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Determinants of Profitability in Rural Banking: An Empirical Study of Malang Raya's BPR

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A B S T R A C T

This study aims to analyze the factors influencing the profitability of Rural Banks (BPR) in the Malang Raya region and to examine the moderating role of gender diversity on the board of directors in the relationship between credit risk and profitability. This research employs a quantitative, causal approach using secondary data from the financial reports of 21 rural banks from 2019 to 2023, resulting in 125 observations. The dependent variable is profitability, measured by Return on Assets (ROA), while the independent variables include Credit Risk (Non-Performing Loan/NPL), Operational Efficiency (BOPO), Liquidity (Cash Ratio/CR), Loan to Asset Ratio (LAR), and Bank Size. The analysis was conducted using multiple linear regression with SPSS Version 27. The results indicate that NPL, BOPO, and Bank Size have a significant negative effect on ROA. Conversely, CR and LAR show a significant positive effect on ROA. The F-test confirms that the independent variables collectively have a significant impact on profitability, with the model explaining 92.4% of the variance in ROA. However, the study finds that gender diversity on the board of directors does not significantly moderate the negative relationship between NPL and ROA. These findings provide practical insights for rural bank management and policymakers, emphasizing the critical importance of credit risk management, operational efficiency, and strategic asset allocation for enhancing financial performance.

Keywords: *Bank Perekonomian Raktyat (BPR), Profitability, Credit Risk, Operational Efficiency, Gender Diversity*
JEL Classification Code: *G21, G32, L25*

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INTRODUCTION

The *Bank Perekonomian Rakyat* (BPR), also known as a rural bank, plays a crucial role in supporting national economic growth, particularly in providing financing to the Micro, Small, and Medium Enterprises (MSMEs) sector, in accordance with the (Financial Services Authority, 2015). Rural banks function as financial institutions focused on fund collection and loan distribution to the community (Purnama et al., 2024). However, as community-based financial institutions, rural banks face significant challenges in maintaining their financial performance, particularly regarding profitability. Profitability, which can be measured using various financial ratios, is an essential indicator of a bank's financial success (Kasmir, 2019). High profitability ensures the long-term sustainability of the bank, while low profitability threatens its survival (Rukaiyah & Hisan, 2023).

One significant factor influencing profitability is credit risk, represented by the Non-Performing Loan (NPL) ratio. NPL measures a bank's ability to manage problematic loans (Mahdi et al., 2023). Previous research has shown that operational efficiency also plays an important role in reducing the NPL ratio, thereby improving overall profitability (Hassan et al., 2023). However, the relationship between credit risk (NPL), operational efficiency (measured by the BOPO ratio), and profitability remains inconsistent, warranting further research, especially within the rural bank sector.

Although profitability is critical for rural banks, there is no clear consensus on the key factors influencing it. Various studies have yielded different findings regarding the influence of credit risk, operational efficiency, and liquidity on profitability. Some studies have shown that NPL significantly negatively impacts Return on Assets (ROA) (Mohammad & Khan, 2024; Widyakto et al., 2021), while others report no significant effect due to stable risk management practices (Rembet & Baramuli, 2020). The influence of operational efficiency, measured by the BOPO ratio, on profitability also shows varying results (Akbar & Nurdiansyah, 2024; Pitaloka & Waluyo, 2022).

Furthermore, the relationship between liquidity (Cash Ratio, CR) and profitability is also inconsistent. Some studies suggest that CR has no significant effect on ROA, particularly when liquidity is not utilized productively (Panjaitan & Adam, 2023), while others state that CR has a positive effect, especially in specific sectors such as Islamic banks (Nuringwahyu et al., 2024).

The influence of the Loan to Asset Ratio (LAR) on profitability is also of interest. LAR measures the proportion of assets used to finance loans disbursed by the bank. This ratio reflects the bank's ability to allocate its assets productively in lending. Previous research has produced mixed results regarding the effect of LAR on profitability. Some studies found that LAR has a positive but insignificant effect on profitability (Budiharjo & Supriatiningsih, 2021), while others found that LAR significantly negatively impacts profitability, as loans not managed with prudence may increase risks for the bank (Saleh, 2022).

Bank size, which indicates a bank's capacity to provide loans and generate interest income, is also an important factor influencing profitability. Larger bank size allows for stronger competitiveness in credit distribution and risk diversification. However, research by (Muttaqin & Qomar, 2024) shows that bank size may negatively impact profitability if not matched with efficiency in asset and operational management.

Gender diversity in management is also increasingly considered crucial in influencing a bank's financial performance. Studies by Galleta (2021) and Widarti (2022) show that gender diversity in management can enhance a bank's sustain-

ability performance (Galletta et al., 2022; Widiarti et al., 2022). Furthermore, research by (Nadeem et al., 2019) reveals that gender diversity on the board of directors can reduce corporate risk while enhancing profitability. In the context of rural banks, gender diversity can serve as a moderating mechanism that improves decision-making in risk management and financial performance. This study aims to fill that gap by analyzing the factors influencing rural bank profitability in Malang Raya, with gender diversity on the board of directors as a moderating variable.

The purpose of this study is to analyze the factors influencing the profitability of rural banks in Malang Raya, focusing on credit risk, operational efficiency, liquidity, the Loan to Asset Ratio (LAR), and bank size. This research will examine the impact of credit risk, measured by the Non-Performing Loan (NPL) ratio, as well as the role of operational efficiency (BOPO) and liquidity (Cash Ratio, CR) on profitability. Additionally, this study will explore the relationship between LAR and bank size with profitability. The research will also test the moderation effect of gender diversity on the board of directors on credit risk management and profitability.

This research contributes to the development of knowledge on rural bank profitability and provides practical insights for managers and policymakers to understand the drivers of profitability and the role of gender diversity in improving risk management, financial performance, and the sustainability of rural banks.

Although previous research has explored the effects of NPL, BOPO, CR, and bank size on profitability, inconsistencies in the findings highlight the need for further research. Furthermore, no studies have specifically examined the role of gender diversity on the board of directors in moderating the relationship between credit risk and profitability, particularly in the rural bank sector. This study aims to address that gap by providing a comprehensive analysis of these factors in the context of rural banks in Malang Raya.

This study employs a quantitative research design, utilizing secondary data from financial reports of rural banks in Malang Raya covering the period from 2019 to 2024. The data will be analyzed using multiple regression analysis to test the relationships between the independent variables (credit risk, operational efficiency, liquidity, LAR, and bank size) and the dependent variable (profitability). Additionally, the moderating effect of gender diversity on the board of directors will be tested using interaction terms in the regression model.

The article is structured into five chapters. The first chapter outlines the introduction, including the background, research problem, objectives, significance, knowledge gap, and methodology. The second chapter presents the literature review, discussing theories and concepts related to credit risk, operational efficiency, profitability, and gender diversity in the banking sector, while identifying research gaps. Chapters three through five explain the research methodology, data analysis and results, as well as conclusions and recommendations for improving rural bank profitability and sustainability.

LITERATURE REVIEW

Agency Theory

Agency theory in banking focuses on the conflict of interest that arises between bank managers (agents) and shareholders (principals), as managers may prioritize personal goals over maximizing shareholder value. This conflict is often exacerbated in the context of corporate governance, where asymmetry of information and decision-making power lead to inefficiencies. One key area of concern is how bank managers may be incentivized through compensation structures that do not align with shareholder interests, lead-

ing to excessive risk-taking or underperformance. A study by Berger and Bonaccorsi di Patti (2006) highlighted that capital structure decisions, including leverage, can affect agency costs and subsequently influence bank performance(Berger & di Patti, 2006). These costs arise when managers make decisions that benefit themselves at the expense of the shareholders' wealth. Additionally, the application of good corporate governance practices, as suggested by agency theory, aims to reduce these conflicts and improve financial performance (Agus & Zaitul, 2020).

Several studies have examined how agency theory plays out in banking practices, particularly concerning the management of risk and profitability. A notable example is research by (Donnellan & Rutledge, 2016), which used agency theory to explain operational risks and the effects of the 2007–2010 financial crisis. The study revealed that poor governance and misaligned incentives between bank managers and shareholders significantly contributed to the financial turmoil, underlining the importance of effective governance mechanisms. Furthermore, agency theory suggests that the structure of board governance can have a significant impact on mitigating or exacerbating such agency problems. The work of (Mondello & Ben Ayed, 2020) also discussed how remuneration policies and risk-taking behavior are influenced by asymmetric information, offering insights into how banks can better align managerial incentives with the long-term health of the organization. These findings underscore the relevance of agency theory in understanding the dynamics of banking performance, particularly in times of financial instability.

Profitability

Profitability is a fundamental indicator that reflects a bank's ability to generate profit from its operational activities. In the context of banking, profitability reflects the efficiency of the bank's management in utilizing its assets and liabilities to achieve maximum revenue (Kasmir, 2019). Profitability is a key indicator in assessing a bank's competitiveness and resilience, which is influenced by various internal and external factors (Liviawati et al., 2022). According to (Financial Services Authority, 2015), banks must have the ability to generate optimal profit as this reflects management efficiency in managing its assets and liabilities. Furthermore, profitability is also a key component in evaluating the bank's health level according to OJK (Financial Services Authority, 2021), which measures bank performance through Return on Assets (ROA) and Return on Equity (ROE). The profitability indicators commonly used to measure a bank's profitability are Return on Assets (ROA) and Return on Equity (ROE). ROA measures the bank's ability to utilize its total assets to generate net income, while ROE measures how effectively the bank uses equity or capital to generate profit (Ghozali, 2018). The higher the values of ROA and ROE, the better the bank's performance in managing its assets and capital to achieve optimal profit.

Credit Risk (NPL)

Credit Risk (NPL) is an indicator that describes the level of non-performing loans experienced by the bank. Non-Performing Loan (NPL) measures the proportion of loans that are not paid as agreed, indicating high credit risk. A high NPL can reduce the rural bank's profitability by increasing provisioning expenses to cover losses (Ahmed et al., 2021). Research shows that high NPL has a negative impact on ROA, as an increase in NPL reduces the rural bank's profit due to higher credit risk (Mandagie, 2021; Widyakto et al., 2021). However, some studies also suggest that effective risk management can mitigate the negative impact of NPL on profitability (Rembet & Baramuli, 2020). Based on previous research, the hypothesis regarding credit risk and the profitability of rural banks in Malang Raya is as follows:

H1: Credit Risk affects the profitability of rural banks in Malang Raya.

Efficiency (BOPO)

Efficiency (BOPO) measures how well the rural bank manages its operational costs relative to the revenue generated. The higher the BOPO ratio, the lower the operational efficiency of the rural bank, which in turn can decrease profitability. Studies indicate that BOPO has a negative impact on ROA, as high operational costs will reduce the rural bank's net profit (Alazis, 2020)(Adam et al., 2018). Rural banks that manage their operational costs efficiently tend to have better profitability, especially in the context of increasing competition (Pitaloka & Waluyo, 2022). Based on previous research, the hypothesis regarding efficiency and profitability is:

H2: Efficiency affects the profitability of rural banks in Malang Raya.

Liquidity (Cash Ratio)

Liquidity (Cash Ratio) is a ratio that measures the rural bank's ability to meet short-term obligations with available liquid assets. A rural bank with a high cash ratio has greater flexibility in meeting obligations without needing to sell productive assets. Research shows that high liquidity can have a positive effect on ROA, as the rural bank can optimize its liquid assets to support operations and credit expansion (Anan, 2023). However, some studies also show that excessive liquidity can indicate idle cash that is not used productively, thus not contributing to profitability improvement (Nangur & Pamungkas, 2022; Panjaitan & Adam, 2023). Based on various findings from previous research, the hypothesis related to liquidity is:

H3: Liquidity affects the profitability of rural banks in Malang Raya.

Loan to Asset Ratio (LAR)

Loan to Asset Ratio (LAR) measures the proportion of the rural bank's assets allocated for credit. A high LAR indicates that more assets are used for credit financing, which can increase interest income and profitability. However, research also shows that a high LAR can increase credit risk, especially if the rural bank does not apply prudent lending principles (Budiharjo & Supriatiningsih, 2021; Saleh, 2022). An increase in LAR can improve ROA, but it must be managed carefully to avoid problematic credit risks that could harm the rural bank. Previous research provides various insights into the effect of LAR, thus the hypothesis related to LAR is as follows:

H4: LAR affects the profitability of rural banks in Malang Raya.

Bank Size

Bank Size relates to the rural bank's capacity to distribute credit and expand its business. Larger rural banks have advantages in the form of economies of scale, portfolio diversification, and better access to funding sources. A larger rural bank also has the ability to spread risks and offer a variety of products and services (Ali & Puah, 2019). However, research also shows that larger rural banks may face challenges such as more complex bureaucracy and operational inefficiencies if not well-managed (Adam et al., 2018; Lestari et al., 2021). Therefore, Bank Size can have both positive and negative effects, and the hypothesis is:

H5: Bank Size affects the profitability of rural banks in Malang Raya.

Gender in Leadership

Gender in Leadership plays a crucial role in decision-making and risk management in banking. Gender diversity on the board of directors can improve the effectiveness of decision-making and operational efficiency of rural banks (Cardillo et al., 2021; Galletta et al., 2022). Research shows that women in leadership positions tend to be more cautious in risk management, which can contribute to reducing credit risk and enhancing profitability (Fayaz et al., 2021). In this study, gender diversity in the board of directors is measured by the percentage of women on the board,

serving as a moderating variable influencing the relationship between financial factors and rural bank profitability. With various possibilities that may affect profitability through gender differences, the hypothesis of this study is:

H6: Gender Diversity in the Board of Directors moderates the relationship between credit risk and profitability of rural banks in Malang Raya.

METHODOLOGY

This research adopts a quantitative, causal approach aimed at understanding the cause-and-effect relationships between several key factors and the profitability of rural banks in the Malang Raya region. Specifically, the study investigates how credit risk, operational efficiency, liquidity, and bank size affect profitability, with gender diversity on the board of directors serving as a moderating variable for credit risk. The decision to employ a quantitative approach stems from the research objectives, which require testing predefined hypotheses about the relationships among these variables and their impact on banking performance. The design is correlational in nature, as it focuses on examining the statistical relationships between the variables, but it also involves elements of causality through the analysis of moderating effects.

Variable and Measurment

This study investigates several financial variables that influence the profitability of rural banks in the Malang Raya region. The dependent variable in this study is profitability, measured by Return on Assets (ROA), which serves as an indicator of how efficiently a rural bank generates profit relative to its total assets. The independent variables include credit risk, operational efficiency, liquidity, and bank size, which are commonly used in financial studies to assess the operational and financial performance of banks. Additionally, the study incorporates gender diversity on the board of directors as a moderating variable to explore its potential effect on the relationship between credit risk and profitability. These variables were operationalized using specific financial ratios derived from the rural banks' annual financial statements, and each measure is explained below along with its corresponding formula.

The study's dependent variable is profitability, measured using Return on Assets (ROA). This indicator reflects the ability of BPRs to generate profits relative to their total assets. ROA is calculated using the formula:

$$\boldsymbol{ROA} = \frac{\textit{Net Income}}{\textit{Total Assets}} \times \mathbf{100}$$

The independent variables include credit risk, measured by the Non-Performing Loan (NPL) ratio, which quantifies the percentage of loans that are in default or close to being in default. The NPL ratio is calculated as:

$$\boldsymbol{NPL} = \frac{\textit{Non-Performing Loans}}{\textit{Total Loans}} \times \mathbf{100}$$

Operational efficiency is represented by the Operational Expense to Operating Income ratio (BOPO), which measures the efficiency of a bank in managing its operational costs relative to its income. The formula for BOPO is:

$$\boldsymbol{BOPO} = \frac{\textit{Operational Expenses}}{\textit{Operating Income}} \times \mathbf{100}$$

Liquidity is measured using the Cash Ratio (CR), which indicates the ability of a bank to meet its short-term obligations with its cash or cash-equivlents. The CR is calculated as:

$$\boldsymbol{CR} = \frac{\textit{Cash + Cash Equivalents}}{\textit{Current Liabilities}}$$

The Loan to Asset Ratio (LAR) measures the proportion of a bank's total assets that are allocated as loans, reflecting the bank's level of lending. The formula for LAR is:

$$LAR = \frac{Total\ Loans}{Total\ Assets} \times 100$$

Bank size is measured using the natural logarithm of total assets (LN of assets), reflecting the scale of the bank's operations. The formula is:

$$Size = \ln(Total\ Assets)$$

The moderating variable, gender diversity on the board of directors, is quantified by the percentage of female directors within the bank's leadership structure. The measurement of this variable is as follows:

$$Gender\ Diversity = \frac{Number\ of\ Female\ Directors}{Total\ Number\ of\ Directors} \times 100$$

Data Collection

Data for this study is secondary, drawn from publicly available financial reports published by the Financial Services Authority (OJK) and individual banks' websites. The sample consists of 21 BPRs from the Malang Raya region, selected based on the availability of complete data for the period from 2019 to 2023. The sampling technique used is purposive sampling, which targets specific BPRs that meet the inclusion criteria, such as consistent reporting of financial statements and inclusion in the OJK's publicly accessible database. Data collection involved retrieving annual financial data from OJK publications and the banks' own websites, ensuring the information was up-to-date and relevant for the study. The key variables, ROA, NPL, BOPO, CR, LAR, and bank size were all extracted from these reports. The reliability and validity of the data are ensured through the use of audited financial statements, which are typically subject to regulatory scrutiny.

Analysis Method

The analysis will be conducted using SPSS Version 27. Descriptive statistics will first provide an overview of the data, including measures of central tendency (mean), dispersion (standard deviation), and the range of each variable. For the main analysis, multiple regression models will be employed to assess the direct and moderated relationships between the independent variables and profitability (ROA). The models will include a linear regression model without moderation and one with the gender diversity variable acting as a moderator. The regression models are specified as follows:

Without Moderation:

$$ROA_{it} = \alpha + \beta_1 NPL_{it} + \beta_2 BOPO_{it} + \beta_3 CR_{it} + \beta_4 LAR_{it} + \beta_5 SIZEit + \varepsilon_{it}$$

With Moderation:

$$ROA_{it} = \alpha + \beta_1 NPL_{it} + \beta_2 BOPO_{it} + \beta_3 CR_{it} + \beta_4 LAR_{it} + \beta_5 SIZE_{it} + \beta_6 (NPL \times Gender) + \varepsilon_{it}$$

Here, β_1, β_2,... β_6 are the coefficients of the respective variables, and ε_{it} represents the error term.

The data will undergo classical assumption testing to ensure the validity of the regression models. These tests will include normality tests (Kolmogorov-Smirnov), multicollinearity tests (Variance Inflation Factor), autocorrelation tests (Durbin-Watson), and heteroscedasticity tests (Glejser test). Should any assumptions be violated, remedies such as transformation of variables or the use of robust regression techniques will be employed.

Finally, hypothesis testing will be conducted using the t-test to assess the significance of each independent variable's influence on profitability. The hypotheses are as follows:

H_0 : β_i = 0 (No effect of the independent variable on ROA)
H_1 : $\beta_i \neq 0$ (The independent variable has a significant effect on ROA)

The significance level for the tests is set at 5%, and the results will be interpret-

ed based on p-values and the t-statistic. Additionally, the coefficient of determination (R^2) will be calculated to measure the proportion of variance in ROA explained by the independent variables.

RESULTS AND DISCUSSION

Descriptive Statistics

The study utilized a dataset of 125 observations from rural banks in Malang Raya spanning 2019 to 2023. As detailed in Table 1, the Return on Assets (ROA), as a measure of profitability, averaged 3.07% but showed significant variation (Std. Dev. = 2.18%), with some banks experiencing losses (minimum -4.33%) and others achieving notable gains (maximum 7.64%). This wide range underscores the diverse financial performance across the sample.

Table 1.
Descriptive Statistics Results

Variable	N	Minimum	Maximum	Mean	Std. Deviation
ROA	125	-4.330	7.640	3.070	2.180
NPL	125	0.120	43.820	9.900	10.220
BOPO	125	62.910	137.800	84.200	11.140
CR	125	6.370	123.490	35.770	22.960
LAR	125	9.880	89.320	68.330	12.840
Size	125	15.290	20.050	17.090	0.950
Gender	125	0.000	1.000	0.537	0.327

Credit Risk (NPL) averaged 9.90%, but its high standard deviation (10.22%) and maximum value of 43.82% highlight substantial disparities in loan quality management among the rural banks. Operational Efficiency (BOPO) averaged 84.20%, indicating that, on average, a significant portion of operating income is consumed by operational costs. Liquidity, measured by Cash Ratio (CR), averaged 35.77%, while the Loan to Asset Ratio (LAR) averaged 68.33%, reflecting the proportion of assets allocated to lending activities. Bank Size, measured by the natural logarithm of total assets, averaged 17.09, showing a range from smaller to larger rural bank operations. Finally, Gender Diversity on the Board of Directors averaged 0.54 (or 54%), suggesting that over half of the sampled rural banks had at least one female director, albeit with varied representation as indicated by its standard deviation (0.327).

Classical Assumption Tests

Before conducting the regression analysis, classical assumption tests were performed to ensure the validity and reliability of the models. The normality of residuals was confirmed using both visual and statistical tests. The Kolmogorov-Smirnov test yielded p-values of 0.200 for both Model 1 and Model 2, which are greater than the significance level of 0.05, indicating that the residuals are normally distributed. The multicollinearity test, using Variance Inflation Factor (VIF) and Tolerance values, showed no significant multicollinearity, with VIF values ranging from 1.222 to 2.348 and Tolerance values above 0.1, confirming that the independent variables are not highly correlated. The Durbin-Watson (DW) statistic, used to check for autocorrelation, showed DW values of 1.772 for Model 1 and 1.775 for Model 2, both within the acceptable range, indicating no significant autocorrelation in the residuals. Finally, the Glejser test confirmed homoscedasticity, as the p-values for all variables (NPL, BOPO, CR, LAR,

Size, and NPL.GENDER) were greater than 0.05, indicating that the variance of the residuals is constant. These results suggest that all assumptions for regression analysis are met, ensuring the reliability of the model's coefficient estimates.

Regression Analysis Results

Following the validation of classical assumptions, a multiple linear regression analysis was conducted to examine the factors influencing rural bank profitability in Malang Raya. This study utilized panel data, combining cross-sectional data from multiple rural banks with time-series data observed over several periods. This rich dataset, likely compiled from audited financial statements or regulatory reports of rural banks in the Malang Raya region, allowed for a comprehensive empirical understanding of how various financial metrics and governance characteristics impact profitability. The analysis proceeded in two stages: Model 1, focusing on direct influences, and Model 2, incorporating gender diversity as a moderating variable.

Model 1 investigates the direct influence of Credit Risk (NPL), Operational Efficiency (BOPO), Cash Ratio (CR), Loan to Asset Ratio (LAR), and Bank Size on Profitability (ROA).

As shown in Table 2, Model 1 has an F-statistic of 240.091 with a significance level of < 0.001. This indicates that the set of independent variables collectively has a highly significant impact on rural bank profitability. The estimated regression results for Model 1 are presented in Table 3.

The regression equation for Model 1 is:

$$ROA_{it} = 17.789 - 0.036NPL_{it} - 0.160BOPO_{it} + 0.011CR_{it} + 0.036LAR_{it} - 0.222SIZEit + \varepsilon_{it}$$

Table 3 displays the coefficients (B), standard errors, standardized beta coefficients, t-statistics, and significance levels (Sig.) for each variable. All independent variables in Model 1 show a significance level (Sig.) less than 0.001, indicating their strong statistical relevance to rural bank profitability.

Table 2.
ANOVA - Model 1 (Without Moderation)

Sum of Squares	df	Mean Square	F	Sig.
546.726	6	91.121	240.091	<0.001b
44.784	118	.380		
591.511	124			

Table 3.
Regression Results - Model 1 (Without Moderation)

Variable	B	t	Sig.
(Constant)	17.897	13.062	<0.001
NPL	-0.036	-5.434	<0.001
BOPO	-0.160	-26.665	<0.001
CR	0.011	3.724	<0.001
LAR	0.036	7.498	<0.001
Size	-0.222	-3.471	<0.001

Table 4.
Model Summary - Model 1 (Without Moderation)

R	R Square	Adjusted R Square	Std. Error of the Estimate
0.961	0.924	0.921	0.61386

For Model 1, as detailed in Table 4, the R2 value is 0.924, with an Adjusted R2 of 0.921. This indicates that approximately 92.4% of the variation in ROA is explained by the independent variables. Model 2: With Moderation (Gender Diversity)

Model 2 extends the analysis by introducing an interaction term between Credit Risk (NPL) and Gender Diversity on the Board of Directors (NPL x Gender) to assess its moderating effect on profitability. teraction term, collectively and significantly influence rural bank profitability. The regression equation for Model 2 is:

$$ROA_{it} = 17.910 - 0.034NPL_{it} - 0.161BOPO_{it} + 0.011CR_{it} + 0.036LAR_{it} - 0.219SIZE_{it} - 0.004(NPL \times Gender) + \varepsilon_{it}$$

Table 6 displays the regression coefficients and statistical metrics for Model 2. The direct effects remain largely consistent with Model 1. Notably, the interaction

Table 5.
ANOVA - Model 2 (With Moderation)

Sum of Squares	df	Mean Square	F	Sig.
546.726	6	91.121	240.091	<0.001b
44.784	118	.380		
591.511	124			

Table 6.
Regression Results - Model 2 (With Moderation)

Variable	B	t	Sig.
(Constant)	17.910	13.021	<0.001
NPL	-0.034	-4.161	<0.001
BOPO	-0.161	-25.766	<0.001
CR	0.011	3.731	<0.001
LAR	0.036	7.422	<0.001
Size	-0.219	-3.395	<0.001
NPL.GENDER	-0.004	-0.392	0.696

As presented in Table 5, Model 2 F-statistic is 240.091 with a significance level of < 0.001. This confirms that the independent variables, including the interaction term (NPL x Gender Diversity) shows a significance level of 0.696, indicating that this interaction is not statistically significant.

Table 7.
Model Summary - Model 2 (With Moderation)

R	R Square	Adjusted R Square	Std. Error of the Estimate
0.961	0.924	0.920	0.616

For Model 2, as shown in Table 7, the R2 value is 0.924 and the Adjusted R2 is 0.920. This indicates a high level of explained variance, similar to Model 1. Both regression models demonstrate a very strong ability to explain rural bank profitability variations, reinforcing the overall validity and robustness of the analytical framework employed in this study.

This study investigated how Credit Risk (NPL), Operational Efficiency (BOPO), Cash Ratio (CR), Loan to Asset Ratio (LAR), and Bank Size influence the profitability of rural banks in Malang Raya. Additionally, it explored whether Gender Diversity in the Board of Directors moderates the relationship between credit risk and profitability. The analysis was conducted using two models: Model 1 without moderation and Model 2 with the moderation effect of gender diversity. The findings, interpreted against a critical t-value of 1.658 (for a 5% significance level), revealed that most independent variables significantly affect Return on Assets (ROA), while gender diversity did not show a significant moderating effect.

Impact of Credit Risk (NPL) on Profitability

The analysis clearly shows that Credit Risk (NPL) significantly and negatively impacts rural bank profitability. In Model 1, the coefficient is -0.036 with a t-value of -5.434 and a significance level ($p<0.001$). In Model 2, the coefficient is -0.034 with a t-value of -4.161 and a significance level ($p<0.001$). In both models, the absolute t-values (5.434 and 4.161) are substantially greater than the critical t-table value of 1.658. This leads to the acceptance of Hypothesis 1, which stated that credit risk affects the profitability of rural banks. This strongly indicates that for every 1% increase in non-performing loans, profitability (ROA) decreases. This negative and significant relationship aligns with existing theories and studies, which consistently find that higher credit risk leads to lower bank profits due to increased default risk and higher provisioning costs. This finding is consistent with research by Budiharjo and Supriatiningsih (2021) and Mandagie (2021) in Indonesia. While some studies suggest that strong risk management can mitigate this effect, our findings emphasize that robust credit risk management is crucial for maintaining the financial health and profitability of rural banks in Malang Raya(Budiharjo & Supriatiningsih, 2021; Mandagie, 2021).

Impact of Operational Efficiency (BOPO) on Profitability

Operational Efficiency (BOPO) has a profoundly significant negative influence on rural bank profitability. In Model 1, the coefficient is -0.160 with a t-value of -26.665 ($p<0.001$). In Model 2, the coefficient is -0.161 with a t-value of -25.766 ($p<0.001$). The absolute t-values (26.665 and 25.766) are far greater than the critical t-table value of 1.658, underscoring the strong statistical significance. This leads to the acceptance of Hypothesis 2, which posited that efficiency affects the profitability of rural banks. This indicates that a 1% increase in BOPO (meaning decreased efficiency) significantly reduces ROA. This highlights the critical importance of efficient cost management for profitability, especially for micro-scale rural banks with limited resources. This result is consistent with Adam et al. (2018) and Alaziz (2020),

who found that improved operational efficiency leads to better financial performance. Poor operational efficiency, often due to suboptimal cost control, directly reduces net profit. Therefore, rural banks in Malang Raya must continuously enhance their cost management strategies and also consider asset quality and growth strategies to achieve sustainable profit growth.

Impact of Cash Ratio (CR) on Profitability

The Cash Ratio (CR) significantly and positively impacts rural bank profitability. In Model 1, the coefficient is 0.011 with a t-value of 3.724 ($p<0.001$). In Model 2, the coefficient is 0.011 with a t-value of 3.731 ($p<0.001$). Both t-values (3.724 and 3.731) exceed the critical t-table value of 1.658, indicating statistical significance. This leads to the acceptance of Hypothesis 3, which stated that Cash Ratio affects the profitability of rural banks. This suggests that a 1% increase in CR leads to a 0.011% increase in ROA. This finding implies that a rural bank's ability to maintain adequate short-term liquidity through cash and equivalents positively contributes to its financial performance. Sufficient liquidity enhances customer confidence and reduces payment default risks, indirectly boosting profitability, as supported by (Adam et al., 2018; Ali & Puah, 2019). While significant, its relatively small coefficient compared to NPL and BOPO indicates that liquidity, though crucial, plays a more indirect role in driving profitability. Rural banks in Malang Raya need to maintain an optimal Cash Ratio to support profitability without sacrificing asset efficiency, as noted by (Salsabila et al., 2024).

Impact of Loan to Asset Ratio (LAR) on Profitability

The Loan to Asset Ratio (LAR) demonstrates a significant positive influence on rural bank profitability. In Model 1, the coefficient is 0.036 with a t-value of 7.498 ($p<0.001$). In Model 2, the coefficient is 0.036 with a t-value of 7.422 ($p<0.001$). Both t-values (7.498 and 7.422) are substantially higher than the critical t-table value of 1.658, confirming strong statistical significance. This leads to the acceptance of Hypothesis 4, which proposed that Loan to Asset Ratio affects the profitability of rural banks. This indicates that a 1% increase in the proportion of loans to total assets raises ROA by 0.036%. This finding underscores that channeling a larger portion of assets into loans translates to higher potential interest income, which is the primary revenue source for banks. This result aligns with (Ali & Puah, 2019; Salsabila et al., 2024). However, it's vital to balance increased LAR with robust credit risk management to maintain asset quality, as cautioned by (Budiharjo & Supriatiningsih, 2021). For rural banks, optimizing LAR for profitability and financial stability requires a balance between aggressive lending and prudent risk assessment.

Impact of Bank Size on Profitability

Surprisingly, Bank Size exhibits a significant negative impact on rural bank profitability. In Model 1, the coefficient is -0.222 with a t-value of -3.471 ($p<0.001$). In Model 2, the coefficient is -0.219 with a t-value of -3.395 ($p<0.001$). The absolute t-values (3.471 and 3.395) are both greater than the critical t-table value of 1.658, indicating statistical significance. This leads to the acceptance of Hypothesis 5, which stated that bank size affects the profitability of rural banks. This suggests that as bank size (measured by the natural logarithm of total assets) increases, rural bank profitability tends to decrease by 0.222% for every 1% increase in size. This counterintuitive finding implies that for rural banks in Malang Raya, growth in size doesn't always lead to improved efficiency or profitability. Larger banks often face greater managerial complexities, increased operational costs, and internal bureaucracies that can hinder efficiency, supporting findings by (Ali & Puah, 2019; Anggraeni et al., 2023) in specific banking contexts.

This suggests potential diseconomies of scale for larger rural banks in the region. Therefore, while size can offer advantages in terms of resources and competitiveness, rural banks must prioritize effective management and operational cost control to ensure that growth supports, rather than detracts from, profitability.

Moderating Role of Gender Diversity in the Board of Directors

The analysis specifically examined the moderating effect of Gender Diversity on the Board of Directorson the relationship between credit risk (NPL) and profitability (ROA) in Model 2. The interaction term (NPL x Gender Diversity) yielded a coefficient of -0.004 with a t-value of -0.392 and a significance level of 0.696 ($p>0.05$). Crucially, the absolute t-value of 0.392 is less than the critical t-table value of 1.658. This indicates that the interaction is not statistically significant. Therefore, Hypothesis 6 is rejected, as the presence of women in directorship positions does not significantly moderate the impact of credit risk on rural bank profitability in this study's context.

This finding contrasts with several prior studies (Galletta et al., 2022; Nadeem et al., 2019) that suggest gender diversity on boards can enhance oversight and decision-making, potentially mitigating risk and improving profitability. The lack of a significant moderating effect in this study might be due to other contextual factors specific to Malang Raya's rural banks, such as organizational culture, ownership structures, or market characteristics, which may dilute the observable impact of board gender composition on this particular relationship. However, promoting gender diversity remains relevant for strengthening good corporate governance and fostering more comprehensive risk management practices, as highlighted by (Widiarti et al., 2022), even if its direct moderating role on credit risk and profitability is not statistically evident in this specific empirical setting.

Summary of Model Fit and Explanatory Power

The overall strength of the models in explaining profitability is very high. The Coefficient of Determination (R2) for Model 1 is 0.924, and for Model 2 is also 0.924. This means that approximately 92.4% of the variation in Return on Assets (ROA) can be explained by the independent variables included in the models. The Adjusted R2 values (0.921 for Model 1 and 0.920 for Model 2) are very close to the R2 values, suggesting that the models are robust and do not suffer from overfitting. The high R2 values confirm that the selected independent variables collectively provide a very strong explanation for the profitability of rural banks in Malang Raya.

CONCLUSIONS

This study investigated the key determinants of profitability in the rural banking sector of Malang Raya over a recent multi-year period, with a specific focus on the moderating role of board gender diversity. The findings reveal that profitability is significantly and negatively impacted by higher credit risk, operational inefficiency, and, counter-intuitively, larger bank size, suggesting potential diseconomies of scale within the local context. Among these, operational efficiency emerged as the most critical inhibitor of profit, underscoring the paramount importance of cost management. Conversely, a healthy liquidity position and a productive allocation of assets to lending activities were found to be significant positive drivers of profitability. Notably, this research did not find statistical evidence to support the hypothesis that board gender diversity moderates the adverse relationship between credit risk and profitability. These results carry significant practical implications for bank managers, who should prioritize stringent risk management and internal cost controls over sheer growth, and for regulators, who should consider operational health as a key supervisory metric. While the mod-

el demonstrated substantial explanatory power, the study's conclusions are framed by its specific geographical and temporal scope. Therefore, future research is encouraged to validate these findings with a national sample, employ qualitative methods to uncover the mechanisms behind the negative size effect, and incorporate macroeconomic factors for a more comprehensive analysis of rural bank sustainability.

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