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INCREASING PROFITS IN THE BANKING SECTOR THROUGH THE OPTIMIZATION OF NPL AND LDR

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Abstract:
This study aims to analyze the impact of managing Non-Performing Loans (NPL) and the Loan to Deposit Ratio (LDR) on the profitability of banking companies in Indonesia, measured through Return on Assets (ROA). The data utilized is secondary data with a quantitative approach, encompassing 150 data points from 30 companies whose reports were published on the Indonesia Stock Exchange during the period of 2020-2024. The analysis results indicate a significant relationship between NPL and profitability, suggesting that high NPL can negatively affect banks' profitability performance. Furthermore, a significant relationship is also found between LDR and profitability, indicating that an optimal LDR can enhance the efficiency of banks in generating profits. This research provides important insights for bank management in decision-making related to loan and deposit management.

INTRODUCTION

In late 2019, the COVID-19 pandemic swept across the globe, creating a wave of widespread uncertainty that affected nearly every aspect of life, including the banking sector in Indonesia. Since the outbreak, the capital market has experienced a significant decline, causing many investors to pull out and reducing confidence in corporate performance, including that of financial institutions (Sutrisno et al., 2020). In this context, an analysis of the factors affecting bank profitability has become crucial, particularly since the banking sector serves as a key pillar in supporting national economic stability. (Dewi et al., 2023).

According to Azhari et al. (2024) to determine how well a company can generate profits over a specific period, investors can examine companies with low or high profitability ratios. One performance indicator frequently used to assess a bank's profitability is Return on Assets (ROA). ROA is used to measure how efficiently a bank manages its assets to generate profits (Aulia & Sukiswo, 2024). However, this efficiency cannot be separated from various factors that influence bank operations, including credit risk—measured through the Non-Performing Loan (NPL) ratio—and the bank's capability in extending credit, as reflected in the Loan-to-Deposit Ratio (LDR).

NPL is a key metric that reflects the proportion of loans that borrowers are unable to repay as agreed (Fibriyanti & Nurcholidah, 2020). A high NPL may indicate that a bank is facing increased credit risk, which in turn can reduce interest income and increase loan loss provisions. This, of course, has a negative impact on ROA, as the bank will struggle to generate optimal profits (Hidayanty et al., 2023). On the other hand, the LDR reflects the relationship between total loans disbursed and deposits received by the bank (Dewi et al., 2023). A high LDR indicates that the bank can channel its available funds to extend loans, thereby increasing the potential for higher interest income and improving ROA. According to Cahyaningtyas & Rahayu (2021) the loan-to-deposit ratio is used to determine a bank's ability to extend credit to the public. LDR is typically referred to as the credit-to-total-third-party-funds ratio, which can be used to measure the amount of third-party funds allocated for credit. This ratio reflects the comparison of total credit to Third-Party Funds (TPF) collected by the bank.

In the context of post-pandemic economic recovery, the management of NPLs and LDRs has become increasingly important. Banks need to develop effective strategies to manage credit risk while maximizing their potential for credit disbursement. Previous studies have shown that there is a complex correlation between NPLs, LDRs, and ROA. Studies conducted by Winarso et al. (2020) dan Aztari & Idayati (2023) state that NPLs impact ROA, where substantial capital can mitigate credit risk in banks. However, unstable economic conditions can increase Non-Performing Loans (NPLs), indicating that external factors continue to influence a bank's credit performance. Conversely, Fanesha et al. (2021) and Ika & Kamaluddin (2023) state that NPLs do not impact ROA; while a decline in NPLs contributes to a reduction in non-performing loans, the increase in total loans granted is far more significant. Consequently, provisioning costs for non-performing loans are lower, which can boost the bank's interest income and profits.

Studies by Aztari & Idayati (2023), Nuhasanah & Maryono (2021), and Dewi et al. (2023) indicate that while the LDR affects ROA, optimizing credit disbursement can increase a bank's interest income and profits. Liquidity is not a determining factor of profitability, while effective credit distribution can keep the amount of non-performing loans low. Conversely, Sa'adah & Wahyuni (2023) and Ika & Kamaluddin (2023) state that LDR does not impact ROA due to a lack of aggressiveness in credit distribution and suboptimal asset accumulation. A low LDR reflects the bank's inability to utilize funds for credit distribution, thereby affecting financial performance.

Although the literature on the determinants of banking profitability has been extensively documented, there are significant discrepancies in the findings among previous studies. This phenomenon underscores the urgency of conducting further research to evaluate and clarify the consistency of the relationships among these variables. The originality of this study lies in the use of comprehensive data from the 2020–2024 period, which specifically captures the dynamics of the banking sector's performance in Indonesia during the transition phase from the peak of the pandemic to economic recovery—a temporal context that remains underrepresented in the current academic literature.

This study aims to provide a clear understanding of the steps banks must take to improve their profitability amid current challenges. It also seeks to contribute to the academic literature on the relationship between NPL, LDR, and ROA, and to offer valuable insights to stakeholders in the banking sector to help them formulate better policies that support sustainable economic growth.

LITERATURE REVIEW

Banking Intermediation Theory dan Banking Intermediation Theory

This study integrates Banking Intermediation Theory and Credit Risk Theory as the primary theoretical foundations for analyzing banking financial performance. The Banking Intermediation Theory proposed by Allen dan Santomero (1997) explains the mechanism of bank efficiency in transforming third-party funds into productive credit, as reflected in the Loan to Deposit Ratio (LDR). Theoretically, the optimization of this intermediation function acts as the primary driver in maximizing interest income. On the other hand, the Credit Risk Theory proposed by Bluhm et al. (2010) provides a fundamental argument regarding the negative impact of poor asset quality on profit stability through an increase in the Non-Performing Loan (NPL) ratio. This theory asserts that failure in credit risk management will degrade bank profitability due to high provisioning costs and the loss of potential interest income from non-performing loans.

Profitability

Profitability is a measure of an entity's ability to generate profits relative to its revenue, assets, or equity (Aulia & Sukiswo, 2024). In the banking sector, profitability reflects a bank's financial health and its ability to deliver value to stakeholders. Indicators such as ROA demonstrate a bank's efficiency in using assets to generate profits. Effective management of resources can enhance profitability and support economic growth, whereas poor management can reduce ROA and profitability (Sa'adah & Wahyuni, 2023).

Non Performing Loan (NPL)

Non-Performing Loan (NPL) is the most important ratio in the financial industry, measuring the proportion of loans that borrowers are unable to repay. A high NPL indicates weaknesses in credit risk management, where many borrowers struggle to meet their repayment obligations, which can disrupt a bank's profitability and liquidity (Winarso et al., 2020). Conversely, a low NPL reflects sound asset quality and effective risk management, which ultimately enables banks to provide loans with high returns and maintain customer trust. Based on Bank Indonesia Regulation No. 13/1/PBI/2011, the maximum permissible NPL limit for banks is 5%.

Loan to Deposit Ratio (LDR)

The Loan-to-Deposit Ratio (LDR) is the most important ratio in the banking industry, measuring the proportion of loans disbursed relative to total deposits received (Abdurrohman et al., 2020). An optimal LDR value indicates a bank's ability to effectively utilize customer deposits to extend loans, thereby increasing interest income and supporting economic growth. However, an excessively high LDR level may signal liquidity risks that endanger the bank. Conversely, a very low LDR figure indicates ineffective management in utilizing deposits, potentially resulting in lost interest income opportunities.

The Impact of Non-Performing Loan (NPL) on Profitability

The Credit Risk Theory developed by Bluhm et al. (2010) underpins the argument that asset quality is a fundamental determinant of banking profitability. This theory explains that credit risk arises when a debtor fails to meet their contractual obligations, which is directly reflected in the Non-Performing Loan (NPL) ratio. In modern risk management, a surge in NPLs forces banks to allocate larger loan loss provisions, thereby directly degrading the Return on Assets (ROA).

This underscores that the effectiveness of credit risk mitigation is not merely a preventive measure, but a core strategy for protecting interest income and maintaining operational efficiency. In the context of post-pandemic recovery, fluctuations in Bank Indonesia's benchmark interest rates require banks to be more selective in extending credit to mitigate the risk of non-performing loans. Disciplined NPL management in accordance with the principles of Credit Risk Theory will minimize the cost of funds and maximize the bank's net profit.

Studies by Fanesha et al. (2021) and Ika & Kamaluddin (2023) found that NPLs have a significant impact on profitability, with an increase in total loans having a greater impact even as NPLs decline, suggesting that the impact of NPLs on non-performing loans tends to be smaller.

H1: Non-Performing Loan (NPL) Affect Profitability

The Impact of the Loan to Deposit Ratio (LDR) on Profitability

The Banking Intermediation Theory by Allen dan Santomero (1997) xplains the primary function of banks as strategic intermediaries between parties with excess funds and those in need of funds. Within this theoretical framework, the Loan-to-Deposit Ratio (LDR) serves as an efficiency indicator for banks in performing this intermediation function. Bank management optimizes the disbursement of loans from Third-Party Funds (TPF) to increase interest income. Effective loan disbursement will significantly increase profit potential or Return on Assets (ROA). Conversely, an LDR that is too low indicates the bank's inability to utilize idle funds to generate profits.

However, banks must still maintain their LDR at an optimal level. An excessively high LDR can increase liquidity risk, which threatens the company's financial stability. During the post-pandemic recovery period, management is required to effectively manage intermediation strategies to maintain financial performance amid the challenges posed by rising interest rates. Proper LDR management is expected to have a positive and sustainable impact on the bank's profitability.

Research by Aztari & Idayati (2023), Nuhasanah & Maryono (2021) and Dewi et al. (2023) supports the hypothesis that the LDR has a positive impact on profit, indicating that effective management of the LDR can improve a bank's financial performance.

H2: The *Loan to Deposit Ratio* (LDR) affects profitability

RESEARCH METHODS

This study utilizes secondary data through a quantitative approach, sourced from the financial statements of banks listed on the Indonesia Stock Exchange (IDX) via the official website www.idx.co.id. The variables in this study are categorized into two types: independent variables and dependent variables. The independent variables used include Non-Performing Loans (NPL) and the Loan-to-Deposit Ratio (LDR), while the dependent variable used is Return on Assets (ROA).

The study population comprises all banking companies listed on the IDX for the 2020–2024 period, totaling 44 companies. The sampling technique employed the purposive sampling method, which involves selecting samples based on specific criteria or considerations. Based on the established criteria, the number of eligible samples is 30 companies with a total of 150 observation data points. The criteria established for sample selection are as follows:

1. Banking companies listed on the Indonesia Stock Exchange (IDX) for consecutive years during the 2020–2024 period.
2. Banking companies that published complete annual financial reports and achieved positive net income during the 2020–2024 observation period.
3. Banking companies that present financial statements in Indonesian Rupiah (IDR) to ensure consistency in data comparison.

Based on the above criteria, the researcher identified companies that met the criteria, with the following details:

Table 1
Sample Criteria

NO	CRITERIA	
1	Banking companies that went public on the Indonesia Stock Exchange (IDX) consecutively during the 2020–2024 period.	44
2	Banking companies that publish complete annual financial reports and have reported positive net income during the 2020–2024 observation period.	(14)
3	Banks that present their financial statements in Indonesian Rupiah (IDR) to ensure consistency in data comparisons.	(0)
Research Sample		**30**
Total Sample (n x Study Period) (30 x 5 years)		**150**

Source: Compiled Data, 2025

RESEARCH FINDINGS

The analysis was conducted using SPSS version 26 to examine the impact of NPL and LDR on profitability.

Descriptive Statistics

Descriptive statistics provide an overview and information about data based on the minimum score, maximum score, mean score, and standard deviation. The following table presents the findings from the descriptive analysis:

Table 2
Descriptive Statistics

Descriptive Statistics					
	N	***Minimum***	***Maximum***	***Mean***	***Std. Deviation***
NPL	150	0.01	3.63	1.0915	0.80831
LDR	150	12.35	527.91	91.1805	52.43221
ROA	150	0.04	5.16	1.7256	1.25661
Valid N (listwise)	150				

Source: Compiled Data, 2025

Based on the data in the table, the total sample size (n) is 150, and it appears that the mean score exceeds the standard deviation. The following is a summary of the statistical test results:

a. Non-Performing Loan (NPL)

The NPL has a minimum score of 0.01 and a maximum score of 3.63. The mean score is 1.0915, while the standard deviation is 0.80831. This indicates that the mean exceeds the standard deviation, which accurately reflects the findings. Consequently, the distribution and pattern are normal and do not indicate the presence of systematic errors.

b. Loan to Deposit Ratio (LDR)

The LDR has a minimum score of 12.35 and a maximum score of 527.91. The mean score is 91.1805, while the standard deviation is 52.43221. This indicates that the mean is higher than the standard deviation, reflecting positive findings. Thus, the data distribution shows a normal pattern and does not indicate the presence of systematic errors.

c. Profitability (ROA)

ROA has a minimum score of 0.04 and a maximum score of 5.16. The mean score is 1.7256, while the standard deviation is 1.25661. This indicates that the mean is higher than the standard deviation, which suggests good results. Therefore, the data distribution follows a normal pattern and does not indicate the presence of systematic error.

Results of Classical Assumption Tests Normality Test

Normality Test

Table 3
Normality Test

One-Sample Kolmogorov-Smirnov Test		
N		150
Normal Parameters[a,b]	*Mean*	0.0000
	Std. Deviation	0.99907
Most Extreme Differences	*Absolute*	0.004
	Positive	0.004
	Negative	-0.004
Test Statistic		0.004
***Asymp. Sig.* (2-*tailed*)**		0.200 [c,d]

Source: Compiled Data, 2025

The results of the normality test using the Kolmogorov-Smirnov test indicate that the data follow a normal distribution. This is evidenced by the Asymp. Sig. (2-tailed) value of 0.200 > 0.05. Therefore, it can be concluded that the data are normally distributed.

Multicollinearity Test

Table 4
Multicollinearity Test

Coefficients[a]			
Model		***Collinearity Statistics***	
		Tolerance	**VIF**
1	(*Constant*)		
	NPL	0.997	1.003
	LDR	0.997	1.003

Source: Compiled Data, 2025

Based on the results of the multicollinearity test, the calculations indicate that the independent variables have a tolerance score >0.10 and a VIF score <10. Therefore, it can be concluded that there is no multicollinearity in the regression model used in this study, and the model is thus suitable for use.

Heteroscedasticity Test

Table 5
Heteroscedasticity Test

Coefficients[a]		
Model		**Sig.**
1	(*Constant*)	0.000
	NPL	0.328
	LDR	0.991

Source: Compiled Data, 2025

The results of the heteroscedasticity test using the Glejser test indicate that no independent variable has a significance level below 0.05 or 5%. Therefore, it can be concluded that the regression model shows no signs of heteroscedasticity.

Autocorrelation Test

Table 6
Autocorrelation Test

Runs Test	
Test Value[a]	150.00[b]
Cases < Test Value	149
Cases >= Test Value	1
Total Cases	150
Number of Runs	3
Z	0.116
Asymp. Sig. (2-*tailed*)	0.907

Source: Compiled Data, 2025

In the context of banking panel data for the 2020–2024 period, which exhibits extreme fluctuations due to the pandemic, the Run Test is considered more robust in detecting autocorrelation patterns without being influenced by rigid statistical assumptions. The results of the Run Test show an Asymp. Sig. (2-tailed) score of 0.907. Based on the table above, it can be concluded that since the Asymp. Sig. (2-tailed) score of 0.907 > 0.05, there is no autocorrelation in the study.

Results of Multiple Linear Regression Analysis

Table 7
Results of Multiple Linear Regression

Coefficients[a]	
Model	***Unstandardized B***

1	(*Constant*)	1.731
	NPL	-0.735
	LDR	0.009

Source: Compiled Data, 2025

Based on the results presented, the data will be entered into the multiple linear regression equation as follows:

$$ROA=1{,}731+(-0{,}735)\ NPL+ 0{,}009\ LDR$$

The formula indicates that the coefficient of:

a. Regression Coefficient α

A constant term of 1.731 indicates that if the independent variables—namely NPL and LDR—are held constant (at a value of 0), the dependent variable—namely ROA—can increase by 1.731 percent.

b. NPL Regression Coefficient (β2)

The NPL regression coefficient of -0.735 indicates a negative correlation between NPL and ROA. In other words, if NPL increases while all other variables are held constant (at a value of 0), ROA will decrease by 0.735 percent.

c. LDR Regression Coefficient (β3)

The LDR regression coefficient of 0.009 indicates a negative correlation between LDR and ROA. In other words, if LDR increases while all other variables are held constant (at a value of 0), ROA decreases by 0.009 percent.

Hypothesis Testing Results

Results Partial Test (T-Test)

Table 8
Partial Test (T-Test)

	Coefficients[a]							
	Model	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics	
							Tolerance	VIF
1	(Constant)	1.731	0.203		8.543	0.000		
	NPL	-0.735	0.101	-0.473	-7.241	0.000	0.997	1.003
	LDR	0.009	0.002	0.364	5.584	0.000	0.997	1.003

Source: Compiled Data, 2025

From the table, we can observe the effect of each independent variable on the dependent variable. This analysis was conducted using a t-test, the details of which are as follows:

a. The Effect of NPL on ROA

Based on the findings of the analysis, the NPL variable yielded a t-statistic significance level of 0.000, which is lower than 0.05. This indicates that, in part, NPL has a significant impact on ROA.

b. The Effect of LDR on ROA

Based on the analysis results, the LDR variable yielded a t-statistic significance score of 0.000, which is lower than 0.05. This indicates that, to some extent, LDR has a significant impact on ROA.

Coefficient of Determination (R^2)

Table 9
Coefficient of Determination (R^2)

Model	*Adjusted R Square*
1	0.367

Source: Compiled Data, 2025

The coefficient of determination (R^2) of 36.7% indicates that the NPL and LDR variables have a moderate influence on bank profitability (ROA) during the 2020–2024 period. This low value is understandable given that banking profitability is a complex phenomenon influenced not only by credit and liquidity risks but also by macroeconomic factors such as the inflation rate and the BI Rate. Additionally, other internal factors such as the ratio of Operating Expenses to Operating Income (BOPO) and management efficiency in the utilization of digital technology are strongly suspected to be dominant variables accounting for 63.3% of the variation in ROA outside the scope of this study's model.

DISCUSSION

The Impact of NPLs on Profitability

Data analysis indicates a significant correlation between Non-Performing Loans (NPLs) and profitability. An increase in NPLs has the potential to reduce profitability, which negatively impacts a bank's financial performance. According to Credit Risk

Theory, credit risk is a form of loss risk arising from a borrower's failure to meet their contractual obligations. This theory emphasizes that poor asset quality, reflected in a high NPL ratio, requires banks to allocate larger provisions for impairment losses (CKPN). An increase in these provision costs directly erodes interest income and reduces Return on Assets (ROA). This situation is highly relevant to the condition of Bank MNC Internasional Tbk. (BABP), which faces serious challenges due to a high Non-Performing Loan (NPL) ratio of 3.63% in 2020, negatively impacting profitability and credit risk management, while Krom Bank Indonesia Tbk. (BBSI) managed to record the highest Return on Assets (ROA) of 5.16% in 2021, reflecting efficiency in asset and risk management. This comparison underscores the importance for BABP to improve its risk management to enhance its financial performance, while BBSI needs to continue maintaining and optimizing its performance to remain competitive in the market. Furthermore, in facing existing challenges, BABP must implement innovative strategies and improve its credit processes to reduce NPLs, while BBSI can leverage its strong position to attract more investors and expand its loan portfolio.

These findings align with the research by Winarso et al. (2020) and Aztari & Idayati (2023), which indicate that NPLs have a significant impact on ROA. Therefore, it is crucial for bank management to take appropriate measures in managing credit risk, including improving credit assessment processes, tightening oversight of the loan portfolio, and developing recovery programs to reduce the number of non-performing loans. These steps are expected to protect the interests of all parties and maintain the bank's financial stability.

The Impact of the LDR on Profitability

The findings of the analysis indicate a significant correlation between the Loan-to-Deposit Ratio (LDR) and profitability. An increase in the LDR can contribute to improved profitability, as banks that are able to effectively manage their loans relative to deposits tend to have better financial performance. Based on Banking Intermediation Theory, banks function as intermediary institutions that transform public deposits into productive loans to generate profits. The LDR reflects a bank's operational efficiency in performing this intermediary function, where increased credit disbursement expands the potential for interest income, positively impacting Return on Assets (ROA). This is particularly relevant given that Krom Bank Indonesia Tbk. (BBSI) recorded the highest

LDR of 527.91% in 2023, reflecting an aggressive strategy in capitalizing on lending opportunities despite significant liquidity risks. On the other hand, Krom Bank Indonesia Tbk. (BBSI)'s Return on Assets (ROA) stood at 5.16% in 2021, indicating efficiency in asset management to generate profits, which suggests the bank's ability to manage its loan portfolio and risks effectively. Although BBSI is able to generate healthy profits, it is important for the bank to maintain a balance between loan growth and liquidity, as prudent liquidity risk management will be key to sustaining performance in the future.

These findings are consistent with research by Sa'adah & Wahyuni (2023) and Ika & Kamaluddin (2023) which indicates that changes in the LDR can have a direct impact on bank profitability. Although an increase in the LDR reflects a bank's ability to use funds to generate revenue, the resulting rise in liquidity risk must also be taken into account. It is important for bank management to regularly review lending and funding policies to maintain a balance between profitability growth and potential risks.

CONCLUSION

The objective of this study is to investigate the effect of Non-Performing Loans (NPL) and the Loan-to-Deposit Ratio (LDR) on Return on Assets (ROA) for banking companies listed on the Indonesia Stock Exchange (IDX) from 2020 to 2024. The results of the study indicate that both hypotheses are accepted. The results of this study indicate that there is a significant correlation between bank profitability and Non-Performing Loans (NPLs), with a significance value of 0.000. A bank's financial performance can be negatively impacted by an increase in NPLs, which has the potential to reduce profitability. Consequently, the importance of careful management in credit decision-making to protect the interests of stakeholders is emphasized. Additionally, profitability is significantly influenced by the Loan-to-Deposit Ratio (LDR), as evidenced by the same significance value of 0.000. An increase in the LDR can lead to improved profitability, indicating that banks that effectively manage their loan-to-deposit ratio tend to have superior financial performance. If the LDR is too high, management must exercise caution to mitigate the increased liquidity risk.

This study has several limitations that should be considered for future research. First, the independent variables used were limited to NPL and LDR; the Adjusted R-Square value of 36.7% indicates that 63.3% of profitability is influenced by other factors outside the model, such as BOPO, NIM, or the BI rate. Second, the sample scope is limited to 30 banks listed on the Indonesia Stock Exchange, so the results may not necessarily be generalizable to the entire banking sector, such as Regional Development Banks (BPD) or Islamic Banks. Third, the 2020–2024 observation period encompasses an economic anomaly phase caused by the COVID-19 pandemic, which may affect data stability compared to normal economic conditions. Finally, the use of ROA as the sole profitability indicator does not provide a comprehensive picture in terms of return on equity (ROE) or other net profit margin efficiencies.

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