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# Internal Financial Determinants of Profitability: Evidence From Rural Banks in Indonesia

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**ABSTRACT**
Rural banks (BPR) in Indonesia face persistent challenges of low profitability, weak capital adequacy, and high credit risk, despite their vital role in financing micro and small enterprises. This study investigates how internal financial indicators—Capital Adequacy Ratio (CAR), Non-Performing Loans (NPL), Loan to Deposit Ratio (LDR), Cash Ratio (CR), and Operating Expenses to Operating Income (BOPO)—affect profitability, measured by Return on Assets (ROA), in rural banks under the OJK Jember jurisdiction during 2021–2023. Using purposive sampling, 33 rural banks were selected, and panel data regression with the Random Effects Model was applied following Chow, Hausman, and Breusch-Pagan LM tests. The results indicate that BOPO has a significant negative impact on ROA, highlighting operational efficiency as the primary determinant of profitability. By contrast, CAR, NPL, LDR, and CR exhibit no significant individual effects, although collectively they explain 88.03% of ROA variation. These findings confirm that efficiency drives profitability in small-scale financial institutions, while other financial ratios exert joint but indirect influence. This study contributes to the literature by clarifying the relative importance of efficiency in rural banking. It provides practical implications for managers and regulators to strengthen cost control, prudent lending, and liquidity management, thereby promoting sustainable performance.

**Keywords:** Rural Banks Profitability, Capital Adequacy, Efficiency, Credit Risk, Loan.
**JEL Code:** E44, F31, F37, G15

## I. Introduction

Rural banks (BPR) are designed to extend financial services to micro and small enterprises, especially in rural areas underserved by commercial banks. Under the supervision of the Financial Services Authority (OJK), their mandate includes mobilizing savings, channeling credit into productive sectors, and promoting local economic development. Despite this strategic role, BPRs consistently show weaker financial performance than commercial banks, marked by low profitability, limited capital adequacy, and persistent credit risk. Figure 1 highlights these disparities. During 2021–2024, the average Return on Assets (ROA) of BPRs stagnated at 1.94%, compared to 2.69% in commercial banks. Their Capital Adequacy Ratio (CAR) averaged only 7.89%, far below the 26.69% of commercial banks, suggesting limited shock absorption. Non-Performing Loans (NPL) were consistently higher at 7.89%, reflecting fragile credit quality. Loan to Deposit Ratio (LDR) remained relatively low at 77.28%, indicating underutilized deposits, while Operating Expenses to Operating Income (BOPO) exceeded 90%, pointing to significant inefficiencies.

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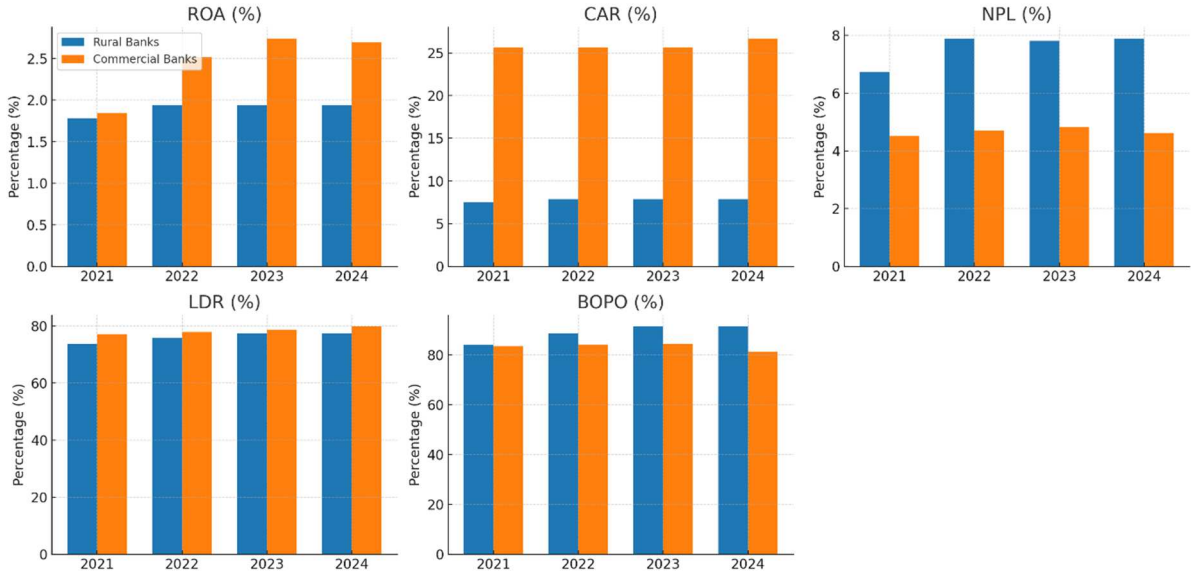


**Figure 1. Comparison of Key Financial Indicators (2021–2024)**

The academic literature identifies five internal factors that shape bank profitability: capital adequacy, which provides resilience but may reduce returns if not used productively (Adhim & Mulyati, 2024; Saputra & Angriani, 2023); credit quality, where high NPL directly lowers earnings (Gupta & Mahakud, 2020; Gazi et al., 2024); credit distribution, reflected by LDR, which can improve profitability if balanced with liquidity (Murtiningrum & Wahyuningsih, 2024; Amir et al., 2022); liquidity, proxied by the Cash Ratio, which supports stability but may reduce returns if excessive (Nadhifa & Budiyanto, 2017; Mohammad & Khan, 2024); and operational efficiency, measured by BOPO, where high ratios suppress profitability (Indraswari & Nurhawaeny, 2017; Hardianto et al., 2024). Most studies confirm these relationships in commercial and Islamic banks; however, limited research has comprehensively analyzed all five factors simultaneously in rural banks, especially using post-pandemic data.

This study addresses that gap by examining the simultaneous impact of CAR, NPL, LDR, Cash Ratio, and BOPO on the profitability of rural banks in the OJK Jember jurisdiction during 2021–2023. The significance of this research lies in clarifying which internal factors most strongly drive the profitability of rural banks, thereby enriching the literature on small-scale financial institutions. From a practical perspective, the findings can guide BPR managers in prioritizing cost efficiency, strengthening credit risk management, and optimizing liquidity allocation. From a policy perspective, regulators can use these insights to design supportive frameworks that enhance resilience and ensure the sustainability of rural banking in Indonesia. The remainder of this article is organized as follows. Section 2 presents a review of the relevant literature and the development of hypotheses. Section 3 describes the research methodology, including data sources, sampling, and analytical techniques. Section 4 reports the empirical findings and provides a discussion in relation to previous studies. Section 5 concludes the study by highlighting the main contributions, managerial and policy implications, and directions for future research.

## II. Literature Review and Hypothesis Development

### 2.1. Financial Intermediation Theory in the Context of Rural Banks

Financial intermediation theory posits that banks act as intermediaries by transforming short-term deposits into long-term loans, thereby reducing transaction costs and mitigating information asymmetry between savers and borrowers (Gurley & Shaw, 1960; Diamond, 1984). Within the rural banking system, this

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intermediation function is crucial because rural banks mobilize local deposits and channel them into productive credit, primarily targeting micro, small, and medium-sized enterprises. Effective intermediation requires not only the capacity to extend credit but also prudent risk management, sound liquidity allocation, and operational efficiency to ensure sustainable profitability.

The variables examined in this study—CAR, NPL, LDR, Cash Ratio, and BOPO—represent key dimensions of this intermediation mechanism. LDR reflects the intensity of transforming deposits into loans, with higher levels indicating more active intermediation but also potential liquidity strain (Berger & Bouwman, 2009; Taswan, 2010). NPL signals the quality of credit allocation, where lower levels indicate effective screening and monitoring, thus supporting profitability (Louzis et al., 2012; Rajan & Dhal, 2003). BOPO captures the cost efficiency of the intermediation process, as excessive operating expenses erode margins, while efficiency improves returns (Athanasoglou et al., 2008; Kasmir, 2018). CAR safeguards solvency and depositor confidence by absorbing potential losses, though excessively high capital levels may reduce asset productivity (Berger, 1995; Taswan, 2010). Finally, the Cash Ratio reflects short-term liquidity strength, which stabilizes intermediation under withdrawal pressures, although excessive liquidity can depress returns due to idle funds (Diamond & Dybvig, 1983; Hossain & Ahamed, 2015).

Taken together, financial intermediation theory provides a coherent framework to understand how these internal bank factors shape profitability in rural banks. Each variable corresponds to a distinct aspect of the intermediation function—solvency, credit quality, liquidity, and efficiency—demonstrating that profitability depends on striking a balance between risk-taking, cost discipline, and liquidity management. This theoretical lens underscores the practical significance of the study: rural bank managers must optimize credit expansion while maintaining prudence and efficiency, and regulators must design supportive frameworks that enhance resilience and safeguard the sustainability of rural banking in emerging economies (Berger & Bouwman, 2009).

### 2.2. Capital Adequacy and Profitability

Capital adequacy is a central element in banking stability and performance, as it reflects a bank's ability to absorb potential losses and safeguard depositor confidence. According to financial intermediation theory, adequate capital enhances the resilience of banks by reducing the probability of insolvency and providing a buffer against credit and operational risks (Diamond & Dybvig, 1983; Berger, 1995). A strong capital base not only supports lending capacity but also enhances credibility in the eyes of depositors and regulators, thereby reducing funding costs and improving the efficiency of the intermediation process. Empirical studies have provided mixed evidence regarding the relationship between capital adequacy and profitability. Several scholars argue that higher capital ratios enhance profitability by lowering risk premiums and fostering greater investor confidence (Bourke, 1989; Berger, 1995). In contrast, other studies highlight the potential trade-off between maintaining high capital levels and maximizing returns, as excess capital may reduce asset productivity and constrain lending activities (Athanasoglou et al., 2008; Taswan, 2010). This duality suggests that while capital adequacy is essential for stability, overly conservative capital holdings may hurt profitability. In the context of rural banks, capital adequacy plays a vital role. Rural banks operate with relatively limited market power and are more vulnerable to credit concentration risks. Strong capital buffers can mitigate these vulnerabilities, allowing banks to expand credit while maintaining solvency and depositor trust. At the same time, an excessively high capital ratio may indicate underutilized funds that could otherwise be allocated to income-generating loans, thus reducing profitability. Based on this reasoning, capital adequacy is expected to have a positive impact on profitability when managed at an optimal level, striking a balance between stability and efficiency.

*H1: Capital Adequacy Ratio (CAR) affects the profitability of rural banks.*

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### 2.3. Credit Quality and Profitability

Credit quality is a critical determinant of bank performance, as it reflects the level of credit risk embedded in a bank's loan portfolio. From the perspective of financial intermediation theory, banks fulfill their intermediary function by transforming deposits into loans, which inherently exposes them to default risk (Diamond & Dybvig, 1983). Poor credit quality, typically measured through a high ratio of non-performing loans (NPLs), undermines this function by eroding asset value, weakening cash flows, and increasing loan-loss provisions (Berger & DeYoung, 1997). Consequently, declining credit quality directly threatens both the stability and profitability of banks. The extant literature provides robust evidence of a negative association between credit quality and profitability. Studies show that higher NPL ratios increase operating costs, reduce interest income, and constrain lending capacity, thereby lowering return on assets (ROA) and return on equity (ROE) (Boudriga et al., 2009; Louzis et al., 2012). Moreover, deteriorating credit quality may damage a bank's reputation and elevate its cost of capital, further reducing profitability (Makri, Tsagkanos, & Bellas, 2014). In the context of rural banks, the impact of credit quality is even more pronounced. Given their concentration in micro, small, and medium-sized enterprises (MSMEs) and local communities, rural banks are susceptible to borrower defaults and local economic fluctuations. Poor credit screening and weak monitoring mechanisms often exacerbate credit risk, making profitability heavily dependent on maintaining sound credit quality. Thus, while rural banks can enhance community access to finance, failure to maintain loan quality can rapidly deteriorate financial performance. Accordingly, it is expected that deteriorating credit quality negatively affects bank profitability.

*H2: Credit quality (NPL) negatively affects the profitability of rural banks.*

### 2.4. Credit Distribution and Profitability

Credit distribution, often captured by the loan-to-deposit ratio (LDR), reflects the extent to which banks utilize mobilized deposits to extend loans. Within the framework of financial intermediation theory, efficient credit allocation is fundamental to a bank's intermediary role in channeling funds from savers to borrowers, thereby supporting both economic activity and the bank's income generation (Diamond & Dybvig, 1983; Levine, 1997). A higher level of credit distribution typically increases interest income and enhances profitability, provided that the loans are prudently managed and credit risk is controlled (Rivard & Thomas, 1997). However, the relationship between credit distribution and profitability is not always linear. While aggressive loan expansion can boost returns in the short term, it may also expose banks to excessive credit risk and liquidity constraints, particularly if the growth outpaces risk management capacity (Athanasoglou et al., 2008).

An excessively high LDR may strain liquidity buffers, elevate funding costs, and increase vulnerability to default, ultimately eroding profitability (Molyneux & Thornton, 1992). Conversely, a very low LDR may indicate underutilization of available funds, which limits income-generating opportunities and constrains profitability. For rural banks, optimal credit distribution is especially critical. Operating predominantly in micro and small-scale markets, rural banks rely heavily on loan income as their primary source of profitability. Maintaining a balanced LDR ensures that deposits are effectively transformed into productive loans, while avoiding the risks associated with overextension. This balance supports sustainable profitability and long-term resilience. Based on this reasoning, it is expected that efficient credit distribution exerts a positive effect on bank profitability.

*H3: Credit distribution (LDR) positively affects the profitability of rural banks.*

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### 2.5. Liquidity and Profitability

Liquidity reflects a bank's ability to honor its short-term obligations while continuing to fund lending activities and investments. According to financial intermediation theory, banks must maintain depositor confidence by ensuring sufficient liquidity, while simultaneously channeling funds into productive assets that generate income (Diamond & Dybvig, 1983). Striking this balance is critical, as both excess and shortage of liquidity can significantly affect bank performance (Bhattacharya & Thakor, 1993). The relationship between liquidity and profitability is therefore ambiguous. On the one hand, higher liquidity enhances stability, reduces funding risk, and protects against unexpected withdrawals, which can contribute positively to profitability by ensuring smooth operations (Bourke, 1989). On the other hand, maintaining excessive liquidity often leads to inefficiency, as liquid assets usually yield lower returns compared to loans and other interest-bearing investments, thereby constraining profitability (Molyneux & Thornton, 1992). Conversely, very low liquidity levels may force banks to seek expensive external funding or liquidate assets at unfavorable conditions, which also harms profitability (Athanasoglou et al., 2008). For rural banks, the liquidity–profitability trade-off is particularly pronounced. Their limited access to capital markets makes them highly dependent on deposit mobilization, while narrow margins and concentrated loan portfolios expose them to greater risks from liquidity shocks. Thus, the profitability impact of liquidity depends mainly on whether it is managed at an optimal level: balanced liquidity supports stable earnings, but both excess and shortage may undermine financial performance. Based on this reasoning, the following hypothesis is proposed.

*H4: Liquidity (Cash Ratio) affects the profitability of rural banks.*

### 2.6. Operational Efficiency and Profitability

Operational efficiency, often measured by the operating income to operating expenses ratio (POBO), indicates how effectively banks control costs relative to revenues. Within the framework of financial intermediation theory, efficient banks are expected to minimize transaction and monitoring costs in order to channel more resources into profitable intermediation activities (Diamond, 1984). A higher POBO ratio indicates a rising operating income relative to expenses, signaling greater efficiency. Such efficiency boosts profit margins and reduces overall bank profitability (Bourke, 1989; Molyneux & Thornton, 1992). In contrast, a lower POBO ratio implies lower efficiency, where costs are poorly managed and profitability is decreased (Athanasoglou et al., 2008). For rural banks, efficiency is particularly critical because their income relies heavily on lending operations, while their scale is limited. Inefficient cost structures—such as excessive administrative or credit monitoring expenses—can quickly diminish earnings. Therefore, maintaining low POBO levels is essential to sustaining profitability. Based on this reasoning, the following hypothesis is proposed.

*H5: Operational efficiency (POBO) positively affects the profitability of rural banks.*

## III. Research Method

The scope of this research encompasses all rural banks registered under the supervision of the Financial Services Authority (OJK) in the Jember region, which includes the regencies of Lumajang, Jember, Bondowoso, Situbondo, and Banyuwangi. The observation period covers 2021–2023, with financial performance indicators obtained from officially published bank-level financial statements. The purposive sampling method was employed to ensure that only rural banks meeting specific criteria were selected. The criteria were as follows: (1) registered with OJK Jember between 2019 and 2023, (2) having complete and officially published financial statements, (3) classified as non-Islamic rural banks, (4) not owned by regional governments, and (5) not involved in mergers or acquisitions during the study period. Based on these criteria, a total of 33 rural banks qualified as valid samples. While purposive sampling ensures relevance to the research

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objectives, potential bias may exist due to the exclusion of banks that do not meet the criteria. This limitation is acknowledged as it may affect the generalizability of the findings (Sugiyono, 2017). The study employs five independent variables—Capital Adequacy Ratio (CAR), Non-Performing Loans (NPL), Loan to Deposit Ratio (LDR), Cash Ratio (CR), and Operational Efficiency (BOPO)—with Return on Assets (ROA) serving as the dependent variable. Each variable is operationalized using established formulas from prior studies, as presented in Table 2.

The dependent variable in this study is profitability, proxied by Return on Assets (ROA), which measures the bank's ability to generate net income from its total assets and is widely regarded as a comprehensive indicator of financial performance (Hendrawan et al., 2018). The independent variables include capital adequacy, credit quality, credit distribution, liquidity, and operational efficiency. Capital adequacy, measured by the Capital Adequacy Ratio (CAR), reflects the bank's resilience in absorbing risk, where a higher CAR may strengthen stability and profitability. However, excessive capitalization could reduce efficiency (Setiawan & Muchtar, 2021). Credit quality, proxied by Non-Performing Loans (NPL), indicates the proportion of problematic loans; higher NPL levels increase provisioning costs and negatively affect profitability (Mazreku et al., 2018). Credit distribution, represented by the Loan-to-Deposit Ratio (LDR), indicates the effectiveness of financial intermediation, with an optimal ratio enhancing lending income. At the same time, excessively high levels may create liquidity pressures (Putri & Suardikha, 2020). Liquidity, captured by the Cash Ratio (CR), illustrates the bank's ability to meet short-term obligations. In contrast, sufficient liquidity enhances confidence and stability, overly high cash reserves reduce income potential, and insufficient liquidity threatens sustainability (Hendrawan et al., 2018). Finally, operational efficiency, measured by the POBO ratio, reflects cost management, where a higher POBO indicates more efficient resource utilization, thereby exerting a positive impact on profitability (Hasanah & Muniarty, 2024).

**Table 2. Variable Definitions and Measurements**

| Variable | Type | Indicator / Formula |
|---|---|---|
| Return on Assets (ROA) | Dependent | $Net\ Income\ /\ Total\ Assets$ |
| Capital Adequacy Ratio (CAR) | Independent | $Capital\ /\ Risk-Weighted\ Assets$ |
| Non-Performing Loans (NPL) | Independent | $Non-Performing\ Loans\ /\ Total\ Loans$ |
| Loan to Deposit Ratio (LDR) | Independent | $Total\ Loans\ /\ Third-Party\ Funds$ |
| Cash Ratio (CR) | Independent | $(Cash + CashEquivalents)/CurrentLiabilities$ |
| POBO (Operating Efficiency) | Independent | $Operating\ Income\ /\ Operating\ Expenses$ |

To examine the effect of independent variables on rural bank profitability, multiple linear regression analysis is employed. To ensure accurate panel data inference, Chow, Hausman, and Breusch-Pagan LM tests will be conducted to select the most suitable model (Pooled OLS, Fixed Effects, or Random Effects). This rigorous selection process is crucial for obtaining unbiased and efficient estimates that account for unobserved heterogeneity across rural banks. The regression model is specified as follows:

$$ROA = \beta_0 + \beta_1 CAR + \beta_2 NPL + \beta_3 LDR + \beta_4 CR + \beta_5 POBO + \varepsilon \quad \text{.....(1)}$$

Where:

1. $\beta_0$ = Constant
2. $\beta_1$–$\beta_5$ = Regression coefficients for each independent variable
3. $\varepsilon$ = Error term

To test the proposed hypotheses, panel data regression analysis was conducted using EViews 12. Prior to estimation, the appropriate model specification was determined through a series of diagnostic tests, namely the Chow test (to compare pooled OLS with fixed effects), the Hausman test (to select between fixed

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and random effects), and the Lagrange Multiplier test (to decide between pooled OLS and random effects). This step ensured that the most suitable estimator was employed, thereby increasing the reliability of the findings.

Once the appropriate model was selected, each hypothesis was tested by examining the significance, sign, and magnitude of the regression coefficients for the independent variables. Specifically, the effect of capital adequacy (CAR), credit quality (NPL), credit distribution (LDR), liquidity (CR), and operational efficiency (POBO) on profitability (ROA) was evaluated at a 5% significance level. A p-value < 0.05 indicates that the independent variable has a statistically significant influence on ROA, while a p-value ≥ 0.05 suggests no significant effect. The sign of the coefficient (positive or negative) further demonstrates whether the relationship is beneficial or detrimental to profitability. For example, a positive CAR coefficient would support the hypothesis that higher capital buffers strengthen financial stability and enhance profitability. In contrast, a negative NPL coefficient would align with the theory that deteriorating credit quality erodes bank earnings.

## IV. Results and Discussion

### 4.1. Descriptive Analysis

The descriptive statistics in Table 3 provide an overview of the distribution and variability of the variables used in this study. The dependent variable, Return on Assets (ROA), has an average value of 3.93%, with a range between –2.76% and 11.52%. This indicates that while some rural banks in the sample were able to generate relatively high profitability, others experienced losses during the observation period. The standard deviation of 3.13% suggests moderate variability in profitability across banks. For the independent variables, the Capital Adequacy Ratio (CAR) shows a relatively high mean of 62.15%, with substantial variation (SD = 36.15%) and a maximum of 176.39%. This reflects that many rural banks maintain capital levels well above the regulatory minimum, though the wide dispersion indicates heterogeneity in capital management practices. Credit Quality (NPL) averages 9.29%, which is above the ideal regulatory benchmark of 5%. The maximum value of 31.43% reveals that certain banks faced severe credit risk, while the median of 6.65% indicates that more than half of the banks still struggled with non-performing loans beyond the recommended threshold. The Loan to Deposit Ratio (LDR) has a mean of 87.08%, with extreme variation ranging from 44.88% to 418.11%.

This implies that while some banks adopt a relatively conservative lending approach, others exhibit excessive loan expansion relative to deposits, potentially exposing them to liquidity risk. In contrast, the Cash Ratio (CR) averages 32.53%, but with a high standard deviation (25.00%) and a maximum of 102.76%, indicating substantial disparity in liquidity positions across banks. Some maintain ample liquid reserves, while others operate with minimal buffers. Finally, Operational Efficiency (POBO) averages 124.85%, with a relatively tight distribution (SD = 17.48%) compared to other variables. The median of 123.03% suggests that most banks operate near this level of efficiency. However, the minimum of 88.59% indicates that certain banks have operational expenses that far exceed their operating income, resulting in inefficiency and losses. Overall, the descriptive results highlight significant heterogeneity among rural banks in the Jember region in terms of profitability, capital strength, credit quality, liquidity, and efficiency.

**Table 3. Results Descriptive Statistics**

| Statistics | ROA | CAR | NPL | LDR | CR | POBO |
|---|---|---|---|---|---|---|
| Mean | 3.93 | 62.15 | 9.29 | 87.08 | 32.53 | 124.85 |
| Median | 3.93 | 57.01 | 6.65 | 78.09 | 25.00 | 123.03 |
| Maximum | 11.52 | 176.39 | 31.43 | 418.11 | 102.76 | 164.69 |
| Minimum | -2.76 | 14.62 | 1.03 | 44.88 | 6.55 | 88.59 |
| Std. Dev. | 3.13 | 36.15 | 7.33 | 41.63 | 25.00 | 17.47 |

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### 4.2. Model Selection Tests

To ensure accurate inference in panel data analysis, model selection was conducted using the Chow, Hausman, and Breusch-Pagan LM tests. The Chow test showed a probability value of 0.0000, indicating that the Fixed Effects Model (FEM) provides a better fit than the Pooled OLS model. In contrast, the Hausman test produced a probability value of 0.5069, suggesting no significant difference between the estimates of FEM and the Random Effects Model (REM), which implies that REM is more appropriate in this context. Furthermore, the Breusch-Pagan LM test resulted in a probability value of 0.0000, confirming that the REM is preferable to Pooled OLS due to the presence of unobserved individual effects across rural banks. Based on these test results, the REM was selected for the final regression model, as it offers estimation efficiency while accounting for heterogeneity across rural banks. (Ghozali, 2018).

### 4.3. Regression Estimation Results (Random Effects Model)

To evaluate the effect of internal financial variables on the profitability of rural banks, measured by Return on Assets (ROA), the study employs a panel data regression using the Random Effects Model (REM). This model was selected based on the results of the Chow, Hausman, and Breusch-Pagan LM tests, which indicated REM as the most appropriate and efficient approach for the dataset. The estimation results from the Random Effects regression model are presented in Table 4.

**Table 4. Regression Results (Random Effects Model)**

| Variable | Coefficient | Std. Error | t-Statistic | Probability | Conclusion |
|---|---|---|---|---|---|
| C | -13.44156 | 3.254873 | -4.1296 | | |
| CAR | -0.072046 | 0.036400 | -1.9792 | +/-2.003 | Not significant |
| NPL | 0.048101 | 0.046747 | 1.028950 | -1.673 | Not significant |
| LDR | -0.024558 | 0.013808 | -1.778549 | +/-2.003 | Not significant |
| CR | 0.149973 | 0.038630 | 3.882297 | +/-2.003 | Significant |
| POBO | 0.147727 | 0.016146 | 9.149185 | 1.673 | Significant |
| R-squared | 0.953198 | | | | |
| F-statistic | 19.68777 | | | | |
| Prob(F-statistic) | 0.000000 | | | | |

The regression results reveal that, among the explanatory variables, only Liquidity (CR) and Operational Efficiency (POBO) have a significant influence on bank profitability (ROA). Liquidity exhibits a positive and significant effect, with a coefficient of 0.1499 and a t-statistic of 3.88 (greater than the critical value of ±2.003). This finding suggests that higher liquidity enhances rural banks' ability to meet short-term obligations while sustaining lending activities, thereby supporting profitability. Operational efficiency, as measured by POBO, also shows a strong and positive association with profitability, with a coefficient of 0.1477 and a t-statistic of 9.15 (greater than the threshold of 1.673). This indicates that more efficient cost management and revenue optimization substantially contribute to improving profitability. Conversely, Capital Adequacy (CAR), Credit Quality (NPL), and Credit Distribution (LDR) are statistically insignificant, implying that these factors do not play a decisive role in determining profitability for rural banks during the study period. The model demonstrates strong explanatory power, with an $R^2$ of 0.9532, suggesting that the independent variables account for 95.32% of the variation in profitability. Furthermore, the F-statistic (19.6878, $p < 0.001$) confirms that the model is jointly significant, supporting the robustness of the findings. In conclusion, the results highlight that liquidity management and operational efficiency (POBO) are the most critical determinants of profitability in rural banks. At the same time, capital adequacy, credit quality, and credit distribution do not exhibit significant effects in this empirical context.

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4.4. Discussion

a. Capital Adequacy and Profitability of Rural Banks

The empirical results indicate that the Capital Adequacy Ratio (CAR) does not have a significant impact on the profitability (ROA) of rural banks. This finding is consistent with prior studies (Saputra & Angriani, 2023; Widyarini & Marsoem, 2021; Murtiningrum & Wahyuningsih, 2024), which suggest that while CAR reflects the financial strength of banks, it does not necessarily translate into higher profitability, particularly in the context of rural banks. Within the framework of financial intermediation theory, capital serves primarily as a risk buffer and a safeguard for banks' intermediation functions (Bossone, 2000; Haris et al., 2020). However, its effectiveness in driving profitability depends on how productively the capital is deployed. In the case of rural banks, capital structures are often conservative and underutilized for productive lending, such as financing MSMEs. As Abdurrohman et al. (2020) noted, high CAR without effective capital mobilization can result in underutilization, thereby limiting its contribution to profitability.

Furthermore, OJK (2024) data show that CAR for rural banks has remained relatively stagnant at 7.89% between 2022 and 2024. This suggests that banks maintain capital levels in line with minimum regulatory requirements rather than leveraging them for aggressive asset expansion. In theoretical terms, this reflects rural banks' limited capacity to convert capital into productive credit, thereby weakening the link between CAR and ROA. Given the small scale, limited distribution networks, and resource constraints of rural banks, credit disbursement decisions tend to be influenced more by borrower quality and operational efficiency than by capital size. Hence, in this context, capital adequacy functions more as a safety buffer than a profit driver. The managerial implication is that rural banks need strategies to optimize capital utilization through improved credit processes, cost efficiency, and digitalization of services to expand productive lending.

b. Credit Quality and Profitability of Rural Banks

The findings show that Non-Performing Loans (NPL) do not significantly affect ROA in rural banks. This result diverges from much of the theoretical and empirical literature, which typically reports a negative relationship between NPL and profitability (Chege & Bichanga, 2017; Gupta & Mahakud, 2020). However, it can be explained by contextual factors specific to rural banks. First, OJK (2024) data indicate that NPLs in rural banks have remained relatively stable, around 7.89% from 2022 to 2024. Although high, this stability suggests that banks have already accounted for the associated risks through adequate provisioning and risk controls, reducing the immediate impact on profitability. Second, rural banks' revenue structures rely heavily on lending to the micro sector, which carries high margins, allowing them to offset potential losses from NPLs. Third, consistent with Widyarini & Marsoem (2021) and Murtiningrum & Wahyuningsih (2024), profitability in rural banks appears more sensitive to operational efficiency (POBO) and intermediation capacity (LDR) than to fluctuations in credit risk. Fourth, rural banks often adopt a relational lending approach rooted in local trust (Hamidi, 2017), which enables more flexible restructuring and renegotiation of problematic loans. Consequently, non-performing loans may not immediately be classified as NPLs, mitigating their effect on profitability. Finally, structural and reporting limitations may also explain this outcome. As Sutrisno (2017) observed, rural banks' risk management systems and internal audit capacities are often limited, potentially leading to conservative reporting of NPLs that do not fully reflect actual credit risk. Thus, the insignificance of NPLs in this study underscores the need to strengthen risk management systems and improve credit quality reporting so that NPLs can serve as a more accurate indicator of financial vulnerability.

c. Credit Distribution and Profitability of Rural Banks

The Loan to Deposit Ratio (LDR) was also found to be statistically insignificant in relation to ROA. This finding aligns with Saputra & Angriani (2023) and Murtiningrum & Wahyuningsih (2024), who argue that while LDR reflects the extent of credit distribution, it does not always directly influence profitability. In financial intermediation theory, LDR measures the ability of banks to channel deposits into credit (Bossone, 2000; Haris et al., 2020). However, its profitability effect depends mainly on credit quality and operational efficiency.

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Between 2021 and 2024, rural banks' LDR fluctuated between 73.67% and 77.28% (OJK, 2024), reflecting cautious credit expansion. Although higher LDRs suggest more lending, profitability gains are contingent on effective risk management. In rural banks, where scale, distribution networks, and technological resources are limited, borrower quality and operational efficiency are more decisive for profitability than LDR levels alone (Gazi et al., 2024; Murtiningrum & Wahyuningsih, 2024). The implication is that third-party funds in rural banks function more as a liquidity safeguard than as a direct profitability driver. Hence, management should prioritize credit risk management and operational optimization to ensure that credit distribution translates into stronger profitability.

d. Liquidity and Profitability of Rural Banks

Unlike CAR, NPL, and LDR, liquidity (measured by Cash Ratio, CR) shows a significant positive effect on profitability. This is consistent with Putri & Pratama (2020), who found that higher liquidity enhances profitability by ensuring stability and resilience against short-term risks. In line with financial intermediation theory, liquidity ensures operational continuity and confidence, enabling banks to meet obligations while channeling funds into productive credit. The average CR of 22.87% during 2021–2024 suggests that rural banks maintained sufficient liquidity buffers while still allocating funds for lending. Supporting evidence from case studies in rural banks in Batang Kapas, Batam, and Lengayang confirms that effective liquidity management contributes to stable profitability (Cintia & Marlius, 2021; Sibagariang & Prima, 2023; Rahmadani & Putra, 2021). Although rural banks operate with slightly lower liquidity than commercial banks, prudent management of CR allows them to sustain healthy profitability. The implication is clear: striking a balance between liquidity and productive lending is crucial for sustaining the profitability of rural banks.

e. Operational Efficiency and Profitability of Rural Banks

The study reveals that operational efficiency, as measured by POBO, has a significant and positive impact on ROA. This result is consistent with Saputra & Angriani (2023), who emphasize that lower POBO (indicating higher efficiency) enhances profitability by reducing costs relative to income. The average POBO improved from 15.97% in 2021 to 10.94% in 2024, reflecting declining operational costs and higher profit margins. Evidence from studies in rural banks in Sidoarjo, Batam, Ternate, and Jambi confirms that improvements in POBO lead to better profitability outcomes (Inggawati et al., 2018; Mahmud & Balamo, 2021; Rifqi, 2024). This highlights the centrality of cost efficiency for rural banks, especially given their competitive disadvantages compared to commercial banks. Furthermore, the integration of digital tools and cost-saving strategies can help rural banks reduce inefficiencies, strengthen profitability, and sustain competitiveness.

## V. Conclusion

This study analyzed the impact of capital adequacy (CAR), credit quality (NPL), loan disbursement (LDR), liquidity (Cash Ratio), and operational efficiency (POBO) on the profitability (ROA) of rural banks (BPR) in the OJK Jember region from 2021 to 2023. The findings reveal that CAR, NPL, and LDR do not exert significant effects on profitability, suggesting that capitalization, non-performing loans, and lending levels alone are insufficient drivers of financial performance without effective utilization and risk management. In contrast, liquidity demonstrates a positive and significant influence, indicating that adequate cash reserves support operational stability and strengthen bank performance. Likewise, operational efficiency (POBO) has a positive impact on profitability, confirming that cost control and efficient resource allocation are crucial determinants of financial sustainability in rural banking.

Despite these insights, the study acknowledges several limitations. First, the reliance on secondary data from annual financial statements restricts the ability to capture short-term fluctuations, such as quarterly or monthly dynamics. Second, the model explains approximately 69% of the variation in profitability, implying that other relevant factors—such as inflation, interest rates, or broader macroeconomic shocks—remain unaccounted for. Third, regulatory changes and extraordinary events during the study period, including the

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aftermath of the COVID-19 pandemic, may have influenced the dataset in ways not fully reflected in the analysis. These limitations provide avenues for future research. Scholars are encouraged to incorporate higher-frequency data (such as quarterly or monthly) to capture more granular profitability dynamics and extend the observation period to enhance the robustness of their findings. Future studies should also integrate both internal and external determinants, including macroeconomic variables, regulatory shifts, and bank-specific risk factors, to develop a more comprehensive understanding of BPR performance.

From a practical perspective, the findings underscore the importance of rural banks strengthening liquidity management and enhancing operational efficiency as key levers for profitability. BPRs should not only focus on loan expansion but also prioritize credit quality and cost efficiency to ensure sustainable growth. Regulators, such as the OJK, are advised to maintain strict oversight of capitalization and liquidity positions, particularly for banks with weaker financial structures, to safeguard sectoral stability. Additionally, efforts to optimize capital utilization and expand inclusive financing mechanisms—such as equity participation or public offerings—could further enhance the resilience and competitiveness of rural banks in supporting local economic development.

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