore, this research aims to explore whether non-performing loans and capital adequacy ratios can serve as early indicators in detecting the direction of changes in a bank's financial condition, whether toward improvement or decline in performance. The analytical direction of this study is intended to evaluate the stability of the relationship between non-performing loans, capital adequacy ratio, and return on assets under fluctuating economic conditions, as well as to assess the extent to which the findings can be utilized to strengthen future banking supervision and risk management policies.

The uniqueness of this study lies in its analytical approach and the specific time period under investigation. This research particularly examines the influence of non-performing loans and the capital adequacy ratio on return on assets among banking institutions listed on the Indonesia Stock Exchange during the 2020–2023 period, encompassing both the pandemic crisis and the early stage of national economic recovery. Previous studies were generally conducted under normal economic conditions, meaning their findings may not accurately capture the dynamics of bank performance during times of crisis and economic uncertainty. The added value of this study also stems from its choice of object—publicly listed commercial banks in Indonesia. These banks have distinct characteristics compared to non-listed ones, as they are required to maintain information transparency, comply with capital market regulations, and face more complex market risks. Therefore, the findings of this research are expected to reflect real and comprehensive conditions of modern banking performance in Indonesia. Covering four consecutive years, this study provides insights into the evolution and trend of the relationships among variables over time. Through a trend-based approach, the study not only analyzes the static correlations between variables but also demonstrates how the influence of non-performing loans and capital adequacy ratios on return on assets may shift in response to national macroeconomic dynamics. By emphasizing the pandemic period and the subsequent recovery phase, this research contributes additional scientific insight into the banking sector's ability to withstand large-scale economic turbulence.

This study is significant as it aims to illustrate the changes in banks' financial performance during the crisis caused by the COVID-19 pandemic and the subsequent phase of economic recovery from 2020 to 2023. The main challenge faced by the banking sector during this period was maintaining a balance between stability and profitability, especially when asset quality declined and capital resources became constrained. Under such pressure, non-performing loans, representing asset quality, and the capital adequacy ratio, reflecting capital sufficiency, emerged as two key factors potentially affecting return on assets, a key indicator of bank profitability. This research seeks to statistically and empirically evaluate the extent to which non-performing loans and the capital adequacy ratio influence return on assets among publicly listed banks on the Indonesia Stock Exchange (IDX) during the 2020–2023 period. The uniqueness of this study lies in its periodization and analytical approach. Unlike most previous studies conducted during periods of normal economic conditions, this research observes bank performance during the pandemic and post-pandemic crisis periods, thereby capturing how risk and capital dynamics influence profitability under extreme conditions. Focusing on publicly listed banks provides additional value, as these institutions differ from non-public banks in terms of information transparency, regulatory compliance, and exposure to market risks. Consequently, the findings of this study are expected to offer a more accurate and comprehensive picture of how the Indonesian banking sector adapted its financial strategies to sustain profitability and resilience amid economic turbulence.

This study utilizes secondary data in the form of annual financial reports to measure the effect of non-performing loans and the capital adequacy ratio on banks' financial performance. From an academic perspective, this research is expected to broaden scientific insights into the study of banking risk and financial effectiveness amid national economic uncertainty. From a practical standpoint, the study serves to provide policy recommendations for bank management and regulatory authorities such as the Financial Services Authority (OJK) and Bank Indonesia (BI), particularly in managing credit risk and capital efficiently to maintain long-term profitability. Through this approach, the research holds significant theoretical and practical value, especially in supporting the formulation of resilient and responsive financial policies in times of crisis. Based on the background

described above, the researcher decided to conduct a study entitled "The Effect of Non-Performing Loans and Capital Adequacy Ratio on Return on Assets in Banking Institutions Listed on the Indonesia Stock Exchange, 2020–2023.

2. LITERATURE REVIEW

2.1 Agency Theory

Agency theory explains the contractual relationship between the owners of a company (principals) and its management (agents) (Santoso & Husaini, 2025). In this relationship, the owners entrust authority to managers to operate the company on their behalf. Managers are responsible for running operational activities efficiently to enhance firm value and generate optimal profit levels, which are reflected through the return on assets (ROA) ratio. However, in practice, a misalignment of interests—commonly referred to as agency conflict—often arises. This conflict occurs because managers may pursue personal goals, such as obtaining bonuses or short-term incentives, which are not always aligned with shareholders' interests in maximizing the company's long-term value (Dennis & Suhendah, 2024).

In the context of the banking industry, shareholders act as principals who expect a high return on assets, while bank management functions as agents responsible for managing both public funds and shareholder capital through strategic decisions on lending and risk management. Managers face a strategic dilemma: when credit policies are implemented aggressively to boost short-term profits, the risk of default increases, leading to higher non-performing loans and a decline in profitability. Conversely, when management adopts an overly cautious approach to maintain high capital levels, the capital adequacy ratio may improve, but opportunities for credit expansion and profit growth become limited. Therefore, managerial decisions in controlling non-performing loans and maintaining an optimal capital adequacy ratio reflect the extent to which managers fulfill their fiduciary duty as agents acting in the best interest of shareholders. Overall, agency theory illustrates the balance managers must achieve between taking calculated risks and maintaining financial stability to ensure sustainable profitability in the banking sector (Utama et al., 2023).

2.2 Conceptual Framework

The conceptual framework of this study is designed to systematically illustrate the relationships among the variables being investigated. It explains how the independent variables—non-performing loans (NPL) and capital adequacy ratio (CAR)—influence the dependent variable, return on assets (ROA). Theoretically, an increase in non-performing loans indicates a higher level of problematic or defaulted loans, which can lead to a decline in bank profitability due to reduced interest income and higher credit risk. Conversely, a higher capital adequacy ratio reflects a bank's stronger ability to absorb potential losses and manage financial risks, thereby improving financial performance and profitability. Thus, this conceptual framework provides a logical foundation for examining the relationship between asset quality, capital adequacy, and bank profitability. The interaction among these variables is expected to empirically explain how a bank's financial health influences its profitability performance:

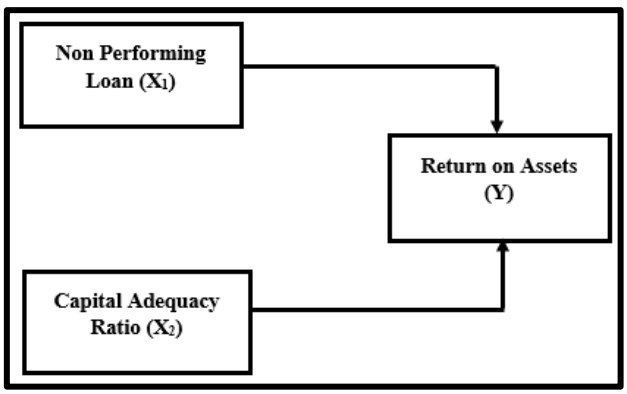

Figure 1. Conceptual Framework of the Study

2.3 Hypothesis Development

2.3.1 The Effect of Non-Performing Loans on Return on Assets

The Non-Performing Loan (NPL) ratio is used to describe the proportion of problematic or defaulted loans relative to the total credit disbursed by a bank (N. A. Wulandari et al., 2025). This ratio serves as an indicator of how effectively a bank manages and mitigates risks arising from lending activities. The management of receivables plays a crucial role in institutions that operate through credit-based transactions. The higher the volume of outstanding loans, the greater the potential risk the institution must bear. An increase in the NPL ratio can reduce the bank's expected income, leading to a negative impact on profitability levels. Therefore, when the NPL ratio rises, a bank's ability to generate profit tends to decline. Conversely, when the NPL ratio decreases, bank profitability is likely to improve. A lower NPL ratio reflects sound financial health and effective management practices, while a higher NPL ratio indicates a deterioration in credit portfolio quality, as a larger proportion of loans become uncollectible. Such conditions force banks to bear losses from non-performing loans, which in turn lowers their earnings as reflected in the Return on Assets (ROA) ratio. Hence, the smaller the NPL ratio, the better the bank's financial performance is likely to be (Indah et al., 2025).

H_1: Non-Performing Loans (NPL) have an effect on Return on Assets (ROA).

2.3.2 The Effect of Capital Adequacy Ratio on Return on Assets

The Capital Adequacy Ratio (CAR) is a measure that indicates a bank's ability to provide sufficient capital to cover the risks associated with all of its assets. In addition to internal capital, the calculation of CAR also takes into account external funding sources such as third-party funds and borrowings. This ratio serves as one of the most important internal indicators that every bank must maintain to ensure financial stability and institutional soundness. According to regulations established by Bank Indonesia, every bank is required to maintain a minimum CAR of 8% to be considered financially healthy in terms of capitalization. If the ratio falls below this threshold, it indicates that the bank faces a high level of financial risk. Conversely, the higher the CAR value, the stronger the bank's capital position in supporting its operational activities and maintaining stability. Therefore, when a bank's capital adequacy improves, its ability to extend credit to the public also increases, which can further enhance profitability and financial resilience (Rifansa & Pulungan, 2022).

H_2: Capital Adequacy Ratio have an effect on Return On Assets.

3. METHODOLOGY

This study employs a descriptive quantitative method to comprehensively explain the relationship between Non-Performing Loans (NPL) and the Capital Adequacy Ratio (CAR) on company performance as the primary research variables. This type of research falls under the quantitative research category, focusing on theory testing through the measurement of variables and the analysis of secondary data using statistical methods. The numerical data utilized in this research are obtained from official information published by the Indonesia Stock Exchange (IDX). The population in this study refers to the entire set of entities that constitute the main object of analysis (Hastuti et al., 2024). In this context, the population includes all banking sector companies listed on the Indonesia Stock Exchange during the period 2020 to 2023. The detailed list of companies included in the research population is presented in the following table:

Table 1. Research Population

No.	Company Code	Company Name
1	AMAR	PT Bank Amar Indonesia Tbk
2	INPC	PT Bank Artha Graha Internasional Tbk
3	BTPN	PT Bank BTPN Tbk

4	BNBA	PT Bank Bumi Arta Tbk
5	BBCA	PT Bank Central Asia Tbk
6	MCOR	PT Bank China Construction Bank Indonesia Tbk
7	BGTG	PT Bank Ganesha Tbk
8	BINA	PT Bank Ina Perdana Tbk
9	BBKP	PT Bank KB Bukopin Tbk
10	BMRI	PT Bank Mandiri (Persero) Tbk
11	BMAS	PT Bank Maspion Indonesia Tbk
12	MAYA	PT Bank Mayapada Internasional Tbk
13	BNII	PT Bank Maybank Indonesia Tbk
14	NISP	PT Bank OCBC NISP Tbk
15	PNBN	PT Bank Pan Indonesia Tbk
16	BEKS	PT Bank Pembangunan Daerah Banten Tbk
17	BJBR	PT Bank Pembangunan Daerah Jawa Barat dan Banten Tbk
18	BJTM	PT Bank Pembangunan Daerah Jawa Timur Tbk
19	BNLI	PT Bank Permata Tbk
20	BKSW	PT Bank QNB Indonesia Tbk
21	BBRI	PT Bank Rakyat Indonesia (Persero) Tbk
22	BSIM	PT Bank Sinarmas Tbk
23	AGRO	PT Bank Raya Indonesia Tbk
24	BBTN	PT Bank Tabungan Negara (Persero) Tbk
25	BVIC	PT Bank Victoria International Tbk
26	SDRA	PT Bank Woori Saudara Indonesia 1906 Tbk
27	BBYB	PT Bank Neo Commerce Tbk
28	AGRS	PT Bank IBK Indonesia Tbk
29	BSWD	PT Bank of India Indonesia Tbk
30	BNGA	PT Bank CIMB Niaga Tbk
31	BDMN	PT Bank Danamon Indonesia Tbk
32	MEGA	PT Bank Mega Tbk
33	BBMD	PT Bank Mestika Dharma Tbk
34	BABP	PT Bank MNC Internasional Tbk
35	MASB	PT Bank Multiarta Sentosa Tbk
36	BBNI	PT Bank Negara Indonesia (Persero) Tbk

Source: www.idx.co.id

In this study, the purposive sampling method was applied. This technique was chosen because it allows the researcher to select samples based on specific considerations and research objectives. The selected samples represent a portion of the population that best reflects the characteristics relevant to the research focus. Sampling was carried out selectively by adhering to predetermined criteria to ensure that the selected units of analysis were appropriate for the study's analytical and empirical objectives. By using this approach, the researcher ensures that the data obtained are both accurate and reliable, providing meaningful insights for the analysis. The following criteria were used in determining the research samples:

1. Companies included in the banking subsector and listed on the Indonesia Stock Exchange (IDX) during the 2020–2023 period.
2. Companies that were consistently listed and actively traded for four consecutive years (2020–2023).
3. Companies that provided complete annual financial reports for the years 2020 through 2023, which were publicly accessible.
4. Companies that recorded non-negative Return on Assets (ROA) values during the 2020–2023 period.

Table 2. Research Samples

No.	Company Code	Company Name
1	BTPN	PT Bank BTPN Tbk
2	BBCA	PT Bank Central Asia Tbk
3	MCOR	PT Bank China Construction Bank Indonesia Tbk
4	BGTG	PT Bank Ganesha Tbk
5	BINA	PT Bank Ina Perdana Tbk
6	BMAS	PT Bank Maspion Indonesia Tbk
7	MAYA	PT Bank Mayapada Internasional Tbk
8	BNII	PT Bank Maybank Indonesia Tbk
9	NISP	PT Bank OCBC NISP Tbk
10	PNBN	PT Bank Pan Indonesia Tbk
11	BJBR	PT Bank Pembangunan Daerah Jawa Barat dan Banten Tbk
12	BJTM	PT Bank Pembangunan Daerah Jawa Timur Tbk
13	BNLI	PT Bank Permata Tbk
14	BBTN	PT Bank Tabungan Negara (Persero) Tbk
15	SDRA	PT Bank Woori Saudara Indonesia 1906 Tbk
16	BNGA	PT Bank CIMB Niaga Tbk
17	BDMN	PT Bank Danamon Indonesia Tbk
18	MEGA	PT Bank Mega Tbk
19	BBMD	PT Bank Mestika Dharma Tbk
20	BABP	PT Bank MNC Internasional Tbk
21	MASB	PT Bank Multiarta Sentosa Tbk
22	BBNI	PT Bank Negara Indonesia (Persero) Tbk

Source: www.idx.co.id

This study collected data through literature review, documentation, and references from the official website of the Indonesia Stock Exchange (IDX). To analyze the collected data, several statistical methods were employed, including descriptive statistics, multiple regression analysis, simultaneous testing (F-test), partial testing (t-test), and coefficient of determination (R^2) analysis. These analytical approaches enable a deeper understanding of the relationships among the variables studied.

Descriptive statistics were used to provide an overview of the general characteristics of the data without drawing further conclusions or statistical inferences. The main function of descriptive statistics in this study is to present a clear and concise summary of the data collected. This technique helps to organize, summarize, and simplify data so that it can be easily interpreted before conducting inferential analyses. Several commonly used descriptive statistical measures include the following:

a. When the mean value is greater than the standard deviation, it may indicate the presence of extreme values that deviate significantly from the average.
b. Conversely, if the mean value is much smaller than the standard deviation, this may suggest a non-normal data distribution, which could be skewed to the left (negative) or exhibit wide dispersion with many low values.

In addition, descriptive statistical analysis helps to better understand the distribution and consistency of the existing data, which is crucial in the interpretation process and decision-making. Multiple regression analysis is an extension of simple regression analysis, which involves only one independent variable. This method is used to describe the relationship between one dependent variable and two or more independent variables. The main objectives of multiple regression are to predict the value of the dependent variable based on the values of the independent variables, to evaluate the strength of the relationship among them, and to identify the individual contribution of each independent variable in explaining the dependent variable.The use of the multiple regression model in this study is justified because it allows for simultaneous analysis of the relationships and effects of two or more independent variables on a single dependent variable. In the context of this research, the independent variables are Non-Performing Loan (NPL) and Capital Adequacy Ratio

(CAR), while the dependent variable is Return on Assets (ROA). The multiple regression equation model used in this study can be expressed as follows:

$$\mathbf{ROA = \alpha + \beta_1(NPL) + \beta_2(CAR) + e}$$

Description:
PBV : *Return on Assets*
α : Constant
β : Regression coefficients
DEB : *Non Performing Loan*
OCF : *Capital Adecuacy Ratio*
e : Error term, representing other factors not included in the model

Before conducting analysis using the multiple linear regression method, several essential steps must be undertaken. One of the most critical steps is testing the classical assumptions. The purpose of classical assumption testing is to ensure that the regression model used meets the required statistical criteria. A model that satisfies these assumptions will produce estimates that are accurate, consistent, and unbiased (Heryaman & Anasta, 2024). Therefore, performing classical assumption tests is a crucial stage to ensure that the regression analysis results are both reliable and valid. These tests verify that the model's residuals and relationships among variables adhere to fundamental statistical requirements, thereby enhancing the credibility of the regression findings. The classical assumption tests consist of several important stages that must be completed before running the regression analysis. Each test serves to identify and correct potential problems that could distort the interpretation of results. The key types of classical assumption tests include normality test, multicollinearity test, heteroscedasticity test, dan autocorrelation test.

The normality test aims to ensure that the residual data follow a distribution pattern that approximates a normal curve (Maharani, 2025). Data are considered normally distributed if the significance value in the Kolmogorov–Smirnov or Shapiro–Wilk test is greater than 0.05. Meeting this criterion indicates that the residuals do not deviate significantly from normality, thereby validating the use of parametric regression analysis. Meanwhile, the multicollinearity test is conducted to determine whether there is a strong correlation among independent variables in the regression model. The main objective of this test is to ensure that each independent variable provides unique and non-redundant information to explain the dependent variable (Primita & Rolanda, 2024). If the independent variables have a very high correlation with one another, it may cause distortion in the regression estimation results. The commonly used indicators to detect multicollinearity are the Tolerance value and the Variance Inflation Factor (VIF). The Tolerance value indicates the proportion of variability in an independent variable that is not explained by other independent variables, while the VIF value represents the reciprocal of the Tolerance value. A higher VIF value implies a stronger correlation among the independent variables, signaling a potential multicollinearity problem. A regression model is considered free from multicollinearity if the Tolerance value is greater than 0.10 and the VIF value is less than 10. When both conditions are met, it can be concluded that the relationships among the independent variables are within acceptable limits. Thus, the results of the regression analysis can be regarded as reliable and valid, as they are not influenced by multicollinearity disturbances that could otherwise bias the interpretation of the variable relationships.

The heteroscedasticity test is conducted to ensure that the variance of the residuals remains constant across all levels of the independent variables (Ramadhani, 2023). The main purpose of this test is to determine whether there is an inequality in the variance of residuals among observations within the regression model. When the residual variance is not constant, heteroscedasticity occurs, which can make the regression estimates inefficient and unreliable (Restiana et al., 2025). One of the most commonly used methods to detect heteroscedasticity is the Glejser test. The decision-making criterion in this test is based on the significance value (p-value) obtained from the results. If the significance value is greater than 0.05, the model is considered free from heteroscedasticity, indicating that the variance of the residuals is constant across observations. Conversely, if the significance value

is less than 0.05, it suggests the presence of heteroscedasticity in the model. Thus, fulfilling the homoscedasticity assumption—where the residuals have constant variance—is one of the key indicators that the regression model is appropriate and reliable for further statistical analysis (Ariestantia et al., 2023).

Furthermore, the autocorrelation test is conducted to determine whether there is a correlation between the residuals of one observation and those of another. The main purpose of this test is to ensure that each prediction error (residual) is independent across time or between observations (Patti Kesuma et al., 2025). If the residuals are correlated with one another, autocorrelation occurs, which can undermine the validity of the regression analysis results. A good regression model must be free from autocorrelation to ensure that the estimation results are efficient, consistent, and unbiased. One of the most commonly used methods to detect autocorrelation is the Durbin–Watson (DW) test. The Durbin–Watson value ranges from 0 to 4, with specific interpretations used to determine the presence or absence of autocorrelation in the model. If the Durbin–Watson (DW) value is close to 2, it can be concluded that there is no autocorrelation in the model. If the DW value is less than the lower limit (dL), it indicates the presence of positive autocorrelation. Conversely, if the DW value is greater than (4 – dL), it suggests negative autocorrelation. The model is considered free from autocorrelation if the DW value falls between the upper limit (dU) and (4 – dU) (Cahyani & Imronudin, 2025). Thus, fulfilling the no-autocorrelation assumption is an essential indicator that the regression model is suitable for hypothesis testing, ensuring that the estimation results are valid, reliable, and unbiased.

In multiple linear regression analysis, the simultaneous test (F-test) is used to identify the collective effect of the independent variables on the dependent variable (Wirawan, 2024). The testing process is based on the calculated F-value. If the calculated F-value is greater than the F-table value, the null hypothesis (H_0) is rejected, indicating that the result is statistically significant. Conversely, if the calculated F-value is smaller than the F-table value, the null hypothesis (H_0) is accepted, meaning there is no significant effect. The decision criteria based on the level of significance are as follows:

a. If the significance value is greater than 0.05, then H_0 is accepted.
b. If the significance value is less than 0.05, then H_0 is rejected.

Next, in multiple regression analysis, the significance of each regression coefficient is tested using the partial test (t-test). This test aims to determine whether a specific independent variable has a significant effect on the dependent variable, while controlling for the influence of other independent variables in the model. The criteria for determining statistical significance are as follows:

a. If the significance value is greater than 0.05, then the null hypothesis (H_0) is accepted.
b. If the significance value is less than 0.05, then the null hypothesis (H_0) is rejected.

In regression analysis, the coefficient of determination is a statistical measure used to assess the extent to which the regression model can explain variations in the dependent variable. This measure indicates how much of the change in the dependent variable can be explained by the independent variables. The coefficient of determination has a value ranging from 0 to 1, representing the proportion of variance in the dependent variable that can be predicted from the independent variables. A value close to 1 indicates that the independent variables can explain almost all of the information needed to predict the dependent variable. Conversely, a value close to 0 suggests that the model has a weak explanatory power. In other words, the closer the coefficient of determination is to 1, the better the regression line fits the actual data. On the other hand, the closer it is to 0, the less capable the model is in explaining the variability of the dependent variable.

4. RESULTS AND DISCUSSION

4.1 Research Findings

4.1.1 Descriptive Statistics

Before proceeding to more in-depth analysis, it is essential to gain a general understanding of the data distribution used in this study. The following table presents the descriptive statistics that provide an overview of the three main variables analyzed in this research—Return on Assets (ROA), Non-Performing Loans (NPL), and Capital Adequacy Ratio (CAR). These descriptive statistics include information on the mean, standard deviation, and number of observations for each variable.

This initial overview helps to understand the overall characteristics and variability of the data prior to conducting inferential analysis:

Table 3. Results of Descriptive Statistics

Descriptive Statistics			
	Mean	Std. Deviation	N
ROA	1,008159	,7092623	88
NPL	3,395705	1,8035099	88
CAR	,296318	,1450281	88

Source: Research Results (Processed Data)

The average value of Return on Assets (ROA) of 1.008159 is higher than its standard deviation of 0.7092623. This indicates that the distribution of ROA data among all samples is not widely dispersed. In other words, most of the companies or banks analyzed have ROA values close to the average, around 1.01%. This finding suggests that profitability among the companies in this study is relatively uniform. Therefore, the efficiency in utilizing assets to generate profits can be considered fairly stable across the observed institutions. In this dataset, the average value of Non-Performing Loans (NPL) is 3.395705, which is higher than its standard deviation of 1.8035099. This indicates that most NPL values are concentrated around 3.4%. The level of deviation from the mean is not substantial, suggesting that the data variation is within a reasonable range. Although the dispersion of NPL values is slightly higher compared to that of Return on Assets, the overall distribution remains stable. The data also show no indication of extreme or outlier values that significantly dominate the dataset. The average Capital Adequacy Ratio (CAR) of 0.296318 is higher than its standard deviation of 0.1450281. This indicates that the level of capital adequacy among the banks analyzed follows a relatively similar pattern. In other words, the majority of banks in the sample are able to maintain the minimum capital requirements in accordance with the established standards. The differences in CAR values among banks are not particularly large or striking, suggesting a good level of consistency in maintaining capital stability (Ambarawati & Abundanti, 2018).

4.1.2 Results of Classical Assumption Tests

Fulfilling the classical assumptions is a crucial stage in multiple linear regression analysis. A model is considered to meet the BLUE (Best Linear Unbiased Estimator) criteria if all classical assumptions are properly satisfied. The normality test of the data is conducted to ensure that the residuals used in the regression model are normally distributed (Yolanda, 2020). This test employs the One-Sample Kolmogorov–Smirnov (K–S) approach with a significance level of 0.05. The results of the data normality test are presented as follows:

Table 4. Results of Data Normality Test

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Predicted Value
N		88
Normal Parameters[a,b]	Mean	1,0081591
	Std. Deviation	,39310471
Most Extreme Differences	Absolute	,075
	Positive	,075
	Negative	-,074
Test Statistic		,075
Asymp. Sig. (2-tailed)		,200[c,d]

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.

d. This is a lower bound of the true significance.
Source: Research Results (Processed Data)

Based on the results presented in the table, the Asymp. Sig. (2-tailed) value was 0.200. Since this value is greater than the significance level of 0.05, it can be concluded that the residual data are normally distributed. This means there is no significant difference between the residual distribution pattern and the expected normal distribution (Palupi & Nariman, 2025). The Test Statistic value of 0.075, along with relatively small differences between the positive and negative extreme values (0.075 and -0.074, respectively), further supports this result. These findings indicate that the residual data are evenly distributed and do not deviate from the shape of a normal distribution. Therefore, it can be concluded that the regression model meets the normality assumption. Having satisfied this assumption, the multiple linear regression analysis can proceed to the next stage, which involves testing for multicollinearity, heteroscedasticity, and autocorrelation. The results of the multicollinearity test are presented below:

Table 5. Results of Multicollinearity Test

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	NPL	,999	1,001
	CAR	,999	1,001

a. Dependent Variable: ROA
Source: Research Results (Processed Data)

Based on the results presented in the table, the Tolerance values for the NPL and CAR variables are both 0.999, while their Variance Inflation Factor (VIF) values are 1.001. Since both variables have Tolerance values greater than 0.10 and VIF values well below 10, it can be concluded that there are no symptoms of multicollinearity in the regression model. Thus, the relationships among the independent variables in this study remain within acceptable limits, indicating that the regression model is appropriate and valid for further analysis (Noverina, 2021). Next, the results of the heteroscedasticity test are presented as follows:

Table 6. Results of Heteroscedasticity Test

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	,571	,221		2,585	,011
	LN_ NPL	,100	,067	,160	1,490	,140
	LN_ CAR	-,005	,156	-,003	-,032	,974

a. Dependent Variable: AbsRes2
Source: Research Results (Processed Data)

Based on the results of the Glejser test, the significance (Sig.) values obtained for the variables LN_NPL and LN_CAR are 0.140 and 0.974, respectively. Since both independent variables have significance values greater than 0.05, it can be concluded that the regression model is free from heteroscedasticity problems. Thus, the residual variance is constant, indicating that the regression model meets the homoscedasticity assumption and is suitable for further analysis. The next step in the classical assumption testing is the autocorrelation test, and the results of this test are presented as follows:

Table 7. Results of Autocorrelation Test

Model Summary[b]

Model	Change Statistics					Durbin-Watson
	R Square Change	F Change	df1	df2	Sig. F Change	
1	,169[a]	8,521	2	84	,000	1,712

a. Predictors: (Constant), LAG_X2, LAG_X1
b. Dependent Variable: LAG_Y
Source: Research Results (Processed Data)

Based on the results presented in the Model Summary table, the obtained Durbin–Watson (DW) value is 1.712. This figure serves as an indicator for assessing whether there is a correlation between residuals from adjacent periods. Generally, a Durbin–Watson value ranging between 1.5 and 2.5 indicates that the model is free from autocorrelation. Since the obtained value of 1.712 falls within this acceptable range, it can be concluded that the model does not exhibit autocorrelation. In other words, there is no significant relationship between the errors of one observation and those of another. This condition demonstrates that the regression model satisfies the autocorrelation assumption. With this assumption fulfilled, the results of the multiple linear regression analysis can be considered accurate, consistent, and unbiased.

4.1.3 Multiple Linear Regression Equation

The multiple linear regression method allows researchers to determine the extent to which independent variables can explain variations in the dependent variable. In this case, multiple linear regression provides an overview of the complex relationships between several variables that influence the measured outcome. Through regression testing, it is also possible to identify how strong or weak the influence of each independent variable is on the dependent variable. The following is the result of the multiple linear regression equation obtained in this study:

ROA = 1,746 - 0,218(NPL)+ 0,007(CAR) + e

The following are the results obtained from the regression analysis conducted:

Table 8. Results of Linear Regression Equation

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1,746	,191		9,137	,000
	NPL	-,218	,036	-,554	-6,137	,000
	CAR	,007	,442	,001	,015	,988

Source: Processed Research Data

The constant value obtained from the analysis is 1.746, which indicates that if the values of Non-Performing Loan (NPL) and Capital Adequacy Ratio (CAR) are both zero, the predicted Return on Assets (ROA) is 1.746. This constant represents the base level of ROA when neither independent variable has any influence. The positive constant implies that the company or bank can still generate profit at a basic level even without being affected by credit risk or capital adequacy factors. In other words, profitability remains achievable under neutral financial conditions.

The regression coefficient for the Non-Performing Loan (NPL) variable is -0.218, meaning that a one-unit increase in the NPL ratio will reduce ROA by 0.218, assuming CAR remains constant. The significance value (Sig.) of 0.000, which is less than 0.05, indicates that the effect of NPL on ROA is statistically significant. Therefore, the higher the NPL ratio, the greater its negative impact on the profitability of the company or bank (Binasthika et al., 2025).

Meanwhile, the regression coefficient for the Capital Adequacy Ratio (CAR) is 0.007, suggesting that each one-unit increase in CAR has the potential to increase ROA by 0.007, assuming

NPL remains unchanged. However, the significance value of 0.988 is far higher than the 0.05 threshold, indicating that the effect of CAR on ROA is not statistically significant. Hence, changes in capital adequacy levels do not have a meaningful impact on the profitability of the company or bank within this regression model.

4.1.4 Coefficient of Determination

The coefficient of determination is used to determine how much influence the combined independent variables have on the dependent variable. When the R^2 value approaches 1, it indicates that the model has a strong ability to explain variations in the dependent variable. Conversely, if the value is close to 0, it means the model has a very low explanatory power (Ishak et al., 2024). The results of the coefficient of determination in this study are presented below:

Table 9. Results of Coefficient of Determination

Model Summary[b]					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,554[a]	,307	,291	,5972622	,789

a. Predictors: (Constant), CAR, NPL
b. Dependent Variable: ROA

Source: Processed Research Data

The Model Summary table presents key information regarding the strength of the relationship between the independent and dependent variables in the regression model. The R value of 0.554 indicates a moderate positive correlation between Non-Performing Loan (NPL) and Capital Adequacy Ratio (CAR) on Return on Assets (ROA). Meanwhile, the R Square value of 0.307 means that 30.7% of the variation in the dependent variable (ROA) can be explained jointly by the independent variables (NPL and CAR). Thus, the regression model is able to explain approximately 30.7% of the total changes or variations in ROA, while the remaining 69.3% is explained by other factors outside the model that were not included in this study. Furthermore, the Adjusted R Square value of 0.291 indicates the adjusted proportion of variance explained by the model, considering the number of independent variables used. This shows that after adjustment, about 29.1% of the variation in Return on Assets can be explained by the regression model.

4.1.5 F-Test (Simultaneous Test)

The F-test aims to determine whether two or more independent variables collectively influence the dependent variable in a regression model. This test is used to assess whether the independent variables, as a group, play a significant role in explaining the variation that occurs in the dependent variable (Rivandi & Gusmariza, 2021). The results of the F-test are presented below:

Table 10. Results of F-Test

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13,444	2	6,722	18,844	,000[b]
	Residual	30,321	85	,357		
	Total	43,766	87			

a. Dependent Variable: ROA
b. Predictors: (Constant), CAR, NPL

Source: Processed Research Data

Based on the results of the F-test, it can be concluded that the regression model used has a significant effect. The significance value of 0.000, which is smaller than 0.05, allows us to reject the null hypothesis stating that there is no influence of the independent variables (Capital Adequacy Ratio

and Non-Performing Loan) on the dependent variable (Return on Assets). Thus, these results confirm that at least one of the two independent variables in the model—either Capital Adequacy Ratio or Non-Performing Loan—has a significant effect on Return on Assets.

4.1.6 t-Test (Partial Test)

The t-test in regression analysis aims to determine whether an independent variable has a significant effect on the dependent variable (Kenzen & Afandy, 2023). The t-test is useful for assessing the strength of each independent variable's contribution to the variable being analyzed. It also helps researchers identify which variable is the most dominant in explaining changes in the dependent variable. The results of the t-test are shown below:

Table 11. Results of t-Test

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1,746	,191		9,137	,000
	NPL	-,218	,036	-,554	-6,137	,000
	CAR	,007	,442	,001	,015	,988

a. Dependent Variable: ROA

The constant (intercept) value of 1.746 indicates the estimated return on assets when the values of non-performing loan and capital adequacy ratio are assumed to be zero. The significance value of 0.000 shows that this baseline value of return on assets is statistically significant. For the non-performing loan (NPL) variable, the regression coefficient is -0.218, which means that if the NPL ratio increases by one unit, the ROA will decrease by 0.218 points, assuming the capital adequacy ratio remains constant. The t-value for NPL is -6.137 with a significance value of 0.000. Since the significance value is less than 0.05, it can be concluded that the effect of NPL on ROA is statistically significant. Thus, NPL has a proven negative influence on return on assets. For the capital adequacy ratio (CAR) variable, the coefficient is 0.007, indicating that each one-unit increase in CAR is expected to raise ROA by 0.007, assuming NPL remains constant. However, the t-value for CAR is only 0.015 with a significance value of 0.988. Since this significance value is much greater than 0.05, it can be concluded that CAR has no significant effect on ROA. This means that changes in the capital adequacy ratio have no real impact on profitability in this model (Efriyenty, 2020).

4.2. Discussion

4.2.1 The Effect of Non-Performing Loans on Return on Assets

The results of the regression analysis show that the Non-Performing Loan (NPL) variable has a negative effect on financial performance, as measured by Return on Assets (ROA). The regression coefficient for the NPL variable is –0.218, indicating that every one-unit increase in NPL leads to a 0.218 decrease in ROA, assuming other variables such as the Capital Adequacy Ratio remain constant. The t-test result for NPL shows a significance value of 0.000, which is smaller than the 0.05 significance level. Therefore, it can be concluded that the effect of NPL on ROA is statistically significant. Logically, this can be explained by the fact that non-performing loans reduce interest income. Uncollected interest income diminishes a company's total revenue, especially in the financial or banking sector. As revenue declines, net profit also decreases, ultimately lowering the company's Return on Assets. A high NPL ratio also reflects poor credit quality, indicating that a company holds a large portion of loans at risk of default.

This condition increases the likelihood of borrower defaults, forcing banks to allocate higher loan loss provisions. These provisions become an additional burden that reduces the company's profit. Furthermore, a high level of NPL leads to lower asset utilization efficiency, as evidenced by a reduced ROA ratio. In other words, the company becomes less effective in using its assets to generate profit. Based on the explanation above, it can be concluded that the higher the Non-Performing Loan ratio,

the lower the company's profitability. Moreover, this finding is consistent with previous research that identified a similar relationship, such as the study conducted (Aurelia, et al. 2024)

4.2.2 The Effect of Capital Adequacy Ratio on Return on Assets

The analysis results show that the Capital Adequacy Ratio (CAR) variable has no significant effect on Return on Assets (ROA). This can be seen from the very small regression coefficient of 0.007, meaning that every one-unit increase in CAR only leads to a 0.007-point increase in ROA. However, this effect is not statistically meaningful. This finding is further supported by the t-test significance value for CAR, which is 0.988, far above the conventional significance threshold of 0.05. Thus, it can be concluded that the influence of CAR on ROA is statistically insignificant. Theoretically, the Capital Adequacy Ratio serves as an indicator of a bank's ability to absorb potential losses from risks that may arise. However, in this context, a high CAR does not necessarily translate into increased profitability. In other words, even if a bank has sufficient or even excess capital, it does not guarantee improved efficiency in utilizing its assets to generate profits.

One possible reason is that banks with high capital adequacy ratios may not effectively optimize their capital use for productive lending activities. Idle capital that is not channeled into profitable credit portfolios tends to have little or no direct contribution to income generation. As a result, the relationship between CAR and ROA may become weak or even nonexistent. Additionally, in practice, banks may prioritize prudential management and regulatory compliance with minimum capital requirements over pursuing short-term profitability. This cautious approach makes capital adequacy function more as a risk buffer rather than a profit driver. From these findings, it can be concluded that while CAR is crucial for maintaining the stability and resilience of banks, it does not play a significant role in enhancing Return on Assets in this study. This result is consistent with previous studies, such as (Junianti et al., 2023), which also found that the relationship between capital adequacy ratio and profitability is not always significant in the short term.

5. CONCLUSION

5.1 Conclusion

Referring to the findings of this study, the following conclusions can be drawn:

1. Based on the results of the regression analysis**,** it was found that the Non-Performing Loan (NPL) variable has a negative and significant effect on Return on Assets (ROA)**.** This is indicated by the NPL regression coefficient of –0.218 with a significance value of 0.000**.** This means that the higher the ratio of non-performing loans, the lower the level of profitability. A high NPL ratio leads to a decline in interest income and an increase in loan loss provisioning costs, which ultimately reduces net profit. These findings reinforce the theory that poor asset quality deteriorates financial performance.
2. The Capital Adequacy Ratio (CAR) variable has no significant effect on Return on Assets (ROA)**.** This is reflected in the very small regression coefficient (0.007) and the very high significance value (0.988**),** which exceeds the 0.05 significance threshold. Thus, changes in capital adequacy ratio do not show a meaningful contribution to profitability. This indicates that having sufficient capital does not necessarily translate into improved efficiency in generating profits. In practice, capital serves more as a risk buffer than as a driver of short-term profitability

5.2 Recommendations

Based on the results of this study, the author provides several recommendations that are expected to serve as guidance for future researchers as well as stakeholders in the banking industry:

1. Future studies are encouraged to include additional variables such as the Loan to Deposit Ratio (LDR)**,** Net Interest Margin (NIM)**,** and Operational Efficiency Ratio (BOPO)**.** The inclusion of these variables is expected to provide a more comprehensive understanding of the factors influencing banking profitability.
2. Future researchers may consider using time series or panel data approaches to better capture the trends and changes in banks' financial performance over multiple years, ensuring a more accurate representation of dynamic financial conditions.

3. Further analysis can also include moderating or mediating variables, such as operational efficiency or risk management, to examine whether these factors strengthen or weaken the relationship between Non-Performing Loans (NPL), Capital Adequacy Ratio (CAR), and Return on Assets (ROA).
4. Future research could be expanded to a regional level by comparing banking data across several ASEAN countries. This comparative approach would help determine the extent to which Indonesia's banking conditions align with or differ from those in other countries within the region.

RESEARCH LIMITATIONS

Every research study has certain limitations that may influence its findings and scope of analysis. These constraints often arise due to limitations in time, data availability, and the variables employed during the research process. Similarly, this study acknowledges several limitations that should be taken into account for future research:

1. The research period is limited to 2020–2023, a relatively short timeframe. This constraint means that the results may not fully capture the long-term changes in banks' financial performance, particularly during the post-pandemic recovery period.
2. The study focuses only on two main variables, namely Non-Performing Loans (NPL) and Capital Adequacy Ratio (CAR). Consequently, other variables that may also influence Return on Assets (ROA) were not examined in this study, such as operational efficiency ratio, liquidity level, and interest rate policies applied by individual banks.
3. The quantitative analytical method used in this study does not take into account qualitative factors such as internal management policies, business strategies, or macroeconomic conditions, which may also have an impact on banking profitability.

PRACTICAL AND ACADEMIC IMPLICATIONS

1. Practical Implications

The practical implications of this research are as follows:

a) This study provides valuable insights for bank management regarding the role of financial ratios in maintaining profitability performance. The findings related to the Non-Performing Loan (NPL) indicate that effective credit risk management is a key factor that must be prioritized. Banks should strengthen their creditworthiness assessment systems, tighten loan approval policies, and enhance the efficiency of collection processes to reduce NPL ratios. These efforts will help maintain a stable Return on Assets (ROA).
b) The analysis of the Capital Adequacy Ratio (CAR) highlights the importance of efficient capital management in accordance with regulatory requirements. Banks are expected not only to meet the minimum capital adequacy standards but also to optimize their available capital to support sustainable business operations and healthy expansion. With sound credit risk management and adequate capital levels, the bank's financial performance will remain stronger and more sustainable.
c) For management and regulators such as the Financial Services Authority (OJK) and Bank Indonesia, this study offers practical insights to support the formulation of more adaptive supervisory and capital policies, especially in response to post-pandemic banking risk dynamics

2. Academic Implications

The academic implications of this research are as follows:

a) This study enriches the literature on banking financial performance analysis, particularly concerning the relationship between Non-Performing Loans (NPL), Capital Adequacy Ratio (CAR), and Return on Assets (ROA). The findings can serve as a reference for future researchers to develop more comprehensive analytical models by incorporating additional variables such as operational efficiency, liquidity, or risk management policies.
b) The research can be used as teaching material in the fields of accounting and financial management, particularly on the topic of bank financial ratio analysis.

c) These findings may also serve as a foundation for further empirical studies exploring the relationship between regulatory frameworks, banking policies, and profitability within the context of digital economy transformation and global uncertainty

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