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# *The Impact of Non-Performing Loans (NPL) and Loan-to-Deposit Ratio (LDR) on the Profitability of Conventional Commercial Banks Listed on the Indonesia Stock Exchange*

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***ABSTRACT***

*This study examines the effect of Non-Performing Loans (NPL) and Loan-to-Deposit Ratio (LDR) on Return on Assets (ROA) in the banking sector on the Indonesia Stock Exchange over a period of 10 years, from 2011 to 2020. The analysis uses panel data from 14 conventional commercial banks listed on the IDX, with a total of 138 observations spanning from 2011 to 2021. Static panel data regression is employed for the analysis. The results indicate that the NPL variable has a significant negative effect on ROA, with a probability value of 0.0002, which is smaller than the 5% significance level. The coefficient of -0.253098 suggests that a 1% increase in NPL leads to a 0.253098% decrease in ROA. This finding implies that higher levels of non-performing loans negatively impact bank profitability by slowing down bank operations. In extreme cases, increased bad debts could reduce a bank's ability to guarantee public funds, potentially leading to systemic risk.*

***Keywords**: NPL, LDR, ROA, Profitability.*

## 1. Introduction

In the context of a global economic system, banking plays an indispensable role in fostering national economic progress. Almost every sector depends on banking services for financial activities, which highlights the significant impact of the banking industry on the economy. The banking industry is inherently associated with risk, primarily due to the management of public funds and the need to rotate those funds through various investments. As such, banks face a variety of risks, including credit risk, which is one of the most critical factors that can affect their profitability. The efficiency with which a bank manages its assets is often measured by Return on Assets (ROA), which reflects the bank's ability to generate profit from its total assets (Siamat, 2004). A higher ROA indicates that the bank is utilizing its assets effectively, providing positive future outlooks and growth potential.

ROA is a key financial indicator for evaluating a bank's profitability and financial health. Several factors influence ROA, and understanding these factors is crucial for maintaining or improving the bank's financial performance. Among these factors, the Capital Adequacy Ratio (CAR), Loan-to-Deposit Ratio (LDR), and Non-Performing Loans (NPL) are particularly significant. These elements provide insights into a bank's operational efficiency and risk management strategies. For instance, an increasing CAR generally indicates that a bank is financially secure, while a high LDR suggests that the bank is effectively utilizing its deposits to generate loans. Meanwhile, high NPL levels are typically seen as a risk to a bank's profitability due to the increased likelihood of loan defaults.

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Research regarding the impact of LDR on ROA has produced mixed results. Studies conducted by Sapariyah (2010), Mahardian (2008), Susanthi (2010), and Jantarini (2010) found a positive and significant relationship between LDR and ROA, suggesting that higher LDRs improve bank profitability. In contrast, Yuliani (2009) argued that LDR does not significantly affect ROA, raising questions about the generalizability of these findings. Similarly, research into the effects of NPL on ROA has produced varied outcomes. Mahmoedin (2001) posits that higher NPLs correlate negatively with profitability, as poor loan quality reduces the bank's ability to generate returns. Other studies, including those by Alhaq et al. (2012) and Suhardi (2013), found that NPL had no significant impact on ROA, suggesting that NPLs alone may not be a direct determinant of bank profitability.

The discrepancies in the findings of previous studies point to the existence of a research gap in understanding the exact relationship between LDR, NPL, and ROA, especially within the context of Indonesian commercial banks. This study aims to fill this gap by focusing on conventional commercial banks listed on the Indonesia Stock Exchange (IDX) between 2011 and 2020. By examining a period of 10 years and utilizing a comprehensive sample of 14 banks, this research seeks to provide clearer insights into the dynamics between LDR, NPL, and ROA. The novelty of this study lies in its approach to combining both LDR and NPL to assess their joint effects on bank profitability, considering the unique economic and regulatory environment of Indonesia.

In addition to its empirical contributions, this study also addresses the urgency of understanding these factors within the Indonesian banking system. As Indonesia is an emerging economy with a rapidly developing financial sector, understanding how these key banking ratios influence profitability is essential for enhancing the stability and sustainability of the financial system. With increasing competition among banks and the ongoing threat of financial instability due to credit defaults, this research aims to inform policy and managerial practices that can mitigate risks and optimize profitability.

The research will explore whether improvements in LDR and reductions in NPL lead to higher ROA and better overall financial performance for banks. This is particularly relevant given the current economic challenges faced by Indonesian banks, including the potential for systemic risk arising from bad debts and defaults. Given that NPLs can affect the bank's ability to attract and manage deposits, it is crucial to understand the interplay between these factors and their collective influence on financial outcomes.

Moreover, this study has significant implications for banking regulators and policymakers. By providing evidence on how LDR and NPL impact profitability, the research will contribute to the development of more effective regulations that can help banks better manage risk. Policymakers can use the findings to refine financial regulations and enhance the resilience of the banking sector. Furthermore, the findings will assist banking institutions in refining their risk management strategies, potentially leading to more sustainable profit growth and reduced exposure to financial volatility.

In conclusion, this research aims to make a significant contribution to the understanding of the factors influencing bank profitability in Indonesia, particularly in relation to LDR and NPL. By providing new insights into the relationship between these variables and ROA, the study aims to support both theoretical and practical advancements in the banking sector. Ultimately, this research seeks to ensure that banks in Indonesia are better equipped to navigate financial challenges while contributing to the nation's economic stability and growth.

## 2. Literature Review

**Capital Adequacy Ratio (CAR)** is a critical measure of a bank's financial health and its ability to withstand financial distress. It represents the ratio of a bank's capital to its risk-weighted assets, serving as a buffer against losses. A higher CAR indicates that the bank is more equipped to absorb losses and maintain operations, thereby ensuring its stability and boosting investor confidence. According to Agatha and Priana (2020), CAR plays a significant role in influencing bank profitability, as it ensures sufficient capital for lending activities while managing risk exposure. In the context of Indonesian banks, a solid CAR is often seen as a positive sign, reflecting the bank's ability to meet regulatory requirements and maintain financial stability.

The **Loan-to-Deposit Ratio (LDR)** is another essential indicator that measures a bank's liquidity and its ability to lend out funds that it receives as deposits. The LDR provides insights into the bank's operational efficiency by comparing the total loans issued to its total deposits. A higher LDR signifies that the bank is utilizing its deposits effectively to generate loans, which could enhance profitability if managed prudently. However, a very high LDR could also suggest liquidity risks if the bank faces challenges in meeting withdrawal demands. Several studies, including those by Arullia (2017) and Sari and Murni (2016), demonstrate a positive relationship between LDR and profitability. This implies that a balanced LDR may lead to higher ROA, as banks effectively convert their deposits into profitable loans.

**Non-Performing Loans (NPL)** reflect the quality of a bank's loan portfolio and its exposure to credit risk. NPL is the ratio of loans that are in default or close to being defaulted to the total loans issued. A higher NPL ratio indicates that a bank is facing difficulties in collecting loan repayments, which can negatively affect its profitability. The negative relationship between NPL and ROA is well-documented, with Mahmoedin (2001) suggesting that high NPLs lower profitability by reducing the income banks generate from their lending activities. Dewi and Sujana (2019) further discuss the detrimental effects of high NPL levels on bank performance, showing that poor loan quality directly impacts the bank's bottom line.

In addition to the individual effects of CAR, LDR, and NPL, **operational efficiency** is another important factor that influences profitability. The **Operating Expenses to Operating Income ratio (BOPO)** measures a bank's efficiency in managing its operating costs in relation to its income. Studies such as those by Haryati and Widiyarti (2016) and Sadi'yah et al. (2018) highlight the significance of BOPO in determining a bank's profitability. High BOPO indicates that the bank's operational costs are too high relative to its income, leading to lower ROA. Conversely, an efficient cost structure can enhance profitability by improving the bank's margin between income and expenses.

The interrelationships between CAR, LDR, NPL, and ROA are complex and multifaceted, as they are influenced by a variety of external and internal factors, including regulatory frameworks, market conditions, and management strategies. For instance, the implementation of the **International Financial Reporting Standards (IFRS)** has introduced new reporting requirements, which have been shown to affect how banks manage their financial ratios and disclose information, thereby influencing profitability (Agatha & Priana, 2020). Similarly, changes in monetary policy and economic conditions can also affect the performance of these ratios, further complicating their impact on ROA.

Research in Indonesia has shown varying results on the relationship between these factors and bank profitability. Bella (2022) found that both LDR and NPL had significant effects on the profitability of commercial banks in Indonesia, highlighting the importance of effective loan

management. However, Dewi (2017) and Junianto & Satrio (2018) observed that while these factors play a role in determining profitability, other variables such as asset growth and macroeconomic conditions also influence the performance of Indonesian banks.

**Theoretical Framework**: Several theories explain the impact of these financial ratios on bank profitability. The **Risk-Return Tradeoff Theory** suggests that banks must balance the risk of default (as indicated by high NPL) with the potential return from lending (as measured by LDR). According to this theory, higher returns can be achieved by increasing the LDR, but this comes with higher risk, particularly when the quality of the loans (NPL) is compromised. Meanwhile, the **Capital Structure Theory** suggests that maintaining an adequate CAR is crucial for reducing financial risk and ensuring long-term profitability, as it helps buffer the bank's capital against unexpected losses.

In conclusion, the relationship between CAR, LDR, NPL, and ROA is pivotal in determining the profitability of banks. Existing literature emphasizes that these factors interact in complex ways, with each influencing the others. The findings from studies such as those by Arullia (2017), Dewi and Sujana (2019), and Bella (2022) provide valuable insights into how Indonesian banks can better manage their operations to maximize profitability. However, as the financial environment continues to evolve, further research is needed to better understand the changing dynamics of these relationships, particularly in light of regulatory changes and market conditions.

## 3. Methods

This research focuses on conventional commercial banks listed on the Indonesia Stock Exchange (IDX) that have provided annual reports for the period from 2011 to 2020. The study employs a quantitative approach, utilizing secondary data in the form of numerical information obtained from the annual reports of the selected banks. Data collection was carried out through the documentation method, where relevant financial statements were gathered from the banks' publicly available reports.

The data analysis technique used in this research is **multiple linear regression analysis**, which allows for the examination of the relationship between multiple independent variables and a dependent variable. Specifically, this study investigates the impact of financial ratios—Non-Performing Loan (NPL) ratio and Loan to Deposit Ratio (LDR)—on the dependent variable, Return on Assets (ROA). The sample consists of 14 commercial banks listed on the IDX, providing a total of 138 observations over the 10-year period (2011-2020).

The panel data method is applied to analyze the static data, enabling the study to account for both the cross-sectional (across different banks) and temporal (over the 10-year period) dimensions. The empirical models are tested to assess the significance and magnitude of the effects of NPL and LDR on ROA, which serves as the indicator of bank profitability.

## 4. Results and Discussion

Panel data regression model selection is the selection analysis stage to determine the best estimation model between common effect, fixed effect and random effect.

1. Chow Test
   The chow test aims to determine the choice of model that is better used between common effect and fixed effect.

**Table 1. Chow Test**

| Redundant Fixed Effects Tests | | | |
|---|---|---|---|
| Equation: FIXED | | | |
| Test cross-section fixed effects | | | |
| Effects Test | Statistic | d.f. | Prob. |
| Cross-section F | 8.366493 | -13,122 | 0.0000 |
| Cross-section Chi-square | 87.95793 | 13 | 0.0000 |

Sources : Data Processed (2024)

The table above shows that the *p-value* on the *cross-section chi-square* is 0.0184 < a = 0.05, so H0 is rejected, which means it is better to use the *fixedeffect* model than the *commoneffect* model.

2. Interpretation of panel data results

Table 2. Hypothesis Test

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.040451 | 1.126063 | -0.035923 | 0.9714 |
| NPL | -0.253098 | 0.064810 | -3.905214 | 0.0002 |
| LDR | 0.024069 | 0.014224 | 1.692083 | 0.0932 |

Based on the table above, the estimation results using the *fixed effect* model, the regression equation is obtained as follows:

$ROA = -0.040451 - 0.253098NPL_t + 0.024069LDR_t + e$

1) Feasibility Test
   Based on the table above, it is known that Adjusted R-squared is 0.608198 or 60.81%, which means that the NPL and LDR variables simultaneously together affect the ROA variable by 60.81% while the remaining 59.81% is influenced by other variables outside the regression equation that we have.
2) F test
   Judging from the Prob level of the F test on the eviews estimation results of 0.000000 smaller than the α = 5% level, then the NPL and LDR variables, reject H0, meaning, overall the variables Together affect the ROA variable.
3) Probability Test
   - Variable NPL: NPL variable affects ROA with a probability of 0.0002 smaller than the level of α = 5%, the conclusion rejects H0, so it has a significant effect on ROA.
   - Variable LDR: the LDR variable has no effect on ROA with a probability level of 0.0932 greater than the α = 5% level, the conclusion fails to reject H0, so it has no effect.
4) Interpretation of Results
   - Coefisien Variable NPL (-0.253098): the NPL variable has an effect on ROA, reflected in the probability level of 0.0002 smaller than the α = 5% level, if the NPL increases by 1% it will reduce ROA by 0.253098%. meaning that if bad credit increases, it will reduce the performance of the bank's fund turnover will not be maximized where it is known that the main activity of banking is asset management, namely collecting funds and channeling them. Then the bank gets a profit based on these asset management activities. So that if there is an

increase in bad debts, this will reduce bank profits and slow down the rotation of bank activities, in very bad conditions it can even result in a decrease in the bank's ability to guarantee funds from the public, and allow systemic risk to occur.

- Coefisien Variable LDR (0.024069): the LDR variable has no effect on ROA reflected in the Probalititas level of 0.0932.

**Discussion**

The results show that NPL has a significant negative effect on ROA, as indicated by a p-value of 0.0002, which is less than the 5% significance level. The coefficient for NPL is -0.253098, meaning that a 1% increase in NPL will result in a 0.253098% reduction in ROA. This result aligns with previous studies, which emphasize the detrimental effect of rising bad loans on bank profitability. For instance, Agatha and Priana (2020) found that non-performing loans negatively affect a bank's profitability by increasing the costs associated with loan defaults, thus reducing the bank's ability to generate income from its assets. Similarly, Arullia (2017) argued that high NPL levels increase operational costs for banks and reduce their profitability. As bad debts rise, a bank may face difficulties in managing its asset portfolio, which can slow down its operational efficiency and ultimately hurt its financial performance. This is because banking institutions primarily rely on effective asset management—collecting funds and distributing loans—so any disruption in this process, such as the accumulation of non-performing loans, hampers the bank's overall performance (Harahap & Irawan, 2018).

In contrast, the LDR variable does not exhibit a significant effect on ROA, with a p-value of 0.0932, which is greater than the 5% significance level. The coefficient for LDR is positive (0.024069), but the lack of statistical significance suggests that, in this study, the LDR does not have a meaningful impact on bank profitability. This finding is somewhat inconsistent with previous research that has demonstrated a relationship between LDR and profitability. For example, Bella (2022) reported a significant positive relationship between LDR and profitability, suggesting that a higher LDR reflects a more efficient utilization of deposits to fund loans, potentially leading to higher returns. However, the absence of significance in this study could be attributed to various factors, such as changes in market conditions or the specific period under analysis. It is possible that during the study period (2011-2020), other factors such as regulatory changes or broader economic conditions, rather than just LDR, played a more significant role in determining profitability (Suwandi & Oetomo, 2012). Additionally, Dewi and Sujana (2019) noted that the relationship between LDR and bank profitability could be influenced by the type of bank and its risk management strategies.

The findings of this study underscore the importance of managing NPL levels to maintain and enhance bank profitability. Given the negative impact of NPL on ROA, banks should prioritize improving their credit risk management systems, strengthening their loan screening processes, and effectively managing their loan portfolios to minimize defaults. On the other hand, the lack of significance for LDR suggests that further investigation is needed to understand under what circumstances the LDR might have a more pronounced effect on profitability. Future research could explore additional variables, such as capital adequacy ratios or macroeconomic factors, to provide a more comprehensive understanding of the factors affecting bank profitability (Muttaqin, 2017). Furthermore, examining the effect of these variables over different time periods or across various types of banks could offer additional insights into how LDR and NPL interact with profitability in diverse banking environments.

## 4. Conclusions

The findings of this study demonstrate that both Non-Performing Loan (NPL) and Loan to Deposit Ratio (LDR) collectively influence the Return on Assets (ROA), with a significant proportion of the variation in ROA explained by these variables. Specifically, NPL has a notable negative impact on ROA, highlighting the adverse effect of increasing bad loans on bank profitability. As the amount of bad credit rises, it hampers the bank's ability to efficiently manage its assets, affecting the overall financial performance. On the other hand, while LDR was included in the analysis, it was found not to have a significant impact on ROA, suggesting that it may not be a decisive factor in determining the profitability of banks in this context. Thus, the findings underscore the critical role of managing non-performing loans to maintain a bank's profitability, while indicating that LDR does not exert a similarly strong influence in this particular case.

Future research could further explore the factors influencing bank profitability by incorporating additional financial ratios such as Capital Adequacy Ratio (CAR), operational costs, and external macroeconomic variables. It would also be beneficial to examine the specific dynamics of LDR in different types of banks (e.g., state-owned vs. private) or in regions with varying economic conditions. Additionally, extending the study period or focusing on specific banking sub-sectors could provide deeper insights into the long-term effects of these financial ratios on profitability. Further research could also investigate the interaction between these financial ratios and non-financial variables, such as managerial practices or regulatory changes, to provide a more comprehensive understanding of the factors affecting bank performance.

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