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RESEARCH ARTICLE OPEN ACCESS

INDONESIAN BANKING FINANCIAL PERFORMANCE ON PROFITABILITY USING PANEL DATA REGRESSION

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Abstract: This study's goal is to determine if the return on assets (ROA) variable posted on the Indonesia Stock Exchange, together with the loan-to-deposit ratio (LDR), capital adequacy ratio (CAR), and non-performing loans (NPL), are correlated with profitability. The impact of return on assets (ROA) factors on the banking sector is investigated in this study. The research used a data sample of 245 from 49 financial institutions that have continuously fulfilled the necessary data requirements for a minimum of five years. Panel data, testing of panel data, testing of classical assumptions, and multiple regression analysis employing econometric views (E-views 12) are among the chosen analytical techniques. The ROA variable is unaffected by the LDR variable's t-test findings. In a similar vein, the ROA variable is unaffected by the t-test findings for the CAR variable. Moreover, the ROA variable is unaffected by the NPL variable's t-test findings. Nonetheless, the ROA variable is concurrently impacted by the LDR, CAR, and NPL factors.
Keywords: LDR, CAR, NPL, ROA, E-Views

Abstrak: Tujuan dari penelitian ini adalah untuk mengetahui apakah LDR (rasio pinjaman ke deposito), CAR (rasio kecukupan modal), dan NPL (loan non-performing) berkorelasi dengan profitabilitas dengan menggunakan variabel ROA (Return on Assets) yang terdaftar di Bursa Efek Indonesia. Penelitian ini menguji pengaruh variabel ROA pada industri perbankan. Penelitian ini menggunakan sampel data sebanyak 245 dari 49 perusahaan perbankan yang memenuhi kriteria memenuhi data kontinyu selama lima tahun. Pemilihan metode yang digunakan untuk menganalisis yakni dengan memilih data panel, menguji data panel, pengujian asumsi klasik, dan analisis regresi berganda menggunakan econometric views (E-views 12) dengan hasil yakni hasil pengujian tes t pada variabel LDR tidak memiliki pengaruh terhadap variabel ROA, hasil pengujian t tes pada variabel CAR tidak memiliki pengaruh terhadap variabel ROA, hasil pengujian tes t pada variabel NPL tidak memiliki pengaruh terhadap variabel ROA dan secara simultan yakni pada variabel LDR, CAR, NPL berpengaruh terhadap variabel ROA.
Kata Kunci: LDR, CAR, NPL, ROA, E-Views

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INTRODUCTION

Banking companies have a vital role in financial activities. In the process, banks provide financial products and services to individuals, businesses, and other entities. The main function of banking involves various things ranging from lending, savings, payment processing, and providing financial services such as investment, and financial planning to electronic services. Banking has a very important role for the economy in allocating resources to economic sectors that need it.

Financial statements contain information related to financial performance during a certain period that provides an overview related to the income statement, balance sheet, and cash flow. Financial performance is an important thing in measuring the health of banks, one which can see an overview of the financial statements by paying attention to financial ratios, by paying attention to the financial ratios that have been presented in the financial statements can provide an overview related to what is needed. Financial performance is one of the tools to measure how well an entity, especially in banking companies, manages assets, income to debt. Performance-related issues are a constant in the banking industry, and the financial statements themselves provide one indicator of sound financial performance. Numerous factors that are available from each bank's financial statements may be used to evaluate the financial performance of the banking industry (Notoadmojo & Rahmawaty, 2017). Any analytical model may be used to forecast future occurrences by analyzing available financial ratios.

According to the information in Circular Letter No. 13/24/DPNP Year 2011 from Bank Indonesia (Bank Indonesia, 2011a), The return on the amount of activity used by the firm is shown by the ROA ratio. Net profit after taxes is compared to total assets to determine ROA. The capacity of the business to make a profit from its assets is gauged by this ratio. Furthermore, ROA is a more accurate indicator of a company's profitability since it demonstrates how well management employs operations to produce profits or earnings at a specific asset level. The value of assets (ROA) allows us to determine how well the business has employed its operations to turn a profit. According to (Ikmal, 2018) in seeing the financial performance of a bank in obtaining profit or profit, it can be seen in the profitability ratio, how efforts to encourage the profitability ratio in the financial statements can continue to be optimal so that it can reflect the level of the company's ability to earn profits. Based on (Astohar & Sumiyanti, 2019) financial performance can be seen from the company's performance so that

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if seen in the perception of increasing banking profits, it can optimize its financial performance. (Aprianti & Sidiq, 2021) using the ardl approach in analyzing financial ratios to determine financial performance in conventional banking in Indonesia. The assessment of financial performance is a relative measure that demonstrates the capacity of banking institutions to generate profits (Safi & Mohi, 2024).

A comparison of the total credit disbursed against the total funds received reveals that a higher LDR ratio indicates a lower liquidity level in banking institutions. Following the regulations set forth by Bank Indonesia (Bank Indonesia, 2013), the GWM for banking institutions is set at a range of 78% to 92%. Based on the findings of (Pratama et al., 2022), The relationship between LDR and profitability is not statistically significant. This is because the amount of credit extended is often larger than the amount of funds already collected, without consideration of the underlying liquidity position of the banking institution. In contrast, (Maulana et al., 2021) suggest that while LDR has an impact, it is not statistically significant. This is attributed to the fact that banking institutions often face challenges in conducting their core operational activities, which can ultimately affect their profitability Based on (Alawiyah et al., 2020) the increase in the LDR ratio in the ROA ratio unit will also increase, in obtaining a large profit, and the distribution of credit can be optimized to the community.

The following information is based on Bank Indonesia's circular letter, No. 13/30/DPNP 2011 (Bank Indonesia, 2011b), The LDR ratio is one financial statistic that is used to assess the composition of loans that a bank awards. It is calculated by dividing the overall amount of money raised by the total number of loans given by the general population. With a high degree of interpretation, the LDR ratio demonstrates that the bank used credit to route the majority of the deposit money. This could mean that the bank is efficient in using funds to earn interest income from loans. The bank may not have enough liquidity to fulfill customers' withdrawal requests. If the LDR ratio, interpreted conservatively, suggests that the concerned banking institution has more deposits than it has disbursed as loans, this suggests that the institution has sufficient liquidity and can process withdrawal requests. But a meager LDR return ratio might also mean that the bank isn't making the most of its lending's prospective interest revenue, which could have an impact on profitability. Banks that channel credit massively will have an impact on returns to the company (Dian Prasetyo Widyaningtyas &

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Andini Galih Ayu Puspitasari, 2021). According to (Petria et al., 2015)liquidity affects profitability by considering existing credit risk.

In the banking industry, the capital adequacy ratio is a metric that allows banks to absorb their loss risk. Following Bank Indonesia's guidelines, particularly Regulation 10/15/PBI/2008 (Bank Indonesia, 2008) for a banking company to be considered healthy, it must have a minimum value of capital adequacy of 8%. It can be demonstrated that the higher this CAR ratio, the more effectively the banking company can handle any credit risk. Based on (Jyana & Affandi, 2019) capital adequacy is necessary and also adequate because the effectiveness in managing banking capital requires good management to generate optimal profits. The elevated CAR ratio indicates the capacity of banking institutions to assume productive assets that entail inherent risks, thereby facilitating a substantial contribution to the profitability of banking entities. The results of the study (Astuti, 2021) show that partially the CAR variable influences profitability.

Based on Bank Indonesia Regulation No. 15/12/PBI/2013, the CAR (Capital Adequacy Ratio) (Bank Indonesia, 2011b) stipulates that all banks must have a minimum CAR of 8%. Nevertheless, to ensure the stability of the banking system, banks frequently implement a more rigorous capital adequacy ratio (CAR) than the prescribed standard. Understanding the CAR ratio according to Bank Indonesia can ensure that banks have a strong capital foundation to face various risks, maintain financial stability, and protect customer interests, guarantee that banks have sufficient capital to bear risks, increase confidence in the health and stability of banks to minimize losses. According to (Trisakti, 2024) Bank Indonesian requirements must be adhered to by banks in order for them to be deemed capable of providing credit. Typically, the CAR ratio is determined by the amount of owned assets and core capital. The effect of the CAR ratio is positive but does not have a significant effect but still pays attention to the capital owned by banks (Asriany, 2021). The capital adequacy ratio is a metric used to assess the sufficiency of capital within a company, with the objective of enabling it to withstand the risks associated with extending credit to the public (Uddin, 2022).

Loans in the non-current category can be called bad credit where the debtor cannot return the loan that has been determined on time. In accordance with the regulations set forth by the Financial Services Authority (Otoritas Jasa Keuangan, 2017) the maximum limit related to non-performing credit financing is 5% where the greater the number of bad credit rates

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caused by loans issued by banks, The higher the level of credit risk faced by the company in question. Based on (Pranowo et al., 2020) NPL harms profitability, the higher the value ratio in the NPL variable will indicate poor credit quality. In contrast (Supeni, 2019) explains that the NPL ratio has no impact if the loan interest rate given is low so that it does not affect banking profits. According to (Abdurrohman et al., 2020) does not influence the NPL ratio because the proportion of non-performing loans at the bank does not affect profits and can be covered by the banking capital itself. As previously outlined (Panta, 2018), the NPL ratio exerts no discernible influence. This is because an expansion in NPLs will impact the reduction in income derived from the increase in interest granted to debtors, thereby facilitating default.

Following the stipulations outlined in Bank Indonesia Regulation No. 15/07/PBI/2013 concerning Statutory Reserves (Bank Indonesia, 2013), The percentage of all loans with subpar, questionable, and non-performing characteristics to all loans is known as the non-performing loan ratio. An elevated NPL ratio signifies an augmented risk of credit-related issues for the banking institution, which may ultimately result in diminished profitability and financial stability. Conversely, a low NPL ratio indicates good credit quality and good credit risk management. To maintain customer and investor confidence and ensure healthy operations, banks usually try to keep the NPL ratio at a low level. Based on (Supeno & Aminudin, 2023) The NPL ratio plays an instrumental role in gauging the financial soundness of a company, particularly in the banking sector. It serves as a crucial indicator of investor and customer confidence. The risk contained in the NPL ratio will have an impact, namely bad credit, where banks must be able to ensure that the loans disbursed must be repaid to minimize the total credit risk (Martini, 2022).

METHOD

In a sample of banks listed on the Indonesia Stock Exchange (IDX) between 2018 and 2022, this study aims to determine the relationship between a set of selected variables, namely NPL (non-performing loan), LDR (loan to deposit ratio), and CAR (capital adequacy ratio), and the dependent variable ROA (return on asset). The sample was chosen using a predetermined set of criteria to guarantee the correctness of the results.

This study looks at how NPLs (non-performing loans), LDRs (loan-to-deposit ratios), and CARs (capital adequacy ratios) affect the variable ROA (return on assets) of banks listed

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on the Indonesia Stock Exchange (IDX) from 2018 to 2022. Based on a set of criteria, data from 49 financial organizations was collected for this study. These criteria include:

Table 1. Assessment Criteria

Number	Criteria
1	Banking companies do not have the variables studied
2	Annual Report of Banking Company for 5 consecutive years
3	Does not attach the Annual Report of the banking company for 5 consecutive years

Source: processed

The assessment is variable

The following indicators are employed as measures of assessment.

Table 2. Variable Indicators

Variable	Definition Variable	Scale	Formula
NPL	A subset of loans known as non performing loans (NPLs) are those that are considered to be of low credit quality and are in arrears. Loans that the debtor is unable to repay within the prearranged period are classified as such.	Comparison	$\textbf{NPL} = \frac{total\ non-performing\ loans}{total\ loans}\ x\ 100\%$
LDR	The loan to deposit ratio (LDR) is a measure of a banking institution's liquidity. It is a comparison of the total loans that have been disbursed with the total funds received. An elevated LDR ratio indicates a diminished liquidity position for the banking institution in question.	Comparison	$\textbf{LDR} = \frac{total\ loans}{total\ deposits}\ x\ 100\%$
CAR	One measure of a bank's ability to withstand possible losses is the capital adequacy ratio or CAR. A larger ability to handle credit risk is indicated by a higher CAR ratio.	Comparison	$\textbf{CAR} = \frac{capital}{risk-weighted\ assets}\ x\ 100\%$
ROA	The capacity of banking institutions to generate profits from the outcomes of their asset management activities.	Comparison	$\textbf{ROA} = \frac{net\ profit}{total\ assets}\ x\ 100\%$

Source: processed

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The analytical technique employed is as follows

E-views version 12 is the data analysis tool utilized, and the following methods are applied to the analysis.

The selection of an appropriate panel data model is a crucial decision in any empirical investigation.

The selection of the fixed effect model and the common effect model is based on testing using the Chow Test, which is conducted on panel data consisting of common effects, fixed effects, and random effects. Should the fixed effect model be selected, the Hausman test model may be continued by selecting the fixed effect model and also the random effect model. If the fixed effect model has been tested on two occasions, it is not necessary to proceed to the Lagrange Multiplier test. Conversely, if the Hausman test is selected for the random effect model, the model selection also requires the Lagrange Multiplier test to select random effect and common effect models.

A feasibility test was conducted on a panel data set to assess the viability of the proposed model

It is recommended that the F-test and T-test be used to conduct feasibility tests to interpret the selection of models both partially, that is to say, individually, and simultaneously, that is to say, together. Subsequently, the extent of influence exerted on the independent and dependent variables must be determined.

The model is called multiple linear regression when there are numerous independent variables and one dependent variable. The multiple linear regression equation is as follows: The independent variables X1, X2, and X3 are what determine the dependent variable, Y. These variables are represented by the appropriate coefficients a, b1, b2, and b3. The model also includes the error term, e. In this case, Y represents the return on assets (ROA).

The constant, represented by the letter a, is a fixed value that remains constant throughout the calculation.

X1 represents NPL.

X_2 represents the LDR.

X3 represents the CAR.

The regression coefficients are represented by b1, b2, and b3.

e represents the error term.

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RESULTS AND DISCUSSION

Chow Test

Table 3. Chow Test

Effect test.	Statistic.	d.f.	Prob.
.Cross-section F.	4.367470	(48,192)	0.0000
.Cross-section Chi-square.	180.085960	48	0,0000

Source: processed

Following the Chow test table, the cross-section fixed-effect test value is less than 0.05. Consequently, in light of the Chow test results, the optimal model for utilization is the fixed-effect method. Thereafter, data testing will proceed to the Hausman testing method.

Hausman Test

Table 4. Hausman Test

Test Summary.	Chi-Sq Statistic.	Xhi-Sq. d.f	Prob.
.Cross-section random.	19.756428	3	0.0002
Comparisons of cross-section random effects tests:			
Variable.	**Fixed.**	**Random.**	**Var(Diff.)**	**Prob.**
LDR_X1	0.000020	0.000012	0.000000	0.0030
CAR_X2	0.014848	-0.008999	0.000049	0.0006
NPL_X3	0.147194	-0.168197	0.008870	0.0008

Source: processed

Based on the Hausman test results, the value of the random effect cross-section test is less than 0.05. This suggests that the best model for the particular analysis of issue is the fixed effect technique. The fixed effect model (FEM) is the best suitable model for this specific test, according to the results of the Chow and Hausman tests.

Classical Assumption Test

Multicollinearity Test

Table 5. Multicollinearity Test

	LDR_X1_	CAR_X2_	NPL_X3_
LDR	1.000000	0.378795	-0.080056
CAR	0.378795	1.000000	-0.144012
NPL	-0.080056	-0.144012	1.000000

Source: processed

The results of the multicollinearity test indicate that no multicollinearity is present, as evidenced by a tolerance value exceeding 0.01.

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Heteroscedasticity test

Table 6. Heteroscedasticity test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.247705	0.214318	5.821747	0.0000
LDR_X1_	3.24E-06	2.33E-06	1.390716	0.1659
CAR_X2_	0.007703	0.004235	1.819002	0.0705
NPL_X3_	-0.262326	0.0686669	-3.820121	0.0002

Impacts on Specification

Fixated cross-section (dummy variable)

R-squared	0.716787	Mean dependent var	1.078467
Adjusted R-squared	0.641559	S.D. dependent var	1.859248
S.E. of regression	1.113131	Akaike into criterion	3.238788
Sum squared resid	237.8998	Schwarz criterion	3.984086
Log likelihood	-343.1321	Hannan-Quinn criter.	3.538953
F-statistic	9.528136	Durbin-Watson stat	2.884699
Prob(F-statistic)	0.000000		

Source: processed

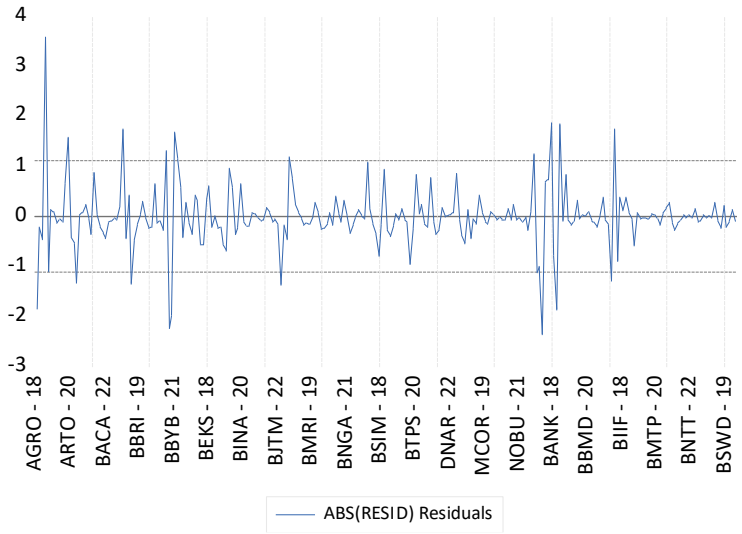

Figure 1. Heteroscedasticity test

Source: processed

A visual inspection of the residual graph indicates that the observed value does not exceed the limit of ±500, thereby establishing that the residual variance is consistent. In conclusion, the data set exhibits no evidence of heteroscedasticity, thereby passing the test.

Panel Data Regression

The estimation equation is as follows:

ABS(RESID) = C(1) + C(2)*LDR__X1_ + C(3)*CAR__X2_ + C(4)* NPL__X3_ + [CX=F]

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Substituted coefficients:

ABS(RESID) = 1,24770494334 + 3,23919024035e-06*LDR__X1_ + 0,00770325232574*CAR__X2_ - 0,26232578253* NPL__X3_ + [CX=F]

Multiple regression

Table 7. Multiple regression

Variable	Coefficient	Std. Error	t-Statistic	Prob
C	-0.014953	0.465806	-0.032101	0.9744
LDR_X1_	1.98E-05	5.06E-06	3.917791	0.0001
CAR_X2_	0.014848	0.009204	1.613158	0.1084
NPL_X3_	0.147194	0.149249	0.986234	0.3253

Impacts on Specification

Fixated cross-section (dummy variable)

R-squared	0.569993	Mean dependent var	0.818730
Adjusted R-square	0.455772	S.D. dependent var	3.179465
S.E. of regression	2.419320	Akaike into criterion	4.791407
Sum squared resid	1123.797	Schwarz criterion	5.536705
Log-likelihood	-532.5516	Hannan-Quinn criter	5.091572
F-statistic	4.990279	Durbin-Watson stat	2.316983
Prob(F-statistic)	0.000000		

Source: processed

The regression equation is as follows:

The regression equation can be expressed as follows: Y = -0.01 + 1.98 + 0.01 + 0.14.

(t) test

The partial t-test results are presented below:

The results of the t-test on the LDR variable (X1) show that the t-count of 3.917791 is larger than the t-count of 1.969774395. Moreover, the statistical significance of the result is indicated by the significant value of 0.0001, which is less than 0.05. This data suggests that there is no correlation between the ROA and LDR factors.

The CAR variable (X2) t-test findings indicate that the significant value of 0.1084 is more than 0.05 and that the t-count of 1.613158 is less than the t-count of 1.969774395. According to this data, the ROA variable in the context of Indonesian banking and finance is unaffected by the CAR variable. The results of the t-test for the NPL variable (X3) indicate that the t-count of 1.969774395 is greater than the t-count of 0.986234. Furthermore, the statistical significance of the observed difference is not supported by the significant value of

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0.3253, which is greater than 0.05. According to this data, the ROA variable in the context of Indonesian banking and finance is unaffected by the NPL variable.

Test (F)

Table 8. (F) test

R-squared	0.569993
Adjudted R-squared	0.455772
S.E. of regression	2.419320
Sum squared resid	1123.797
Log likelihood	-532.5516
F-statistic	4.990279
Prob(F-statistic)	0.000000

Source: processed

In the case of banking finance in Indonesia, the F-test result of 4.990279 is more than the F-table value of 2.642057083 and the significant value of 0.000000, suggesting that the LDR, CAR, and NPL variables impact the ROA variable concurrently.

Discussion

The ratio of loans to deposits (LDR) to the ratio of return on assets (ROA)

The t-count of 3.917791 is more than the t-count of 1.969774395, according to the results of the t-test on the LDR variable (X1), and a significant value of 0.0001 is less than 0.05. This suggests that the return on assets (ROA) variable in Indonesian banks is unaffected by the LDR variable. Banking institutions are responsible for making sure that their LDR ratio stays below the cap that Bank Indonesia has established. This data suggests that great profitability is not always correlated with a high LDR ratio. Furthermore, it is important to assess the efficacy of the total loans made in relation to the cash received from third parties, accounting for credit-related factors. The LDR ratio exerts no influence on profitability. This is because if banks allocate all their funds to third parties without considering the level of non-performing loans, the profit generated will decline due to the utilization of funds that have not been optimized.

The ratio of CAR (Capital Adequacy Ratio) to the ratio of return on assets (ROA)

The CAR (X2) variable's t-test results show that the significant value of 0.1084 is more than 0.05 and that the t-count of 1.613158 is smaller than the t-count of 1.969774395. These results suggest that, in Indonesian financial institutions, the ROA (Return on Assets) variable is influenced by the CAR (Capital Adequacy Ratio) variable. Bank profitability is often greatly impacted by the CAR, albeit this influence may differ according on the bank's capital

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management practices and the state of the market. Banks with a high CAR have the potential to increase profitability through stability, risk-bearing capacity, and regulatory compliance. However, effective capital management remains a key factor in ensuring that a high CAR contributes positively to profitability. While a high CAR indicates capital adequacy, ineffective capital management can harm profitability. Banks must be able to manage capital effectively and efficiently by optimizing capital to generate profits.

The ratio of NPL (Non-Performing Loan) to the ratio of return on assets (ROA)

The NPL variable (X3) t-test findings show that the significant value of 0.3253 is larger than 0.05 and the t-count of 0.986234 is smaller than the t-count of 1.969774395. This shows that in the Indonesian banking industry, the ROA (Return on Assets) variable is unaffected by the NPL (Non-Performing Loan) variable. The profitability of a bank is significantly impacted by the ratio of non-performing loans (NPLs). Generally speaking, a greater non-performing loan (NPL) percentage is associated with reduced profitability due to factors including decreased interest revenue, increased provisioning costs, inefficient assets, and dwindling investor trust. Consequently, banks must implement effective credit risk management strategies to maintain a low NPL ratio. This approach can contribute to enhanced profitability and overall financial stability of the banking institution. To ensure long-term profitability, banks must adopt a proactive approach to continuously monitor and manage their NPL ratio.

CONCLUSION

The ROA variable is unaffected by the incomplete findings of the LDR variable. On the other hand, both the NPL and CAR variables have an impact on the ROA variable. In the context of banking finance in Indonesia, these variables also have an impact on the ROA variable. The ROA variable is simultaneously impacted by the LDR, CAR, and NPL variables. It should be highlighted that this study has limitations since banking institutions should focus more on credit risk, particularly when it comes to preserving the financial ratio factors listed in the financial statements of the business.

This research has several restrictions. First, only five years' worth of data are used. The LDR, CAR, and NPL variables are taken from the financial statements of banks that are listed on the Indonesian stock exchange.

In order to obtain a more thorough knowledge of the topic, it is advised that more study be carried out utilizing data from a period longer than five years, with an emphasis on assessing the effect of other variables associated to profitability.

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