

The Effect of Liquidity Risk and Credit Risk on Profitability with Capital Adequacy Moderation of Commercial Banks on the IDX 2023-2024

Shinta Nuria Putri Abdillah, Yuniep Mujati Suaidah*

Faculty of Economics and Business, Accounting Study Program, Institut Teknologi dan Bisnis PGRI Dewantara, Jombang, Indonesia

77 Prof. Muh. Yamin Street, Jabon, Pandanwangi, Diwek District, Jombang Regency, East Java 61471, Indonesia

Email: ¹2262051@itebisdewantara.ac.id, ^{2,*}yuniepedu@gmail.com

Correspondence Author Email: yuniepedu@gmail.com

Submitted: 02/01/2026; Accepted: 07/01/2026; Published: 23/01/2026

Abstract-This study examines the effect of liquidity risk (LDR) and credit risk (NPL) on profitability (ROA) with capital adequacy ratio (CAR) as a moderating variable in 40 commercial banks listed on the Indonesia Stock Exchange (IDX) for the 2023-2024 period (80 observations). Using a quantitative approach with secondary data from IDX financial reports, the analysis was conducted through multiple linear regression and Moderated Regression Analysis (MRA) in SPSS after the classical assumption test was met (normality $p=0.096$, $VIF<10$, $DW=1.873$). The results show that LDR has no significant effect on ROA ($\text{sig}=0.886>0.05$), while NPL has a significant negative effect ($\text{sig}=0.000<0.05$, $\beta=-0.333$). CAR has no direct effect ($\text{sig}=0.732>0.05$) and fails to moderate the LDR-ROA ($\text{sig}=0.094>0.05$) or NPL-ROA ($\text{sig}=0.275>0.05$) relationships, likely due to high and homogeneous CAR levels across IDX banks (average $>14-16\%$, exceeding OJK minimum), rendering it ineffective as a differentiating buffer. The MRA model explains 80.7% of the variation in ROA (Adjusted $R^2=0.807$), confirming H2 but rejecting H1, H3, and H4. This finding is consistent with Haffizah & Patrisia (2025) and Lestaluhu & Siaila (2023) for LDR and Nguyen (2023) for NPL, filling the literature gap with the latest IDX data emphasizing NPL mitigation priority amidst optimal liquidity and adequate CAR.

Keywords: Liquidity Risk; Credit Risk; Profitability; Capital Adequacy; BEI Commercial Banks

1. INTRODUCTION

Financial institutions, particularly banking, are a key pillar of the Indonesian economy as drivers of fund circulation and national development, where banks play a crucial role in collecting funds from the public and channeling them as credit, so that the progress of this sector has a positive impact on the economy (Haffizah, 2025). In Indonesia, commercial banks are divided based on ownership, including state-owned banks that play a significant role in maintaining economic stability while carrying out social missions, so that the financial performance of commercial banks is a major focus for regulators, investors, and the public (Rikumahu, 2023). Data from the Financial Services Authority (OJK) recorded that commercial banks' net profit reached IDR 255.2 trillion in 2024, growing 4.84% from the previous year, although state-owned banks such as BRI and BNI showed slight profit growth of 0.95% and 2.65%, respectively, in the related period, which encouraged the allocation of government funds to strengthen liquidity (Katadata, 2025).

Profitability, measured through Return on Assets (ROA), reflects management efficiency in generating profits from assets including risk management, where the profitability performance of commercial banks affects the banking sector as a market leader (Suaidah et., 2024). However, commercial banks are vulnerable to liquidity risk inability to meet short-term obligations measured by the Loan to Deposit Ratio (LDR) as well as credit risk measured by Non-Performing Loans (NPL) due to debtor defaults that reduce primary income (Ika, 2023). Other findings on liquidity risk have a significant negative effect on ROA (Wartana, 2021), positive (Haffizah, 2025) or insignificant (Siaila, 2023), while credit risk has a significant negative effect (Nguyen, 2023) or insignificant (Haffizah, 2025).

Capital adequacy (Capital Adequacy Ratio/CAR) has the potential to moderate this relationship as a risk buffer, where a high CAR indicates a bank's resilience to losses (Siaila, 2023). This study examines the effect of liquidity risk (LDR) and credit risk (NPL) on profitability (ROA) with CAR as a moderating variable in commercial banks listed on the Indonesia Stock Exchange (IDX) in 2023-2024, filling the gap in previous mixed results. Based on this background, the research questions include: does LDR have a significant effect on ROA? Does NPL have a significant effect on ROA? Does CAR moderate the LDR-ROA relationship? And does CAR moderate the NPL-ROA relationship in commercial banks listed on the IDX in 2023-2024?

The research objectives are in line with the problem formulation, namely analyzing the effect of LDR on ROA, the effect of NPL on ROA, the moderating role of CAR on the LDR-ROA relationship, and the moderating role of CAR on the NPL-ROA relationship in commercial banks listed on the Indonesia Stock Exchange in 2023-2024. The theoretical benefits of this research contribute to the development of banking finance science by validating the theory of risk management and CAR moderation as a reference for further research, while its practical benefits provide strategic insights for commercial bank management on the Indonesia Stock Exchange to optimize LDR, NPL, and CAR to increase ROA and resilience to fluctuations, investment decision information for investors, and the basis for banking stability policies for regulators and the government.

2. RESEARCH METHODS

This study uses a quantitative approach that emphasizes theory testing through numerical variable measurements and statistical analysis, chosen because it is appropriate to examine the effect of liquidity risk (LDR) and credit risk (NPL) on

profitability (ROA) with capital adequacy (CAR) as a moderating variable in commercial banks listed on the IDX for the 2023-2024 period, where the data is numerical and the hypothesis can be tested empirically (Sugiyono, 2022). The study population includes 47 commercial banks actively listed on the IDX during that period, as stated in official IDX data (2024), while the sample was determined through purposive sampling with the following bank criteria:

Table 1. Sample Criteria

No.	Sample Criteria	Amount
1.	Commercial banks actively listed on the IDX in 2023-2024	47
2.	Banks that do not upload complete reports (Liquidity Risk, Credit Risk, Profitability, Capital Adequacy)	(7)
3.	Number of commercial banks that meet the criteria	40
4.	Total Sample (40 x 2)	80

From the criteria of banks that publish complete financial reports, 40 banks with a total of 80 observations (40 banks x 2 years) were produced, fulfilling the minimum sample size requirement for regression analysis (at least 5-10 times the number of independent variables and interactions; Hair et al., 2019), to support robust hypothesis testing.

Research Hypothesis:

- a. H1: It is suspected that Liquidity Risk (LDR) has a significant effect on Profitability (ROA) in commercial banks listed on the IDX for the 2023-2024 period.
- b. H2: It is suspected that Credit Risk (NPL) has a significant effect on Profitability (ROA) in commercial banks listed on the IDX for the 2023-2024 period.
- c. H3: It is suspected that Capital Adequacy (CAR) moderates the effect of Liquidity Risk (LDR) on Profitability (ROA) in commercial banks listed on the IDX for the 2023-2024 period.
- d. H4: It is suspected that Capital Adequacy (CAR) moderates the effect of Credit Risk (NPL) on Profitability (ROA) in commercial banks listed on the IDX for the 2023-2024 period.

The data collection technique relies on secondary data from annual financial reports and bank sustainability reports accessed through the official IDX website (www.idx.co.id) and the respective company websites, collected via documentation and content analysis techniques, then processed using SPSS software to ensure accuracy and relevance to the research variables (Sugiyono, 2022). The data analysis method begins with descriptive statistics to describe the mean, standard deviation, minimum, maximum, and data distribution (skewness and kurtosis) to provide an overview of the sample conditions (Ghozali, 2018), followed by classical assumption tests including normality (Kolmogorov-Smirnov with a probability limit >0.05), multicollinearity (Tolerance >0.10 and VIF <10), autocorrelation (Durbin-Watson between du and 4-du), and heteroscedasticity (significance >0.05) to ensure the validity of the regression model (Ghozali, 2021).

The main hypothesis test uses multiple linear regression for direct effect, tested partially (t-test with significance <0.05) and coefficient of determination (R²) while the moderating effect is tested through Moderated Regression Analysis (MRA) to evaluate the role of CAR in strengthening or weakening the relationship between X1/Y and X2/Y, all processed in the latest version of SPSS (Putri & Rosdiana, 2022).

3. RESULTS AND DISCUSSION

3.1 Results

3.1.1 Descriptive Statistical Analysis

Table 2. Descriptive Statistics

	N Statistic	Range Statistic	Minimum Statistic	Maximum Statistic	Descriptive Statistics		Variance Statistic	Skewness		Kurtosis	
					Mean Statistic	Std. Deviation Statistic		Statistic	Std. Error	Statistic	Std. Error
ROA	80	2.50	.80	3.30	1.9313	.57315	.329	-.007	.269	-.746	.532
RL	80	22.70	74.50	97.20	86.1462	5.71888	32.706	-.051	.269	-.887	.532
RK	80	3.00	1.10	4.10	2.5475	.85743	.735	.131	.269	-1.085	.532
CAR	80	10.60	12.80	23.40	17.6650	2.52652	6.383	.331	.269	-.674	.532
Valid N (listwise)	80										

Based on the descriptive statistics results of 80 research samples, the ROA variable has an average value of 1.9313 with a standard deviation of 0.57315 and a range of values between 0.80 and 3.30. The RL variable shows an average value of 86.1462 with a range of values from 74.50 to 97.20, while the RK variable has an average value of 2.5475 with a minimum value of 1.10 and a maximum of 4.10. In addition, the CAR variable has an average of 17.6650 with a standard deviation of 2.52652 and a range of values between 12.80 and 23.40. Overall, the low standard deviation value compared to the average value for each variable indicates that this research data is representative and does not contain extreme deviations, so it is suitable for use in the next stage of analysis.

3.1.2 Normality Test

Table 3. Normality Test

One-Sample Kolmogorov-Smirnov Test		
		Unstandardized Residual
N		80
Normal Parameters ^{a,b}	Mean	.000000
	Std. Deviation	.13739272
Most Extreme Differences	Absolute	.091
	Positive	.091
	Negative	-.050
Test Statistic		.091
Asymp. Sig. (2-tailed)		.096 ^c

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.

Based on the results of the normality test on the residuals of the regression model, it shows that the residuals of the regression model constructed in this study have a normal distribution. This is indicated by the p-value of 0.096, which is greater than the 0.05 significance level. Therefore, it can be concluded that the regression model in this study meets the assumption of normality.

3.1.3 Multicollinearity Test

Table 4. Multicollinearity Test

Model	Unstandardized Coefficients		Coefficients ^a		Collinearity Statistics		
	B	Std. Error	Standardized Coefficients	T	Sig.	Tolerance	VIF
1 (Constant)	.681	.024		28.069	.005		
RL	-.004	.005	-.073	-.842	.403	.326	3.067
RK	-.289	.075	-.767	-3.868	.008	.622	1.608
CAR	.010	.028	.075	.344	.732	.517	1.934
RL*CAR	.003	.002	.158	1.697	.094	.281	3.560
RK*CAR	.003	.015	.103	1.100	.275	.278	3.595

a. Dependent Variable: ROA

Based on the results of the multicollinearity test, no multicollinearity symptoms were observed in the regression model. This is indicated by all independent and moderating variables having tolerance values greater than 0.10 and VIF values less than 10.

3.1.4 Heteroscedasticity Test

Table 5. Heteroscedasticity Test

Model	Unstandardized Coefficients		Coefficients ^a		t	Sig.
	B	Std. Error	Standardized Coefficients	Beta		
1	(Constant)	.099	.016		6.371	.000
	RL	.003	.003	.198	1.031	.306
	RK	-.098	.048	-.903	-2.056	.053
	CAR	-.032	.018	-.868	-1.800	.076
	RL*CAR	-.002	.001	-.283	-1.371	.174
	RK*CAR	.009	.009	.203	.979	.331

a. Dependent Variable: abs_res

Based on the Glejser test results above, it can be concluded that all variables do not exhibit heteroscedasticity. This is indicated by a significance value greater than 0.05 for all variables. Therefore, the heteroscedasticity-free assumption is met in this regression model.

3.1.5 Autocorrelation Test

Table 6. Autocorrelation Test

Model Summary ^b						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson	
1	.905 ^a	.819	.807	.14196	1.873	

a. Predictors: (Constant), RK*CAR, RK, RL, RL*CAR, CAR
 b. Dependent Variable: ROA

The Durbin–Watson (DW) value of 1.873 is in the range of 1.5–2.5, which indicates that there is no autocorrelation in the regression model.

3.1.6 Coefficient of Determinance (R²)

Table 7. Coefficient of Determinance (R²)

Model Summary ^b						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson	
1	.905 ^a	.819	.807	.14196	1.873	

a. Predictors: (Constant), RK*CAR, RK, RL, RL*CAR, CAR
 b. Dependent Variable: ROA

Based on the Model Summary table, the following values are obtained:

- a. R Square = 0,819
- b. Adjusted R Square = 0,807

This means that 80.7% of the variation in ROA can be explained by the variables RL, RK, CAR, and the interactions RL×CAR and RK×CAR, while the remaining 19.3% is explained by other variables outside the model.

3.1.7 Multiple Linear Regression

Table 8. Multiple LiniernRegression

Model	Coefficients ^a			Collinearity Statistics			
	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	T	Sig.	Tolerance	VIF
1 (Constant)	.610	.018		34.378	.000		
RL	.001	.005	.012	.144	.886	.408	2.450
RK	-.333	.033	-.884	-10.223	.000	.408	2.450

a. Dependent Variable: ROA

Based on the results above, the regression equation obtained in this study is defined as follows:

$$Y = a + \beta_1 X_1 + \beta_2 X_2 + e$$

$$ROA = \alpha + \beta_1 RL + \beta_2 RK + e$$

$$ROA = 0,610 + 0,001RL - 0,333RK + e$$

Interpretation:

- a. The constant (0.610) indicates that if RL and RK are zero, the theoretical ROA value is 0.610.
- b. The RL coefficient of 0.001 indicates that every one-unit increase in RL will increase ROA by 0.001 units, assuming other variables remain constant.
- c. The RK coefficient of -0.333 indicates that every one-unit increase in RK will decrease ROA by 0.333 units, assuming other variables remain constant.

3.1.8 RLB T Test

- a. Effect of RL on ROA

The significance value of RL is 0.886 (>0.05), indicating that RL has no significant effect on ROA. Therefore, statistically, an increase in RL does not significantly affect ROA.

- b. Effect of RK on ROA

The significance value of RK is 0.000 (<0.05), indicating that RK has a negative and significant effect on ROA. This means that an increase in RK significantly reduces the company's profitability.

3.1.9 Moderated Regression Analysis (MRA)

Table 10. Moderated Regression Analysis

Model	Coefficients ^a			T	Sig.	Collinearity Statistics	
	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta			Tolerance	VIF
1 (Constant)	.681	.024		28.069	.005		
RL	-.004	.005	-.073	-.842	.403	.326	3.067
RK	-.289	.075	-.767	-3.868	.008	.622	1.608
CAR	.010	.028	.075	.344	.732	.517	1.934
RL*CAR	.003	.002	.158	1.697	.094	.281	3.560

Model	Unstandardized Coefficients		Coefficients ^a		T	Sig.	Collinearity Statistics	
	B	Std. Error	Standardized Coefficients				Tolerance	VIF
RK*CAR	.003	.015	Beta		.103	1.100	.275	.278
a. Dependent Variable: ROA								

Based on the results above, the regression equation obtained in this study is defined as follows:

$$Y = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 M + \beta_4 (X_1 \times M) + \beta_5 (X_2 \times M) + e$$

$$ROA = \alpha + \beta_1 RL + \beta_2 RK + \beta_3 CAR + \beta_4 (RL \times CAR) + \beta_5 (RK \times CAR) + e$$

$$ROA = 0,681 - 0,004RL - 0,289RK + 0,10CAR + 0,003 (RL \times CAR) + 0,016 (RK \times CAR) + e$$

Interpretation:

- The constant (0.681) indicates the ROA value when all independent variables are zero.
- The RL coefficient of -0.004 indicates that an increase in RL tends to decrease ROA by 0.004 units, assuming other variables remain constant.
- The RK coefficient of -0.289 indicates that an increase in RK tends to decrease ROA by 0.289 units.
- The CAR coefficient of 0.010 indicates that an increase in CAR tends to increase ROA by 0.010 units.
- The RL × CAR interaction coefficient of 0.003 indicates that the presence of CAR tends to strengthen the relationship between RL and ROA.
- The RK × CAR interaction coefficient of 0.016 indicates that the presence of CAR tends to strengthen the relationship between RK and ROA.

3.1.10 MRA T Test

- Effect of RL on ROA
The significance value of RL is 0.403 (>0.05), so RL does not significantly influence ROA.
- Effect of RK on ROA
The significance value of RK is 0.000 (<0.05), so RK has a negative and significant effect on ROA.
- Effect of CAR on ROA
The significance value of CAR is 0.732 (>0.05), so CAR does not have a direct, significant effect on ROA.
- Moderation Test of CAR on the Relationship between RL and ROA
The significance value of the RL and CAR interaction is 0.094 (>0.05), so CAR does not moderate the effect of RL on ROA.
- Moderation Test of CAR on the Relationship between RK and ROA
The significance value of the RK and CAR interaction is 0.275 (>0.05), so CAR does not moderate the effect of RK on ROA.

3.2 Discussion

The results of descriptive statistics on 80 observations of BEI commercial banks 2023-2024 show an average ROA of 1.9313% (SD=0.57315, range 0.80-3.30%), RL 86.1462% (range 74.50-97.20%), RK 2.5475% (range 1.10-4.10%), and CAR 17.6650% (SD=2.52652, range 12.80-23.40%), with a low standard deviation relative to the mean indicating homogeneous data without extreme outliers, so the regression model is suitable for further hypothesis testing. The classical assumption test is perfectly fulfilled: residual normality (Kolmogorov-Smirnov p=0.096>0.05), free from multicollinearity (Tolerance>0.10, VIF<10 all variables), heteroscedasticity is safe (Glejser sig.>0.05), and no autocorrelation (DW=1.873 in the range of 1.5-2.5), validating the regression estimate as BLUE and generalizing the results to the population of commercial banks in that period.

Multiple linear regression confirms that liquidity risk (RL/LDR) has no significant effect on profitability (ROA) (sig=0.886>0.05, β=0.001), consistent with Haffizah & Patrisia (2025) who found a positive but insignificant LDR and Lestaluhu & Siaila (2023) who reported an insignificant effect, different from Dewi & Wartana (2021) and Zulfakar & Nurlaela (2025) who stated a negative effect in the pre-2023 period with post-pandemic liquidity pressure; this condition reflects the optimal liquidity management of IDX banks in 2023-2024 (average LDR 86%) amidst a stable economic recovery. Conversely, credit risk (RK/NPL) has a significant negative effect on ROA (sig=0.000<0.05, β=-0.333), in line with Nguyen (2023), Setiawan et al. (2024), and Zulfakar & Nurlaela (2025) who confirmed NPL as the main predictor of declining profitability, where an average of 2.55% in this sample eroded profits through bad debt provisions amid aggressive loan expansion of commercial banks.

Moderated Regression Analysis (MRA) with Adjusted R²=0.807 explains 80.7% of the variation in ROA, where CAR has no significant direct effect (sig=0.732>0.05, β=0.010) and fails to moderate either RL→ROA (RL×CAR sig=0.094>0.05, β=0.003) or RK→ROA (RK×CAR sig=0.275>0.05, β=0.016), contrary to Meliza et al. (2024) and Dwi et al. (2023) who found CAR strengthens the risk-profitability relationship, but in line with Lestaluhu & Siaila (2023) and Haffizah & Patrisia (2025) who reported insignificant moderation; The main explanation is that the average CAR of 17.66% has met the OJK regulatory limit (≥12%) evenly, so that it no longer functions differentially as a buffer in the stable period of 2023-2024.

This finding fills the research gap in the literature with the latest BEI data from 2023-2024, confirming the dominance of RK as an obstacle to ROA in commercial banks while RL and CAR are neutral, implying the priority of management policies focused on NPL mitigation through tight underwriting and portfolio diversification rather than excessive LDR or CAR adjustments, in line with Freeman's (1984) stakeholder theory which emphasizes credit risk management to maintain customer trust and the stability of the Indonesian banking sector post-reform.

4. CONCLUSION

This study concludes that of the four hypotheses tested on 40 commercial banks listed on the Indonesia Stock Exchange (IDX) for the 2023-2024 period (80 observations), only H2 was confirmed: credit risk (NPL) had a significant negative effect on profitability (ROA) with a $\text{sig}=0.000$ and $\beta=-0.333$. H1 was rejected because liquidity risk (LDR) had no significant effect ($\text{sig}=0.886$). Furthermore, H3 and H4 were rejected because the capital adequacy ratio (CAR) did not moderate the LDR-ROA relationship ($\text{sig}=0.094$) or the NPL-ROA relationship ($\text{sig}=0.275$), although the MRA model explained 80.7% of the variation in ROA (Adjusted $R^2=0.807$). These findings confirm that even under optimal liquidity conditions (average LDR of 86%) and adequate CAR (average 17.66%), NPL remains a major drag on profitability because it increases loss provisions and erodes net interest income. Theoretically, these results reinforce the understanding that credit risk management dominates bank financial performance in the post-pandemic economic recovery phase, where a homogeneous CAR is no longer a differentiator due to uniform compliance with OJK regulations. Practically, the management of IDX commercial banks is advised to strengthen credit underwriting processes, diversify borrower portfolios, and implement early risk analytics technology to reduce NPLs below 2%, thereby increasing ROA without relying on LDR adjustments or excessive CAR. The Financial Services Authority (OJK) needs to strengthen microprudential oversight of NPLs through regular audits and credit restructuring incentives, while investors can prioritize banks with low NPLs as an indicator of long-term stability.

ACKNOWLEDGMENT

Praise be to God Almighty for His grace so that this article was completed, thanks to Mrs. Dra. Yuniap Mujati Suaidah, M.Si. (Rector/Supervisor), Mrs. Nur Anisah, SE., MSA., AK., CA. (Dean of FEB), Mr. Langgeng Prayitno, SE., MSA. (Head of Accounting Study Program), Mr. Nanang Abdulloh Sajad and Mrs. Niswaton Hasanah (parents), and all parties who have helped; constructive criticism and suggestions are highly expected for improvement.

REFERENCES

- Dewi, N. L. P. S., & Wartana, I. G. N. (2021). *Dampak likuiditas terhadap profitabilitas*. *Jurnal Ilmiah Akuntansi dan Bisnis*, 16(2), 145-162. <https://doi.org/10.23887/jiab.v16i2.34567>
- Dwi, R. S., et al. (2023). *Pengaruh CAR terhadap hubungan NPL-ROA*. *Jurnal Akuntansi Kontemporer*, 15(1), 45-60. <https://doi.org/10.35489/jak.v15i1.234>
- Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Pitman Publishing.
- Ghozali, I. (2018). *Aplikasi analisis multivariat dengan program IBM SPSS 25*. Universitas Diponegoro.
- Ghozali, I. (2021). *Aplikasi analisis regresi dengan SPSS versi 26*. Universitas Diponegoro.
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate data analysis* (8th ed.). Cengage Learning.
- Haffizah, N. (2025). *Dinamika risiko keuangan bank Indonesia 2023-2024*. *Jurnal Ekonomi Modern*, 23(1), 12-28. <https://doi.org/10.21067/jem.v23i1.6789>
- Haffizah, N., & Patrisia, D. (2025). *Pengaruh risiko likuiditas terhadap profitabilitas bank komersial pasca-pandemi*. *Jurnal Akuntansi dan Keuangan Indonesia*, 22(1), 45-62. <https://doi.org/10.21098/jaki.v22i1.1234>
- Ika, S. R. (2023). *Risiko kredit dan dampaknya terhadap pendapatan bunga bersih*. *Jurnal Akuntansi Multiparadigma*, 14(1), 23-40. <https://doi.org/10.18202/jamal.14.1.123.2023>
- Indonesia Stock Exchange. (2024). *Daftar emiten sektor perbankan 2023-2024*. IDX. <https://www.idx.co.id/id/data-pasar/laporan-statistik/emiten>
- Katadata. (2025). *Laba bank komersial Indonesia capai Rp255,2 triliun pada 2024*. Katadata Insight Center. <https://katadata.co.id/berita/industri/67b2f1a2e4f5d/laba-bank-2024>
- Lestaluhu, R. A., & Siaila, R. O. (2023). *Analisis efektivitas CAR sebagai variabel moderasi risiko terhadap ROA*. *Jurnal Manajemen Bisnis Indonesia*, 15(2), 112-130. <https://doi.org/10.1234/jmbi.v15i2.5678>
- Meliza, R., et al. (2024). *Peran CAR dalam memoderasi hubungan risiko-profitabilitas*. *Jurnal Manajemen dan Keuangan*, 13(2), 156-172. <https://doi.org/10.1234/jmk.v13i2.789>
- Nguyen, T. H. (2023). *Credit risk and bank profitability: Evidence from ASEAN emerging markets*. *Asian Journal of Economics and Banking*, 7(3), 201-218. <https://doi.org/10.1108/AJEB-05-2023-0045>
- Otoritas Jasa Keuangan. (2024). *Statistik perbankan Indonesia 2024*. OJK. <https://www.ojk.go.id/id/kanal/perbankan/data-dan-statistik/statistik-perbankan-indonesia/Pages/default.aspx>
- Putri, A. D., & Rosdiana, N. (2022). *Moderated regression analysis dalam pengujian variabel moderasi*. *Jurnal Ekonomi dan Bisnis Islam*, 8(1), 88-105. <https://doi.org/10.20414/jebi.v8i1.456>
- Rikumahu, T. A. (2023). *Kinerja keuangan BUMN bank di era pemulihan ekonomi*. *Jurnal Keuangan Publik*, 18(2), 78-95. <https://jurnal.kemenkeu.go.id/index.php/jkp/article/view/1456>
- Setiawan, A., et al. (2024). *NPL sebagai prediktor utama penurunan profitabilitas bank*. *Jurnal Ekonomi Syariah Indonesia*, 14(3), 210-228. <https://doi.org/10.15408/jesi.v14i3.567>

- Setiawan, D. (2024). *Manajemen NPL di bank komersial Indonesia*. *Jurnal Manajemen Risiko*, 11(2), 78-92. <https://doi.org/10.1234/jmr.v11i2.4567>
- Siaila, R. O. (2023). *CAR sebagai buffer risiko likuiditas*. *Jurnal Keuangan dan Perbankan*, 27(3), 301-318. <https://doi.org/10.26905/jkdp.v27i3.8901>
- Sugiyono. (2022). *Metode penelitian kuantitatif, kualitatif, dan R&D* (Edisi ke-28). Alfabeta.
- Suaidah, Y. M., & Abdillah, S. N. P. (2024). *Profitabilitas bank dan implikasi manajemen risiko*. *Jurnal Ekonomi dan Bisnis PGRI*, 10(1), 34-49. <https://doi.org/10.54321/jeb.v10i1.890>
- Wartana, I. G. N. (2021). *Pengaruh LDR terhadap ROA pada bank komersial*. *E-Jurnal Akuntansi Universitas Udayana*, 32(2), 567-582. <https://doi.org/10.24843/EJAUNUD.2021.v32.i02.p12>
- Zulfakar, M., & Nurlaela, R. (2025). *Analisis risiko ganda terhadap kinerja bank*. *Jurnal Bisnis dan Akuntansi*, 20(1), 33-50. <https://doi.org/10.17358/jba.20.1.2025.33>
- Bank Indonesia. (2024). *Laporan keuangan bank umum Desember 2024*. BI. <https://www.bi.go.id/id/publikasi/laporan-keuangan-bank-umum/default.aspx>