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Analysis of the Effect of Non-Performing Loans, Loan to Deposit Ratio, and Capital Adequacy Ratio on Book Value per Share through Return on Assets Mediation

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Abstract: This study examines the effect of Non-Performing Loans (NPL), Loan-to-Deposit Ratio (LDR), and Capital Adequacy Ratio (CAR) on firm value proxied by Book Value per Share (BVS), with Return on Assets (ROA) as a mediating variable in banking companies listed on the Indonesia Stock Exchange during 2015–2024. This research employs a quantitative approach using panel data regression. The sample consists of 11 banks selected through purposive sampling, resulting in 110 observations. Data analysis was conducted using EViews 12 and the Sobel test to examine the mediation effect. The results show that NPL has a negative and significant effect on ROA and BVS. LDR has no significant effect on ROA but positively affects BVS. CAR has a positive effect on both ROA and BVS. Furthermore, ROA significantly increases BVS. Mediation analysis indicates that ROA does not mediate the effect of NPL and LDR on BVS but mediates the relationship between CAR and BVS. These findings highlight the importance of credit risk management, effective intermediation, and strong capital structures in enhancing banking firm value.

Keyword: Non-Performing Loan (NPL), Loan to Deposit Ratio (LDR), Capital Adequacy Ratio (CAR), Book Value per Share (BVS), Return on Assets (ROA).

INTRODUCTION

The banking sector plays a strategic role in the economic system because it functions as a financial intermediary that mobilizes funds from surplus units and reallocates them to deficit units in the form of credit. The effectiveness of this intermediation function is closely related to banking performance and the ability of banks to create value for shareholders. One indicator that reflects firm value from a fundamental perspective is Book Value per Share (BVS), which represents the portion of a company's equity attributable to each outstanding share. BVS reflects the intrinsic strength of a company because it indicates the level of net assets owned by shareholders (Brigham & Houston, 2014). Therefore, an increase in BVS is often interpreted as an improvement in the firm's long-term financial value.

In the banking industry, firm value is strongly influenced by financial performance, particularly factors related to credit risk, liquidity management, and capital adequacy. Credit risk is commonly measured by the Non-Performing Loan (NPL) ratio, which reflects the proportion of problematic loans in a bank's credit portfolio. Higher NPL levels indicate deteriorating asset quality and potentially reduce bank profitability. Liquidity conditions are generally assessed through the Loan-to-Deposit Ratio (LDR), which illustrates the effectiveness of banks in channeling third-party funds into productive loans. Meanwhile, capital strength is measured by the Capital Adequacy Ratio (CAR), which indicates a bank's ability to absorb potential losses arising from operational risks.

From a theoretical perspective, the relationship between financial performance and firm value can be explained through signaling theory and agency theory. Signaling theory suggests that financial information disclosed by companies provides signals to investors regarding the firm's financial condition and prospects (Brigham & Houston, 2014). Financial ratios such as NPL, LDR, and CAR convey important information regarding credit risk, liquidity conditions, and capital strength. In addition, agency theory explains the relationship between shareholders as principals and managers as agents responsible for managing corporate resources efficiently (Berger & Bonaccorsi, 2006). In this context, financial performance indicators become essential tools for evaluating management effectiveness.

However, the influence of banking financial ratios on firm value does not always occur directly. Profitability may act as an important mechanism that links financial performance with firm value. Profitability, commonly measured by Return on Assets (ROA), reflects a bank's ability to generate profits from its total assets. Higher profitability enables banks to increase retained earnings and strengthen equity, which ultimately contributes to increasing Book Value per Share.

Empirical conditions in Indonesian banking companies indicate fluctuations in several key financial ratios, including NPL, LDR, CAR, and ROA, which are often accompanied by changes in firm value. In certain periods, increases in non-performing loans are followed by declining profitability, suggesting that credit risk plays a crucial role in determining banking performance. On the other hand, improvements in capital adequacy are not always followed by higher profitability, indicating that capital strength does not automatically translate into better financial performance. These conditions highlight the complexity of the relationship between banking financial ratios, profitability, and firm value.

Previous studies examining the relationship between banking financial ratios and firm value have also produced inconsistent findings. Some studies show that credit risk negatively affects bank profitability and firm value (Wahyuni et al., 2023), while other studies indicate that the impact of credit risk may be mitigated through effective risk management and capital strengthening strategies (Pratiwi & Ardiansari, 2023). Similarly, empirical evidence regarding the effect of liquidity and capital adequacy on profitability and firm value remains mixed across different studies (Suwandi & Oetomo, 2017; Hermina & Suprianto, 2016).

Furthermore, most previous studies primarily focus on the direct relationship between financial ratios and firm performance, while relatively limited research investigates the role of profitability as a mediating mechanism linking banking financial indicators to firm value. In the banking sector, profitability may serve as a key channel through which credit risk, liquidity management, and capital adequacy influence shareholder value. Therefore, this study aims to examine the effect of Non-Performing Loans (NPL), Loan-to-Deposit Ratio (LDR), and Capital Adequacy Ratio (CAR) on Book Value per Share (BVS) with Return on Assets (ROA) as an intervening variable in banking companies listed on the Indonesia Stock Exchange during the period 2015–2024. This study is expected to contribute to the development of banking financial management literature by providing empirical evidence on

the role of profitability in linking financial risk, liquidity management, and capital adequacy with firm value.

METHOD

In this study, the scope of the research object determined by the author is in accordance with the problem to be studied, namely Return on Assets (ROA) as an intervening variable, with the analysis of financial ratios used, namely Non Performing Loan (NPL), Loan to Deposit Ratio (LDR), Capital Adequacy Ratio (CAR) and Book Value per Share (BVS) in banking companies listed on the Indonesia Stock Exchange. The units of analysis in this study are Book Value per Share (BVS) and Return on Assets (ROA) using the annual financial reports of banking companies listed on the Indonesia Stock Exchange from 2015 to 2024.

This research uses a quantitative approach, aiming to examine the relationships between variables through statistical analysis. This quantitative approach was chosen because the research variables are measured using numerical data, allowing for empirical hypothesis testing. The data used in this study is secondary data obtained from the annual financial reports of banking companies listed on the Indonesia Stock Exchange. The observation period covers 2015 to 2024. The data used is quantitative in numerical form, sourced from published financial reports. This research focuses on the analysis of several banking financial ratios, namely Non-Performing Loans (NPL), Loan-to-Deposit Ratio (LDR), Capital Adequacy Ratio (CAR), Return on Assets (ROA), and Book Value per Share (BVS). Based on the time dimension, the research data is a combination of time series and cross-sectional data. The combination of these two types of data forms panel data, therefore the analysis technique used in this study is panel data regression.

Operational variables are the translation of research variables into a form that can be measured empirically. This study is entitled "The Effect of Non-Performing Loans (NPL), Loan to Deposit Ratio (LDR), and Capital Adequacy Ratio (CAR) on Book Value per Share (BVS) through Return on Assets (ROA) as an Intervening Variable in Banks Listed on the Indonesia Stock Exchange." The variables used consist of three independent variables, one intervening variable, and one dependent variable. The independent variables include Non-Performing Loans (NPL), Loan to Deposit Ratio (LDR), and Capital Adequacy Ratio (CAR). NPL is used to measure the level of bank credit risk indicated by the proportion of non-performing loans to total loans. LDR indicates the bank's ability to channel third-party funds in the form of credit, thus reflecting the level of liquidity. CAR illustrates the adequacy of bank capital in covering risks arising from operational activities. The intervening variable in this study is Return on Assets (ROA), which is a profitability ratio that indicates the bank's ability to generate profits from its total assets. The dependent variable is Book Value per Share (BVS), which is a ratio that shows the book value of a company's equity per outstanding share and is used to describe the company's fundamental value (Fakhruddin & Hadianito, 2001).

The following table shows the Operational Definition of Research Variables.

Tabel 1. Descriptive Statistics

Variable	Type	Definition	Measurement Formula	Scale
NPL	Independent	Ratio used to measure the proportion of non-performing loans compared to total loans, indicating the level of credit risk faced by a bank.	$\text{NPL} = (\text{Non-Performing Loans} / \text{Total Loans}) \times 100\%$	Ratio
LDR	Independent	Ratio that measures a bank's ability to distribute funds collected from third parties into loans.	$\text{LDR} = (\text{Total Loans} / \text{Third Party Funds}) \times 100\%$	Ratio

Variable	Type	Definition	Measurement Formula	Scale
CAR	Independent	Ratio that indicates the adequacy of a bank's capital in covering potential risks arising from operational activities.	$CAR = (\text{Capital} / \text{Risk Weighted Assets}) \times 100\%$	Ratio
ROA	Intervening	Profitability ratio that measures a bank's ability to generate profit from its total assets.	$ROA = (\text{Net Income} / \text{Total Assets}) \times 100\%$	Ratio
BVS	Dependent	Ratio that reflects the book value of company equity for each outstanding share, represents the firm's fundamental value.	$BVS = \text{Total Equity} / \text{Total Outstanding Shares}$	Ratio

Source: Research data

The population in this study consisted of 40 banking companies listed on the Indonesia Stock Exchange (IDX). The sampling technique used purposive sampling, a method of selecting samples based on specific criteria relevant to the research objectives (Sugiyono, 2016).

The sample selection criteria in this study included banking companies consistently listed on the IDX during the 2015–2024 period; companies that published complete and continuous annual financial reports during the study period; and companies that recorded positive profits during the observation period. This study used secondary data obtained from the annual financial reports of banking companies published on the official website of the Indonesia Stock Exchange (www.idx.co.id). This explanatory research aims to analyze the relationships between variables in banking companies in Indonesia during the 2015–2024 period. Data processing was performed using Microsoft Excel for tabulation and descriptive analysis, while statistical analysis was conducted using EViews version 12 to test linear regression and panel data regression models.

Descriptive statistical analysis is used to provide a general overview of the characteristics of the research data before further analysis. The descriptive statistics used include the mean, median, maximum, minimum, and standard deviation values to indicate the trend and spread of the data. Furthermore, skewness is used to assess the degree of skewness in the data distribution, while kurtosis indicates the degree of skewness of the distribution compared to a normal distribution. The Jarque–Bera test is used to test the normality of the data by comparing probability values to the 5% significance level. However, in panel data regression analysis, the assumption of normality is not a primary requirement, so violations of this assumption do not significantly affect model estimation (Nachrowi, 2006).

$$Y_{it} = \alpha + \beta X_{it} + \varepsilon_{it}$$

where i :

i indicates the cross-section unit and t

t indicates the observation period.

There are three approaches used in estimating panel data regression models, namely:

1. Common Effect Model (CEM)

This model is the simplest approach, combining time series and cross-section data without considering differences in characteristics between individuals or overtime. Model estimation is performed using the Ordinary Least Squares (OLS) method.

2. Fixed Effect Model (FEM)

This model assumes differences in characteristics between individuals, as indicated by differences in intercept values. This approach uses dummy variables to capture differences between cross-sectional units.

3. Random Effect Model (REM)

This model assumes that differences between individuals are reflected in the error components. Parameter estimation is performed using the Generalized Least Squares (GLS) method.

To determine the most appropriate panel data regression model, several tests are performed, as follows:

1. The Chow Test, used to determine the best model between the Common Effect Model and the Fixed Effect Model.
2. The Hausman Test, used to select between the Fixed Effect Model and the Random Effect Model.
3. The Lagrange Multiplier (LM) Test, used to determine the best model between the Common Effect Model and the Random Effect Model.

Classical Assumption Test

The classical assumption test is conducted to ensure that the regression model produces a BLUE (Best Linear Unbiased Estimator) estimator. The tests performed include:

1. Normality Test, to determine whether the data is normally distributed using the Jarque–Bera test.
2. Multicollinearity Test, to detect a strong correlation between independent variables through the correlation matrix.
3. Heteroscedasticity Test, to test for equality of residual variances using the White test.
4. Autocorrelation Test, to detect residual correlation between periods using the Breusch–Godfrey Serial Correlation LM Test.

Hypothesis Testing

Once the appropriate regression model is obtained, hypothesis testing is conducted through the following steps:

1. Coefficient of Determination (R^2)

Used to measure the ability of the independent variables to explain the variation in the dependent variable

2. F-Test (Simultaneous)

Used to determine the effect of the independent variables jointly on the dependent variable.

3. Partial T-Test

Used to test the effect of each independent variable on the dependent variable individually.

Mediation (Intervening) Test

The Sobel Test is used to determine the significance of the indirect effect of the independent variable on the dependent variable through the mediating variable. The indirect effect is obtained by multiplying the path coefficients between the independent variable and the intervening variable (a) and the intervening variable and the dependent variable (b).

Because the research uses ROA mediation, there are two structural models.

$$ROA_{it} = \alpha + \beta_1 NPL_{it} + \beta_2 LDR_{it} + \beta_3 CAR_{it} + \varepsilon_{it}$$

ROA_{it} = Return on Company Assets i on t period

NPL_{it} = Non-Performing Loan

LDR_{it} = Loan to Deposit Ratio

CAR_{it} = Capital Adequacy Ratio

α = Constanta

β = Coefficient regress

ε = Error term

This model is used to test the effect of NPL, LDR, and CAR on ROA.

Model 2 (Determinants of Firm Value)

$$BVS_{it} = \alpha + \beta_1 NPL_{it} + \beta_2 LDR_{it} + \beta_3 CAR_{it} + \beta_4 ROA_{it} + \varepsilon_{it}$$

BVS = Book Value per Share of company i in period t

RESULT AND DISCUSSION

The population of this study was all banking companies listed on the Indonesia Stock Exchange (IDX) during the period 2015–2024. The sampling technique used purposive sampling, a method of selecting samples based on certain criteria (Sugiyono, 2013). Based on these criteria, 11 banks were selected as research samples: Bank Mandiri, BNI, BRI, BTN, BCA, OCBC NISP, Bank Mega, Bank Danamon, Bank Permata, Bank Panin, and Bank MNC. With an observation period of ten years, the total number of data analyzed was 110 observations.

The sample of companies to be observed in this study is:

Tabel 2. Sampling Process

No	Sample Characteristics	Max
1	The population of companies operating in the banking sector and listed on the IDX from 2015 to 2024.	40
2	Banks listed after 2015 but never delisted during the 2015–2024 period.	-13
3	Banks delisted from the Indonesia Stock Exchange during the 2015–2024 period.	-16
4	Banks meeting all research data criteria (complete data available for the variables NPL, LDR, CAR, ROA, and BVS during 2015–	11
Final sample size		11
Observation period		10 years
Number of observations		110

Source: Research data

Table 3. Research Sampling

No	Bank Name	Stock Code	IPO Status	Observation Period
1	Bank Mandiri	BMRI	Listing	2015–2024
2	Bank Negara Indonesia (BNI)	BBNI	Listing	2015–2024
3	Bank Rakyat Indonesia (BRI)	BBRI	Listing	2015–2024
4	Bank Tabungan Negara (BTN)	BBTN	Listing	2015–2024
5	Bank Central Asia (BCA)	BBCA	Listing	2015–2024
6	Bank OCBC NISP	NISP	Listing	2015–2024
7	Bank Mega	MEGA	Listing	2015–2024
8	Bank Danamon	BDMN	Listing	2015–2024
9	Bank Permata	BNLI	Listing	2015–2024
10	Bank Panin	PNBN	Listing	2015–2024
11	Bank MNC	BABP	Listing	2015–2024

Source: Research data

The following are the results of the statistical data description:

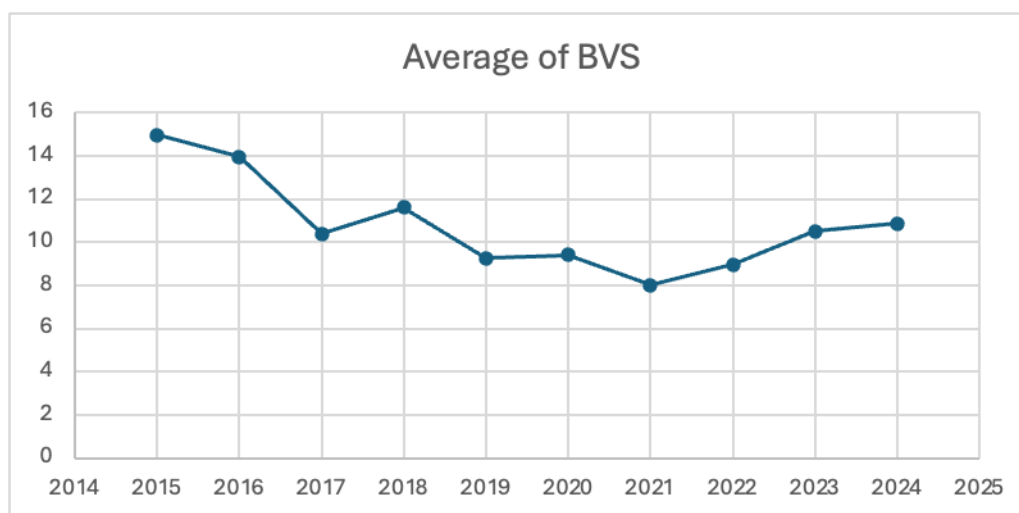
Table 4. Statistical Data Description

	BVS	CAR	LDR	NPL	ROA
Mean	10.78853	1.345273	1.921915	2.829364	1.129937
Median	7.927954	1.334151	1.933639	2.770000	0.887302
Maximum	50.00000	1.962748	2.054996	10.40000	4.820455
Minimum	2.115385	1.099681	1.684756	0.440000	0.235043
Std. Dev.	7.608519	0.111344	0.065992	1.653145	0.758558
Skewness	2.480031	1.647179	-0.878407	1.849001	2.364465
Kurtosis	10.71130	10.28347	3.975194	8.036558	10.21839
Jarque-Bera	385.3039	292.8830	18.50476	178.9431	341.3112
Probability	0.000000	0.000000	0.000096	0.000000	0.000000
Sum	1186.739	147.9800	211.4106	311.2300	124.2930
Sum Sq. Dev.	6309.961	1.351324	0.474686	297.8847	62.71969
Observations	110	110	110	110	110

Source: Research data

Based on descriptive statistics, the Book Value per Share (BVS) variable has an average value of 10.79 with a median of 7.93, indicating a non-symmetrical data distribution. The maximum value is 50.00 and the minimum is 2.12, with a standard deviation of 7.61, indicating significant differences in company value between banks. The Capital Adequacy Ratio (CAR) variable has an average of 1.35, a median of 1.33, and a standard deviation of 0.11, indicating that banks' capital adequacy levels are relatively stable and do not experience significant fluctuations. Meanwhile, the Loan to Deposit Ratio (LDR) has an average of 1.92, a median of 1.93, and a standard deviation of 0.07, reflecting a relatively balanced level of banks' intermediary function in channeling third-party funds into loans. Furthermore, the Non-Performing Loan (NPL) variable has an average value of 2.83 with a standard deviation of 1.65, indicating variations in credit quality between banks in managing financing risks. The Return on Assets (ROA) variable has an average of 1.13 with a standard deviation of 0.76, reflecting differences in banks' ability to utilize assets to generate profits. The Jarque-Bera test results indicate that all variables have probability values below 0.05, thus the data is not normally distributed. In addition, most variables show positive skewness and relatively high kurtosis values, indicating a tendency for data distribution to be skewed to the right and the possibility of extreme values in the study sample. This condition reflects that the fundamental performance of banking in Indonesia during the observation period shows a high level of heterogeneity between banks.

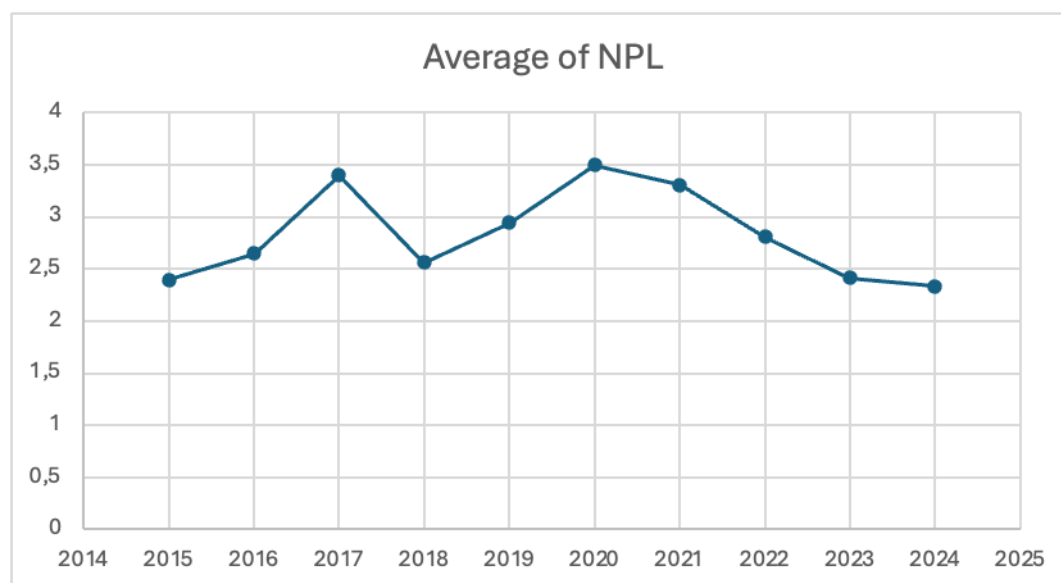
The following is the data trend for each variable as follows:



Source: Research data

Figure 1. Trends in the development of BVS in banking companies

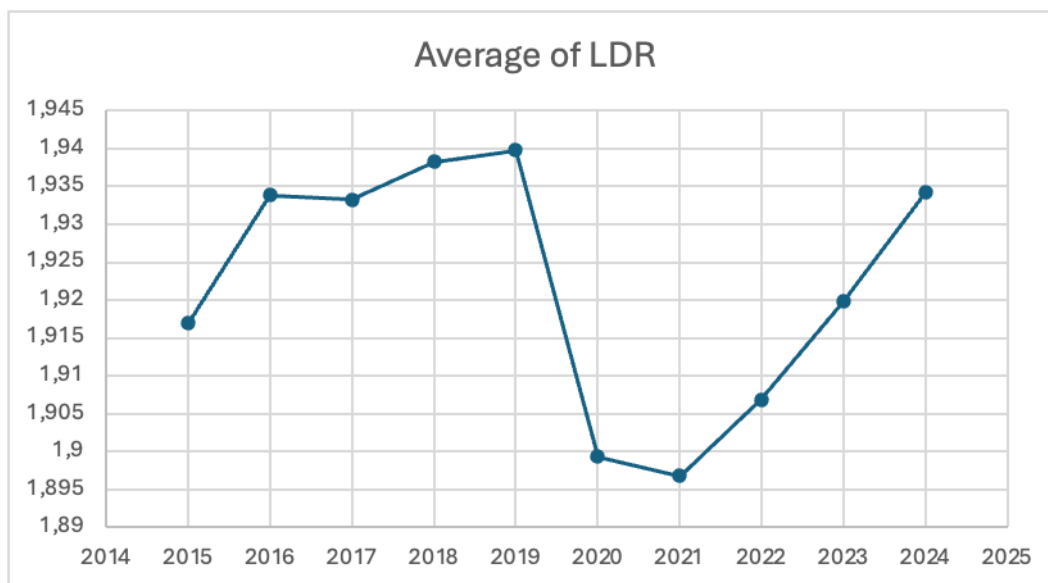
The Book Value per Share (BVS) variable shows a long-term downward trend. At the beginning of the observation period, BVS was relatively high, then experienced a significant decline in 2016 and continued to decline until reaching its lowest point in 2021. After 2021, BVS showed an increase again until 2024, indicating a recovery in the company's book value, although it has not yet returned to the initial level.



Source: Research data

Figure 2. Trends in the development of NPLs in banking companies

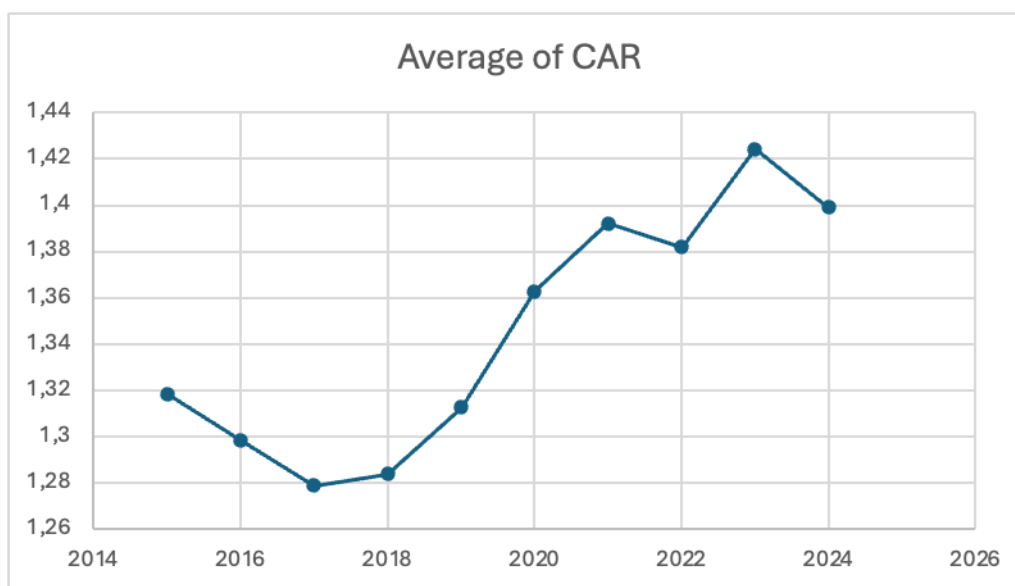
Based on time series data for the 2015–2024 period, the Non-Performing Loan (NPL) variable exhibits a fluctuating pattern. In 2015–2017, the average NPL tended to increase and reached its highest value in 2017. Subsequently, NPLs decreased in 2018 and increased again in 2019, reaching their highest peak during the observation period in 2020. This condition reflects increasing credit risk during that period. After 2020, the average NPL tends to decline until 2024, indicating an improvement in bank credit quality.



Source: Research data

Figure 3. Trends in the development of NPLs in banking companies

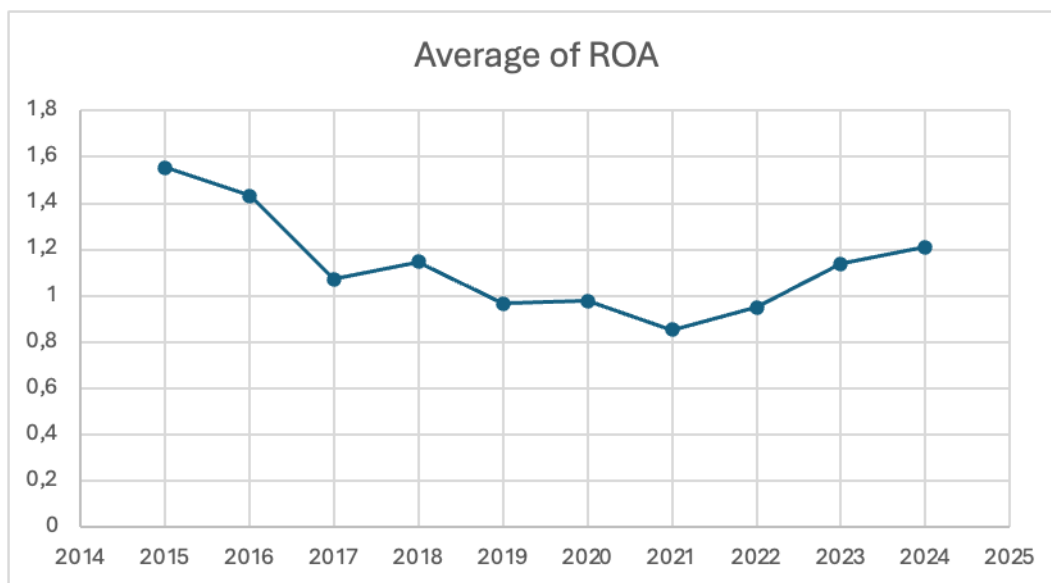
The Loan-to-Deposit Ratio (LDR) variable exhibited relatively moderate fluctuations during the observation period. At the beginning of the period, the LDR remained stable, then declined in 2017 and increased again in 2018. In 2020 and 2021, the LDR tended to decline, indicating banking prudence in lending. Afterward, the LDR increased again until 2024, indicating a recovery in banking intermediation activity.



Source: Research data

Figure 4. Trends in the development of CAR in banking companies

The Capital Adequacy Ratio (CAR) variable shows a relatively stable trend with an upward trend. In the 2015–2019 period, CAR experienced minor fluctuations, but from 2020 to 2024, a consistent increase was observed. This indicates that banks have increasingly strong capital levels, enabling them to absorb risks that may arise from operational activities.



Source: Research data

Figure 5. Trends in the development of ROA in banking companies

The Return on Assets (ROA) variable exhibited considerable fluctuations during the 2015–2024 period. During the 2015–2019 period, ROA tended to increase and reached its highest point in 2019. However, in 2020–2021, there was a significant decline, reflecting weakening banking profitability. Furthermore, in the 2022–2024 period, ROA increased again, indicating improved financial performance and increased efficiency in asset utilization. In general, time series analysis during the study period indicates that banking financial variables fluctuate, influenced by both economic conditions and internal company performance. The NPL and ROA variables reflect economic pressures during specific periods, while CAR shows a relatively stable trend, indicating strengthening bank capital. The LDR and BVS variables illustrate changes in intermediation activity and the dynamics of company value over time. These fluctuating patterns highlight the importance of using panel data analysis to obtain more comprehensive estimates. In the context of panel data regression, particularly in the Fixed Effect Model and Random Effect Model approaches, testing classical assumptions is not a primary requirement because these methods have accommodated heterogeneity between individuals in panel data.

Next, the regression model assumptions were tested to ensure that the resulting estimates were valid, unbiased, consistent, and efficient, as proposed by Damodar N. Gujarati (2014). Based on the results of the normality test using the Jarque–Bera method, a probability value of 0.0000 was obtained, which is less than the significance level of $\alpha = 0.05$. These results indicate that the residuals in the regression model are not normally distributed, indicating a deviation from the normality assumption. This condition can be caused by extreme residual values or asymmetrical data distribution. However, in panel data regression analysis, the normality assumption is not always an absolute requirement, as explained by Nachrowi Djalal Nachrowi (2006). Furthermore, based on the Central Limit Theorem, if the number of observations is sufficiently large ($n > 30$), deviations from the normality assumption can be ignored (Gujarati, 2014).

Next, a multicollinearity test was conducted to determine the existence of a strong linear relationship between the independent variables in the regression model. The presence of multicollinearity can cause instability in the estimation of the regression coefficients. To detect the presence of this problem, the Variance Inflation Factor (VIF) indicator is used, which shows the extent to which independent variables are correlated with each other in explaining the regression model.

Table 5. Output Multicollinearities

	NPL	LDR	CAR	ROA
NPL	1.000000	0.022148	-0.100893	-0.690044
LDR	0.022148	1.000000	0.024282	0.016811
CAR	-0.100893	0.024282	1.000000	0.176613
ROA	-0.690044	0.016811	0.176613	1.000000

Source: Research data

Based on the results of the multicollinearity test, testing is carried out by observing the correlation values between independent variables. A regression model is declared free from multicollinearity if the correlation value between independent variables is below the threshold of 0.8. The analysis results show that all correlation values between the NPL, LDR, CAR, and ROA variables are below this threshold, so it can be concluded that there is no strong linear relationship between the independent variables in the model. Thus, the regression model used does not experience symptoms of multicollinearity, so that each independent variable can explain the dependent variable relatively independently and the results of the regression coefficient estimates can be interpreted validly.

Furthermore, the heteroscedasticity test is carried out with the aim of testing whether the regression model has the same variance from the residuals of one observation to another. If the residual variance from one observation to another remains constant, it is called homoscedasticity, then if the residual variance from one observation to another is different, it is called heteroscedasticity. Based on the results of the heteroscedasticity test, a probability value (p-value) is obtained that is greater than 0.05, so it can be concluded that the regression model does not experience heteroscedasticity. These results indicate that the residual variance is constant across all observations or in other words the model meets the homoscedasticity assumption. By fulfilling these assumptions, it can be stated that the regression model used is suitable for further analysis, because there are no problems with inequality of error variances that can affect the accuracy of the regression coefficient estimates or research conclusions.

Next, panel data regression models were selected using the Chow Test, the Hausman Test, and the Lagrange Multiplier Test. The Chow Test results showed a cross-section F probability of 0.0014 and a cross-section Chi-square of 0.0005 (<0.05), indicating that the Fixed Effects Model (FEM) was superior to the Common Effects Model. However, the Hausman Test yielded a probability of 0.3746 (>0.05), suggesting the Random Effects Model (REM) is more appropriate due to its more efficient estimation. These results were confirmed by the Breusch–Pagan Lagrange Multiplier Test, which showed a cross-section probability of 0.0033 (<0.05), indicating that the Random Effects Model was more appropriate than the Common Effects Model. Therefore, the Random Effects Model (REM) was used in subsequent estimations.

The panel regression estimation results show that partially, Non-Performing Loans (NPL) and the Capital Adequacy Ratio (CAR) significantly influence Return on Assets (ROA), while the Loan to Deposit Ratio (LDR) does not. The NPL variable has a negative coefficient of -0.3213 with a probability of 0.0000, indicating that an increase in the level of non-performing loans will reduce bank profitability. This reflects that credit quality is a significant factor influencing a bank's ability to generate profits. Meanwhile, the CAR has a positive coefficient of 1.6757 with a probability of 0.0038, indicating that the stronger a bank's capital, the greater its ability to generate profits through the utilization of its assets. Conversely, the LDR variable has no significant effect on ROA with a probability of 0.2787, indicating that the level of credit distribution to third-party funds did not directly determine the level of bank profitability during the study period.

The Adjusted R^2 value of 0.4632 indicates that approximately 46.32% of the variation in ROA can be explained by the NPL, LDR, and CAR variables, while the remainder is influenced by other factors outside the model. Furthermore, the Prob(F-statistic) value of 0.0000 indicates that the independent variables simultaneously have a significant effect on ROA, thus the regression model used has a good ability to explain variations in banking profitability.

The following are the results of the Sobel test

Table 6. Sobel test

Variable	a	b	s_a	s_b	Std Error	Test Statistic Sobel (Z)	p-value
CAR – ROA – BVS	1.676	9.857	0.565	0.145	5.575	2.963	0.003
LDR – ROA – BVS	1.166	9.857	1.071	0.145	10.557	1.089	0.276
NPL – ROA – BVS	(0.321)	9.857	2.114	0.145	20.837	(0.152)	0.879

Source: Research data

Overall, the Sobel test results indicate that only CAR has a significant indirect effect on BVS through ROA, while LDR and NPL are not mediated by ROA. This explanation confirms that the role of ROA as an intervening variable is selective, meaning it is only effective in the relationship between CAR and BVS.

Table 7. Summary of Panel Data Regression Hypothesis Test Results

No	Influence	Hypothesis	Results Information
1	NPL Negative impact → ROA	Accepted	Negative impact
2	LDR Positive impact → ROA	Rejected	No effect
3	CAR Positive impact → ROA	Accepted	Positive impact
4	NPL Negative impact → BVS	Accepted	Negative impact
5	LDR Positive impact → BVS	Accepted	Positive impact
6	CAR Positive impact → BVS	Accepted	Positive impact
7	ROA Positive impact → BVS	Accepted	Positive impact
8	NPL → ROA → BVS	Rejected	not mediating
9	LDR → ROA → BVS	Rejected	not mediating
10	CAR → ROA → BVS	Accepted	Mediating

Hypothesis 1: The Effect of NPLs on ROA

The results of this study indicate that Non-Performing Loans (NPLs) negatively impact Return on Assets (ROA). An increase in non-performing loans reduces the quality of banks' assets and encourages the creation of larger loan loss reserves. This condition reduces interest income and depresses banks' net profits. This finding confirms that credit risk is a key determinant of a bank's ability to generate profitability.

Hypothesis 2: The Effect of LDR on ROA

The results of this study indicate that the Loan to Deposit Ratio (LDR) negatively impacts ROA. This indicates that increased lending is not always accompanied by increased profitability. An excessively high LDR ratio has the potential to increase liquidity risk and degrade credit quality, thus depressing bank profit performance. Thus, the effectiveness of bank intermediation is highly dependent on the quality of lending.

Hypothesis 3: The Effect of Capital Adequacy Ratio (CAR) on ROA

The results of this study indicate that the Capital Adequacy Ratio (CAR) does not significantly impact ROA. This finding suggests that high capital adequacy serves more as a risk buffer than as a direct source of profit growth. Large capital will only increase profitability if it is utilized productively in efficient intermediation and investment activities.

Hypothesis 4: The Effect of Non-Performing Loans (NPLs) on Book Value per Share

The results of this study indicate that Non-Performing Loans (NPLs) negatively affect Book Value per Share (BVS). An increase in non-performing loans reduces retained earnings and equity due to increased loan loss reserves. This decrease in equity directly reduces the book value of the company's shares. This finding indicates that asset quality is an important factor in determining the fundamental value of a banking company.

Hypothesis 5: The Effect of LDR on Book Value per Share

The results of this study indicate that the Loan to Deposit Ratio (LDR) positively affects Book Value per Share (BVS). This indicates that the bank's ability to channel third-party funds into productive loans can increase interest income and corporate profits. This increase in profits strengthens the bank's equity, thereby increasing the book value per share.

Hypothesis 6: Effect of CAR on Book Value per Share

The results of this study indicate that the Capital Adequacy Ratio (CAR) has a positive effect on Book Value per Share (BVS). A strong capital structure improves a bank's financial stability and ability to absorb risk. This provides a positive signal to investors regarding the security of their investments, thus increasing the company's value, which is reflected in the book value of the shares.

Hypothesis 7: Effect of ROA on Book Value per Share

The results of this study indicate that Return on Assets (ROA) has a positive effect on Book Value per Share (BVS). High profitability indicates efficient asset management in generating profits. Increased profits will increase retained earnings and strengthen the company's equity. This ultimately increases the book value of the shares, an indicator of the company's fundamental value.

Hypothesis 8: NPL → ROA → BVS

The results of this study indicate that ROA does not mediate the effect of NPL on Book Value per Share. This indicates that the impact of credit risk on company value occurs directly through a decline in asset and equity quality. Investors tend to respond to increasing NPLs as a negative signal without waiting for changes in profitability.

Hypothesis 9: LDR → ROA → BVS

The results show that ROA does not mediate the effect of LDR on Book Value per Share. This suggests that increased credit distribution does not always increase bank profitability. The effectiveness of the intermediation function is highly dependent on credit quality and operational efficiency, so an increase in LDR does not necessarily lead to increased company value.

Hypothesis 10: CAR → ROA → BVS

The results show that ROA mediates the effect of CAR on Book Value per Share. Strong capital adequacy improves bank operational stability, thus supporting increased profitability. Increased profitability then strengthens the company's equity and impacts an increase in the book value of shares.

CONCLUSION

This study analyzes the influence of Non-Performing Loans (NPL), Loan-to-Deposit Ratio (LDR), and Capital Adequacy Ratio (CAR) on Book Value per Share (BVS) with Return on Assets (ROA) as an intervening variable in banking companies listed on the Indonesia Stock Exchange during 2015–2024. The results indicate that NPL has a negative effect on ROA, confirming that higher credit risk reduces bank profitability. In contrast, LDR does not significantly affect ROA, while CAR positively influences profitability, suggesting that stronger capital adequacy enhances banks' capacity to generate returns.

Regarding firm value, NPL negatively affects BVS, whereas LDR and CAR positively influence BVS. In addition, ROA significantly increases BVS, indicating that higher profitability contributes to stronger shareholder value. The mediation analysis shows that ROA only mediates the relationship between CAR and BVS, but not between NPL or LDR and BVS. These findings imply that capital adequacy plays a strategic role in increasing firm value through profitability, while credit risk management remains crucial in maintaining financial performance. Future research is recommended to incorporate additional financial and macroeconomic variables to provide a more comprehensive explanation of firm value in the banking sector.

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