

---

## **Determinants of Financial Performance of Regional Development Banks in Java Island: Evidence from Panel Data 2020-2024**

---

Priska Basariana Panggabean<sup>1</sup>

***Abstract:***

*This study examines the determinants of financial performance, measured by Return on Assets (ROA), among six Regional Development Banks (Bank Pembangunan Daerah/BPD) in Java Island, Indonesia, over the period 2020–2024. The sample comprises Bank DKI, Bank BJB, Bank Banten, Bank Jateng, Bank BPD DIY, and Bank Jatim. Using panel data from audited annual reports and analysed using multiple linear regression in SPSS 29, the study investigates the effects of Net Interest Margin (NIM), Capital Adequacy Ratio (CAR), Loan-to-Deposit Ratio (LDR), and Non-Performing Loan (NPL) on ROA. The study period spans both the COVID-19 pandemic crisis of 2020–2021 and the recovery phase of 2022–2024, providing a comprehensive view of RDBs' financial dynamics under varying macroeconomic conditions. The findings reveal that NIM has a significant positive effect on ROA, whereas CAR, LDR, and NPL do not have statistically significant individual effects; the full model explains 83.6% of the variance in ROA. These results contribute new empirical insights into the financial behaviour of Indonesian regional development banks during and after an economic crisis, with practical implications for bank management, regional government shareholders, and banking regulators.*

**Keywords:** *Financial Profitability Ratios, Regional Development Banks, Inclusive Economic Development, Financial Performance, CAMEL*

Submitted: January 7, 2026, Accepted: February 20, 2026, Published: February 28, 2026

### **1. Introduction**

The Indonesian banking sector occupies a central position in the Indonesian economy, serving as the primary intermediary between surplus and deficit economic units. Within this sector, Regional Development Banks (Bank Pembangunan Daerah/BPD) hold a distinctive institutional mandate: to channel resources toward provincial development, manage regional government treasury functions, and extend financial access to underserved segments of the local economy. Established under Law No. 13

---

<sup>1</sup> Universitas Pelita Harapan, [priska.panggabean@uph.edu](mailto:priska.panggabean@uph.edu)

of 1962 and subsequently governed by the Banking Law No. 7 of 1992 and its amendments, RDBs combine commercial banking operations with developmental functions under regional government ownership. They manage regional government treasury functions, channel financial resources toward provincial development priorities, and open credit access to various middle and/micro economy business segments of the local economy.

The financial performance of RDBs is a matter of both institutional and public policy significance. Profitability, commonly measured by Return on Assets (ROA), is stated as the most comprehensive indicator of bank efficiency and financial health. The Indonesian Financial Services Authority (Otoritas Jasa Keuangan/OJK) classifies banks with ROA exceeding 1.5% as 'very healthy,' underscoring its regulatory centrality. However, aggregate data for the BPD segment reveal a concerning profitability trend. According to OJK's Banking Industry Profile Report (2023), the average ROA of RDBs declined from approximately 2.1% in 2019 to 1.4% in 2020 and 1.2% in 2021, before partially recovering to 1.6% in 2022 and 1.7% in 2023. This trajectory reflects both the disruptive impact of the COVID-19 pandemic and the structural challenges facing regional banking institutions in Indonesia.

The COVID-19 pandemic suddenly triggered a sharp economic downturn in Indonesia in 2020, with GDP falling by 2.07% (Badan Pusat Statistik, 2023). "The banking sector faced surging loan impairments, mandatory credit-restructuring programs under OJK Regulation No. 11/POJK.03/2020, and compressed net interest margins as monetary policy became more accommodative. For RDBs, whose loan portfolios are often concentrated among public-sector employees and regional enterprises, the pandemic amplified existing vulnerabilities, including elevated non-performing loans, constrained capital deployment, and declining intermediation efficiency. The recovery period since 2022 has introduced new dynamics, including digital transformation imperatives and the gradual unwinding of pandemic-era regulatory relief, creating a complex backdrop for examining determinants of financial performance.

Java Island, which contributes more than half (Rizal S et al., 2024) Indonesia's gross domestic product (GDP) and hosts most of its population (Badan Pusat Statistik, 2023), is home to several of the country's most prominent BPDs. This study focuses on six Java-based BPDs: Bank Jakarta (Jakarta Capital Region), Bank BJB (West Java and Banten Province), Bank Banten, Bank Jateng (Central Java), Bank BPD DIY (Special Region of Yogyakarta), and Bank Jatim (East Java). Collectively, these institutions manage significant volumes of public assets and serve diverse regional economic communities, making their financial performance particularly important from a government and policy perspective.

Existing studies on Indonesian bank profitability have predominantly focused on national commercial banks (Tangngisalu et al., 2020; Widyastuti & Aini, 2021), state-owned banks (Rifansa et al., 2022), or Islamic banks (Widarjono et al., 2020), with relatively few studies examining RDBs as a distinct institutional category. Moreover, most empirical studies on Indonesian banking were conducted prior to the COVID-19 pandemic or covered only the initial pandemic year, leaving the dynamics of the

pandemic-to-recovery transition largely unexplored. This study addresses these gaps by examining the determinants of ROA for six Java-based BPDs over the 2020–2024 period, encompassing both the pandemic crisis and the subsequent recovery phase. The independent variables examined—Net Interest Margin (NIM), Capital Adequacy Ratio (CAR), Loan-to-Deposit Ratio (LDR), and Non-Performing Loan ratio (NPL)—represent the core CAMEL dimensions of income performance, capital adequacy, liquidity management, and asset quality. The study makes three primary contributions to the existing literature. First, it provides a focused longitudinal analysis of Java’s RDBs, a sub-sector underrepresented in academic research. Second, by encompassing both the pandemic crisis and recovery periods, it provides temporal depth that cross-sectional studies lack. Third, the panel data framework enables both cross-sectional comparisons and time-series analysis, strengthening the robustness of findings. The overarching objective is to generate empirical evidence that can inform bank management decisions, guide regional government shareholders in their oversight role, and contribute to the design of RDB-specific regulatory frameworks.

## 2. Theoretical Background

### 2.1. Theoretical Framework

This study draws on four complementary theoretical frameworks to explain the relationships between the selected financial ratios and bank profitability. The Intermediation Theory of Banking (Klein, 1971; Sealey & Lindley, 1977) posits that banks generate value by transforming short-term liquid deposits into long-term illiquid loans. Within this framework, the efficiency of intermediation—partially captured by NIM—is a fundamental determinant of profitability (Dinh, 2024; Rohman et al., 2022). Banks that manage their asset-liability spread effectively generate higher net interest income relative to their earning asset base, translating directly into superior ROA (Le & Ngo, 2020).

The Risk-Return Trade-off Framework (Markowitz, 1952) provides the theoretical basis for examining CAR and NPL effects on profitability. Well-capitalized banks are theoretically positioned to absorb potential losses and assume measured risks in pursuit of higher returns, while excessive non-performing loans erode profitability through income loss, provisioning costs, and capital impairment (Naili & Lahrichi, 2022; Rohman & Nurkhin, 2023). Empirical evidence further confirms that rising NPL ratios significantly suppress ROA, particularly during periods of macroeconomic stress such as the COVID-19 pandemic.

The Liquidity Preference Theory (Keynes, 1936) informs the LDR variable by explaining how banks manage the trade-off between maintaining liquidity reserves and maximizing returns through loan deployment—a tension particularly pronounced during economic downturns when liquidity demands are uncertain. Empirical studies in the Indonesian banking context affirm that LDR significantly influences profitability, though its effect is moderated by prevailing credit quality and macroeconomic conditions (Rohman et al., 2022; Soesetio et al., 2022).

Agency Theory (Jensen & Meckling, 1976) is particularly relevant in the RDB context, where regional government shareholders may impose non-commercial developmental objectives on bank management, creating principal-agent conflicts that influence financial performance outcomes. Regional governments may prioritize loan channeling to local enterprises or public sector employees over strict risk-adjusted return maximization, potentially distorting the standard financial ratios-to-profitability relationships documented in commercial banking literature (Syafriadi et al., 2023). The persistence of such agency conflicts in government-affiliated financial institutions has been documented across multiple governance frameworks, reinforcing the need to account for ownership structure when interpreting RDB financial performance (Aluchna, 2022; Rohman et al., 2022).

## **2.2 Return on Assets (ROA) as a Measure of Bank Profitability**

Return on Assets (ROA), defined as net income divided by total assets, serves as the primary profitability metric in this study. ROA measures how effectively bank management generates earnings from the asset base under its control, making it particularly suitable for comparative analysis across banks of different sizes (Satyagraha et al., 2022; Rachim, 2021). It is preferred over Return on Equity (ROE) in this context because ROE can be distorted by leverage effects, a relevant concern given the heterogeneous capital structures of the sampled RDBs. OJK regulations specify ROA benchmarks for Indonesian bank soundness assessments: ROA > 1.5% (very healthy), 1.25%–1.5% (healthy), 0.5%–1.25% (fair), 0%–0.5% (unhealthy), and < 0% (very unhealthy). For Java's RDBs, ROA performance across the study period was shaped by pandemic-induced headwinds and subsequent recovery patterns, making the 2020–2024 window particularly informative for understanding profitability dynamics.

## **2.2. Net Interest Margin (NIM) and ROA**

Net Interest Margin (NIM), defined as net interest income divided by average earning assets, represents the most direct indicator of a bank's core income-generating capacity through its intermediation function. Theoretically, a higher NIM indicates more profitable lending spreads, which should directly translate into higher ROA by increasing the primary revenue component of bank operations (Haryanto et al., 2021; Tangngisalu et al., 2020).

The NIM-ROA relationship is one of the most consistently documented associations in bank profitability literature. Widyastuti and Aini (2021) confirmed a positive NIM-ROA relationship for a sample of Indonesian conventional banks over 2017–2019, while Rifansa et al. (2022) extended this finding to a broader Indonesian banking sample that included regional development banks. Internationally, Mateev et al. (2022) documented similar positive NIM-profitability associations across European banks during periods of financial stress, suggesting the relationship holds across diverse institutional contexts.

In the RDB context, NIM may be particularly influential because regional banks often enjoy pricing power in geographically concentrated markets and benefit from captive civil servant lending programs characterised by stable interest spreads and low default

rates. OJK prescribes a minimum NIM of 1.5% for Indonesian banks, though RDBs typically report levels significantly above this number.

*H<sub>1</sub>: Net Interest Margin (NIM) has a significant positive effect on Return on Assets (ROA).*

### **2.3. Capital Adequacy Ratio (CAR) and ROA**

The Capital Adequacy Ratio (CAR) measures capital held relative to risk-weighted assets, serving as the primary regulatory mechanism to ensure solvency. Under OJK Regulation No. 11/POJK.03/2020 and Basel III principles as adapted for Indonesia, the minimum CAR requirement ranges from 8% to 14% depending on a bank's risk profile. From a profitability perspective, the dominant view in the literature is that well-capitalised banks benefit from lower funding costs, stronger market confidence, and greater capacity to pursue yield-enhancing investments (Suyanto, 2021; Tangngisalu et al., 2020). Empirically, Tangngisalu et al. (2020) confirmed a significant positive CAR-ROA relationship for Indonesian banks, and Siddique et al. (2022) documented consistent positive associations for South Asian commercial banks. However, an opposing strand argues that excess capital may indicate resource under-deployment, where funds retained within low-yield regulatory buffers generate lower returns than actively deployed earning assets, potentially suppressing ROA in over-capitalised institutions (Satyagraha et al., 2022; Mateev et al., 2022). For Indonesian RDBs, whose capital levels are heavily influenced by regional government injection decisions rather than retained earnings alone, this theoretical ambiguity has particular empirical relevance.

*H<sub>2</sub>: Capital Adequacy Ratio (CAR) has a significant positive effect on Return on Assets (ROA).*

### **2.4. Loan-to-Deposit Ratio (LDR) and ROA**

The Loan-to-Deposit Ratio (LDR) represents the proportion of deposit funding deployed as loans and serves as a proxy for both intermediation intensity and liquidity risk. OJK regulations prescribe an optimal LDR range of 78%–100% for Indonesian banks, reflecting the balance between productive credit deployment and prudent liquidity management. A higher LDR suggests more aggressive deployment of lower-cost deposits into higher-yield loans, theoretically enhancing interest income and ROA (Haryanto et al., 2021; Hermuningsih et al., 2020).

However, excessive LDR may signal elevated liquidity risk and reliance on expensive wholesale funding, potentially eroding profitability (Darjana et al., 2022). Empirically, the evidence is mixed: Haryanto et al. (2021) found a positive LDR-ROA relationship for Indonesian commercial banks, while Bikker and Vervliet (2021) documented potential non-linearity under low-interest rate conditions. During the COVID-19 pandemic, loan restructuring and credit contraction suppressed LDR figures for many RDBs; as credit recovery progressed in 2022–2024, normalisation of LDR was observed, though accompanied by emerging asset quality concerns (Darjana et al., 2022).

*H<sub>3</sub>: Loan-to-Deposit Ratio (LDR) has a significant positive effect on Return on Assets (ROA).*

## 2.5 Non-Performing Loan (NPL) and ROA

The Non-Performing Loan (NPL) ratio, measured by dividing gross non-performing loans by total loans, is a robust indicator of credit risk and asset quality. Higher NPL reduces profitability through at least three channels: loss of interest income on impaired loans, mandatory provisioning that increases operating expenses, and reputational damage that constrains future business growth (Mateev et al., 2022; Siddique et al., 2022). OJK mandates a maximum gross NPL of 5%, and banks exceeding this threshold face heightened supervisory intervention. The negative NPL-ROA relationship is among the most consistently documented findings in bank performance literature. Siddique et al. (2022) confirmed this relationship for South Asian commercial banks, Mateev et al. (2022) documented it in a cross-country analysis of European banks during COVID-19, and Tangngisalu et al. (2020) and Widyastuti and Aini (2021) established it specifically within Indonesian banking contexts.

The pandemic-era loan restructuring relaxation under OJK Regulation No. 11/POJK.03/2020 temporarily suppressed reported NPL ratios by permitting reclassification of restructured credit as performing; as this relief was phased out from 2022 onward, RDBs faced NPL normalisation pressures with consequent implications for profitability (Susanti et al., 2023; Yanti et al., 2021).

*H<sub>4</sub>: Non-Performing Loan (NPL) has a significant negative effect on Return on Assets (ROA).*

## 3. Methodology

### 3.1. Population and Sample

The population of this study is 27 RDBs currently operating across Indonesia. To ensure comparability and data completeness, a purposive sampling technique was employed based on three criteria: (1) the institution must be officially classified as a RDB under OJK categorization; (2) the institution must be domiciled within Java Island; and (3) the institution must have consistently published complete and audited annual reports throughout the entire observation period from 2020 to 2024. Six BPDs satisfy all criteria, yielding a balanced panel dataset comprising 30 firm-year observations (6 banks  $\times$  5 years). This sample purposefully covers both the COVID-19 pandemic period (2020–2021) and the post-pandemic recovery phase (2022–2024), enabling analysis of financial performance dynamics across distinct macroeconomic phases.

**Table 1. Research Sample**

No.	Bank Name	Province	Established	Ownership
1	Bank Jakarta	DKI Jakarta	1961	Provincial Govt.
2	Bank BJB	West Java & Banten	1961	Provincial Govt. / Public
3	Bank Banten	Banten	2016	Provincial Govt.
4	Bank Jateng	Central Java	1963	Provincial Govt.
5	Bank BPD DIY	D.I. Yogyakarta	1961	Provincial Govt.

6	Bank Jatim	East Java	1961	Provincial Govt. / Public
---	------------	-----------	------	---------------------------

*Source: RDBs official websites and audited annual report*

### 3.2. Research Design and Data Sources

This study employs a quantitative explanatory research design to find causal relationships between selected financial ratios and bank profitability. Secondary data is used, specifically the audited annual financial reports of the six sampled RDBs, retrieved from the respective official websites. The utilisation of audited financial statements ensures data accuracy, consistency, and conformity with Indonesian Financial Accounting Standards (PSAK) and OJK reporting requirements. The 2020–2024 observation period is selected to encompass the full cycle from pandemic onset through recovery, providing a more complete picture of RDB financial dynamics than studies limited to pre-pandemic or single-year pandemic observations.

### 3.3. Operational Definition and Measurement of Variables

Table 2 presents the operational definitions, measurement formulas, and OJK benchmarks for all variables used in this study. The dependent variable, ROA, captures overall profitability efficiency. The four independent variables represent the core dimensions of the CAMEL framework relevant to RDB financial performance: earning quality (NIM), capital adequacy (CAR), liquidity (LDR), and asset quality (NPL).

**Table 2. Operational Variables**

Variable	Type	Measurement Formula	OJK Benchmark	Source
ROA	Dependent	Net Income / Total Assets × 100%	> 1.5% (Very Healthy)	Annual Report
NIM	Independent	Net Interest Income / Avg. Earning Assets × 100%	> 1.5%	Annual Report
CAR	Independent	Tier 1 + Tier 2 Capital / Risk-Weighted Assets × 100%	Min. 8%–14%	Annual Report
LDR	Independent	Total Loans / Total Third-Party Funds × 100%	78%–100%	Annual Report
NPL	Independent	Non-Performing Loans / Total Loans × 100%	Max. 5%	Annual Report

*Source: OJK benchmarks from Circular Letter No. 14/SEOJK.03/2017*

### 3.4. Analytical Technique

This study employs multiple linear regression on balanced panel data, processed in SPSS version 29. Panel data regression was selected because it simultaneously utilises

cross-sectional variation across six RDBs and time-series variation across five annual periods, yielding 30 observations. This approach allows the model to capture both between-bank differences in financial structure and within-bank changes over the business cycle, providing greater statistical efficiency than either pure cross-sectional or time-series analysis alone. The regression model is specified as follows:

$$ROA_{it} = \alpha + \beta_1 NIM_{it} + \beta_2 CAR_{it} + \beta_3 LDR_{it} + \beta_4 NPL_{it} + \varepsilon_{it}$$

where  $ROA_{it}$  denotes the return on assets of bank  $i$  in year  $t$ ,  $\alpha$  represents the constant term,  $\beta_1$  through  $\beta_4$  are the regression coefficients for each independent variable, and  $\varepsilon_{it}$  is the error term.

### 3.5. Classical Assumption Test

Before regression estimation, a series of classical assumption tests were conducted to validate model integrity. (1) Normality test using the Kolmogorov–Smirnov test to verify that residuals follow a normal distribution; (2) Multicollinearity test using Variance Inflation Factor (VIF) and Tolerance values, where  $VIF < 10$  and  $Tolerance > 0.10$  indicate absence of problematic collinearity; (3) Heteroscedasticity test using scatter plot analysis of studentized residuals against predicted values, where random dispersion indicates homoscedastic errors; and (4) Autocorrelation test using the Durbin–Watson statistic, where values approaching 2.0 suggest absence of serial correlation. Hypothesis testing was conducted using a t-test to assess the partial effects of each independent variable ( $\alpha = 0.05$ ) and an F-test to evaluate the joint significance of all variables. Model explanatory power was assessed through the coefficient of determination ( $R^2$ ) and Adjusted  $R^2$ .

## 4. Empirical Findings and Discussion

### 4.1 Descriptive Statistics

Table 3 presents the descriptive statistics for all variables across the 30 firm-year observations.

**Table 3. Descriptive Statistics (n = 30)**

Variable	Min (%)	Max (%)	Mean (%)	Std. Dev.	OJK Threshold
ROA	-3.80	2.95	1.28	1.66	> 1.5%
NIM	0.56	6.61	4.96	1.44	> 1.5%
CAR	17.31	43.62	27.31	7.91	Min. 8%
LDR	51.38	146.77	80.91	16.19	78%–100%
NPL	1.16	22.27	4.27	4.43	Max. 5%

*Source: Audited Annual Reports 2022-2024, SPSS Analysis*

The descriptive statistics in Table 3 reveal considerable variation in financial performance across the panel. The panel mean ROA of 1.28% falls below the OJK benchmark of 1.5%, indicating that, on average, the sampled RDBs did not fully meet the regulator’s profitability standard during the observation period. The extent of dispersion is notable: the minimum ROA of  $-3.80\%$  reflects severe earnings

compression experienced by at least one institution during the COVID-19 pandemic, while the maximum of 2.95% demonstrates that stronger performers sustained healthy returns even under stressed conditions. The standard deviation of 1.66 percentage points—comparable in magnitude to the mean, suggesting that post-pandemic recovery was not similar across the sample.

NIM presents a more favourable picture, with a panel mean of 4.96%—well above the OJK minimum of 1.5%, indicating that the sampled institutions generally preserved adequate interest income buffers throughout the study period. CAR averaged 27.31%, far exceeding the regulatory minimum, reflecting the capital injections by regional governments during the pandemic period and ensuring that even banks experiencing negative ROA remained solvent. LDR's mean of 80.91% falls within the OJK optimal range of 78%–100%, though the maximum of 146.77% indicates episodes of aggressive credit expansion relative to deposit growth for individual banks. The NPL ratio averaged 4.27%, approaching but generally remaining below the 5% OJK ceiling, with the maximum of 22.27% reflecting the heightened credit risk experienced during the peak of the pandemic-era crisis. The NPL standard deviation of 4.43% indicates that credit quality recovery was heterogeneous across the six institutions.

## 4.2. Classical Assumption Result

The normality test yielded an Asymptotic Significance (2-tailed) value of 0.20, exceeding the 0.05 threshold, confirming that the model residuals follow a normal distribution.

**Table 4. Normality Test Result**

**One-Sample Kolmogorov-Smirnov Test**

		Unstandardized Residual	
N		30	
Normal Parameters <sup>a,b</sup>	Mean	.0000000	
	Std. Deviation	.62423386	
Most Extreme Differences	Absolute	.123	
	Positive	.104	
	Negative	-.123	
Test Statistic		.123	
Asymp. Sig. (2-tailed) <sup>c</sup>		.200 <sup>d</sup>	
Monte Carlo Sig. (2-tailed) <sup>e</sup>	Sig.	.293	
	99% Confidence Interval	Lower Bound	.281
		Upper Bound	.305

a. Test distribution is Normal.

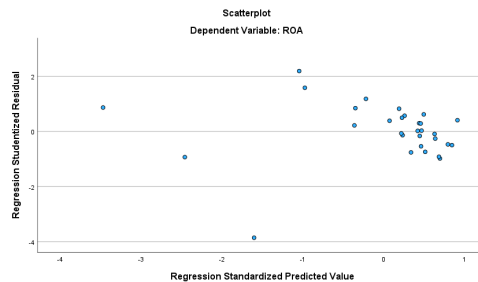
b. Calculated from data.

c. Lilliefors Significance Correction.

d. This is a lower bound of the true significance.

e. Lilliefors' method based on 10000 Monte Carlo samples with starting seed 2000000.

The heteroscedasticity diagnostic, conducted via scatter plot analysis, shows a random dispersion pattern without systematic clustering or funnel-shaped distribution, indicating the absence of heteroscedasticity



**Figure 1. Heteroscedasticity Test Result**

The multicollinearity test results in Table 5 show that all independent variables have Tolerance values greater than 0.10 and VIF values below 10, confirming no problematic linear relationships among the independent variables. These diagnostic outcomes collectively validate the appropriateness of the OLS regression framework for the current dataset.

**Table 5. Multicollinearity Test Result**

		Coefficients <sup>a</sup>					Collinearity Statistics	
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Tolerance	VIF
		B	Std. Error	Beta				
1	(Constant)	-1.138	1.349		-.844	.407		
	NIM	.738	.159	.642	4.635	<.001	.295	3.390
	CAR	-.017	.021	-.079	-.787	.439	.563	1.776
	LDR	-.005	.010	-.048	-.491	.628	.593	1.687
	NPL	-.091	.064	-.243	-1.416	.169	.192	5.208

a. Dependent Variable: ROA

The Durbin-Watson statistic of 1.711 (Table 6) falls within the inconclusive region ( $dL = 1.143$ ,  $dU = 1.739$ ) for  $n = 30$  and  $k = 4$ , preventing a definitive conclusion based on this test alone. Therefore, a Runs Test is additionally conducted to further examine the presence of autocorrelation. The Runs Test yielded an asymptotic significance value of 0.353 (Table 7), which exceeds the 0.05 significance threshold, indicating a failure to reject the null hypothesis of no autocorrelation. Based on the combined results of both tests, it is concluded that the regression model is free from autocorrelation, thereby satisfying the classical assumption.

**Table 6. Durbin-Watson Autocorrelation Test**

Model Summary <sup>b</sup>					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.927 <sup>a</sup>	.859	.836	.67232	1.711

a. Predictors: (Constant), NPL, LDR, CAR, NIM

b. Dependent Variable: ROA

**Table 7. Autocorrelation Runs-Test**

<b>Runs Test</b>	
	Unstandardize d Residual
Test Value <sup>a</sup>	,01490
Cases < Test Value	15
Cases >= Test Value	15
Total Cases	30
Number of Runs	13
Z	-,929
Asymp. Sig. (2-tailed)	,353

a. Median

### 4.3 Results of Multiple Linear Regression

From the multiple linear regression analysis, the result is as follow:

$$ROA = (-1.138) + 0.738 \text{ NIM} - 0.17 \text{ CAR} - 0.05 \text{ LDR} - 0.91 \text{ NPL} + \varepsilon$$

**Table 8. Regression Coefficient Results**

Variable	Coefficient ( $\beta$ )	t-statistic	Sig.	Decision	Direction
Constant	-1.138	-	-	-	-
<b>NIM</b>	0.738	4.635	0.001***	H <sub>1</sub> Accepted	Positive
<b>CAR</b>	-0.170	-0.787	0.439	H <sub>2</sub> Rejected	Negative (n.s.)
<b>LDR</b>	-0.050	-0.491	0.628	H <sub>3</sub> Rejected	Negative (n.s.)
<b>NPL</b>	-0.910	-1.416	0.169	H <sub>4</sub> Rejected	Negative (n.s.)
<b>F-statistic</b>	<b>F-sig: 0.001***</b>	<b>R<sup>2</sup>: 0.859</b>	<b>Adj. R<sup>2</sup>: 0.836</b>		

Note: \*\*\*  $p < 0.01$ ; n.s. = not significant at the 0.05 level. Source: SPSS 29 output, processed by the author.

The F-test result (F-sig = 0.001) confirms that the independent variables NIM, CAR, LDR, and NPL simultaneously exert a significant effect on ROA. The Adjusted R<sup>2</sup> of 83.6% indicates that the four independent variables collectively explain 83.6% of the variance in ROA, with the remaining 16.4% attributable to factors outside the model, potentially including macroeconomic variables (inflation, GDP growth, Bank Indonesia reference rate) and bank-specific operational efficiency indicators.

NIM shows a regression coefficient of 0.738, with a t-value of 4.635 and a significance level of 0.001 ( $p < 0.01$ ), leading to acceptance of H<sub>1</sub>. This confirms that NIM has a

significant positive effect on ROA among the six Java RDBs during 2020–2024. A one-percentage-point increase in NIM is associated with a 0.738 percentage-point increase in ROA, holding other variables constant. The result is consistent with the intermediation theory's prediction that higher interest spreads directly enhance profitability and align with findings reported by Widyastuti and Aini (2021) and Rifansa et al. (2022) for Indonesian banking samples.

The regression coefficient for CAR is  $-0.17$ , with a  $t$ -value of  $-0.787$  and a significance level of  $0.439$  ( $p > 0.05$ ), indicating  $H_2$  is not supported. The negative direction and statistical insignificance are different from the theoretical risk-return expectation. A contextual explanation lies in the extraordinary regulatory environment of 2020–2022, during which multiple provincial governments across Java injected substantial capital into their respective RDBs to stimulate regional economies and meet OJK minimum requirements. This capital injection elevated CAR ratios without a proportional increase in earning asset deployment or revenue generation. Satyagraha et al. (2022) argue that state-driven capital injections in Indonesian RDBs do not trigger the risk-buffer or signalling mechanisms assumed by the positive CAR-ROA hypothesis, creating capital abundance without commensurate profitability improvement.

LDR yields a coefficient of  $-0.05$ , a  $t$ -statistic of  $-0.491$ , and a  $p$ -value of  $0.628$  ( $p > 0.05$ ), indicating  $H_3$  is not supported. The observed negative direction contradicts the theoretical expectation of positive credit-to-profitability transmission. This difference may reflect the structural dynamics of the post-COVID environment, during which deposit recovery outpaced credit expansion, maintaining LDR below pre-pandemic benchmarks. Additionally, pandemic-era credit growth was concentrated in lower-risk, lower-yield asset classes rather than higher-yield commercial portfolios, limiting NIM contribution. Darjana et al. (2022) demonstrate that post-pandemic credit expansion among Java-based banks was accompanied by latent asset quality deterioration, where restructured loans reclassified as performing obscured underlying balance sheet vulnerabilities and subsequently necessitated elevated provisioning charges in later periods.

NPL shows a coefficient of  $-0.91$ , a  $t$ -statistic of  $-1.416$ , and a  $p$ -value of  $0.169$  ( $p > 0.05$ ), indicating  $H_4$  is not statistically supported at conventional significance levels. Despite the negative direction being theoretically consistent, statistical insignificance is likely attributable to OJK's loan restructuring relaxation under Regulation No. 11/POJK.03/2020, which permitted institutions to reclassify restructured credit as performing. This regulatory accommodation artificially suppressed reported NPL ratios throughout 2020–2021, disrupting the conventional transmission channel through which deteriorating asset quality reduces profitability. The policy effectively concealed latent credit quality deterioration, a pattern consistent with findings by Widyastuti and Aini (2021) for Indonesian regional banks and Susanti et al. (2023) for the broader Indonesian banking sector during the pandemic period.

## 5. Discussion

The empirical findings of this study generate several substantive insights about the financial dynamics of Java's RDBs during the 2020–2024 period, which must be interpreted in the context of both the COVID-19 pandemic shock and the subsequent institutional recovery.

The significant positive relationship between NIM and ROA confirms the primacy of interest income efficiency as the main profitability driver for RDBs. This finding aligns with a broad international literature on bank profitability (Mateev et al., 2022; Siddique et al., 2022) and is consistent with Indonesian banking studies (Widyastuti & Aini, 2021; Rifansa et al., 2022). For RDBs specifically, the outsized explanatory power of NIM (coefficient = 0.738, Adjusted R<sup>2</sup> contribution most notable among individual predictors) reflects the structural characteristics of regional banking in Indonesia: RDBs derive a disproportionately high share of revenues from net interest income, with limited fee-based income diversification compared to large national commercial banks. Civil servant payroll lending, a captive market segment for many RDBs, contributes stable, high-margin loan portfolios that sustain NIM even under adverse economic conditions. This finding reinforces the argument, advanced by Satyagraha et al. (2022), that NIM optimisation should be the central pillar of RDB profitability management strategy.

The insignificant negative relationship between CAR and ROA is different from the risk-return hypothesis but is theoretically aligned with the RDB institutional context. During 2020–2022, regional governments across Java injected capital into their RDBs both to comply with OJK minimum requirements and to position regional banks as instruments of local economic stimulus. Unlike capital accumulation through retained earnings, which signals operational efficiency, government-injected capital enlarges the asset base without generating proportional revenue, mechanically diluting ROA. This finding is consistent with Satyagraha et al.'s (2022) stochastic frontier analysis of Indonesian RDBs, which documented that capital adequacy alone does not predict profitability efficiency in government-controlled regional banks. The implication is that blanket capital injection policies, while prudentially necessary, must be accompanied by strategic plans to utilise capital into high-yield earning assets to avoid the ROA-dilution effect documented here.

The absence of a significant positive LDR-ROA relationship, despite the theoretical expectation, reflects the specific credit environment of the post-pandemic recovery phase in Java. The pandemic suppressed credit demand, expanded deposit inflows (as households and businesses reduced consumption and investment), and directed surviving credit growth toward restructured or lower-risk exposures. This configuration produced LDR ratios that were structurally lower than pre-pandemic norms, not necessarily reflecting strategic intermediation decisions, but rather the demand-side dynamics of the crisis. Furthermore, as Darjana et al. (2022) document for the Java region specifically, the credit expansion that happened from 2022 onward carried an extra legacy risk from restructured loan portfolios, creating non-linear effects between loan growth and profitability that aggregate LDR figures do not

capture. This finding suggests that LDR, while a useful regulatory monitoring tool, may have limited predictive value for RDB profitability during structural economic transitions.

The statistically insignificant NPL-ROA relationship, despite its theoretically expected negative direction, represents perhaps the most contextually distinctive finding of this study. The OJK's pandemic restructuring relief policy fundamentally altered the information content of reported NPL ratios during 2020–2021 by permitting the reclassification of impaired loans as performing. While the regulatory intervention was effective in preventing a credit crunch and preserving banking system stability, it resulted in a disconnection between reported asset quality metrics and the true underlying credit risk faced by banks. Similar regulatory distortions of NPL reporting have been documented during European banking crises (Mateev et al., 2022) and in post-Asian financial crisis studies of regional banking in Southeast Asia. As regulatory relief was phased out from March 2022, NPL normalisation pressures emerged for several RDBs, particularly those with concentrated exposure to pandemic-affected sectors such as tourism, hospitality, and small-scale trade (Susanti et al., 2023). The deferred recognition of latent NPLs constitutes a residual risk for RDB profitability in the medium term, beyond the 2024 endpoint of this study.

This study is subject to several limitations that should be acknowledged. First, the sample is restricted to six Java-based RDBs, limiting generalizability to RDBs in outer islands, which may exhibit different financial characteristics, loan portfolio compositions, and regional economic conditions. Second, the model does not incorporate macroeconomic control variables such as inflation, GDP growth, or the Bank Indonesia reference interest rate, nor bank-specific controls such as total assets or operating efficiency ratio (BOPO), which may constitute omitted variable bias. The remaining 16.4% unexplained variance in the model likely captures effects from these excluded factors. Third, the five-year observation period, while encompassing a complete crisis-to-recovery cycle, is relatively short for panel data analysis; extending the time horizon would improve the stability and generalizability of coefficient estimates. Finally, the use of SPSS for panel data regression does not allow for fixed-effects or random-effects estimation to control for unobserved bank-level heterogeneity, a limitation that future research should address using dedicated panel data software such as Stata, EViews, or others.

## 6. Conclusion

This study investigated the determinants of Return on Assets (ROA) among six Regional Development Banks in Java Island over the 2020–2024 period, using balanced panel data from audited annual reports and multiple linear regression analysis. The findings reveal that Net Interest Margin (NIM) is the only variable resulting in a statistically significant positive effect on ROA (coefficient = 0.738,  $p < 0.01$ ), confirming the primacy of interest income efficiency as the main profitability driver for RDBs and highlighting the importance of managing lending spreads and earning asset quality. Individually, CAR, LDR, and NPL ratios failed to show a statistically significant influence on ROA. The negative coefficients observed in CAR

and LDR can be explained by pandemic-driven capital infusion practices and the realignment of credit markets in the post-crisis period, respectively. The insignificance of NPL is most likely explained by OJK's restructuring relaxation policy, which suppressed reported NPL ratios and disrupted the conventional asset quality-to-profitability transmission mechanism during 2020–2021. Together, the four variables explain 83.6% of ROA variance, confirming the collective relevance of the CAMEL-based framework for RDB financial performance evaluation.

These findings carry practical implications for multiple stakeholders. For the management, the results underscore the need to prioritise NIM optimisation through strategic asset-liability management, product pricing, and portfolio diversification beyond low-yield public sector lending. For regional government shareholders, the study highlights the risks of capital injection without strategic earning asset deployment plans, as excess capitalisation decreases the percentage of ROA rather than enhancing it. For OJK and policymakers, the findings suggest that RDB-specific monitoring frameworks should account for the institutional peculiarities of regional bank governance and the distortive effects of pandemic-era regulatory relief on standard financial ratio interpretations.

Future research should address the limitations of this study by expanding the sample to include RDBs across outer island provinces, extending the observation period beyond 2024 to capture full NPL normalisation effects, incorporating macroeconomic controls and bank-level efficiency variables, and applying fixed-effects or random-effects panel regression models to control for unobserved bank-level heterogeneity. Such extensions would substantially enhance the generalizability and policy relevance of findings on the determinants of RDB financial performance in Indonesia.

## References:

- Arintoko, A. (2021). Internal factors affecting commercial bank lending: Symmetric and asymmetric effects of macro-level data evidence. *Jurnal Keuangan dan Perbankan*, 25(3), 717–733. <https://doi.org/10.26905/jkdp.v25i3.5760>
- Badan Pusat Statistik. (2023). *Statistik Indonesia 2023 [Statistical yearbook of Indonesia 2023]*. BPS–Statistics Indonesia. <https://www.bps.go.id>
- Darjana, D., Wiryono, S. K., & Koesrindartoto, D. P. (2022). Does credit performance change in the post-COVID-19? Evidence from Java Island, Indonesia. *Buletin Ekonomi Moneter dan Perbankan*, 25(2), 257–272. <https://doi.org/10.21098/bemp.v25i2.1894>
- Devi, S., Warasnasih, N. M. S., Masdiantini, P. R., & Musmini, L. S. (2020). The impact of COVID-19 pandemic on the financial performance of firms on the Indonesia Stock Exchange. *Journal of Economics, Business, and Accountancy Ventura*, 23(2), 226–242. <https://doi.org/10.14414/jebav.v23i2.2313>
- Haryanto, S., Aristanto, E., Assih, P., Aripin, Z., & Bachtiar, Y. (2021). Loan to deposit ratio, risiko kredit, net interest margin, dan profitabilitas bank. *AFRE (Accounting and Financial Review)*, 4(1), 146–154. <https://doi.org/10.26905/afr.v4i1.6154>

- Hermuningsih, S., Sari, P. P., & Rahmawati, A. D. (2020). The influence of third-party funds and non-performing loans (NPL) on credit distribution with profitability as an intervening variable in commercial banks. *International Journal of Economics, Business and Accounting Research (IJEBAR)*, 4(2), 40–50. <https://doi.org/10.29040/ijebar.v4i02.988>
- Hosen, M. N., Muhari, S., & Kardius, K. C. (2021). The effects of productivity and liquidity on the profitability of Islamic banks in Indonesia. *Al-Iqtishad: Jurnal Ilmu Ekonomi Syariah*, 13(2), 411–430. <https://doi.org/10.15408/aig.v13i2.22585>
- Huong, T. T. X., Nga, T. T. T., & Oanh, T. T. K. (2021). Liquidity risk and bank performance in Southeast Asian countries: A dynamic panel approach. *Quantitative Finance and Economics*, 5(1), 111–133. <https://doi.org/10.3934/qfe.2021006>
- Sudiartana, I. M., Rupa, I. W., & Dewi, I. G. A. A. O. (2021). The influence of macroeconomic indicators on profitability: A case study of regional development banks in Indonesia. *The Journal of Asian Finance, Economics and Business*, 8(8), 581–590. <https://doi.org/10.13106/jafeb.2021.vol8.no8.0581>
- Mardhiyaturrositaningsih. (2022). The impact of the COVID-19 pandemic on the financial performance of Islamic rural banks in Central Java. *Muqtasid: Jurnal Ekonomi dan Perbankan Syariah*, 13(1), 63–76. <https://doi.org/10.18326/muqtasid.v13i1.63-76>
- Mateev, M., Sahyouni, A., & Al Masaeid, T. (2022). Bank performance before and during the COVID-19 crisis: Does efficiency play a role? *Banks and Bank Systems*, 17(3), 1–20. [https://doi.org/10.21511/bbs.17\(3\).2022.01](https://doi.org/10.21511/bbs.17(3).2022.01)
- Otoritas Jasa Keuangan. (2020). *Peraturan OJK Nomor 11/POJK.03/2020 tentang stimulus perekonomian nasional sebagai kebijakan countercyclical dampak penyebaran Coronavirus Disease 2019*. Otoritas Jasa Keuangan. <https://www.ojk.go.id>
- Otoritas Jasa Keuangan. (2023). *Laporan profil industri perbankan triwulan IV 2022 [Banking industry profile report Q4 2022]*. Otoritas Jasa Keuangan. <https://www.ojk.go.id>
- Panggabean, P. B. (2023a). Penerapan metode CAMEL dalam penilaian kondisi kesehatan bank umum pemerintah di Indonesia. *JMBI UNSRAT (Jurnal Ilmiah Manajemen Bisnis dan Inovasi Universitas Sam Ratulangi)*, 10(3), 2411–2419. <https://doi.org/10.35794/jmbi.v10i3.54140>
- Panggabean, P. B. (2023b). Pengukuran rasio keuangan terhadap kinerja bank pemerintah di Indonesia. *JMBI UNSRAT (Jurnal Ilmiah Manajemen Bisnis dan Inovasi Universitas Sam Ratulangi)*, 10(3), 1847–1858.
- Rachim, R. (2021). Financial services authority on profitability with external factors as moderating variables at regional development banks in Indonesia. *Accounting*, 7(5), 1085–1094. <https://doi.org/10.5267/j.ac.2021.3.020>
- Rifansa, M. B., Aisyah, N., & Pulungan, F. (2022). The effect of CAR, NPL, NIM, LDR, and BOPO on return on assets (ROA) in Bank IV Indonesia. *Budapest International Research and Critics Institute Journal (BIRCI-Journal)*, 5(2), 15723–15737. <https://doi.org/10.33258/birci.v5i2.5484>

- 
- Satyagraha, F. T., Purwono, R., & Sari, D. W. (2022). An analysis of the performance of regional development banks (RDB) in Indonesia: Stochastic frontier analysis approach. *Economies*, 10(9), 228. <https://doi.org/10.3390/economies10090228>
- Siddique, A., Khan, M. A., & Khan, Z. (2022). The effect of credit risk management and bank-specific factors on the financial performance of South Asian commercial banks. *Asian Journal of Accounting Research*, 7(2), 182–194. <https://doi.org/10.1108/AJAR-08-2020-0071>
- Susanti, S., Putra, R., & Bahtiar, M. D. (2023). Banking performance before and during the COVID-19 pandemic: Perspectives from Indonesia. *Cogent Economics and Finance*, 11(1), 2202965. <https://doi.org/10.1080/23322039.2023.2202965>
- Suyanto, S. (2021). The effect of bad credit and liquidity on bank performance in Indonesia. *The Journal of Asian Finance, Economics and Business*, 8(3), 451–458. <https://doi.org/10.13106/jafeb.2021.vol8.no3.0451>
- Tangngisalu, J., Hasanuddin, R., Hala, Y., Nurlina, N., & Syahrul, S. (2020). Effect of CAR and NPL on ROA: Empirical study in Indonesian banks. *The Journal of Asian Finance, Economics and Business*, 7(6), 9–18. <https://doi.org/10.13106/jafeb.2020.vol7.no6.009>
- Widarjono, A., Mifrahi, M. N., & Perdana, A. R. A. (2020). Determinants of Indonesian Islamic rural banks' profitability: Collusive or non-collusive behavior? *The Journal of Asian Finance, Economics and Business*, 7(11), 657–668. <https://doi.org/10.13106/jafeb.2020.vol7.no11.657>
- Widyastuti, P. F., & Aini, N. (2021). Pengaruh CAR, NPL, dan LDR terhadap profitabilitas bank (ROA) tahun 2017–2019. *JIMAT: Jurnal Ilmiah Mahasiswa Akuntansi Universitas Pendidikan Ganesha*, 12(3), 1020–1026. <https://doi.org/10.23887/jimat.v12i3.35234>
- Yanti, N. I., Komalasari, A., & Prasetyo, T. J. (2021). Does COVID-19 have an impact on bank performance in Indonesia? A comparative analysis based on BUKU. *Journal Dimensie Management and Public Sector*, 2(2), 9–18. <https://doi.org/10.48173/jdmpps.v2i2.90>