

# Analyzing How Liquidity, Efficiency, and Bank Size Influence Profitability: Ownership Structure as a Moderator

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## Abstract

Despite asset growth, rural banks in East Java face declining profitability, with limited research on how financial factors and government ownership shape this performance. This study examines the factors influencing the profitability of rural banks (Bank Perekonomian Rakyat/BPR) in East Java, Indonesia, focusing on liquidity, asset quality, operational efficiency, bank size, and government ownership. The research adopts a quantitative explanatory design with a correlational approach, using secondary data from audited financial statements of rural banks registered with the Financial Services Authority (OJK) for the period 2019–2023. The sample was selected through purposive sampling, covering rural banks with available financial reports and a minimum asset size of IDR 50 billion. Data were analyzed using multiple regression analysis (MRA) to test the direct effects of financial variables on profitability and the moderating role of regency government ownership. The results show that operational efficiency, measured by the Operational Expense to Operating Income ratio (BOPO), negatively affects profitability, highlighting the importance of cost management. Liquidity, as indicated by the Cash Ratio (CR), and asset quality, reflected by the Non-Performing Loan (NPL) ratio, have an insignificant impact on profitability in this context. Regency government ownership moderates the relationship between operational efficiency and profitability, suggesting that local government ownership can reduce the adverse effects of high operational costs. However, local government ownership did not significantly affect asset quality, bank size, or profitability. This study underscores the need for better operational efficiency in rural banks.

**Keywords:** Asset Quality, Liquidity, Operational Efficiency, Profitability, Rural Banks.

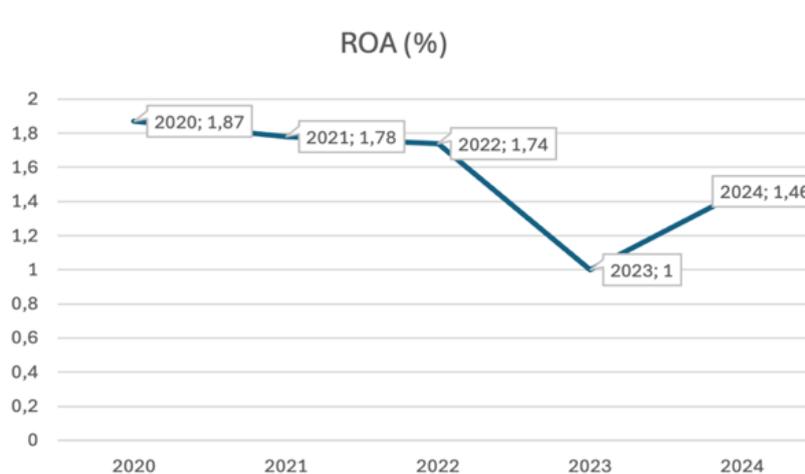
## 1. Introduction

The banking sector plays a crucial role in the economy of a country due to its intermediary function, bridging the gap between fund suppliers and users (Ceysa et al., 2024). This intermediary role allows banks to contribute significantly to economic stability by mobilizing funds, distributing credit, facilitating payment systems, and transmitting monetary policies. As financial institutions, banks facilitate the accumulation of capital through deposits and extend credit to meet the financing needs of various sectors. The strategic position of banks, particularly in fostering economic growth and stability, makes them central players in the financial system of a nation (Kasmir, 2016).

Profitability is one of the most important indicators of banking performance, commonly measured using Return on Assets (ROA). Despite its importance, rural banks in East Java have experienced a decline in ROA between 2021 and 2023 (Figure 1), raising concerns regarding their financial management and sustainability (Financial Services Authority, 2024). Several internal factors are considered to influence ROA. Asset quality, reflected in the Non-



Performing Loan (NPL) ratio, directly affects profitability through higher provisioning costs and reduced lending capacity (Akbar & Nurdiansyah, 2024). Liquidity, measured by the Cash Ratio (CR), while essential for short-term stability, can reduce profitability when excessive reserves limit productive lending opportunities (Puspitasari et al., 2021). Operational efficiency, captured by the ratio of Operational Expense to Operating Income (BOPO), is another critical determinant, as higher values indicate inefficiency that erodes profitability (Alazis, 2020). In addition, bank size has been linked to profitability, where larger banks may benefit from economies of scale, but at the same time face challenges in managing greater operational complexity (Hassan et al., 2023).



**Figure 1. Return on Assets (ROA) from 2020-2024 for Rural Banks in East Java**

Beyond financial indicators, ownership structure has also been recognized as a factor influencing bank performance. Institutional ownership is generally associated with stronger governance and better financial performance. However, the impact of regency and provincial government ownership on rural bank profitability remains underexplored. On the one hand, government ownership could strengthen governance, risk management, and operational discipline; on the other hand, it could also introduce bureaucratic inefficiencies. Moreover, the moderating role of regency and provincial government ownership in the relationship between financial indicators and profitability in rural banks has not been adequately addressed in the literature. Previous studies have mostly concentrated on commercial banks, with limited attention to rural banks, which operate under different structures and challenges (Pratama et al., 2021).

In Indonesia, particularly in East Java, rural banks (Bank Perekonomian Rakyat/BPR) have experienced significant asset growth in recent years. From 2020 to 2024, total assets increased from IDR 14,002 billion to IDR 22,629 billion, marking one of the fastest growth rates among provinces (Financial Services Authority, 2024). This remarkable expansion demonstrates the increasing role of rural banks in regional economic development. However, the decline in profitability despite strong asset growth highlights a paradox that requires further investigation. Specifically, it is necessary to examine how liquidity, asset quality, operational efficiency, and bank size influence profitability, and how these relationships are moderated by regency and provincial government ownership.

Therefore, this study aims to analyze the effects of liquidity, asset quality, operational efficiency, and bank size on the profitability of rural banks in East Java, while examining the moderating role of regency government ownership. The findings are expected to enrich the

literature on rural bank performance and provide practical insights for policymakers and managers in improving financial sustainability.

## 2. Literature Review

### 2.1. Agency Theory

Agency theory is a well-established framework in organizational economics, first formalized by Michael C. Jensen and William H. Meckling in their seminal work in 1976. They introduced the concept of the “agency problem,” which arises when there is a conflict of interest between the principal (the owner or shareholder) and the agent (the manager). This theory suggests that agents, who are hired to act on behalf of the principals, may not always act in the best interest of the shareholders, particularly when their personal interests (e.g., compensation, job security) diverge from those of the owners (Jensen & Meckling, 1976). In the context of banks, agency problems can manifest in various ways, such as when bank managers prioritize short-term gains, job security, or personal benefits over the long-term financial health of the institution, potentially leading to suboptimal decision-making regarding risk, liquidity, asset management, and profitability.

In the banking sector, agency theory has significant implications for understanding how various factors such as ownership structure, financial performance, and governance interact. Bank managers, as agents, are tasked with managing the resources of the bank (such as liquidity, assets, and operational costs) to optimize profitability while balancing risk. Shareholders, as principals, seek the highest possible returns with the least amount of risk. However, differences in goals and incentives between the two groups can lead to inefficiencies or risk-taking behaviors that may not align with the interests of the shareholders. In particular, when ownership structures are complex, or when rural banks are owned by regency governments, these conflicts can be exacerbated, influencing how well resources are allocated and ultimately affecting the overall financial performance of the bank.

### 2.2. Profitability

Profitability is a key indicator of a company’s ability to generate profit from its core operations. In the banking sector, profitability is critical as it measures how efficiently a bank manages its assets and liabilities to generate earnings. One commonly used ratio to assess profitability is Return on Assets (ROA), which evaluates how effectively a bank utilizes its assets to generate profits (Hassan et al., 2023). A higher ROA generally reflects better asset utilization to enhance profitability (Mulyaningsih & Hidajat, 2022). Additionally, Return on Equity (ROE) is another key ratio used to evaluate how well a bank utilizes shareholders’ equity to generate profits, highlighting the return to investors (Rasyid & Sosrowidigdo, 2022) (Rasyid & Sosrowidigdo, 2022). Research has shown that profitability ratios like ROA and ROE are crucial indicators for assessing the financial health of banks, including rural banks in developing regions (Puteri, 2021).

### 2.3. Liquidity

Liquidity refers to a company’s ability to meet its short-term obligations, and the Cash Ratio (CR) is a primary indicator used to measure this. The CR measures the ratio between liquid assets and current liabilities, indicating how well a bank can cover short-term obligations without resorting to additional external resources (Agista et al., 2021). Banks with a higher CR are generally better equipped to handle financial crises, especially in the short term (Hamdillah et al., 2021). However, excessively high CR can also indicate underutilized funds, potentially reducing profitability (Khairani et al., 2020)(Indrayani et al., 2022). For

rural banks, effective liquidity management is essential for maintaining a stable financial position while avoiding idle funds that could otherwise be invested in profitable ventures (Puteri, 2021). Based on these insights, it is hypothesized that liquidity, as measured by the CR, positively affects the profitability of rural banks in East Java.

**H1:** CR has a positive effect on the profitability of Rural banks in East Java.

## 2.4. Asset Quality

The asset quality of a bank is typically measured by the Non-Performing Loan (NPL) ratio, which indicates the proportion of problematic loans in relation to total loans disbursed. A higher NPL ratio suggests that a bank faces significant credit risk, which negatively affects profitability (Tangngisalu, 2020). Research by Akbar and Nurdiansyah (2024) confirms that a high NPL ratio adversely impacts ROA, highlighting the necessity for effective credit risk management to preserve profitability. A study by Budiwati & Jariah (2021) further supports that poor asset quality, especially in the form of high NPLs, leads to an increase in loan loss provisions, which in turn reduces profitability. Given the crucial role asset quality plays in determining profitability, it is hypothesized that a higher NPL ratio negatively affects the profitability of rural banks in East Java.

**H2:** NPL has a negative effect on the profitability of Rural banks in East Java.

## 2.5. Operational Efficiency

Operational efficiency is often measured by the ratio of Operational Expenses to Operating Income (BOPO). A lower BOPO ratio indicates more efficient management of operational costs in generating income. Efficient operational management enhances profitability, whereas a high BOPO ratio signifies inefficiency, reducing profitability (Alazis, 2020). Studies by Akbar and Nurdiansyah (2024) and Indrayani et al. (2022) suggest that a high BOPO ratio is negatively correlated with ROA, emphasizing the importance of cost control in maintaining profitability. Further, operational efficiency impacts the overall cost structure of rural banks, with studies showing that better cost management leads to improved financial performance (Agista et al., 2021). Therefore, it is hypothesized that a higher BOPO ratio negatively affects the profitability of rural banks in East Java.

**H3:** BOPO has a negative effect on the profitability of Rural banks in East Java.

## 2.6. Bank Size

Bank size, typically measured by total assets, is often associated with profitability. Larger banks typically have more resources to disburse loans, make profitable investments, and leverage economies of scale (Priatna et al., 2023). Larger banks also tend to have greater financial stability and the ability to diversify risks, both of which can contribute to higher profitability (Puteri, 2021). However, a larger bank size also poses challenges such as increased operational costs (Widia & Prananta, 2021). In rural banks, size has been found to correlate positively with profitability, as larger banks benefit from greater market reach and resource optimization (Hamdillah et al., 2021). Given the importance of these factors, it is hypothesized that total assets have a positive effect on the profitability of rural banks in East Java.

**H4:** Total assets have a positive effect on the profitability of Rural banks in East Java.

## 2.7. Ownership Structure

The ownership structure of a bank, whether public, private, or foreign owned, can significantly influence its management and performance, including operational efficiency and risk management. In the context of rural banks in East Java, this study focuses specifically on regency and provincial government ownership, which may have distinct impacts on the bank's priorities. For example, government-owned banks often have a different set of objectives

compared to private banks, such as focusing on regional development or local economic stability. These objectives can affect liquidity management, credit risk, and operational efficiency.

Research by Bahtiar and Parasetya (2022) suggests that ownership structure can moderate the relationship between various factors affecting profitability. For instance, regency and provincial government ownership may prioritize social responsibility and regional economic growth, which could influence liquidity and risk management practices. Supporting this, Tamara (2017) found that regional government ownership in Indonesia had a positive impact on profitability, measured by return on assets (ROA) and return on equity (ROE), while simultaneously reducing risk exposure based on the Z-score. Further evidence from Macenning et al. (2023) also emphasizes the role of management efficiency and loan-to-deposit ratio as significant determinants of profitability in Regional Development Banks in Indonesia, highlighting how government involvement can shape internal financial practices. Ownership structures, especially those involving government control, can also impact asset management, risk exposure, and profitability. Thus, it is hypothesized that regency and provincial government ownership moderates the relationship between NPL, BOPO, total assets, and profitability.

**H5:** Regency Government ownership structure affects the relationship between NPL and profitability of Rural banks in East Java.

**H6:** Regency Government ownership structure affects the relationship between BOPO and profitability of Rural banks in East Java.

**H7:** Regency Government ownership structure affects the relationship between total assets and profitability of Rural banks in East Java.

### 3. Methods

The research design for this study is quantitative and explanatory in nature. This approach is selected due to the study aim of analyzing the influence of financial variables on the profitability of rural banks in East Java, as well as exploring the moderating role of regency ownership. The explanatory design allows for the establishment of cause-and-effect relationships between independent variables and the dependent variable, while also examining how ownership structure moderates these relationships. The quantitative approach is suitable as it enables the statistical analysis of numerical data, allowing for objective conclusions that are generalizable (Sugiyono, 2018). Specifically, this study is correlational, as it aims to assess the relationships between liquidity, asset quality, operational efficiency, bank size, and profitability, with regency ownership as a moderating variable. The study focuses on several key variables, each of which has been operationalized in Table 1 as follows.

**Table 1. The key variables and their operationalisation**

Variable	Measurement	Equation
Liquidity	Cash Ratio (CR)	$CR = \frac{\text{Cash and Cash Equivalents}}{\text{Short-Term Liabilities}}$
Asset Quality	Non-Performing Loan (NPL) ratio	$NPL \text{ Ratio} = \frac{\text{Non-Performing Loans}}{\text{Total Loans}}$
Operational Efficiency	Operational Expense to Operating Income ratio (BOPO)	$BOPO = \frac{\text{Operational Expenses}}{\text{Operating Income}}$
Bank Size	Total Assets	$Ln(\text{Total Assets})$

Variable	Measurement	Equation
Profitability (Dependent Variable)	Return on Assets (ROA)	$ROA = \frac{\text{Net Income}}{\text{Total Assets}}$
Regency Ownership (Moderating Variable)	Percentage of shares held by regency governments	$\text{Ownership} = \frac{\text{Local governments}}{\text{Total ownership shares}}$

### 3.1. Sample and Sampling Technique

The target population for this study includes all rural banks in East Java that are owned by regency or provincial governments and are registered and supervised by the Financial Services Authority of Indonesia (OJK). The sampling technique used is purposive sampling, which is appropriate to ensure the selection of banks that are representative of the characteristics of rural banks in East Java and that meet the inclusion criteria of the study. The inclusion criteria required rural banks to have comprehensive financial reports available for the period between 2019 and 2023 and a minimum asset size of IDR 50 billion. The sample is expected to consist of multiple rural banks across East Java, each with varying levels of regency ownership, enabling the examination of the moderating role of regency ownership.

The data used in this study are secondary data, collected from the official annual financial statements of the selected rural banks, which are published by the OJK and the respective banks. These financial reports provide reliable, audited data on key financial ratios such as CR, NPL, BOPO, total assets, and ROA. The method of data collection involves documentation analysis, where financial statements for the relevant period (2019-2023) were accessed from OJK and directly from the rural banks. The data collected is considered reliable due to its verified nature, having been audited by authorized institutions.

### 3.2. Technique of Data Analysis

Descriptive analysis was conducted to summarize data characteristics, including means, standard deviations, and value ranges, ensuring the absence of outliers. Multiple regression analysis (MRA) was then used to assess the direct effects of independent variables on the dependent variable and explore the moderating role of regency ownership. The regression models tested are as follows:

Model without moderating variable:

$$ROA = \alpha + \beta_1 \times CR + \beta_2 \times NPL + \beta_3 \times BOPO + \beta_4 \times Aset + \epsilon$$

Model with moderating variable:

$$ROA = \alpha + \beta_1 \times CR + \beta_2 \times NPL + \beta_3 \times BOPO + \beta_4 \times Aset + \beta_5 \times (NPL \times \text{Regency\_Ownership}) + \beta_6 \times (BOPO \times \text{Regency\_Ownership}) + \beta_7 \times (Aset \times \text{Regency\_Ownership}) + \epsilon$$

where:

1.  $\alpha$  is the constant
2.  $\beta_1$  to  $\beta_9$  are the regression coefficients
3. CR, NPL, BOPO, and Aset are the independent variables
4. Regency\_Ownership represents regency government ownership structure
5.  $\epsilon$  is the error term

To ensure the validity of the regression models, classical assumption tests were performed, including tests for normality, multicollinearity, autocorrelation, and heteroscedasticity. Normality was tested using the Kolmogorov-Smirnov test to ensure that residuals are normally distributed. Multicollinearity was assessed through the variance inflation factor (VIF) to check for high correlations among independent variables. Autocorrelation was examined using the run test to ensure that there is no systematic relationship between residuals over time. Heteroscedasticity was tested using the Glejser regression test to check for non-constant variance of residuals.

## 4. Results and Discussion

Descriptive analysis provides a comprehensive overview of the characteristics of the research variables (Table 2). The statistics include the number of observations (n), minimum, maximum, mean, and standard deviation for variables such as ROA, CR, NPL, BOPO, Size (ln Assets), and Regency Ownership Structure. The results show considerable variation across the 77 sample data points collected from rural banks in East Java during the period 2018 to 2023. For instance, the ROA ranges from a low of 0.63% to a high of 6.92%, with a mean of 2.95% and a standard deviation of 1.36%, indicating a significant variation in profitability across the banks. Liquidity, measured by CR, ranges from 7.20% to 72.16%, with an average of 27.62%. The wide variation in CR indicates differing strategies in liquidity management, with some banks maintaining conservative reserves, while others hold substantial cash for security, impacting credit risk and operational stability. Similarly, the NPL ratio ranges from 0.35% to 13.30%, with a mean of 3.59%, indicating generally manageable asset quality but with notable outliers facing higher credit risk. The operational efficiency, measured by the BOPO ratio, ranges from 54.74% to 96.28%, suggesting varying levels of cost management, with most rural banks operating with relatively low profit margins due to high operational costs.

**Table 2. Descriptive Analysis Results**

Variable	Minimum	Maximum	Mean	Std. Deviation
ROA	0.63	6.92	2.95	1.36
CR	7.20	72.16	27.62	14.03
NPL	0.35	13.30	3.59	2.48
BOPO	54.74	96.28	79.72	7.92
SIZE	16.92	21.92	19.08	1.15
Regency_Ownership	85.78	100.00	98.41	3.53

The Size variable, measured by the natural logarithm of total assets, shows a mean of 19.09, indicating diverse scales among rural banks, with smaller banks having limited lending capacity and larger ones benefiting from economies of scale. The ownership structure is highly concentrated, with a mean of 98.41%, suggesting that most rural banks are predominantly government-owned, primarily by regency governments, which heavily influence funding, budgeting, and operational policies.

### 4.1. Classical Assumption Tests

The data were tested for the classical assumptions of multiple regression analysis. The normality of residuals was tested using the Kolmogorov-Smirnov (K-S) test, which returned a p-value of 0.091, indicating that the residuals meet the assumption of normality. This suggests that the distribution of residuals does not deviate significantly from a normal distribution. Multicollinearity was assessed by examining the Tolerance and Variance Inflation Factor (VIF) values. The results showed that all Tolerance values were above 0.1, and the VIF values were

below 10, indicating that there were no significant issues with multicollinearity. This ensures that the independent variables in the regression model are not highly correlated.

The autocorrelation test was conducted using the Durbin-Watson statistic, which returned a value of 2.1660. This value is close to 2, suggesting that there is no positive autocorrelation present in the model, and the residuals are randomly distributed across observations. Finally, the Glejser test for heteroscedasticity was performed by regressing the absolute residuals on the independent variables. Finally, the Glejser test was conducted to assess heteroscedasticity. The results indicated that most variables, including CR, NPL, and SIZE, had p-values above the significance threshold, suggesting that these variables do not exhibit heteroscedasticity. However, the BOPO variable showed a significant coefficient with a p-value of 0.009, indicating potential heteroscedasticity for this variable.

#### 4.2. Multiple Regression Analysis

Two regression models are used in this study: First model without the moderating variable and second model with the moderating variable and interactions. First model tests the direct effect of CR, NPL, BOPO, and Bank Size (SIZE) on ROA, without considering the moderating effect of regency ownership. The regression equation with the coefficients inserted is as follows:

$$ROA = 18.650 - 0.007 \cdot CR + 0.031 \cdot NPL - 0.157 \cdot BOPO - 0.162 \cdot SIZE$$

The estimated results for this model are presented in Table 3.

**Table 3 Result Multiple Regression Without Moderation**

Variable	Unstd. Coefficients Beta	Std. Error	Std. Coefficients Beta	T	P-Value
(Constant)	18.650	1.238		15.066	<0.001
CR	-0.007	0.005	-0.072	-1.385	0.170
NPL	0.031	0.027	0.056	1.144	0.256
BOPO	-0.157	0.008	-0.914	-18.490	<0.001
SIZE	-0.162	0.057	-0.138	-2.868	0.005
<b>F-Statistics</b>	106.503				
<b>Sig. (F)</b>	0.001				
<b>R-Square</b>	0.855				

In Model 1, the F-statistic value of 106.503 with a significance level of 0.001 confirms that the overall regression model is statistically significant. The R-Square value of 0.855 indicates that 85.5% of the variation in ROA is explained by the independent variables included. This suggests a strong explanatory power, and the adjusted R<sup>2</sup> further supports the model's reliability.

Model 2 introduces regency ownership as a moderating variable and the interaction between independent variables and Regency\_Ownership to examine the moderating effect of regency ownership on the relationship between these variables and profitability (ROA). The regression equation with moderating variables and interactions is as follows:

$$ROA = -4.344 - 0.009 \cdot CR - 0.732 \cdot NPL + 1.703 \cdot BOPO - 6.777 \cdot SIZE + 0.221 \cdot \text{Regency\_Ownership} + 0.008 \cdot (NPL \times \text{Regency\_Ownership}) - 0.019 \cdot (BOPO \times \text{Regency\_Ownership}) + 0.067 \cdot (SIZE \times \text{Regency\_Ownership})$$

The estimated results for this model are presented in table 4.

**Table 4. Result Multiple Regression with Moderation**

Variable	Unstd. Coefficients Beta	Std. Error	Std. Coefficients Beta	T	P-Value
<b>(Constant)</b>	-4.344	58.851		-0.074	0.941
<b>CR</b>	-0.009	0.005	-0.096	-1.830	0.072
<b>NPL</b>	-0.732	1.484	-1.337	-0.494	0.623
<b>BOPO</b>	1.703	0.682	9.910	2.498	0.015
<b>SIZE</b>	-6.777	3.876	-5.739	-1.749	0.085
<b>Owner</b>	0.221	0.594	0.574	0.372	0.711
<b>NPL. Regency_Ownership</b>	0.008	0.015	1.386	0.512	0.610
<b>BOPO. Regency_Ownership</b>	-0.019	0.007	-10.044	-2.727	0.008
<b>SIZE. Regency_Ownership</b>	0.067	0.039	4.171	1.715	0.091
<b>F-Statistics</b>	59.274				
<b>Sig. (F)</b>	0.001				
<b>R-Square</b>	0.875				

Model 2, which incorporates regency ownership as a moderating variable and its interaction with NPL, BOPO, and SIZE, produces an F-statistic of 59.274 ( $p = 0.001$ ), indicating that the overall regression model is statistically significant. The R-Square of 0.875 demonstrates an improvement in explanatory power compared to Model 1, suggesting that 87.5% of the variation in ROA is explained by the included independent variables and their interactions.

### 4.3. Discussion

The results of this study provide a comprehensive understanding of the factors influencing the profitability of rural banks in East Java. Overall, the combination of liquidity, asset quality, operational efficiency, and bank size explains a substantial portion of the variations in profitability, highlighting the importance of internal financial management and operational practices. These findings set the stage for a detailed examination of how each factor, Current Ratio (CR), Non-Performing Loans (NPL), BOPO, and bank size affects the Return on Assets (ROA) of rural banks, as well as the potential moderating role of regency government ownership.

The analysis shows that the Current Ratio (CR) exhibits a negative and statistically insignificant relationship with Return on Assets (ROA) in both Model 1 and Model 2, indicating that higher liquidity does not necessarily enhance profitability. Consequently, the hypothesis that CR positively affects profitability (H1) is not supported. This finding aligns with previous research suggesting that maintaining high liquidity may entail opportunity costs, as funds held in cash reserves are not invested in higher-return opportunities (Khairani et al., 2020). In the context of East Java, rural banks may prioritize lending activities over holding large cash reserves, which could explain the lack of significant impact of liquidity on profitability. Nonetheless, liquidity may assume a more significant role under specific conditions, particularly in volatile markets where it acts as a buffer against financial risks. High liquidity can facilitate crisis management and provide opportunities for funding profitable projects, even if short-term returns are not immediately visible (Sikira et al., 2024). However, rural banks in East Java may not fully experience such buffering benefits.

Similarly, asset quality, measured by Non-Performing Loans (NPL), shows no statistically significant effect on ROA in both models, indicating that NPL does not have a direct impact on profitability in this context. Therefore, the hypothesis that NPL negatively affects profitability (H2) is not supported. This finding contrasts with studies such as Akbar &

Nurdiansyah (2024), which found a significant negative relationship due to higher provisioning costs and reduced lending capacity caused by non-performing loans. The positive but insignificant relationship observed in this study suggests that rural banks in East Java may implement effective risk management practices, such as efficient loan recovery mechanisms or higher provisioning, which mitigate the negative effects of NPLs. This is consistent with Anwar et al. (2020), who emphasized that robust asset quality management can lower NPL ratios and enhance profitability, highlighting the importance of operational practices in shaping the asset quality-profitability relationship.

Operational efficiency (BOPO) demonstrates a highly significant negative effect on profitability across both models. Higher BOPO values are associated with lower ROA, and this effect persists even when considering the moderating role of government ownership in Model 2. Accordingly, the hypothesis that BOPO negatively affects profitability (H3) is strongly supported. These results are consistent with Alazis (2020), who found that inefficiencies in managing operating expenses significantly reduce profitability. For rural banks in East Java, this indicates the necessity of optimizing operational costs, including administrative expenses and loan processing, to enhance profitability (Avramidis et al., 2021; Chernobai et al., 2021; Liao & Xu, 2023; Zhang et al., 2022).

Finally, bank size (SIZE), measured by the natural logarithm of total assets, shows a negative relationship with ROA in both models, suggesting that larger rural banks may experience diminishing returns due to increased operational complexity, despite potential economies of scale. The hypothesis that bank size positively affects profitability (H4) is therefore not supported. This aligns with Priatna et al. (2023), which argues that while larger banks may enjoy scale advantages, these benefits can be offset by higher administrative costs and operational challenges. Zhang et al. (2022) also found that complex structures in larger banks may lead to inefficiencies and operational risks, reducing profitability. Thus, in the context of East Java's rural banks, the expected benefits of scale are not fully realized, likely due to difficulties in managing larger operations effectively.

The study also examined the role of government ownership, specifically regency-level ownership, as a moderating factor in the relationship between key bank performance indicators and profitability. The results indicate that regency ownership does not significantly moderate the relationship between Non-Performing Loans (NPL) and profitability, as evidenced by the insignificant interaction term, meaning that H5 is not supported. This finding may be attributed to the limited capital available to regency-owned banks, which constrains their capacity to manage asset quality effectively despite their local knowledge and proximity to the community (Agustin et al., 2018). Consequently, local government ownership alone does not appear sufficient to mitigate the impact of non-performing loans on rural banks' profitability.

In contrast, the hypothesis that regency ownership moderates the relationship between operational efficiency (BOPO) and profitability (H6) was supported. The interaction term for BOPO  $\times$  Regency Ownership was significant in both models, indicating that regency ownership reduces the negative effect of operational inefficiency on profitability. This suggests that rural banks with local government involvement benefit from better oversight and financial stability, which can offset the adverse effects of high operational costs. Regency ownership likely enhances corporate governance by aligning the bank's objectives with public welfare and ensuring efficient allocation of resources, which contributes to improved profitability even in the presence of operational (Tamara, 2017; Widiyanto et al., 2023).

Moreover, evidence from prior studies Widia & Prananta (2021) indicates that local government-owned banks, particularly in rural areas, are better positioned to focus on social

responsibility and regional economic development. The deep understanding that regency-owned banks have of local financial needs enables them to tailor services effectively, supporting more inclusive economic growth despite capital limitations.

Regarding bank size, the interaction between regency ownership and SIZE (H7) revealed a marginal positive effect in Model 2, suggesting that local government involvement slightly strengthens the positive relationship between bank size and profitability. Although this effect was not statistically significant at the 5% level, it indicates that regency ownership may assist larger rural banks in enhancing profitability by providing capital support and strategic guidance. Such involvement can improve the management of larger operations, aligning with findings by Madya et al. (2022) and Macenning et al. (2023), who emphasized that efficient management and optimal loan-to-deposit ratios (LDR) are critical for profitability in government-owned rural banks.

Overall, these results highlight that while regency government ownership does not uniformly affect all performance relationships, it plays a significant role in moderating the impact of operational efficiency and potentially supports larger banks in achieving better profitability. This suggests that local government participation can strengthen institutional stability and governance, enabling rural banks to better navigate operational challenges and scale effectively.

## 5. Conclusion

This study set out to analyze the influence of liquidity, asset quality, operational efficiency, and bank size on the profitability of rural banks (BPR) in East Java, as well as to examine the moderating role of regency government ownership. The findings consistently demonstrate that operational efficiency (BOPO) has a significant negative effect on profitability, reaffirming the central importance of cost management for rural banks. In contrast, liquidity (CR) and asset quality (NPL) were found to have no significant impact on profitability, suggesting that effective risk management and loan recovery practices may have mitigated their influence. Bank size showed a negative association with profitability, indicating that the benefits of economies of scale may be offset by rising operational complexity. The moderating effect of regency ownership was most evident in the relationship between operational efficiency and profitability, where government ownership reduced the adverse effect of high operational costs. However, regency ownership did not significantly moderate the relationships between NPL, bank size, and profitability.

Theoretical contributions of this study lie in providing empirical evidence that strengthens agency theory and efficiency theory in the context of rural banks. Specifically, the results highlight how government ownership can play a governance role in mitigating inefficiencies, while also showing that traditional determinants of profitability (liquidity and asset quality) may operate differently in smaller, government-owned banks. Practical contributions include the insight that rural banks should prioritize operational efficiency as a key driver of profitability, while policymakers and local governments should focus on strengthening governance mechanisms to reduce inefficiency in government-owned banks. Moreover, the finding that larger rural banks tend to have lower profitability suggests the need for capacity-building initiatives to ensure that scaling up does not compromise efficiency.

By reconnecting these findings to the initial research objective, this study underscores that improving operational efficiency remains the most critical pathway for enhancing rural bank profitability in East Java. Future research could extend this analysis by incorporating external macroeconomic variables or comparing government-owned and privately-owned

rural banks across regions, thereby enriching the understanding of ownership structure in banking performance.

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