International Journal of Economics, Business and Innovation Research
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E-ISSN : 2964-0865
IJEBIR

An Empirical Analysis Of The Determinants Indonesian Banking Profitability Based On Panel Data 2021-2024

Zahwa Andini Nur Utary[1], Ninik Mas'adah[2], Guruh Marhaenis Handoko Putro[3], Ira Megayara[4]

[1,2,3,4] Departement of Accounting, Faculty of Economics and Business, Muhammadiyah University of Lamongan, Indonesia

Corresponding Author: zahwaandinin@gmail.com

Abstract

Reserach seeks empirically investigate the determinants of influencing profitability in the Indonesian banking industry using panel data. Research centers on banking sub-firms in the industry registered listed on the Indonesia Stock Exchange (IDX) over the 2021-2024 observation period. An explanatory method employed, employing secondary information—specifically corporate financial statements—sourced from the IDX and IDN Financials. A targeted sampling method was employed to choose the sample, leading to 128 standard data values and 21 unbalanced data points, for an overall sample size of 149 observations. An analysis was performed using a regression with panel data model using EViews version 12. Empirical findings show that the Net Interest Margin (NIM) has a negative impact on earnings, whereas the LDR, NPL, NIM, CAR do not significantly affect profitability. Results from the research indicates that growth interest margins doesn't automatically boost profits, as the gains tend to be absorbed by risk provisioning requirements; meanwhile, the LDR, NPL, and CAR did not serve as primary determinants of profitability performance for these banking companies during the study period. These results offer insights for banking management regarding the optimization of intermediation functions and capital management to enhance financial performance

Keywords: ***Loan to Deposit Ratio*** **(LDR),** ***Non-Performing Loan*** **(NPL),** ***Net Interest Margin*** **(NIM),** ***Capital Adequacy Ratio*** **(CAR),** ***Profitability*****.**

INTRODUCTION

Banking plays ande essential part in bolstering national economic development since it acts as anmediator establishment that gathers funds gathered from the community and reallocates it as a loan. Grounded in Legislation Number 10 of 1998

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related to financial, financial institutions play vital role in supporting national development by increasing economic expansion, equity, and stability on a bational level. Therefore, health banking sector is crucial element preserving sustainability concerning the economy of Indonesia (Al-fadzar *et al*., 2021).

In carrying out its functions, the banking industry faces various challenges stemming from both external and internal factors. External factors include changes in monetary policy, exchange rate fluctuations, rising loan rates and impact of the COVID-19 outbreak on economic conditions. Meanwhile, internal elements such weak oversight, low asset quality, and limited capital can also impact a bank's financial performance. Therefore, banks need to sustain their financial performance to remain profitable and maintain public trust (Widyastuti & Aini, 2021).

The profitability of a bank is typically assessed its profit-generating capability. Profit-generating capability indicates a firm's capacity to produce earnings from its assets. One widely used profitability indicator is ROA, financial metric shows bank's capacity create earnings from its overall resources (Lestari, 2021; Luu *et al*., 2020). The greater the ROA, the greater proficient the financial institution is at manage resources to produce profit (Fanny *et al*., 2020).

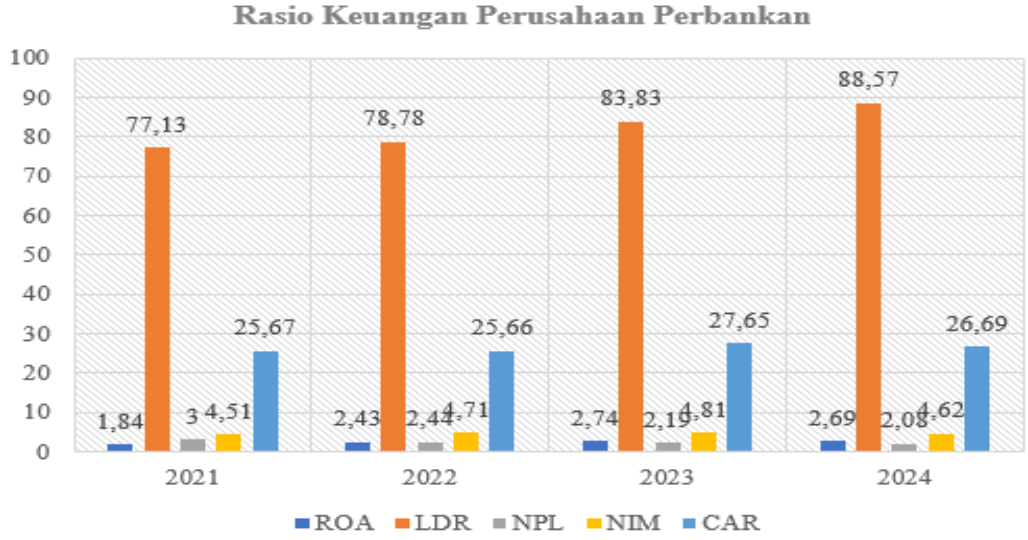


Chart 1. Development of Banking Financial Ratios for 2021-2024

Source: IDX information analyzed by scholars (2025)

Drawing from information obtained from financial institutions registered on the IDX for 2021–2024 period, ROA increased 1.84% in 2021 to 2.74% in 2023, but decreased slightly to 2.69% in 2024. This condition indicates that banking profitability has grown despite a slight weakening in the last year. In addition to ROA, other financial ratios also showed changes. The LDR rose from 77.13% to 88.57%, indicating rise in credit

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distribution by the bank. Non-Performing Loans (NPL) decreased from 3.00% to 2.08%, indicating an improvement in credit quality. Net Interest Margin (NIM) increased until 2023 but fell to 4.62% in 2024, while the Capital Adequacy Ratio (CAR) fluctuated but remained at a high level, reflecting a relatively strong capital condition.

Banking profitability is affected by multiple financial ratios, particularly the LDR, NPL, NIM, CAR (Pasaribu, 2022). The LDR is utilized to assess a bank's capacity to channel collected resources for the public in the shape of credit. The larger the productive credit distribution, more the bank can capitalize on profit-making opportunities thereby increasing profitability (Dewi *et al*., 2020; Hadian & Phety, 2021).The NPL is a proportion indicating the rate of delinquent loans to total loans disbursed. A high NPL signifies an increased danger of bad borrowings, that can reduce bank profits. Therefore, NPL is expected to negatively impact profitability (Lestari & Setianegara, 2020; Cahyani *et al*., 2024).

The NIM assesses bank's capability produce NIM from earnings assets. A elevated NIM indicates a financial institution's capacity to generate earnings, thus increasing profitability (Wibowo *et al*., 2020; Sanny & Dewi, 2020). CAR displays a bank's capital capacity endure operational dangers and possible losses. Strong capital will enhance the ability of a bank to engage in commerce operations, generate profits (Rina & Rofiuddin, 2021; Zulvia, 2020).

Prior studies examining the impact of LDR, NPL, NIM, CAR profitability shown inconsistent results. Some studies discovered that LDR and CAR did not have an impact on profitability, others showed a significant positive (Cahyani *et al*., 2024; Nurinfiaa & Damayanti 2023; Setiawan *et al*., 2021). These differing findings suggest that the connecting among financial ratios and profitability requires moreover study.

The uniqueness of this research is found in the application of the latest data on the post-COVID-19 pandemic for the 2021–2024 period, reflecting economic recovery and changes in monetary policy. Furthermore, this research simultaneously analyses the impact of LDR, NPL, NIM, CAR on the financial success of finance subsector businesses registered on IDX utilizing panel data analysis through EViews 12. This study utilizes the Signaling Theory suggested (Spence, 1973). This theory explains that monetary ratios can indicationto investors concerning the state and outlook of the business. The LDR, NPL, NIM, and CAR ratios reflect the bank's health, which can ultimately influence investor perceptions belonging to the firm profitability.

Grounded in the development of banking financial ratios, differences in prior research findings, along with the significance of profitability for sustainability banking industry, this research intends to explore impact the LDR, NPL, NIM, CAR regarding profitability of finance subsector firms included companies listed on the Indonesia Stock Exchange (IDX) 2021–2024 period. Study results are anticipated to aid in the

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advancement of science, bank administration decision-making, investment considerations, and policy planning in the banking sector.

LITERATUR REVIEW

Signalling Theory

According to signal theory, companies seek to minimize information imbalance between management and external interested parties through providing relevant information regarding their financial status and outlook for the future (Spence, 1973; Ross, 1977). Managers disclose information through financial reports to signal the firm's performance and prospects, thereby influencing investors' perceptions and investment decisions (Suganda, 2018:15). Financial performance represents one of the primary signals considered by investors, while information presented in financial statements serves as the basis for assessing firm value and future growth in the capital market (Fiana *et al*., 2022; Mulyadi & Affan, 2022). Within the banking sector, LDR, NPL, NIM, CAR function as financial indicators that convey signals regarding a bank's operational performance and monetary stability. An increased LDR indicates effective fund intermediation and offers an encouraging indication of capacity of the bank to produce earnings. Conversely, a higher NPL indicates substandard credit quality and increasing credit risk, thereby sending a negative signal that may reduce stakeholder confidence and profitability. Meanwhile, a elevated NIM illustrates the financial institution’s efficiency in handling interest-creating resources and liabilities, signaling stronger earnings capability and future profitability (Natanael & Mayangsari, 2022). Likewise, a greater CAR signifies that the bank possesses sufficient funds to take in possibilities risks, providing a positive signal of financial soundness and enhancing investor confidence in the bank's long-term profitability (Pasaribu, 2023).

Previous Research

Earlier research has revealed contradictory results concerning the effects LDR, NPL, NIM, CAR regarding profitability within the banking industry. Several studies reported the LDR does not have a meaningful influence on earnings (Cahyani *et al*., 2024; Putri *et al*., 2021; Goh *et al*., 2022; Anggari & Dana 2020), whereas other studies found that LDR positively and significantly affects profitability (Hadian & Phety, 2021; Setiawan *et al*., 2021; Hidayat *et al*., 2022). Research on NPL also produced mixed results. Some studies demonstrated that NPL significantly affects profitability (Cahyani *et al*., 2024; Hadian & Phety 2021), while others found no notable connection between NPL and profitability (Mulyani *et al*., 2022; Putri *et al*., 2021). Likewise, previous findings regarding NIM remain inconsistent. Several studies concluded that NIM has beneficial, noteworthy effect on profitability (Cahyani *et al*., 2024; Nurinfiaa & Damayanti 2023), whereas other

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studies stated that NIM does not have a major impact (Dewi, 2024; Fadli, 2024) or even a considerable adverse effect on profit margins (Siagian *et al*., 2021; Hidayat *et al*., 2022). Similar inconsistencies were also identified for CAR. A number of studies found that CAR positively and significantly influences profitability (Mulyani *et al*., 2022; Goh *et al*., 2022; Setiawan *et al*., 2021; Dewi, 2024; Anggari & Dana 2020), while other studies suggested that CAR does not substantially impact profitability (Putri *et al*., 2021; Nurinfiaa & Damayanti 2023; Fadli, 2024).

The inconsistent empirical findings indicate that the relationships between LDR, NPL, NIM, CAR, and profitability remain inconclusive and require further investigation. Differences in research periods, sample characteristics, banking classifications, and analytical methods may contribute to these variations. Therefore, this research reevaluates the LDR, NPL, NIM, and CAR regarding the monetary success of finance subsector businesses registered listed on the Indonesia Stock Exchange (IDX) within 2021-2024 timeframe to provide more recent evidence based on observation concerning the factors influencing banking profitability.

Scientific Debate

Empirical research has yielded varying results concerning the effects LDR, NPL, NIM, CAR on the banking profitability. Several studies found that LDR and CAR positively influence profitability because efficient fund intermediation and adequate capital strengthen banks' financial performance (Hadian & Phety, 2021; Goh *et al*., 2022; Setiawan *et al*., 2021; Anggari & Dana (2020). Likewise, other studies reported that NPL negatively affects profitability, while NIM positively contributes to profitability by improving banks' ability to generate interest income (Cahyani *et al*., 2024; Nurinfiaa & Damayanti, 2023).

However, other empirical evidence suggests different results. Several studies found LDR, NPL, CAR have notable effect regarding profitability (Putri *et al*., 2021; Mulyani *et al*., 2022; Fadli, 2024) , while some studies reported that NIM has no significant effect or even a substantial adverse impact on profitability (Dewi, 2024; Hidayat *et al*., 2022; Siagian *et al*., 2021). These irregular findings propose that the relationships between LDR, NPL, NIM, CAR, and profitability remain inconclusive and may vary depending on differences in observation periods, banking characteristics, macroeconomic conditions, regulatory policies, and research methodologies. Consequently, the factors influencing bank profitability continue to be subject scientific debate and require further empirical investigation, particularly for banking subsector Indonesia Stock Exchange (IDX) listed companies during the 2021-2024 period.

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Research Position

Research positions itself within the financial institution and corporate finance literature by integrating LDR, NPL, NIM, CAR into one analytical framework to analyze their impacts on profitability. Unlike previous empirical studies, which primarily investigated only two or three of these financial ratios or focused on different banking classifications and observation periods, this research simultaneously analyzes the combined effect of LDR, NPL, NIM, CAR regarding the profitability of banking sector firms catalogued Indonesia Stock Exchange (IDX) listed companies during 2021 to 2024 Timeframe. Furthermore, this research adopts signal theory as the underlying theoretical perspective to explain how financial rations act as indicators of financial institution's banking condition and upcoming performance, thereby influencing investors' assessments and investment decisions. This integrated framework constitutes the novelty of the study and provides updated empirical evidence regarding the elements affecting banking profitability in the Indonesian banking sector under recent economic conditions.

Conceptual Farework

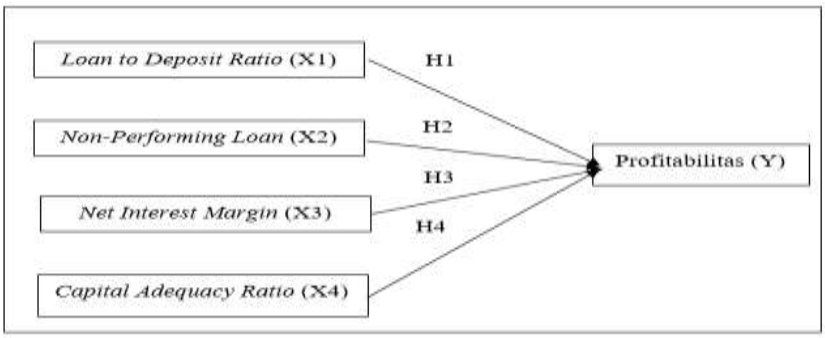


Figure 1. Theoretical Structure

As shows in Figure 1, the theoretical structure of study proposes that LDR, NPL, NIM, CAR influence the profitability of banking companies. LDR signifies a bank's capacity to fulfil its liquidity requirements, its effectiveness in directing funds from third parties into loans, where an increased LDR signifies more efficient financial intermediation that may contribute to greater profitability (Dewi *et al*., 2020; Indriani & Alamsyah, 2020). Meanwhile, NPL represents the caliber of a bank's lending portofolio and the degree of credit risk. A hingher NPL reflects an increase in problematic loans non-performing outcomes of loans from ineffective credit management or borrowers' inability to fulfill their obligations, which may reduce profitability (Kasmir, 2018:127; Hadian & Phety, 2021). Furthermore, NIM evaluates a bank's capability to produce NIM from its income-generating assets. An increased NIM reflects greater efficiency in

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managing productive assets, thereby increasing the bank's capacity to produce earnings (Kasmir, 2017:200; Cahyani *et al.*, 2024). Moreover, CAR signifies sufficiency a bank's funds withstand possible dangers resulting from its operation functions. Higher CAR indicates stronger capital capacity, boosts stakeholder trust and aids the bank's sustainable growth profitability (Thian, 2021:191; Zulvia, 2020).

This relationship is grounded in signal theory, which explains that financial ratios disclosed in corporate financial statements serve as signals to lessen the information gap between management and investors (Spence, 1973; Ross, 1977). Financial indicators such as LDR, NPL, NIM, and CAR provide important information regarding a bank's liquidity, credit quality, operational efficiency, and capital adequacy, enabling investors to evaluate the bank's financial condition and future profitability. Consequently, effective liquidity management, lower credit risk, higher interest income efficiency, and stronger capital adequacy are expected to strengthen investor confidence and improve the financial success of banking firms.

Hypothesis

Referring to conceptual framework previously explained, the hypotheses in the research can be expressed in the subsequent way:

H_1: LDR has a positive effect on bank profitability.
H_2: NPL has a negative effect on bank profitability.
H_3: NIM has a positive effect on bank profitability.
H_4: CAR has a positive effect on bank profitability.

RESEARCH METHODS

Research utilized a numerical method utilizing a descriptive approach to examine the impacts LDR, NPL, NIM, CAR banking profitability. The quantitative approach was selected because it utilizes numerical data analyzed through statistical procedures to explain causal relationships among variables. The explanatory design was adopted to investigate the degree to which the independent variables affect profitability within the banking sector, firm registered on the IDX.

Population consisted of 47 banking subsector companies registered on the IDX throughout 2021-2024 timeframe. Specimen was chosen through purposive sampling according to set standards, which included firms that regularly released comprehensive financial statement during the observation period. Accoridng to these standards, 32 firms were choosen, leading to 128 balanced observations and 21 additional unbalanced panel observations, yielding a total of 149 observations for analysis.

This research employed secondary data acquired from the authorized IDX site, IDN Financials, authorized stites of the selected businesses. Data consisted of annual

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reports and financial statements containing information on profitability, LDR, NPL, NIM, CAR. Data were collected using the method of documentation because it allows researchers to acquire objective and historical information from publicly available financial reports. Profitability was employed as the variable that depends and assessed using ROA. Independent variables comprised LDR, which assesses a bank's capacity to convert external funds into loans; NPL, that reflects risk of credit and lending caliber; NIM that measures efficiency generating net interest income from income-generating assets; and CAR, that represents capital of a financial institution adequacy covering operational dangers.

This study was grounded signal theory, which explains that financial information disclosed by companies serves as an indication to diminish information imbalance between management and investors. Financial metrics such as LDR, NPL, NIM, and CAR, provide information regarding a bank's liquidity, credit quality, earnings capability, and capital strength, thereby influencing investors' assessments of the bank's future profitability.

Data quality was strengthened through data screening and diagnostic procedures before hypothesis testing. Descriptive statistics examination was first executed to summarize the attributes the data. Subsequently, panel data regression assumptions were evaluated through normality, multicollinearity, heteroscedasticity, test for self-correlation to verify validity and reliability estimated model.

Empirical an examination was conducted utilizing panel data analysis using EViews version 12. Model selection was performed through CEM, FEM, REM procedures identify the greatest suitable estimation model. Hypothesis testing performed utilizing F-test, t-test, determination coefficient (R^2) at a 5% significance level. The regression alaysis utilized in this research is articulated of course.

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + ei_t$$

Explanaion:

A	:	*Konstanta*
B	:	Koefisien Jalur
Y	:	Profitabilitas
X1	:	*Loan to Deposit Ratio* (LDR)
X2	:	*Non-Performing Loan* (NPL)
X3	:	*Net Interest Margin* (NIM)
X4	:	*Capital Adequacy Ratio* (CAR)
E	:	Residual
I	:	Perusahaan Perbankan
T	:	Periode/Tahun

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RESEARCH RESULTS

1. Results of Descriptive Statistical Assessment

Table 1. Results of Descriptive Statistical Analysis

Date: 02/27/26 Time: 09:25					
Sample: 2021 2024					
	SINTANY	LOGTANX1	TANX2	COSTANX3	COSTANX4
Mean	0.012309	-0.263110	0.024286	0.998871	0.964816
Median	0.011400	-0.207890	0.024500	0.999043	0.969745
Maximum	0.032494	0.624440	0.060900	0.999965	0.999758
Minimum	0.000100	-1.226559	0.001000	0.996549	0.869602
Std. Dev.	0.008024	0.378920	0.013202	0.000707	0.025327
Skewness	0.541912	-0.284265	0.252835	-1.046164	-1.783416
Kurtosis	2.732184	3.196690	2.552891	4.185409	6.671903
Jarque-Bera	4.154667	1.206379	1.518698	19.27677	87.35054
Probability	0.125264	0.547064	0.467971	0.000065	0.000000
Sum	0.984740	-21.04879	1.942900	79.90972	77.18531
Sum Sq. Dev.	0.005086	11.34282	0.013769	3.95E-05	0.050673
Observations	80	80	80	80	80

Source: Eviews 12 results output, analyzed by researchers in 2026

Drawing from descriptive statistics, ROA averaged 0.0123, indicating relatively healthy and homogeneous bank profitability. LDR averaged -0.2631, with significant variation across banks. NPL averaged 0.0243, indicating good banking asset quality. NIM averaged 0.9989, reflecting the bank's ability to generate optimal and relatively uniform net interest income. Meanwhile, CAR averaged 0.9648, indicating very strong and stable bank capital throughout the study period.

2. Results of Panel Data Regression Examination

a. Selection of Panel Data Regression Estimation Model

1) Chow Test

Table 2. Results of the Chow-Test Significance Test

Redundant Fixed Effects Test			
Equation: Untitled			
Test cross-section fixed effects			
Effects Test	Statistic	d. f.	Prob.
Cross-section F	8.254652	(27,48)	0.0000
Cross-Section Chi-square	138.436695	27	0.0000

Source: Eviews 12 result output, analyzed scholars in 2026

According to the chow examination results shown Table 2, the p-value is 0.0000 < 0.05, Therefore, H_0 is discarded and H_1 is acknowledged, making FEM is a more appropriate than the CEM.

2) Hausman Test

Table 3. Results of Hausman Test Significance Test

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Correlated Random Effects-Hausman Test				
Equation: Untitled				
Test cross-section random effects				
Test Summary	Chi-Sq. Statistic	Chi-Sq. d. f.		Prob.
Cross-section random	9.408909	4		0.0517
Cross-section random effects test comparisons:				
Variable	Fixed	Random	Var (Diff.)	Prob.
LOGTANX1	0.003537	0.000632	0.000005	0.1522
TANX2	0.067857	-0.015848	0.002103	0.0680
COSTANX3	-3.197079	-5.233392	4.812083	0.3533
COSTANX4	0.017397	0.054532	0.000942	0.2262

Source: Eviews 12 results output, analyzed by scholars in 2026

As per the outcomes of hausman emanitaion displayed table 3, the likelihood value 0.0517 > 0.05, so H_0 accepted, thus REM a better-suited model compared to the FEM.

3) Langrange Multiplier Test (LM)

Table 4. Results of the Lagrange Multiplier (LM) Significance Test

Lagrange Multiplier Test for Random Effects			
Null hypotheses: No effects			
Alternative hypotheses: Two-sided (Breusch-Pagan) and one-sided (all others) alternatives			
	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	37.20251 (0.0000)	0.911791 (0.3396)	38.11430 (0.0000)
Honda	6.099386 (0.0000)	-0.954878 (0.8302)	3.637717 (0.0001)
King-Wu	6.099386 (0.0000)	-0.954878 (0.8302)	1.168674 (0.1213)
Standardized Honda	6.862703 (0.0000)	-0.701533 (0.7585)	0.369499 (0.3559)
Standardized King-Wu	6.862703 (0.0000)	-0.701533 (0.7585)	-1.267937 (0.8976)
Gourieroux. et al.	--	--	37.20251 (0.0000)

Source: Eviews 12 results output, handled by scientists in 2026

According to the findings LM Test shown table 4, the Breusch-Pagan p-value is 0.0000 < 0,05, leading to REM the suitable model for employ.

4) Panel Data Regression Test Results

Regression equations used for panel data include:

SINTANY = 5.18741475067 + 0.000632209963822*LOGTANX1 - 0.0158481429284*TANX2 - 5.23339235169*COSTANX3 + 0.0545320259471*COSTANX4 + [CX=R]

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Information:

SINTANY	:	Profitabilitas
LOGTANX1	:	*Loan to Deposit Ratio* (DR)
TANX2	:	*Non-Performing Loan* (NPL)
COSTANX3	:	*Net Interest Margin* (NIM)
COSTANX4	:	*Capital Adequacy Ratio* (CAR)

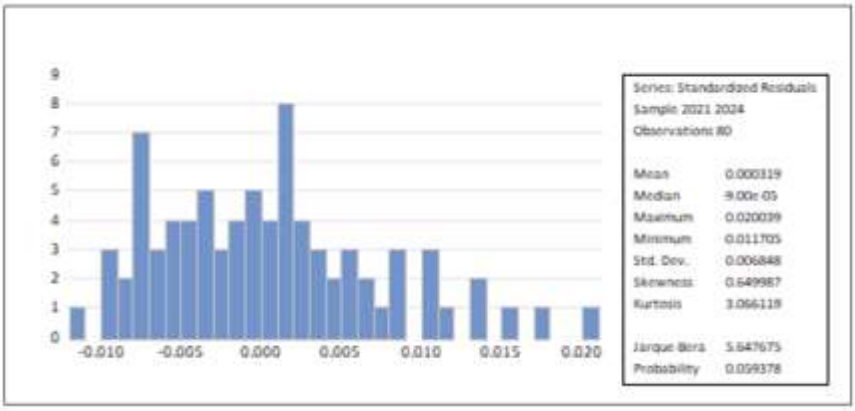
The equation for the panel data regression is shown below:

a) A fixed figure of 5.1874 suggestesd that if the LDR, NPL, NIM, CAR variables are held constant, company's profitability 5.1874.
b) LDR coefficient of regression 0.0006 indicates that LDR positively impacts profitability, but the impact is quite limited.
c) Coefficient regression of NPL -0.0158 suggests that NPL adversely impacts profitability, where rise in NPL is probably going to diminish the company's profitability.
d) The coefficient of NIM regression of -5.2334 indicates that NIM prossesses a negative effect on profitability, where a rise in NIM is likely to be followed by decrease in the company's profitability during study period.
e) CAR coefficient regression 0.0545 suggests that CAR positively influences profitability, suggesting that the larger the bank's capital, the higher the profitability attained.

3. Classical Assumption Test Result

a. Normality Test

Table 5. Normality Test Results



Source: Eviews 12 results output, analyzed scholars in 2026

Referring to table 5, the normality test findings explain that if the chance measurement of 0.0593 is larger than 0.05, the output shows that the

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assumption of no effect the equation dismissed, meaning that remainders the model not spread or typically distributed.

b. Multicollinearity Test

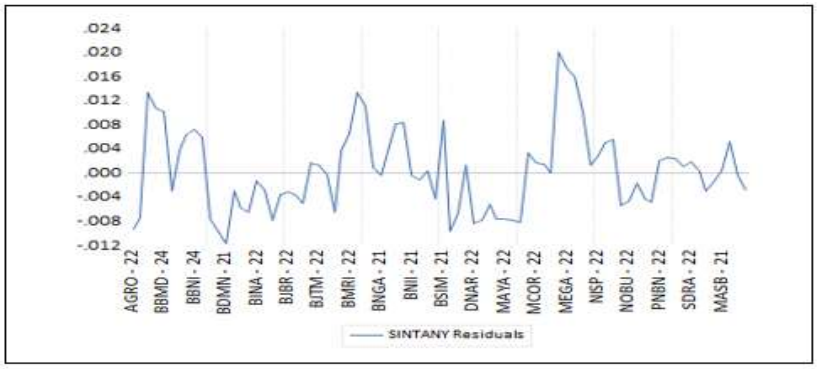
Table 6. Multicollinearity Test Results

	LOGTANX1	TANX2	COSTANX3	COSTANX4
LOGTANX1	1.000000	-0.218940	-0.026988	0.165184
TANX2	-0.218940	1.000000	0.035424	0.026376
COSTANX3	0.026988	0.035424	1.000000	0.142962
COSTANX4	0.165184	0.026376	0.142962	1.000000

Source: Eviews 12 results output, analyzed scholars in 2026

According to the outcomes of the multicollinearity examination in table 6, every correlation coefficient between the independent variables is under 0.80, leading to the conclusion that the research the model lacks multicollinearity problems.

c. Heteroscedasticity Test



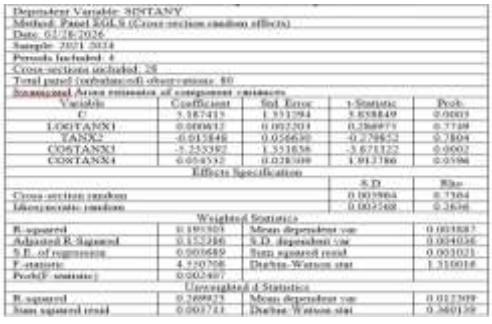
Graph 1. Resluts of the Heteroscedasticity Test

Source: Eviews 12 results output, analyzed scholars in 2026

According to Graph 1, the residuals fall within ±500, suggesting that the residual variation of the residuals remains steady. Consequently, research model is devoid of heteroscedasticity.

d. Autocorrelation Test

Table 7. Test Results Affected by Autocorrelation Symptoms



Source: Eviews 12 output results, analyzed by researchers in 2026

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According to the outcomes of the autocorrelation examination, DW statistic 1.3100 evaluated against dL and dU values at a 5% significance threshold for 4 independent variabels (k) and 80 samples (n). The outcomes of this comparison are utilized to assess if autocorrelation exists in the regression model.

Table 8. Obtaining dL, dU, 4-dL, and 4-Du Values

N	K= 4					Conclusion
	dL	dU	DW	4-dU	4-Dl	
80	1.5337	1.7430	1.3100	2.257	2.4663	Presence of Autocorrelation

Source: Eviews 12 output results, analyzed by researchers in 2026

Drawing from the findings of the Durbin-Watson test in Table 4.8, DW value obtained was 1.3100 which is below the dU value (1.7430), thus the regression model is indicated to experience autocorrelation.

Table 8. Results of Autocorrelation-Free Test

Dependent Variable: D(SINTANY)				
Method: Panel EGLS (Cross-section random effects)				
Date: 02/28/2026 Time: 00:28				
Sample (adjusted): 2021 2024				
Periods Included: 3				
Cross-sections included: 20				
Total panel (unbalanced) observations: 52				
Swamyand Arora estimator of component variances				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.000332	0.000673	-0.492885	0.6244
D(LOGTANX1)	0.002395	0.003433	0.697714	0.4888
D(TANX2)	0.033363	0.079183	0.421344	0.6754
D(COSTANX3)	-4.112038	2.908551	-1.413776	0.1640
D(COSTANX4)	0.032074	0.036540	0.877783	0.3845
Effects Specification				
			S.D.	Rho
Cross-section random			0.000000	0.0000
Idiosyncratic random			0.004319	1.0000
Weighted Statistics				
R-squared	0.099617	Mean dependent var		-0.000494
Adjusted R-Squared	0.022989	S.D. dependent var		0.004322
S.E. of regression	0.004272	Sum squared resid		0.000858
F-statistic	1.300000	Durbin-Watson stat		1.864613
Prob(F-statistic)	0.283736			
Unweighted d Statistics				
R-squared	0.099617	Mean dependent var		-0.000494
Sum squared resid	0.000858	Durbin-Watson stat		1.864613

Source: Eviews 12 output results, analyzed by researchers in 2026

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According to the autocorrelation test, DW statistic 1.8646 evaluated against the dL and dU statistics at a 5% significance level to assess the existence of autocorrelation within the regression model.

Table 9. Obtaining dL, dU, 4-dL, and 4-Du Values

N	K= 4					Conclusion
	dL	dU	DW	4-dU	4-Dl	
52	1.3929	1.7223	1.8646	2.2777	2.6071	No Autocorrelation

Source: Eviews 12 output results, analyzed by researchers in 2026

Base on the DW test findings in Table 9, DW value of 1.8646 in the midst of the dU (1.7223), 4-dU (2.2777) values. Thus, regression model does not experience autocorrelation.

4. Hypothesis Testing

a. Simultaneous Test (F Test)

Table 10. Simultaneous Test Results (F Test)

Dependent Variable: SINTANY				
Method: Panel EGLS (Cross-section random effects)				
Date: 02/28/2026				
Sample: 2021 2024				
Periods Included: 4				
Cross-sections included: 28				
Total panel (unbalanced) observations: 80				
Swamyand Arora estimator of component variances				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.187415	1.351294	3.838849	0.0003
LOGTANX1	0.000632	0.002203	0,286975	0.7749
TANX2	-0.015848	0.056630	-0.279852	0.7804
COSTANX3	-5.233392	1.351836	-3.871322	0.0002
COSTANX4	0.054532	0.028509	1.912786	0.0596
Effects Specification				
			S.D.	Rho
Cross-section random			0.005964	0.7364
Idiosyncratic random			0.003568	0.2636
Weighted Statistics				
R-squared	0.195303	Mean dependent var		0.003887
Adjusted R-Squared	0.152386	S.D. dependent var		0.004036
S.E. of regression	0.003689	Sum squared resid		0.001021
F-statistic	4.550708	Durbin-Watson stat		1.310016
Prob(F-statistic)	0.002407			
Unweighted d Statistics				
R-squared	0.269923	Mean dependent var		0.012309
Sum squared resid	0.003713	Durbin-Watson stat		0.360139

Source: Eviews 12 output results, analyzed by researchers in 2026

Based on the F-test findings in table 10, importance value 0.0024 < 0.05, therefore hypothesis confirmed. This suggests that LDR, NPL, NIM, and CAR collectively influence profitability in a meaningful way.

b. Partial Test (T Test)

Table 11. Partial Test Results (T-Test)

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Dependent Variable: SINTANY				
Method: Panel EGLS (Cross-section random effects)				
Date: 02/28/2026				
Sample: 2021 2024				
Periods Included: 4				
Cross-sections included: 28				
Total panel (unbalanced) observations: 80				
Swamyand Arora estimator of component variances				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.187415	1.351294	3.838849	0.0003
LOGTANX1	0.000632	0.002203	0,286975	0.7749
TANX2	-0.015848	0.056630	-0.279852	0.7804
COSTANX3	-5.233392	1.351836	-3.871322	0.0002
COSTANX4	0.054532	0.028509	1.912786	0.0596

Source: Eviews 12 results output, analyzed by researchers in 2026

According to the t-test outcomes in Table 11, the LDR (sig. 0.7749), NPL (sig. 0.7804), and CAR (sig. 0.0596) variables do not significantly influence profitability because they have a significance value above 0.05. Meanwhile, NIM (sig. 0.0002) has a significant detrimental impact on earnings because it has a value of significance below 0.05.

c. Test of the Coefficient of Determination (R2)

Table 12. Results of the Determination Coefficient (R2) Test

Dependent Variable: SINTANY				
Method: Panel EGLS (Cross-section random effects)				
Date: 02/28/2026				
Sample: 2021 2024				
Periods Included: 4				
Cross-sections included: 28				
Total panel (unbalanced) observations: 80				
Swamyand Arora estimator of component variances				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.187415	1.351294	3.838849	0.0003
LOGTANX1	0.000632	0.002203	0,286975	0.7749
TANX2	-0.015848	0.056630	-0.279852	0.7804
COSTANX3	-5.233392	1.351836	-3.871322	0.0002
COSTANX4	0.054532	0.028509	1.912786	0.0596
Effects Specification				
			S.D.	Rho
Cross-section random			0.005964	0.7364
Idiosyncratic random			0.003568	0.2636
Weighted Statistics				
R-squared	0.195303	Mean dependent var		0.003887
Adjusted R-Squared	0.152386	S.D. dependent var		0.004036
S.E. of regression	0.003689	Sum squared resid		0.001021
F-statistic	4.550708	Durbin-Watson stat		1.310016
Prob(F-statistic)	0.002407			
Unweighted d Statistics				
R-squared	0.269923	Mean dependent var		0.012309
Sum squared resid	0.003713	Durbin-Watson stat		0.360139

Source: Eviews 12 results output, analyzed by researchers in 2026

In light of the findings from the test for coefficient of determination within Table 12, the value of the Adjusted R-Square 0.1524 or 15.24%. Suggests the LDR, NPL, NIM, and CAR variables are able to explain 15.24% of profitability, as long as the leftover 84.76% is accounted for by factors beyond the research model.

DISCUSSION

Effect of LDR on Profitability

Findings indicate LDR lacks a considerable effect regarding profitability, as indicated through Return on Assets (ROA), with significance value 0.7749. Therefore, the first hypothesis (H_1) is rejected. These results conform to the study carried out Cahyani *et al*., (2024); Putri *et al*., (2021); Nurinfiaa & Damayanti (2023); Siagian *et al.,* (2021),

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stated that LDR little influence on profitability. Outcome suggests that profitability within the financial sector subsector is not solely established by the ratio of loans issued compared to deposit collected, since banks also generate income from sources that do not involve interest such as service charges and commissions.

From the perspective of signaling theory, an increase in LDR is expected to signal that banks are effectively performing their intermediation function by channeling funds into productive loans that generate higher returns. However, the findings do not support this theoretical expectation. A high LDR may also indicate greater liquidity risk, particularly when it approaches the upper regulatory threshold. Consequently, investors tend to interpret increases in LDR cautiously rather than as a positive signal of future profitability. This indicates that credit expansion in itself is not enough to enhance financial performance unless accompanied effective liquidity management and prudent risk control.

The findings of this study are inconsistent with Hadian & Phety (2021); Goh *et al*., (2022); Hidayat *et al*., (2022); Setiawan *et al*., (2021); Anggari & Dana (2020) and who found that LDR positively influences profitability. These differences may can be clarified through differences in banking terms during observation period. In this study, banks generally adopted more conservative liquidity management strategies, prioritizing financial stability over aggressive credit expansion. As a result, loan growth was no longer the primary determinant of profitability during the 2021–2024 period.

The Impact of NPL on Profitability

Empirical results reveal Non-Performing Loan (NPL) does not greatly impact profitability, as suggested by a significance value of 0.7804. Accordingly, ththe subsequent hypothesis (H_2) is dismissed. Discovery aligns with research Mulyani *et al*., (2022) and Putri *et al*., (2021), which concluded NPL lacks no notable influence on profitability. The results imply that variations in credit risk throughout the observation phase were not substantial enough to impact banks' ability to generate profits.

Signaling theory suggests that lower NPL ratios provide an encouraging indication concerning asset quality and management of credit, thus enhancing investor trust and improving financial performance. However, this study does not endorse the theory. During the investigation period, the average NPL consistently stayed under the regulatory limit established by Bank Indonesia, indicating that the sampled banks maintained relatively healthy credit quality. Since the variation in NPL among banks was relatively small, differences in credit risk were insufficient to explain variations in profitability.

These findings contradict those reported by Cahyani *et al.*, (2024); Hadian & Phety (2021); Hidayat *et al.*, (2022), who found that NPL negatively affects profitability. The discrepancy may be attributed to the relatively stable credit quality maintained by banks

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during the study period. Effective credit risk management enabled banks to absorb fluctuations in non-performing loans without substantially affecting their overall economic performance.

Impact NIM on Profitability

Findings demonstrate NIM holds considerable negative impact on profitability, with a value of significance 0.0007. Consequently, the third hypothesis (H_3), which proposed favorable connection is turned down. This discovery is in agreement Hidayat *et al.*, (2022); serta Siagian *et al*., (2021), who likewise discovered negative connection between NIM and profitability. The result indicates that elevated interest margins do not necessarily translate into higher profitability because a considerable portion of interest income is allocated to loan loss provisions and other risk management expenses.

According to signaling theory, a higher NIM should signal efficient asset management and stronger earnings capability. Nevertheless, the empirical evidence does not support this assumption. A wider interest margin may instead reflect higher lending rates, which could reduce loan demand, increase credit risk, and require larger provisioning expenses. Consequently, investors may interpret excessively high NIM as an indication of greater operational and credit risk rather than improved financial performance.

The findings differ from those of Dewi (2024); Fadli (2024), who reported no significant relationship between NIM and profitability, as well as Cahyani *et al.*, (2024); dan Nurinfiaa & Damayanti (2023), who found a positive effect. These inconsistencies may arise from differences in banking strategies and macroeconomic conditions across research periods. During 2021–2024, Indonesian banks emphasized maintaining credit quality and regulatory compliance, causing increased interest margins to be offset by higher provisioning costs and risk management expenditures.

Impact of CAR on Profitability

Outcomes indicate CAR doesn't substantially influence profitability, as shows by a significance value of 0.0596. Therefore, fourth hypothesis (H_4) declined. Discovery supports the studies counducted Putri *et al.*, (2021); Setiawan *et al*., (2021); Nurinfiaa & Damayanti (2023); Fadli (2024), that came to the conclusion that CAR does not greatly affect profitability. The outcomes suggest that having a strong capital position alone cannot enhance financial performance unless the available capital is utilized efficiently in productive activities.

Based on signaling theory, a greater CAR ought to provide a favorable indication concerning a bank's fiscal status capacity and capability to take in possible hazards. However, this study does not support the theory. Investors appear to place greater

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emphasis on operational efficiency, lending effectiveness, and earnings performance rather than the size of capital reserves. Consequently, strong capitalization does not necessarily result in increased profitability when excess capital remains underutilized or is not effectively converted into income-generating assets.

Outcomes are unreliable together alongside those of Mulyani *et al*., (2022); Goh *et al*., (2022); Dewi (2024); dan Anggari & Dana (2020), who found that CAR positively affects profitability. The differences may be explained by macroeconomic conditions during the observation period. Although banks maintained strong capital adequacy, weaker credit demand, changing monetary policies, and economic uncertainty limited opportunities to convert available capital into productive assets capable of generating higher returns.

CONCLUSSION

The findings of this study indicate that LDR, NPL, NIM, CAR do not substantially impact the monetary success in banking subsector firms registered in the Indonesia Stock Exchange throughout 2021–2024 timeframe, whereas NIM exerts major unfavorable impact in profitability. These findings imply profitability the financial industry in Indonesia not mainly ascertained traditional financial ratios, as banks' financial performance is also influenced by operational efficiency, non-interest income, liquidity management strategies, monetary policy, and broader macroeconomic conditions. The findings further suggest that signaling theory has limited explanatory power in the banking industry, since higher LDR, lower NPL, stronger CAR, or wider NIM aren't necessarily understood by the market as positive indications of improved financial execution. This research adds to the banking literature through the provision of empirical evidence regarding the relationship in the middle LDR, NPL, NIM, CAR, and profitability among Indonesian banking companies during the post-pandemic recovery period. However, the study is limited by the relatively low coefficient of determination (Adjusted R^2), the inclusion of only four financial ratios as explanatory variables, the data transformation and observation adjustments required to satisfy statistical assumptions, and the relatively short observation period covering only 2021–2024. Therefore, it is suggested that future studies include additional bank-particular and macroeconomic variables, such as operating efficiency (BOPO), firm size, fee-based income, inflation, and benchmark interest rates, extend the observation period to capture different economic cycles, and employ alternative analytical approaches to obtain more comprehensive and robust findings.

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