THE INFLUENCE OF CAR, NPL, AND LDR ON ROA IN DIGITAL BANKING LISTED ON THE INDONESIA STOCK EXCHANGE

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Abstract. *The era of digital banking 4.0 presents opportunities for banks to innovate in service to customers. This study aims to analyze the influence of CAR, NPL, and LDR on ROA in digital banks listed on the Indonesia Stock Exchange (IDX) for the 2021–2024 period. This study uses a quantitative approach with multiple linear regression method. The sample consisted of 7 digital banks selected through saturated sampling techniques. The t-test results showed that CAR and NPL had no significant effect on ROA, whereas LDR had a significant effect on ROA. The F test showed that simultaneously the three independent variables had a significant effect on ROA. A determination coefficient value (R^2) of 44.6% indicates that ROA can be explained by CAR, NPL, and LDR of 44.6%, while the rest is influenced by other factors. This research shows that digital banking must pay more attention to the effectiveness of fund distribution through LDR to improve profitability performance.*

Keywords: *CAR, Digital Banking, LDR, NPL, ROA*

1. INTRODUCTION

The development of information technology that has occurred has had a positive impact on many aspects of life, including in the financial services sector, especially in the banking sector. One of the tangible manifestations of this development is the presence of digital banking services as an innovation in providing convenience to customers. The advancement of digital banking is an interesting issue to analyze, considering that there is significant potential to continue to grow. Moreover, the emergence of the digital banking era 4.0 opens up opportunities to offer more innovative services for its customers. (Mutiasari, 2020).

Along with increasing competition and public expectations for digital-based financial services, digital banks are required to maintain healthy financial performance to maintain their competitiveness and business sustainability. However, several digital banks listed on the Indonesia Stock Exchange show fluctuations in profitability performance, which is reflected in the Return on Asset (ROA).

Financial performance instability can be influenced by several factors, one of which is bank financial risk, such as CAR, NPL, and LDR. Bank financial ratios aim to find out the actual condition of the bank whether it is in a healthy, unhealthy, or possibly unhealthy condition (Kasmir, 2018).

Basically, every business activity always has potential risks, including in the banking sector. One type of risk that is often faced by banking institutions is credit risk that arises due to lending activities to customers. This risk arises when there is a delay or inability of the debtor to meet payment obligations, which is then classified as non-performing credit or non-performing or non-performing credit (Nasution, 2020). Another factor that affects a bank's financial performance is analyzed through the liquidity ratio, the LDR ratio shows how much money the bank uses to provide loans. If the Loan to Deposit Ratio is higher, then the bank's profit will increase. With increased profits, the bank's performance will also improve (Sudarmawanti & Pramono, 2017).

Table 1.1 Average Ratio of CAR, NPL, LDR, and ROA in Digital Banking

Year	CAR	NPL	LDR	ROA

2020	39,10%	3,5%	97,40%	-3,94%
2021	49,76%	2,39%	96,40%	2,72%
2022	38,71%	2,32%	90,88%	0,81%
2023	35,26%	2,33%	95,23%	1,11%

(Source: Data processed by researchers – Financial Services Authority, 2023)

Referring to table 1.1, it shows that the financial ratio of digital banking fluctuates during 2020 – 2023. ROA as an indicator of profitability shows fewer stable conditions, even recording a negative value of -3.94% in 2020, increasing to 2.72% in 2021, then dropping to 0.81%, and to 1.11% in 2023. In this case, ROA is categorized as relatively low when measured by BI's provision that banks must have a minimum ROA ratio above 1.5%. The movement of CAR also shows a fluctuating trend, in 2021 CAR experienced a significant increase to 49.76% followed by an increase in ROA to 2.72%, but in 2022 and 2023 CAR decreased to 38.71% and 35.26%, while ROA remained positive at 0.81% and 1.11%. So it doesn't fully support the statement (Silaban, 2023) about the unidirectional relationship between CAR and ROA.

The Non-Performing Credit (NPL) ratio declined from 3.5% in 2020 to 2.32% in 2022 and increased slightly to 2.33% in 2023, However, the movement of ROA does not fully reflect the negative relationship as suggested (Fauziah, 2021). Meanwhile, the Loan to Deposit Ratio (LDR) shows dynamics that are in line with the theory (Anisa et al., 2021) that one-way relationship with ROA. in 2021 and 2022, the LDR decreased from 96.40% to 90.88% followed by a decrease in ROA from 2.72% to 0.81%. In 2023, the LDR increased to 95.23% and the ROA also increased to 1.11%, indicating the compatibility between theory and data.

Some previous studies have shown inconsistent results regarding the influence of CAR, NPL, LDR on ROA as in the CAR studies studied (D. Nugroho et al., 2019) found that CAR had a significant positive influence on ROA. Meanwhile, research conducted by (Djalil, 2019) indicates that CAR has no effect on ROA. In addition, there is also research related to credit risk measured by Non-Performing Loans (NPL) which has been proven to have an effect on profitability (Sudaryanti et al., 2019). Meanwhile, in another study related to NPL, it was found that NPL had no effect on profitability (Hamidah et al., 2023). The Loan to Deposit Ratio (LDR) also affects profitability (Steven et al., 2018). But in another study, it was revealed that LDR had no effect on profitability (Widyastuti & Aini, 2021). Some of the differences in results found in the study mentioned above show that there is a research gap. Therefore, research needs to be conducted to examine the relationship between these factors and ROA.

2. LITERATURE REVIEW
2.1 Signaling Theory
Signal theory was proposed by Spence in 1973 to accurately convey information describing the problem to external parties who are willing to invest even if there is no certainty. (Fiana et al., 2022). Signaling theory suggests that managers tend to provide information to investors to reduce information asymmetry between internal and external parties, especially through the issuance of financial statements. The information conveyed in the form of public announcements serves as a signal for investors to consider and determine investment decisions. The signals given can be in the form of positive information (good news) or negative (bad news) (Kusuma & Ruslim, 2022). In this regrad, the improvement in financial ratio performance in banking is expected to provide a strong and credible signal to investors in making investment decisions.

2.2 Capital Adequacy Ratio (CAR)
According to (Jamaluddin, 2024) CAR as a ratio indicates the bank's ability to maintain existing capital to cover possible credit losses, participation, securities, and bills at other banks. Capital is one of the important components needed by banks to support their smooth operations. The higher the Capital Adequacy Ratio, the greater the bank's ability

to survive the risks arising from risky loans or productive activities and to increase profits or profitability.

The Bank for International Settlements (BIS) sets a Capital Adequacy Ratio of 8% (eight percent), with a high and low Capital Adequacy Ratio that can be influenced by the capital owned and the risk to assets (Oppusunggu & Allo, 2021). If the ratio is below the minimum limit, it means that the company shows the bank's inability to absorb operational losses. On the other hand, if the ratio is above 8 percent, it indicates that the bank is solvent and capable of facing potential losses. In CAR measurements, it can be formulated as follows:

$$CAR = \frac{CAR\ Tier\ 1 + CAR\ Tier\ 2}{Risk\ Weighted\ Assets}$$

2.3 Non-Performing Loans (NPL)

According to (Maulina, 2017) NPL is the ratio of total non-performing loans to total non-performing loans provided to customers. Total credit is the amount of credit given to a third party excluding credit to other banks, but non-performing credit refers to credit of less smooth, doubtful and stuck-in quality. Non-performing loans tend to increase as NPL ratios increase, and will decrease if NPL ratios decrease. Based on Bank Indonesia Regulation No. 17/11/PBI/2015, the gross Non-Performing Loans ratio is less than 5% and the net Non-Performing Loans ratio is also less than 5%. In the measurement of NPL, it can be formulated as follows:

$$NPL = \frac{Non\ Performing\ Loan}{Total\ Loans}$$

2.4 Loan-to-Deposit Ratio (LDR)

LDR is a measure used to evaluate a bank's health-related condition in relation to liquidity. LDR is a comparison used to assess how much credit is provided compared to the total assets held by the bank. (Darmawan, 2020). Referring to Bank Indonesia Regulation No. 15/7/PBI/2013 regarding the standard limit of LDR ratios which ranges from 78%-92%. If the LDR Ratio is below or less than 78%, this indicates that the bank is not effective in disbursing all the funds that have been accumulated, If the Loan to Deposit Ratio is above or more than 92%, then the total loan provided by the bank has exceeded the funds collected (Putri & Dewi, 2017). In LDR measurement, it can be formulated as follows:

$$LDR = \frac{Loans}{Total\ Third\ Party\ Funds}$$

2.5 Return on Assets (ROA)

According to (Wibowo & Arif, 2005) ROA is a ratio that compares net profit after interest and taxes to total assets. This ratio serves as an indicator of the level of profitability measured based on the number of assets owned. The indicator is that the higher the value of the Return on Asset, the greater the level of profitability the bank gets, so the likelihood of the bank experiencing financial problems becomes smaller. Return on Asset has an important role for banks because it shows how effective management is in managing the assets it owns to generate profits (Djalil, 2019). In the measurement of ROA, it can be formulated as follows:

$$ROA = \frac{Earnings\ After\ Interest\ and\ Tax}{Total\ Assets}$$

3. RESEARCH METHODS

This research method uses a quantitative approach. The sample taken includes digital banking listed on the Indonesia Stock Exchange (IDX) for the period 2021 to 2024. The

sampling technique used in this study is saturated sampling, where all members of the population are used as samples (Siyoto & Sodik, 2015). Therefore, the sample in this study is the entire population, namely 7 digital banking companies listed on IDX for the 2021-2024 period.

The collection of information in this study uses documentation techniques, namely by collecting, recording, and analyzing secondary information which includes the annual financial statements of digital banking released by the Indonesia Stock Exchange. This study uses Descriptive Statistical Tests to test sample data and multiple linear regression tests. Then the classical assumption test and hypothesis testing were carried out, the determination coefficient test (R squared), the T-test and the F test were carried out.

4. RESULTS AND DISCUSSION
4.1 Results
4.1.1 Descriptive Statistics

According to (Prasetya & Wardhani, 2021) Descriptive statistics are statistics that are used to explain or decipher data in general.

Table 4.1. Descriptive Statistics

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
CAR_X1	28	4.11	169.92	51.8464	39.09481
NPL_X2	28	.01	10.15	3.1893	2.50947
LDR_X3	28	52.63	376.56	113.0964	71.09040
ROA_Y	28	.00	4.42	.9746	1.46910
Valid N (listwise)	28				

(Source: Data processed with SPSS 20)

4.1.2 Classic Assumption Test
a. Normality Test

The normality test is used to evaluate whether independent variables and dependent variables have normal distributions (Sahir, 2022).

Table 4.2. Normality Test Results

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		28
Normal Parameters[a,b]	Mean	0E-7
	Std. Deviation	1.03082620
Most Extreme Differences	Absolute	.208
	Positive	.208
	Negative	-.140
Kolmogorov-Smirnov Z		1.101
Asymp. Sig. (2-tailed)		.177

a. Test distribution is Normal.

b. Calculated from data.

(Source: Data processed with SPSS 20)

Based on table 4.2, the asymp value is known. Sig (2-tailed) is 0.177 > 0.05, so it can be concluded that the data is normally distributed.

b. Multicollinearity Test

The multicollinearity test is a test used to determine whether there is a significant correlation between independent variables in a multiple regression model (Duli, 2019).

Table 4.3. Multicollinearity Test Results

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	CAR_X1	.370	2.702
	NPL_X2	.560	1.784
	LDR_X3	.270	3.706

a. Dependent Variable: ROA_Y

(Source: Data processed with SPSS 20)

Based on table 4.3, it can be seen that the variables CAR, NPL, and LDR have a tolerance value of more than 0.1 and a VIF value that is below 10. Thus, it can be concluded that there are no symptoms of multicollinearity.

c. Heteroscedasticity Tests

Heteroscedasticity tests were used to see if there was a difference in residual variance between individual observations (Sahir, 2022).

Table 4.4. Heteroscedasticity Test Results

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.206	.268		.770	.449
	CAR_X1	.005	.006	.269	.949	.352
	NPL_X2	-.074	.071	-.241	-1.044	.307
	LDR_X3	.004	.004	.349	1.051	.304

a. Dependent Variable: ABRESID

(Source: Data processed with SPSS 20)

Based on table 4.4, the significance value for variable CAR (X1) is 0.352, variable NPL (X2) is 0.307, and variable LDR (X3) is 0.304. The three significance values were greater than 0.05 which indicated that there were no symptoms of heteroscedasticity in the analyzed regression model.

d. Autocorrelation Test

According to (Sahir, 2022) The autocorrelation test was used to find out if there was a correlation deviation between the residuals of two observations in the regression model.

Table 4.5. Autocorrelation Test Results

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.713[a]	.508	.446	1.09336	1.767

a. Predictors: (Constant), LDR_X3, NPL_X2, CAR_X1

b. Dependent Variable: ROA_Y

(Source: Data processed with SPSS 20)

In table 4.5, it can be seen that the DW number is 1.767. To find out the DU value, you can see the Durbin Watson table where the number of samples (n) is 28 and the number of variables (k) is 3, so that the results are 1.6503 < 1.767 < 2.3497, This means that there are no autocorrelation symptoms in this study.

4.1.3 Multiple Linear Regression Analysis Test

One approach in multivariate analysis that is often applied in social studies is multiple linear regression, which aims to understand the relationship between a single dependent

variable and several independent variables (Badruddin et al., 2020).

Table 4.6. Multiple Linear Regression Analysis Test Results

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.387	.424		-.913	.370
	CAR_X1	-.001	.009	-.039	-.166	.870
	NPL_X2	-.177	.112	-.303	-1.583	.127
	LDR_X3	.018	.006	.857	3.108	.005

a. Dependent Variable: ROA_Y

(Source: Data processed with SPSS 20)

Regression equations:

Y = -0.387 – 0.001X1 – 0.177X2 + 0.018X3

The results of the regression equation above can be explained as follows:
1. The value of the constant is -0.387, which means that if the independent variable has a value equal to 0, the dependent variable will increase by -0.387 percent.
2. A CAR value of -0.001 indicates a negative relationship direction, meaning that if the CAR increases with other variables constantly, the ROA will decrease by 0.001 percent.
3. An NPL value of -0.177 indicates a negative relationship direction, meaning that if NPL increases by another constant variable, ROA will decrease by -0.177 percent.
4. An LDR value of 0.018 indicates a positive relationship, meaning that if the LDR increases with other variables constantly, the ROA will increase by 0.018.

4.1.4 Hypothesis Test
a. Cohesion Determination Test

The determination coefficient (R^2) test is a measure that reflects the part of the variation of the free variable that can explain the variation of the bound variable (Leon et al., 2023).

Table 4.7. Determination Coefficient Test Results

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.713[a]	.508	.446	1.09336

a. Predictors: (Constant), LDR_X3, NPL_X2, CAR_X1

b. Dependent Variable: ROA_Y

(Source: Data processed with SPSS 20)

Based on table 4.7, the adjusted value of R squared is 0.446 or equal to 44.6% which explains that the dependent variables of ROA can be explained by independent variables (CAR, NPL, and LDR) of 44.6% with the remaining 55.4% being described by other variables outside of the independent variables that are not included in this study.

b. T Test

A partial test is a partial regression coefficient test to determine the partial significance or individual independent variables of a bound variable (Sahir, 2022).

Table 4.8. T Test (Partial)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.387	.424		-.913	.370
	CAR_X1	-.001	.009	-.039	-.166	.870
	NPL_X2	-.177	.112	-.303	-1.583	.127
	LDR_X3	.018	.006	.857	3.108	.005

a. Dependent Variable: ROA_Y

(Source: Data processed with SPSS 20)

Looking at table 4.8, it can be assumed:

1. The calculated value for X1 CAR shows that the CAR has a calculation of -0.166 with a significance level of 0.870 > 0.05. This means that the tcount is -0.166 < ttable 2.06390, then H1 is minus. So, it can be concluded that CAR has no effect on ROA.

2. The calculation value for X2 NPL shows that NPL has a calculation of -1.583 with a significance level of 0.127 > 0.05. This means that the tcount is -1.583 < ttable 2.06390, then H2 is rejected. So, it can be concluded that NPLs have no effect on ROA.

3. The calculation value for X3 LDR shows that the LDR has a calculation of 3.108 with a significance level of 0.005 < 0.05. This means that the tcount is 3.108 > ttable is 2.06390, then H3 is accepted. So, it can be concluded that LDR has an effect and is significant on ROA.

c. Test F

According to (A. S. Nugroho & Haritanto, 2022) The F test is used with the aim of determining whether the independent variables applied in this study together affect their dependent variables significantly or vice versa.

Table 4.8. Test F Results

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	29.583	3	9.861	8.249	.001^b
	Residual	28.690	24	1.195		
	Total	58.273	27			

a. Dependent Variable: ROA_Y

b. Predictors: (Constant), LDR_X3, NPL_X2, CAR_X1

(Source: Data processed with SPSS 20)

Referring to table 4.9, it is known that the calculated f-value of 8.249 exceeds the f-value of the table which is 3.01, with a significance level of 0.001 lower than 0.05. These findings indicate that H4 is accepted, i.e. CAR, NPL, and LDR have a simultaneous effect on ROA.

4.2 Discussion

1. Effect of CAR on ROA

CAR has no significant influence on the ROA indicated by tcount -0.166 < ttable 2.06390 with a significance level of 0.870 > 0.05. This means that the higher the CAR value, the lower the ROA value. The higher the bank's capital ability to maintain the possibility of loss risk, it does not necessarily have a real effect on the increase in ROA. Because when a bank has a large amount of capital but has not been able to manage it optimally in generating profits, then the amount of capital has not shown a significant influence on ROA. This is in line with research (Djalil, 2019) that CAR has no significant effect on ROA.

2. Effect of NPLs on ROA

NPL have no significant effect on ROA as shown by tcount -1.583 < ttable 2.06390 with a significance level of 0.127 > 0.05, This is because the data used as a sample has an NPL ratio of <5% so it has a low credit ratio. A low credit ratio does not affect ROA because banks have high capital to cover risks with bank capital. This is in line with research (Hamidah et al., 2023) which states that NPL have no significant influence on ROA.

3. Effect of LDR on ROA

LDR has a significant influence on ROA as shown by tcount 3.108 < ttable 2.06390

with a significance level of 0.005 < 0.05. This is in line with the principles and logic of banking operations, namely that the greater the amount of third-party funds that have been successfully collected from the community, the higher the potential for income acquisition through the distribution of these funds. One of the strategies that can be applied by management to increase profitability reflected through ROA is to optimize credit distribution. However, management must also pay attention to the upper and lower limits of the ratio Loan to Deposit Ratio Maintain the stability and liquidity health of the bank. This is in line with research (Steven et al., 2018) which states that LDR has a positive and significant influence on ROA.

4. Influence of CAR, NPL and LDR on ROA

CAR, NPL and LDR have a significant influence simultaneously on ROA as shown by a fcount of 8,249 > ftable which is 3.01 with a significance value of 0.001 < 0.05. These results are supported by previous research conducted by (Nasution, 2020) which reveals that CAR, NPL and LDR simultaneously affect ROA.

CONCLUSION

Based on the results that have been conducted, this study concludes that some of the CAR and NPL variables do not have a significant impact on ROA in digital banks listed on the Indonesia Stock Exchange (IDX) for the 2021–2024 period. This shows that high capital adequacy ratios and low levels of non-performing loans do not directly increase the profitability of digital banks. On the other hand, LDRs have been proven to have a positive and significant influence on ROA, which shows that the effectiveness of disbursing funds from third parties is one of the key factors in improving the financial performance of digital banks. Simultaneously, the three independent variables (CAR, NPL, and LDR) had a significant influence on ROA with a determination coefficient value of 44.6%. This shows that the model built is able to explain almost half of the variation in digital banking profitability, while the rest is influenced by other factors beyond the scope of this study. Therefore, to increase profitability, digital bank management needs to focus more on optimizing the LDR ratio, without ruling out the efficiency of capital use and the control of non-performing loans.

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