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Original Article

Profitability Determinants in Rural Banks: The Moderating Role of Ownership

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Abstract

The profitability of BPRs still faces serious challenges due to relatively low and fluctuating ROA performance compared to other banks. This raises the need to re-examine the financial factors and ownership structure that could potentially affect the performance of BPRs. This study investigates the factors affecting the profitability of rural banks (BPR) in Malang Raya and Pasuruan, Indonesia, with a focus on operational efficiency, credit risk, liquidity, bank size, and ownership structure. Using panel data from the Financial Services Authority (OJK), the study applies multiple linear regression to analyze 168 valid observations after data cleaning. The results reveal that operational efficiency (OER) and credit risk (NPL) negatively affect ROA, while larger bank size also reduces profitability. Liquidity, measured by Loan to Deposit Ratio (LDR) and Loan to Asset Ratio (LAR), does not significantly impact ROA. Furthermore, private ownership amplifies the negative effect of credit risk on profitability. These findings suggest that rural banks should focus on improving operational efficiency, managing credit risk more effectively, and addressing management inefficiencies, particularly in larger institutions. The study also highlights the importance of balancing profit maximization with robust risk management in privately owned banks. The implications of this research are valuable for policymakers and bank managers aiming to enhance financial performance and sustainability in the rural banking sector.

Keywords: Bank Size, Credit Risk, Operational Efficiency, Ownership Structure, Profitability, Rural Banks.

1. Introduction

The banking sector is crucial to the economy in Indonesia, serving as an intermediary between fund providers and the public, facilitating payment transactions, and acting as a key instrument for the transmission of monetary policy issued by the government (Dalimunthe & Lubis, 2023). Rural Banks (Bank Perkreditan Rakyat/BPR) are one type of bank in Indonesia. Rural Banks play an important role in supporting the sustainability of micro, small, and medium-sized enterprises by collecting funds and redistributing them as loans to entrepreneurs. However, rural banks currently face significant challenges in maintaining financial performance, as measured by poor profitability. Profitability serves as a crucial indicator of performance that indicates how well a bank can generate returns using its assets, with Return on Assets (ROA) recognized as a widely adopted metric (Fitri et al., 2025). High profitability ensures the sustainability of banking operations, while low profitability raises concerns about its operational viability (Ross et al., 2017).

BPR (Rural Banks) currently face challenges in maintaining financial performance, particularly demonstrated by profitability that tends to be low and fluctuating. Based on Table 1, BPR's ROA experienced a sharp decline in 2023 from 1.74% to 1.00%, while commercial banks' ROA increased significantly. Furthermore, BPR's ROA throughout the 2021–2024

period remained below the average of commercial banks and Islamic banks, indicating profitability instability and the need for deeper analysis regarding the factors that influence it.

Table 1. Performance comparison of ROA in rural, commercial, and Islamic banks

Year	Rural Bank (%)	Commercial Bank (%)	Islamic Bank (%)
2021	1.78	2.56	1.55
2022	1.74	3.41	2.00
2023	1.00	3.85	1.88
2024	1.46	3.77	2.07

The performance comparison of ROA among rural bank, commercial banks, and Islamic banks, as presented in Table 1, reveals that rural bank typically exhibits lower and more fluctuating ROA values compared to their counterparts (OJK, 2024). This discrepancy underscores the need for a deeper understanding of the factors influencing profitability in rural bank. Liquidity, operational efficiency, and credit risk are among the factors that influence the level of profitability achieved by a bank, each contributing in different ways. Liquidity ratios such as Loan to Deposit Ratio (LDR) and Loan to Asset Ratio (LAR) are commonly used to assess liquidity, while operational efficiency is often measured by the Operational Efficiency Ratio (OER) (Syafitri et al., 2023). Furthermore, credit risk, indicated by the Non-Performing Loan (NPL) ratio, and bank size have been shown to influence profitability, though the results of existing studies have been inconsistent, highlighting the need for further exploration (Abdelaziz et al., 2020; Anggraeni et al., 2023).

Although several previous studies have examined the impact of financial variables such as liquidity, operational efficiency, and credit risk on bank profitability, the results for rural banks remain inconsistent. For instance, the relationship between liquidity ratios, such as the Loan to Deposit Ratio (LDR), and Return on Assets (ROA) has shown mixed findings (Rakhmawati et al., 2021). Similarly, the effects of operational efficiency, measured by the Operational Efficiency Ratio (OER), and credit risk, measured by Non-Performing Loan (NPL) ratios, on profitability continue to be debated (Martsila & Meiranto, 2013; Suwandi & Nurdin, 2024).

This inconsistency is likely caused by differences in regional context, bank size, ownership structure, and methodology used. Furthermore, most previous studies have not considered the role of moderation or interaction, such as the influence of ownership structure, which can strengthen or weaken the relationship between financial variables and profitability. Therefore, there is a research gap that emphasizes the need for more comprehensive analysis regarding factors that affect BPR profitability in various contexts.

Although several previous studies have examined the influence of liquidity, operational efficiency, and credit risk on bank profitability, empirical studies focusing on rural banks (BPR) in Greater Malang are still limited. One important aspect that has not received much attention is the role of private ownership as a moderating variable in the relationship between credit risk and profitability, particularly in the BPR context.

This research aims to fill this gap by analyzing the influence of liquidity, operational efficiency, credit risk, and bank size on profitability, while simultaneously examining the moderating role of private ownership in BPRs located in Malang City and Pasuruan. The selection of Greater Malang and Pasuruan regions is based on the central role of BPRs in MSME financing in these areas, as well as profitability fluctuations that indicate the need for deeper empirical study of factors affecting BPR financial performance.

By focusing on BPRs in Greater Malang, this research is expected to provide new insights regarding factors that influence BPR profitability and highlight the importance of governance structure, such as private ownership, in shaping financial performance. The findings of this research are also expected to fill the literature gap while providing practical guidance for improving operational strategies and long-term sustainability of BPRs in the region.

2. Literature Review

2.1. Agency Theory

Agency theory addresses the conflicts arising from the division between ownership and control within organizations, focusing on the dynamics between principals (owners) and agents (managers) (Moloi & Marwala, 2020). The theory highlights that the different goals of principals and agents can create problems that impact the organization's efficiency (Zhang et al., 2022). The theory asserts that principals and agents may have conflicting interests, which leads to agency problems (Halim et al., 2024). To solve these issues, strategies like incentive structures and independent audits have been suggested (Possler et al., 2023). Sukendri et al. (2024) offers a valuable insight by applying agency theory to the banking sector, stressing how ownership concentration can help reduce agency costs. Their study underscores that insider ownership concentration, as compared to outsider ownership, is more effective in managing these costs, highlighting the relevance of ownership in minimizing conflicts between principals and agents.

Farooque (2021)adds another layer to this understanding, focusing on the importance of ownership and audit committee governance in mitigating agency costs in New Zealand firms. He highlights the positive effects of insider ownership and the independence of audit committees in controlling agency costs, suggesting that strong governance mechanisms are crucial in minimizing conflicts, especially in less-regulated environments. Hendrastuti & Harahap (2023) expand on this perspective by providing a comprehensive review of agency theory, categorizing agency problems into various forms, such as information asymmetry and moral hazard. They propose solutions through stronger incentive alignment and more intensive monitoring. Their contributions focus on the critical role of supervision and incentive adjustments in reducing imbalances arising from information dependence in agency relationships.

On the other hand, intermediation theory explains the critical role of banks as intermediaries between savers (those with surplus funds) and borrowers (those with a deficit). This function is central to ensuring the smooth transfer of funds, and banks act as financial intermediaries, contributing to economic stability (Hu & Varas, 2025). In Indonesia, this function is regulated under Law No. 10 of 1998, which emphasizes the vital role of banks in ensuring the flow of capital for economic activities. By collecting deposits and providing loans, banks contribute to the efficient allocation of resources and the overall stability of the financial system.

2.2. Profitability

Profitability serves as an indicator of how effectively a bank can earn income through its main activities. Maintaining high liquidity generally improves the financial safety of a bank by lowering the likelihood of bankruptcy, although an overabundance of liquid assets may diminish profitability if the funds are not used efficiently (Junianti et al., 2023). The financial performance of a bank can be evaluated using several financial ratios, such as ROA, which indicates how effectively the bank uses its assets to generate profit (Gupta & Dongre, 2024).

According to the Financial Services Authority (*Otoritas Jasa Keuangan*/OJK) through Circular Letter OJK No. 9/SEOJK.03/2020, profitability can also be measured using the ROA ratio. This ratio functions as an essential instrument to evaluate how efficiently a bank operates and how well it can optimize profit using the resources it manages (OJK, 2020).

2.3. Liquidity

Liquidity refers to the capacity of a bank to fulfill its short-term liabilities and acts as a crucial indicator of overall financial stability (Nikolchuk et al., 2023). In this study, liquidity is measured using two main ratios, Loan to Deposit Ratio (LDR) and Loan to Asset Ratio (LAR). LDR indicates the extent to which available funds from deposits are channelled into lending activities, showing how effectively deposits are being utilized. However, an excessively high LDR may expose the bank to risks related to liquidity in the event of large-scale fund withdrawals, while an extremely low LDR may signal underutilization of available funds. Meanwhile, LAR illustrates the portion of total assets committed to lending, and a very high value may increase the likelihood of credit risk, potentially reducing overall profitability (Prabowo et al., 2018). Managing liquidity effectively is crucial for maintaining a balance between profitability and risk.

Investigation by Yulyanti et al. (2022) suggested that LDR significantly affects profitability (ROA), with a well-managed LDR positively contributing to profitability. However, a high LDR may introduce liquidity risks, especially during large-scale withdrawals, potentially affecting the stability and profit margins of the bank. Similarly, an excessively high LAR may drive profitability but also increases the likelihood of credit risks, which negatively impacts ROA as NPL rise. Therefore, managing liquidity through these ratios is key to maintaining a balance between profitability and financial stability. Building on the discussion above, it is proposed that liquidity, as indicated by the Loan to Deposit Ratio (LDR) and Loan to Asset Ratio (LAR), has a positive impact on the profitability of rural banks.

H1: Liquidity (LDR and LAR) positively affects profitability.

2.4. Operational Efficiency

The effectiveness of a bank in managing its operations plays a vital role in influencing overall profitability. This level of efficiency is commonly assessed through the Operational Efficiency Ratio (OER). When the OER is low, it reflects strong cost control and optimal operational performance, which in turn supports higher profit levels. On the other hand, a high OER points to operational shortcomings that may reduce earnings. Properly managing operational activities is fundamental for maintaining strong profitability and ensuring the institution remains competitive within the financial industry (Allen & Rai, 1996).

Study by Wardana & Setiadi (2023) found a significant negative relationship between high OER ratios and ROA. Banks with low OER are more likely to manage their operations efficiently, which leads to higher profitability. Therefore, improving operational efficiency is directly tied to maximizing profitability in banking operations. Given the crucial role of operational efficiency in banking profitability, it is hypothesized that a higher OER negatively affects the profitability of rural banks.

H2: Operational efficiency negatively affects profitability.

2.5. Credit Risk

Credit risk is a significant concern for banks and is typically measured using the NPL ratio. NPL represents the proportion of loans that are not being repaid as scheduled (Othman & Gabbori, 2024). A high NPL ratio indicates that the bank is exposed to a greater risk of loan defaults, which can negatively affect its profitability (Abdelaziz et al., 2020). Effective

management of credit risk is essential to uphold financial stability and ensure that credit losses do not reduce profitability.

According to Abdelaziz et al. (2020), a higher NPL ratio leads to lower ROA due to the increased costs associated with managing non-performing loans. Effective credit risk management is crucial for maintaining a high ROA. Banks with well-managed credit portfolios generally exhibit lower NPL ratios, leading to improved profitability. Considering the critical role of credit risk management in sustaining profitability, it is hypothesized that credit risk, as indicated by the NPL ratio, negatively impacts the profitability of rural banks.

H3: Credit risk negatively affects profitability.

2.6. Bank Size

Bank size is a key factor in evaluating the capacity of a bank to generate revenue. Typically, larger banks possess greater resources, enabling them to provide more credit and undertake substantial investments. However, larger banks also face challenges, such as managing higher operational costs and risks associated with their larger scale (Darto et al., 2023; Sutandijo & Sugiyarti, 2022). The management of a large asset base is crucial for improving profitability, as poorly managed large banks may face diminished returns despite their greater resources. Research by suggested that while larger banks benefit from economies of scale, the operational complexity and increased costs may limit the return on assets if not managed effectively. On the other hand, Sutandijo & Sugiyarti (2022) found that larger banks tend to have more stable financial performance, which may lead to a more consistent ROA. Given the complex relationship between bank size and profitability, it is hypothesized that larger banks are likely to experience more stable profitability, although their size may also present operational challenges. Therefore, it is hypothesized that bank size, as measured by natural logarithm of total assets, affects the profitability of rural banks.

H4: Bank size affects profitability.

2.7. Private Ownership Structure

The ownership structure of banks is a critical factor in shaping their approach to managing credit risk, including non-performing loans (NPLs), and its subsequent impact on profitability. A robust body of literature suggests that ownership structures, whether private, public, or foreign, influence how banks manage risks, operational efficiency, and financial performance. Particularly, private ownership structures have been shown to enhance a bank's flexibility in decision-making, allowing them to respond more swiftly to market fluctuations and manage risks more efficiently.

Private banks generally exhibit greater agility in credit risk management compared to state-owned or public banks. As private owners tend to focus on profit maximization, they are more likely to implement efficient risk mitigation strategies and pursue operational changes that improve profitability (Sutanto et al., 2024). This shows up in private banks having lower NPL rates, as they're motivated to keep defaults low to protect their bottom line. Studies also suggest that banks with concentrated ownership, where a few key players hold most of the control, tend to monitor risks more closely and face less financial exposure (Kihuro, 2023).

The link between ownership and profitability has been studied extensively. Ownership concentration can directly improve decision-making or indirectly shape how banks handle credit risks. Research by Luana et al. (2024) highlighted that the ownership structure has a significant impact on how credit risk (NPLs) affects profitability in ASEAN banks. Similarly, Wardoyo et al. (2022) demonstrated that in rural banks in Semarang, ownership concentration moderated the negative effects of NPLs on profitability, indicating that ownership plays a crucial role in mitigating the adverse effects of credit risk.

The impact of ownership structure on the relationship between NPLs and profitability was also highlighted by Suresh G et al. (2021), who found that concentrated ownership structures lead to higher profitability due to more effective risk management and a stronger focus on operational efficiency. In line with these findings, Chaudhary (2025) argued that the ownership structure of a bank indirectly affects how it responds to credit risk, such as NPLs, and how that response influences profitability. Ownership concentration helps safeguard investments and mitigate potential financial losses from non-performing loans, which, in turn, protects profitability.

Considering the body of literature, it is evident that ownership structure plays a significant role in moderating the relationship between credit risk and profitability. This aligns with the findings of Kihuro (2023), who showed that ownership structure not only impacts a bank's risk management practices but also affects its profitability. Therefore, it is hypothesized that ownership structure moderates the relationship between credit risk (NPL) and profitability, with concentrated ownership structures likely enhancing profitability by improving the bank's ability to manage credit risk efficiently.

H5: Ownership structure moderates the relationship between credit risk (NPL) and profitability.

2.8. Conceptual Framework

The conceptual model for this research is illustrated in Figure 1. The model emphasizes the direct effects of liquidity, operational efficiency, and credit risk on profitability (measured by ROA). Additionally, the ownership structure is considered a moderating variable, influencing the relationships between these financial variables and profitability. This framework aligns with the theoretical perspectives of agency and intermediation, extending them by incorporating empirical evidence from previous studies.

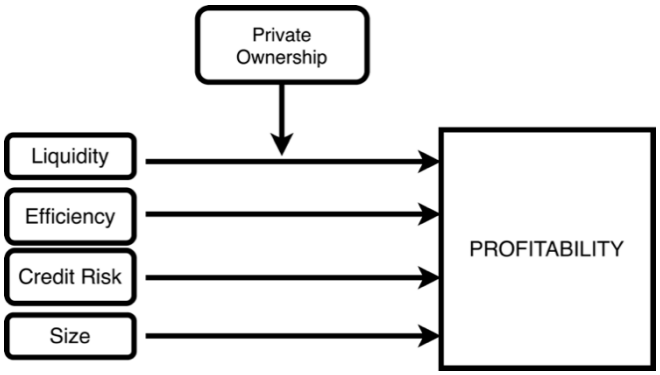

Figure 1. Conceptual Framework

3. Methods

3.1. Research Type

This research is classified as quantitative research because it uses numerical data taken from rural bank (BPR) financial reports to be analyzed statistically. This research is also categorized as associative-causal (causal-comparative) research, as it aims to determine the cause-and-effect relationship between several independent variables, namely LDR, LAR, OER, NPL, and Bank Size, on the dependent variable which is profitability (ROA), while simultaneously examining the role of the moderating variable, namely private ownership, in influencing these relationships. Thus, this research not only describes data, but also systematically tests the influence and interactions between variables.

3.2. Research Variables and Operational Definitions

To better understand the interactions between the variables in this study, it is essential to define and measure each of the variables involved. These variables include dependent, independent, and moderating variables that impact the profitability of rural banks. Below is an explanation of the measurement methods for each variable utilized in this study.

Profitability, as the dependent variable, indicates the ability of a bank to generate profit from assets.

$$ROA = \frac{\text{Net Income}}{\text{Total Assets}} \quad \text{..... (1)}$$

In addition, LDR, LAR, OER, NPL, and Bank Size act as independent variables.
LDR measures the amount of loans granted by the bank compared to the total deposits held.

$$LDR = \frac{\text{Total Loans}}{\text{Total Deposits}} \quad \text{..... (2)}$$

LAR measures the proportion of total loans given by the bank relative to its total assets.

$$LAR = \frac{\text{Total Loans}}{\text{Total Assets}} \quad \text{..... (3)}$$

OER measures the operational efficiency of the bank by comparing total operating expenses to operating income.

$$OER = \frac{\text{Operating Expenses}}{\text{Operating Income}} \quad \text{..... (4)}$$

NPL measures the quality of loans by showing the proportion of loans that are problematic or not repaid as scheduled.

$$NPL = \frac{\text{Non-Performing Loans}}{\text{Total Loans}} \quad \text{..... (5)}$$

Bank size is measured by the total assets owned, which indicates the scale of operations and the capacity of the bank.

$$\text{Bank Size} = \text{Total Assets} \quad \text{..... (6)}$$

Private ownership structure, as a moderating variable, measures the extent to which the bank is privately owned. In this study, it is operationalized as a dummy variable where 1 indicates a privately-owned rural bank and 0 indicates a government-owned rural bank. This coding allows testing whether private ownership modifies the relationship between liquidity (LDR) and profitability (ROA).

3.3. Sample and Sampling Technique

To analyze the impact of the independent variables on profitability (measured by ROA), this study employs Multiple Regression Analysis. Multiple regression is a statistical technique used to examine the relationship between one dependent variable and multiple independent variables. In this study, ROA is the dependent variable, while the independent variables include LDR, LAR, OER, NPL, and Bank Size. The sample consists of rural banks in East Java Province, including both government-owned and privately-owned banks, selected purposively to ensure data relevance and comparability across similar operational and regulatory

conditions. The research period of 2018-2023 was chosen to capture recent performance trends, including both pre- and post-pandemic conditions. The regression model helps determine how each independent variable influences profitability, as well as the direction (positive or negative) of these relationships.

3.4. Analytical Method and Hypothesis Testing

To analyze the impact of the independent variables on profitability (measured by ROA), this study employs Multiple Regression Analysis. Multiple regression is a statistical technique used to examine the relationship between one dependent variable and multiple independent variables. In this case, ROA is the dependent variable, while the independent variables include LDR, LAR, OER, NPL, and Bank Size. The regression model helps determine how each independent variable influences profitability, as well as the direction (positive or negative) of these relationships.

The regression model employed in this study is outlined as follows:

A. Model 1 (without moderating effect):

$$ROA_1 = \alpha + \beta_1(LDR) + \beta_2(LAR) + \beta_3(OER) + \beta_4(NPL) + \beta_5(\text{Bank Size}) + e \quad \ldots\ldots\ldots (7)$$

B. Model 2 (with moderating effect):

$$ROA_2 = \alpha + \beta_1(LDR) + \beta_2(LAR) + \beta_3(OER) + \beta_4(NPL) + \beta_5(\text{Bank Size}) + \beta_6(LDR \times \text{Private Ownership}) + e \quad \ldots\ldots\ldots (8)$$

The regression model employed in this study is outlined in two forms: Model 1, which does not include a moderating effect, and Model 2, which includes the moderating effect of private ownership structure. In Model 1, ROA is explained by the independent variables LDR, LAR, OER, NPL, and Bank Size. In Model 2, the interaction term between LDR and private ownership structure is added to test whether ownership structure alters the relationship between liquidity and profitability. The coefficients $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ represent the influence of each variable, and the intercept α indicates the value of ROA when all variables are zero.

Using linear regression will result in an analysis of coefficients, significance, simultaneous effects, and model accuracy or determination. Before interpreting these results, classical assumption tests are conducted to ensure that the data meets the necessary assumptions for valid regression analysis, such as normality, multicollinearity, autocorrelation, and heteroscedasticity (Mardiatmoko, 2024).

4. Results and Discussion

4.1. Research Results

4.1.1. Descriptive Statistics

The dataset consists of 168 valid observations from rural banks in Malang Raya and Pasuruan, including both government-owned and privately owned institutions, collected from annual financial reports published by the OJK and carefully cleaned to remove incomplete data and outliers. Key financial indicators analyzed include operational efficiency (OER), credit risk (NPL), liquidity (LDR and LAR), bank size (total assets), and profitability (ROA), with ownership type included to examine its moderating effect.

The descriptive statistics in Table 2 provide a clear picture of the financial condition of rural banks in Malang Raya and Pasuruan. On average, the ROA is 4.43%, which is well above the minimum requirement of 1.5% set in SEOJK No. 11/SEOJK.03/2022, indicating that most banks in the sample are operating at a profitable level. The BOPO ratio averages 78.88%, also below the 85% threshold stipulated in the same regulation, suggesting that operational efficiency is being maintained (OJK, 2022). Liquidity is also relatively sound, with an average LDR of 84.09%, which falls within the recommended safe range of 80% to 110% as defined by SEOJK No. 10/SEOJK.03/2014 (OJK, 2014). These indicators suggest that, in general, rural banks in the region demonstrate healthy profitability, efficiency, and liquidity.

Table 2 Summary of Descriptive Statistics

Variable	N	Minimum	Maximum	Mean	Std. Deviation
ROA	168	0.73	13.39	4.43	2.48
OER	168	52.58	105.15	78.88	9.90
LDR	168	26.27	273.23	84.09	34.52
LAR	168	0.11	0.87	0.64	0.13
NPL	168	0.07	31.06	7.32	6.78
Size	168	15.52	20.05	17.25	0.87
Ownership	168	0	1	0.07	0.25

Source: Processed Data (2025)

In contrast, the average NPL stands at 7.32%, which exceeds the 5% limit defined by Bank Indonesia Regulation No. 13/1/PBI/2011 (Bank Indonesia, 2011), signaling that credit quality remains a serious challenge. This high level of problem loans indicates weaknesses in lending practices and risk management, which could erode the otherwise positive financial performance. Interestingly, the coexistence of high profitability with high credit risk raises an important question about the sustainability of these results. It suggests that while rural banks in Malang Raya and Pasuruan are able to generate significant returns, they may be exposed to vulnerabilities that could threaten long-term stability. This paradox further motivates the need to examine how factors such as ownership structure, efficiency, and governance interact with risk to shape profitability outcomes.

4.1.2. Multiple Linear Regression Analysis

Before conducting regression analysis, classical assumption tests were performed to ensure model validity. The Kolmogorov-Smirnov test shows an Asymp. Sig. value of 0.200 and a Monte Carlo value of 0.580, both above 0.05, indicating normally distributed residuals. Multicollinearity analysis (Table 3) shows tolerance values above 0.1 and VIF values below 10, confirming no multicollinearity among variables. The Durbin-Watson statistic of 1.824 falls within the acceptable range, suggesting no autocorrelation. Finally, the Glejser test results show all significance values above 0.05, indicating no heteroscedasticity. Thus, the regression model meets all classical assumptions and is considered valid and reliable.

With these assumptions satisfied, the regression analysis was carried out using two models. The first model examined the direct effects of liquidity, operational efficiency, credit risk, and bank size on profitability. The second model introduced an interaction term between NPL and ownership to test whether private ownership modifies the relationship between credit risk and profitability. The regression equations for both models are presented as follows:

A. Model 1 (without moderating variable):

$$ROA = 28.289 - 0.221\ (OER) + 0.001\ (LDR) + 1.139\ (LAR) - 0.029\ (NPL) - 0.407\ (Size)$$

The regression results on both models show that there are several differences when the moderating variable is included. In Model 1 (without moderating variable), profitability (ROA) is negatively influenced by operational efficiency (OER), credit risk (NPL), and bank size (Size), while liquidity measured by Loan to Deposit Ratio (LDR) and Loan to Asset Ratio (LAR) has a positive effect on ROA. This indicates that the more efficient a bank is in managing its operational costs, the lower the profitability obtained, which may reflect inefficiency in the cost structure. Conversely, increased liquidity, both through LDR and LAR, drives increased profitability.

B. Model 2 (with moderating variable NPL × Ownership):

$$ROA = 28.414 - 0.219\ (OER) + 0.002\ (LDR) + 1.059\ (LAR) - 0.033\ (NPL) - 0.420\ (Size) - 0.201\ (NPL \times Ownership)$$

Meanwhile, in Model 2 (with the moderating variable NPL × Ownership), the direction of coefficients from the main variables is relatively consistent with Model 1, but their coefficient values change slightly. The main difference lies in the inclusion of the interaction between credit risk (NPL) and ownership (Ownership), which produces a negative coefficient (-0.201). This indicates that private ownership strengthens the negative impact of credit risk on bank profitability. In other words, when banks with private ownership experience an increase in NPL, the decline in profitability becomes sharper compared to banks without private ownership. This finding confirms the important role of ownership structure in moderating the relationship between credit risk and profitability, and provides implications that credit risk management must be given more attention by banks with private ownership to avoid suppressing financial performance.

Table 3 Regression Model Without Moderation

Coefficients[a]						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	28.289	1.842		15.360	<0.001
	OER	-0.221	0.008	-0.883	-26.405	<0.001
	LDR	0.001	0.003	0.012	.336	0.737
	LAR	1.139	0.665	0.061	1.712	0.089
	NPL	-0.029	0.012	-0.079	-2.313	0.022
	Size	-0.407	0.094	-0.144	-4.349	<0.001
	F Statistics	157.324				
	Sig. (F)	<0.001				
	R^2	0.829				

Source: Processed Data (2025)

In the first regression model (shown in Table 3), the F-statistic for Model 1 is 157.324 ($p < 0.001$), indicating that the model is statistically significant overall. The R^2 value of 0.829 suggests that 82.9% of the variance in ROA is explained by the independent variables. The Adjusted R^2 is 0.824, confirming that the model remains robust after accounting for the number of predictors.

Table 4 Regression Model with Moderation

Coefficients[a]						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	28.414	1.779		15.972	<0.001
	OER	-0.219	0.008	-0.873	-26.936	<0.001
	LDR	0.002	0.003	0.021	0.606	0.545
	LAR	1.059	0.643	0.057	1.646	0.102
	NPL	-0.033	0.012	-0.090	-2.719	0.007
	Size	-0.420	0.090	-0.148	-4.641	<0.001
	NPL.Ownerhip	-0.201	0.056	-0.113	-3.565	<0.001
	F Statistics	142.697				
	Sig. (F)x	<0.001				
	R^2	0.842				

Source: Processed Data (2025)

In Model 2 (shown in Table 4), the F-statistic is 142.697 ($p < 0.001$), showing that the model is still highly significant overall, although slightly lower than Model 1. The R^2 increases to 0.842, meaning that 84.2% of the variation in ROA is now explained by the model. The Adjusted R^2 also improves to 0.836, indicating better model fit despite the inclusion of an additional variable. This improvement from $R^2 = 0.829$ in Model 1 to $R^2 = 0.842$ in Model 2 shows that ownership structure as a moderating variable strengthens the model's explanatory power.

4.2. Discussion

4.2.1. The Effect of Liquidity on Profitability (ROA)

Liquidity, as measured by LDR and LAR, did not have a statistically significant effect on ROA in either regression model. The coefficients were not meaningful, and the p-values indicated that liquidity does not significantly influence profitability for rural banks in Malang Raya and Pasuruan. These findings are consistent with the results of who found that LDR did not significantly affect profitability in rural banks in Tabanan. Similarly, Salsabila et al. (2024) concluded that while LDR influenced NIM, it had no significant direct effect on ROA. However, Sunaryo (2020) found that LDR had a significant positive effect on profitability in larger commercial banks. This suggests that the relationship between liquidity and profitability may differ depending on the context of the bank and its scale of operations. Meanwhile, Abdelaziz et al. (2020) found that liquidity risk had a negative impact on profitability in MENA region banks, further highlighting the diverse findings in the literature.

Overall, these results indicate that for rural banks in this region, simply increasing lending activity relative to deposits or assets does not guarantee higher returns. Factors such as risk management practices, local market conditions, and regulatory requirements may all play a role in moderating the impact of liquidity on profitability. Hence, the hypothesis that liquidity positively affects profitability (H1) is not accepted in this context. These findings highlight the importance of implementing liquidity management strategies that are grounded in empirical evidence rather than relying solely on general banking assumptions. Support programs and regulatory adjustments for rural banks should be designed to match their operational realities, market size, and customer base. For practitioners, particularly bank managers, this means integrating granular financial data and comprehensive risk assessments

into lending and deposit strategies to achieve sustainable profitability without exposing the bank to unnecessary liquidity risks.

4.2.2. The Effect of Operational Efficiency on Profitability (ROA)

Operational efficiency, as measured by OER, has a negative and statistically significant effect on ROA. The coefficient indicates that increases in OER reduce profitability, and the p-value confirms the robustness of this relationship in both regression models. This result aligns with previous studies, such as Rakhmawati et al. (2021) which also found that lower operational efficiency, reflected by higher OER, diminishes the ability of rural banks to generate returns from their assets. Similarly, research by Anggraeni et al. (2023) on conventional banks in Indonesia confirmed the negative relationship between OER and ROA, emphasizing that as OER increases, the operational burden on banks rises, thus reducing their profitability. These results provide strong support for the second hypothesis (H2), and therefore, it is accepted that operational efficiency, as measured by OER, negatively affects profitability. These findings highlight the need for rural banks in Malang Raya and Pasuruan to enhance their operational efficiency by reducing costs and increasing revenues to improve overall financial performance (Anggraeni et al., 2023).

These findings underline the urgency for rural banks in Malang Raya and Pasuruan to pursue operational improvements that are guided by accurate financial data, such as cost-to-income ratios and activity-based costing, to identify inefficiencies and reallocate resources more effectively. Efficiency enhancement efforts should not only focus on cost reduction but also on optimizing revenue streams through product diversification, technological adoption, and improved service delivery. By integrating data-driven monitoring systems into daily operations, banks can create a sustainable operational framework that strengthens profitability while maintaining service quality.

4.2.3. The Effect of Credit Risk on Profitability (ROA)

The regression results in Table 3 and Table 4 show that liquidity, as measured by both LDR and LAR, does not have a statistically significant effect on ROA. The coefficients of both ratios are small and their p-values remain above the 0.05 threshold in both models, indicating that changes in liquidity do not translate directly into improved profitability for rural banks in Malang Raya and Pasuruan. This suggests that the ability of rural banks to generate returns is not primarily driven by liquidity positions, but rather by other factors such as credit quality and operational efficiency.

This finding corroborates earlier research by Mandagie (2021), both of which documented the detrimental effect of rising credit risk on bank profitability. High NPL levels increase the risk of default, ultimately reducing banks' ability to generate profits. Thus, the second hypothesis (H3) is accepted, credit risk, as measured by NPL, has a significant negative effect on profitability. The implication for management is clear: rural banks in Malang Raya and Pasuruan must strengthen their credit risk management practices. This could involve stricter lending criteria and closer monitoring of loan quality to reduce NPLs and boost profitability.

To ensure long-term impact, these measures should be complemented with data-driven early warning systems that track borrower repayment patterns, sector-specific risk profiles, and macroeconomic indicators. Leveraging such analytical tools would allow banks to anticipate potential defaults earlier, design targeted restructuring plans, and maintain a healthier loan portfolio. By embedding these practices into their operational framework, rural banks can mitigate credit risk more effectively and safeguard profitability in varying market conditions.

4.2.4. The Effect of Bank Size on Profitability (ROA)

Bank size, measured by total assets, has a significant negative effect on ROA. The regression results in both models confirm that larger rural banks tend to show lower profitability, and this negative relationship remains consistent before and after including the moderating variable. This finding is consistent with Nguyen et al. (2024) who observed that larger banks often face greater management challenges and higher operational costs, which can erode profits. Similar results were reported by Muthia et al. (2020) indicating that increases in bank size are associated with declining profitability, possibly due to inefficiencies in managing larger asset bases and maintaining operational stability at scale. Therefore, the third hypothesis (H4) is accepted: bank size has a significant negative effect on profitability. These findings suggest that bigger is not always better in the rural banking sector. Instead, smaller banks may benefit from greater agility and operational efficiency.

For rural banks in Malang Raya and Pasuruan, this highlights the need to balance growth ambitions with operational capacity, ensuring that asset expansion is supported by robust cost control measures and efficient resource allocation. Data-driven monitoring of asset utilization rates, branch-level performance, and capital adequacy can help management determine the optimal scale that maximizes returns without introducing excessive operational complexity. By aligning growth strategies with measurable efficiency indicators, banks can sustain profitability while avoiding the diseconomies of scale often associated with uncontrolled asset expansion.

4.2.5. The Moderating Role of Private Ownership Structure

Private ownership was tested as a moderating variable in the second regression model. The statistical results indicate that the interaction between NPL and ownership is significant and shows a negative effect on ROA. This means that the model confirms the presence of moderation, where ownership structure strengthens the impact of credit risk on profitability.

This finding is in line with Anggraeni et al. (2023), who observed that private ownership tends to have a negative association with ROA due to a greater emphasis on short-term profit maximization. Research by Bahtiar & Parasetya (2022) also found that private ownership may exacerbate financial performance problems, particularly in risk management. In this context, private rural banks may prioritize profits over robust risk management, increasing their vulnerability to credit risk and resulting in lower profitability.

Accordingly, the fourth hypothesis (H5) is accepted, private ownership structure significantly moderates and aggravates the negative relationship between credit risk and profitability. For rural banks in Malang Raya and Pasuruan, especially those under private ownership, these findings emphasize the urgency of strengthening credit risk control systems to mitigate the adverse effects of high NPL ratios on profitability. This can be achieved through more stringent borrower assessment, enhanced post-disbursement monitoring, and regular portfolio stress testing. Management should integrate risk-adjusted performance metrics into decision-making processes to ensure that the pursuit of short-term gains does not compromise long-term financial stability. By embedding disciplined risk governance into operational practices, private-owned banks can better withstand credit shocks while safeguarding sustainable profitability.

5. Conclusion

This study examined the effects of liquidity (LDR, LAR), operational efficiency (OER), credit risk (NPL), and bank size on the profitability (ROA) of rural banks in Malang Raya and Pasuruan, with private ownership structure serving as a moderating variable. The results show that operational inefficiency and higher credit risk have significant negative effects on profitability, while larger bank size also reduces ROA, possibly due to increased complexity and operational costs. Liquidity ratios, both LDR and LAR, do not have a statistically significant impact, indicating that higher liquidity alone does not guarantee better financial performance. The moderating analysis further reveals that private ownership strengthens the negative effect of credit risk on profitability, suggesting that governance structures influence how financial risks affect rural bank performance.

These findings provide a deeper understanding of rural bank profitability by addressing a gap in previous research. While prior studies have examined individual factors affecting bank performance, the inclusion of private ownership as a moderating variable demonstrates a previously underexplored interaction between governance structure and credit risk. This contribution is particularly relevant for rural banks in Indonesia, where ownership composition varies and operational conditions differ from larger commercial banks. By highlighting the influence of ownership on the risk–profitability relationship, this study extends the knowledge on how institutional characteristics affect financial outcomes.

The results also offer guidance for improving the performance of rural banks. Enhancing operational efficiency through cost management and process optimization is essential, as inefficiency directly reduces profitability. Strengthening credit risk management, including rigorous loan evaluation, monitoring, and recovery strategies, is critical to mitigate the negative impact of NPL on returns. Bank size should be managed strategically to avoid inefficiencies associated with scale, ensuring that asset expansion aligns with operational capacity and resource allocation. For privately owned banks, ownership concentration should be leveraged to improve oversight and risk management rather than exacerbate the effects of credit risk.

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