

Examining Internal and External Drivers of Profitability in Indonesian Rural Banks: Evidence from Panel Data Analysis

Analisis Faktor Internal dan Eksternal terhadap Profitabilitas Bank Perekonomian Rakyat di Indonesia: Pendekatan Data Panel

Gordon Pardamean Tampubolon^{*}, Lutfi Lutfi

Faculty of Economic and Business, Hayam Wuruk University, Indonesia

**correspondence e-mail:* gordinpartam@gmail.com

Article Info	Abstract
<i>Article History :</i> Received: 16 July 2025 Accepted: 23 December 2025 Published: January 2026 <i>DOI Number :</i> 10.33059/jseb.v17i1.12646 <i>How to Cite :</i> Tampubolon, G. P., & Lutfi, L. (2026). Examining internal and external drivers of profitability in Indonesian rural banks: Evidence from panel data analysis. <i>Jurnal Samudra Ekonomi dan Bisnis</i>, 17(1), 134-146. DOI: 10.33059/jseb.v17i1.12646.	This study investigates the internal and external determinants of profitability in Indonesian Rural Banks (BPR), with credit risk acting as a mediating variable. Internal factors include capital adequacy, bank size, operational efficiency, and credit distribution, while external factors comprise inflation and interest rates. The study utilizes a panel data regression method, covering 23 conventional BPRs operating in West and Central Kalimantan from 2019 to 2023. The findings reveal that capital adequacy negatively affects profitability, whereas operational efficiency and credit distribution exert positive influences. However, excessive credit expansion leads to rising non-performing loans (NPL), which subsequently diminish profitability. Interest rates and inflation have no significant impact. This research contributes to the literature by empirically confirming the mediating role of credit risk in rural bank performance and offers strategic insights for policymakers and rural bank managers to strengthen financial sustainability. Keywords: Credit Risk, Panel Data Regression, Profitability, Operational Efficiency, Rural Banks.

Info Artikel	Abstrak
<i>Riwayat Artikel :</i> Diterima: 16 Juli 2025 Disetujui: 23 Desember 2025 Dipublikasikan: Januari 2026 <i>Nomor DOI :</i> 10.33059/jseb.v17i1.12646 <i>Cara Mensitasi :</i> Tampubolon, G. P., & Lutfi, L. (2026). Examining internal and external drivers of profitability in Indonesian rural banks: Evidence from panel data analysis. <i>Jurnal Samudra Ekonomi dan Bisnis</i>, 17(1), 134-146. DOI: 10.33059/jseb.v17i1.12646.	<i>Penelitian ini mengkaji faktor internal dan eksternal yang memengaruhi profitabilitas Bank Pedesaan (BPR) di Indonesia, dengan risiko kredit sebagai variabel mediasi. Faktor internal meliputi kecukupan modal, ukuran bank, efisiensi operasional, dan distribusi kredit, sedangkan faktor eksternal terdiri dari inflasi dan suku bunga. Penelitian ini menggunakan metode regresi data panel, yang mencakup 23 BPR konvensional yang beroperasi di Kalimantan Barat dan Tengah dari tahun 2019 hingga 2023. Hasil penelitian menunjukkan kecukupan modal berpengaruh negatif terhadap profitabilitas, sedangkan efisiensi operasional dan distribusi kredit berpengaruh positif. Namun, ekspansi kredit yang berlebihan menyebabkan peningkatan kredit macet (NPL), yang selanjutnya mengurangi profitabilitas. Suku bunga dan inflasi tidak memiliki dampak yang signifikan. Penelitian ini berkontribusi pada literatur dengan secara empiris mengkonfirmasi peran mediasi risiko kredit dalam kinerja bank pedesaan dan menawarkan wawasan strategis bagi pembuat kebijakan dan pengelola bank pedesaan untuk memperkuat keberlanjutan keuangan.</i> Kata kunci: Risiko Kredit, Regresi Data Panel, Profitabilitas, Efisiensi Operasional, Bank Perekonomian Rakyat.

INTRODUCTION

Rural Banks (BPR) are integral to Indonesia's financial system, catering to demographics frequently marginalized by traditional banking services, especially micro and small firms in rural regions. BPRs, as financial intermediaries, aggregate public funds and direct them towards productive lending to produce profit and foster regional economic growth (Adusei, 2015). In this context, profitability is a crucial metric of institutional sustainability, indicating a bank's capacity to manage operational efficiency, mitigate risk, and sustain long-term competitiveness (Lamothe *et al.*, 2024; Majumder & Uddin, 2017).

In recent years, the profitability of BPRs has exhibited a troubling decline. The Financial Services Authority (OJK) reports that the average Return on Assets (ROA) of BPRs significantly decreased from 2.31 percent in 2019 to merely 1.00 percent in 2023 (OJK, 2023, as stated in SEOJK No. 11/SEOJK.03/2022). This ongoing fall prompts inquiries about the internal financial stability of BPRs and their ability to withstand increasing competition and macroeconomic fluctuations.

A multitude of empirical studies has investigated the factors influencing bank profitability, encompassing both internal and external elements. Internal determinants often encompass capital sufficiency, bank size, operating efficiency, and credit distribution (Ali & Puah, 2018; Khairunnisa *et al.*, 2022; Lamothe *et al.*, 2024). External factors, such as inflation and interest rates, have been shown to substantially influence profitability (Tan, 2016; Abdelaziz *et al.*, 2020). Majumder & Uddin (2017) discovered that enough capitalization improves profitability, while Abdelaziz *et al.* (2020) cautioned that excessive capitalization may elevate liquidity risk and diminish profits. Tan (2016) and Abdelaziz *et al.* (2020) highlighted that although credit expansion is often linked to enhanced earnings, it may concurrently result in elevated credit risk and an increase in non-performing loans (NPLs) if not underpinned by robust risk management.

Despite the growing body of research on banking performance, studies explicitly focusing on Rural Banks in Indonesia remain limited. Much of the recent literature still concentrates on large commercial banks or international banking systems, often overlooking the distinctive business models, regulatory environments, and risk exposures of rural banks (Tan, 2016; Almaskati, 2022; Lamothe *et al.*, 2024). Furthermore, limited research has integrated credit risk as a mediating variable in the association between credit distribution and profitability — an essential oversight, especially considering that BPRs predominantly cater to higher-risk demographics, including micro and informal borrowers (Adusei, 2015; Khairunnisa *et al.*, 2022).

This study examines the internal and external factors affecting the profitability of BPRs in Indonesia, utilizing credit risk — represented by the Non-Performing Loan (NPL) ratio — as a mediating variable. This research utilizes panel data from traditional BPRs in West and Central Kalimantan from 2019 to 2023, encompassing both cross-sectional and temporal dynamics. The innovation resides in its emphasis on BPRs, which possess unique operational and risk attributes; the utilization of a mediation framework to analyze how credit risk conveys the impact of credit distribution on profitability; and the amalgamation of internal (capital adequacy, bank size, operational efficiency, credit growth) and external (interest rates, inflation) factors within a cohesive model. This methodology augments the empirical comprehension of the profitability-risk relationship and offers pragmatic insights for enhancing the financial performance and resilience of BPRs.

LITERATURE REVIEW

The concept of financial intermediation posits that banks function as crucial institutions linking surplus and deficit units in an economy by transforming short-term liabilities into long-term assets. Banks promote efficient fund allocation, alleviate information asymmetry, and diminish transaction costs, hence improving economic performance (Greenbaum *et al.*, 2019; Haddou, 2022). Banks can alleviate market inefficiencies, including adverse selection and moral hazard, via credit screening, monitoring, and liquidity generation (Khoo *et al.*, 2024). These activities not only enable the effective distribution of resources but also support profitability and risk management in banking operations (Almaskati, 2020; Abdelaziz *et al.*, 2020; Khairunnisa *et al.*, 2022).

Within the context of Rural Bank (BPR), which predominantly functions in rural and microeconomic sectors, the concepts of financial intermediation are significantly pertinent. BPRs gather deposits from surplus units and allocate them to productive loans for micro, small, and medium companies (MSMEs), thus promoting financial inclusion and fostering local economic development (Adusei, 2015). This business model also subjects BPRs to several risks — namely credit, liquidity, and operational risks — that can directly affect their profitability (Abdelaziz *et al.*, 2020; Ali & Puah, 2018). Comprehending the influence of internal and external factors on profitability is essential for maintaining performance. This study proposes and evaluates the following hypothesis.

Capital is a crucial determinant of bank profitability, since sufficient capital bolsters investor trust, facilitates credit growth, and improves resilience to external disturbances (Majumder & Uddin, 2017; Ilyas *et al.*, 2018; Ali & Puah, 2018). Excessive capitalization may diminish asset utilization efficiency and increase liquidity risk (Abdelaziz *et al.*, 2020). Therefore, sustaining adequate capital levels is crucial for achieving a balance among solvency, liquidity, and profitability.

H1: Capital (CAR) has a significant effect on profitability (ROA).

Bank size also plays a substantial role in profitability. Larger banks often benefit from economies of scale and scope, enabling more efficient cost structures and broader market access. These advantages allow for diversification, lower funding costs, and better risk-sharing (Adusei, 2015; Ilyas *et al.*, 2018; Gupta & Mahakud, 2020). Nonetheless, Lamothe *et al.* (2024) emphasize that the benefits of size materialize only with sound risk management. Conversely, larger banks might suffer diseconomies of scale if internal coordination becomes inefficient (Gazi *et al.*, 2021).

H2: Bank size has a significant effect on profitability (ROA).

Operational efficiency is another key determinant. Efficiency is often measured using the ratio of operating expenses to operating income (BOPO), where lower ratios indicate greater profitability. Efficient banks reduce waste, respond quickly to market changes, and optimize cost structures through technological adoption and human capital investment (Ilyas *et al.*, 2018; Majumder & Uddin, 2017; Abdelaziz *et al.*, 2022). Moreover, efficiency boosts a bank's ability to generate non-interest income and cushion against revenue volatility (Hakimi *et al.*, 2020).

H3: Operational efficiency (BOPO) has a negative and significant effect on profitability (ROA).

The volume and quality of loan disbursement — captured by the Loan to Asset Ratio (LAR) — is vital in generating interest income. A high LAR reflects active utilization of assets for credit and is positively associated with profitability (Ilyas *et al.*, 2018; Lamothe *et al.*, 2024). Strategic lending to sectors such as MSMEs offers high margins and broader financial inclusion (Hakimi *et al.*, 2020), but requires robust risk assessments to prevent future losses.

H4: Loan disbursement (LAR) has a positive and significant effect on profitability (ROA).

External macroeconomic conditions also shape bank performance. Interest rate movements directly affect the spread between lending and deposit rates. Higher rates generally increase net interest margins (Hakimi *et al.*, 2020), but banks must manage interest rate risk effectively to avoid volatility (Ilyas *et al.*, 2018). Rate-setting flexibility and hedging mechanisms are crucial to sustaining profitability amid market shifts (Majumder & Uddin, 2017; Adusei, 2015).

H5: Interest Rate (SBI) has a negative and significant effect on profitability (ROA).

Inflation similarly affects the banking sector. While moderate inflation can support lending margins, excessive inflation can lead to deteriorating credit quality and rising operational costs (Lamothe *et al.*, 2024; Majumder & Uddin, 2017). Banks with responsive pricing mechanisms are better positioned to preserve earnings in inflationary periods (Tan, 2016), while sluggish adjustments can compress profits (Hakimi *et al.*, 2020).

H6: Inflation has a negative and significant effect on profitability (ROA).

A critical aspect in this intermediation framework is credit risk, commonly measured by the Non-Performing Loan (NPL) ratio. High NPL levels reflect poor credit quality and reduce profitability via provisioning and reduced interest income (Tan, 2016; Hakimi *et al.*, 2020). Effective credit risk management — through stringent screening, monitoring, and portfolio control — enhances profitability despite loan growth (Ilyas *et al.*, 2018; Wireko & Forson, 2017).

H7: Credit risk (NPL) has a negative and significant effect on profitability (ROA).

More importantly, credit risk may also mediate the relationship between loan disbursement and profitability. While aggressive lending boosts income, it also raises the risk of defaults if credit quality is not well managed. Thus, NPLs can act as a conduit through which excessive or poorly monitored loan growth undermines ROA (Adusei, 2015; Hakimi *et al.*, 2020).

H8: Credit risk (NPL) mediates the effect of loan disbursement (LAR) on profitability (ROA).

METHOD

This study used a quantitative explanatory research methodology to examine the causal relationships between internal and external factors and the profitability of rural banks (BPR) in the provinces of West and Central Kalimantan, Indonesia. The research utilizes secondary panel data, integrating cross-sectional and time-series elements, facilitating a thorough analysis of variances among banks and throughout time (Creswell, 2018; Sugiyono, 2019).

The dependent variable of the study is profitability, measured by return on assets (ROA). The internal factors are capital adequacy ratio (CAR), bank size, operational efficiency ratio (BOPO), and loan distribution. External variables encompass inflation and the standard benchmark interest rate (SBI rate). Furthermore, credit risk — quantified by the Non-Performing Loan (NPL) ratio — is incorporated as a mediating variable to elucidate the transmission mechanism by which credit expansion influences bank profitability. This method corresponds with previous research highlighting the essential importance of credit quality in financial intermediation, as an increase in non-performing loans can diminish net interest margins and impair asset performance (Tan, 2016; Abdelaziz *et al.*, 2020). The analysis covers a five-year period from 2019 to 2023, concentrating on traditional BPRs in those particular provinces.

The variables in this study are delineated and quantified as follows. Profitability (ROA) denotes the bank's capacity to produce earnings from its assets. The Financial Services Authority (OJK) utilizes ROA as the principal metric to assess the financial stability of BPR, as outlined in Circular

Letter No. 11/SEOJK.03/2022. ROA is determined by dividing net income before tax by total assets, expressed as a percentage. This ratio indicates the efficiency with which a bank employs its assets to produce profit (Buchory, 2016; Ilyas *et al.*, 2018).

Capital (CAR), or Capital Adequacy Ratio, represents the bank's capacity to absorb losses arising from risk-weighted assets. It is a critical measure of financial strength and risk resilience. According to OJK regulations (SEOJK No. 11/SEOJK.03/2022), CAR is computed by dividing total capital (core and supplementary) by risk-weighted assets, and expressed as a percentage (Majumder & Uddin, 2017; OJK, 2022). A higher CAR indicates greater capital strength and stability.

Bank size (SIZE) indicates the operational scale of the bank, typically measured by total assets. In this study, bank size is measured using the natural logarithm of total assets ($\ln$ Total Assets), which is commonly applied in empirical research to address scale variance and reduce skewness in asset data (Adusei, 2015; Lutfi *et al.*, 2020).

Operational efficiency (BOPO) assesses how effectively a bank manages its operating costs relative to its operating income. The Financial Services Authority (OJK) uses the BOPO ratio (operating expenses to operating income) to evaluate bank efficiency. The formula involves dividing total operating expenses by total operating income and expressing the result as a percentage (Ali & Puah, 2018; Lamothe *et al.*, 2024). A lower BOPO ratio indicates higher efficiency.

Credit distribution, measured using the Loan to Asset Ratio (LAR), reflects the proportion of a bank's total assets allocated to credit. LAR is calculated by dividing total loans by total assets and multiplying by 100 percent (Tan, 2016; Majumder & Uddin, 2017). A higher LAR signifies a stronger intermediation role of the bank through productive credit disbursement.

Interest Rate refers to the annual average of the Bank Indonesia Certificate Rate (SBI), which serves as the national reference rate. It directly affects bank profitability through its influence on interest margins and funding costs (Lamothe *et al.*, 2024). Higher interest rates may increase short-term bank profitability through the interest rate pass-through mechanism.

Inflation is measured using the annual inflation rate reported by Indonesia's Central Bureau of Statistics (BPS). Inflation impacts bank profitability by affecting operating costs, loan repayment ability, and the real value of assets (Majumder & Uddin, 2017; Tan, 2016). Moderate and anticipated inflation may positively influence profitability, while unexpected high inflation typically has a negative effect.

Credit risk is the likelihood of loss arising from a borrower's failure to repay a loan. It is typically measured using the Non-Performing Loan (NPL) ratio, which compares the amount of non-performing loans to total loans, expressed as a percentage (Abdelaziz *et al.*, 2020; OJK, 2022). A high NPL ratio indicates poor credit quality, increased loan loss provisions, and reduced profitability.

The population of this study includes all 23 conventional Rural Banks headquartered in West and Central Kalimantan. These banks serve as vital financial intermediaries, primarily supporting micro, small, and medium enterprises (MSMEs). A purposive sampling technique is employed to select banks that meet specific criteria aligned with the study's objectives, consistent with the use of non-probability sampling methods in exploratory banking studies (Etikan *et al.*, 2016). The inclusion criteria are as follows: (1) the banks must have consistently published audited financial reports from 2019 to 2023 on the official website of the Financial Services Authority (OJK); (2) they must not be under special regulatory statuses such as "Under Intensive Supervision," "Under Resolution," or "License Revoked," in accordance with OJK Regulation No. 28 of 2023; and, (3) they must have submitted complete financial data to the OJK regularly during the study period. These criteria ensure

the inclusion of financially sound and transparent institutions, thereby enhancing the credibility and reliability of the analysis.

The study relies exclusively on secondary data, sourced from the publicly accessible financial statements of the selected BPRs, which are published by the OJK. These reports provide standardized, audited data on all variables relevant to this research. The choice of secondary data is justified by its accessibility, reliability, and consistency over time. The data can be retrieved from the official OJK portal <https://cfs.ojk.go.id/cfs/Report.aspx?BankTypeCode=BPK&BankTypeName=BPR%20Konvensional>. The choice of secondary data is justified by its advantages in terms of availability, consistency, cost-efficiency, and suitability for longitudinal panel analysis.

Panel data regression analysis is utilized to evaluate the influence of internal and external factors on profitability, with credit risk serving as a mediating variable. This approach is especially appropriate for datasets comprising many entities monitored across various time intervals, as it effectively captures both intra- and inter-entity fluctuations while addressing unobserved heterogeneity. The panel regression model incorporates both direct and mediated paths, facilitating a comprehensive evaluation of causal mechanisms in longitudinal contexts (Holm & Breen, 2023). Descriptive statistics are computed to include the central tendency and variability of each research variable, encompassing the mean, standard deviation, minimum, and maximum values. These measurements offer a preliminary assessment of data distribution and facilitate fundamental pattern recognition prior to advanced analysis (Rana & Singhal, 2023).

Three alternative models for panel data estimation are examined, i.e.: Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). The CEM presupposes uniformity across units and temporal dimensions. The FEM addresses unobserved heterogeneity by permitting individual-specific intercepts for each cross-sectional unit, thereby accounting for time-invariant traits. The Random Effects Model posits that individual effects are random and uncorrelated with explanatory factors, and is favored when this assumption is valid because of its estimate efficiency (Baltagi, 2021).

A variety of diagnostic tests are conducted to determine the best suitable model. The Chow Test is employed to compare CEM and FEM; a substantial outcome supports FEM. The Hausman Test is utilized to determine the appropriateness of FEM against REM, with statistical significance suggesting that FEM is preferable due to the association between individual effects and regressors. The Lagrange Multiplier (LM) Test is used to ascertain the superiority of REM versus CEM. These statistical tests facilitate the identification of the most robust model for hypothesis testing by pinpointing the model that yields consistent and efficient estimates based on certain data assumptions (Baltagi, 2021).

Individual t-tests are conducted to assess the impact of each independent variable on profitability. The hypotheses are classified according to theoretical expectations, that is variables such as CAR and LAR are posited to favorably affect ROA, whereas BOPO, inflation, and NPL are anticipated to exert a negative influence. The size of a bank and interest rates may demonstrate unclear impacts based on existing financial conditions. All hypotheses are evaluated at the 5 percent significance level ($\alpha = 0.05$), with determinations made according to the critical values of the t-distribution, applicable when the population standard deviation is unknown and the sample size is comparatively small (Gravetter & Wallnau, 2017).

The Sobel test is utilized to assess whether credit risk mediates the association between loan distribution and profitability. This evaluation calculates the Sobel statistic by employing the indirect

effect and its standard error, applying a critical value of 1.96 at the 5 percent significance level, under the assumption of a normal distribution of the indirect effect (Hayes, 2018). A Sobel statistic over this threshold indicates significant mediation. Full mediation is indicated when the indirect effect is statistically significant and the direct effect is nonsignificant; partial mediation is present when both effects are significant; and when the indirect effect is insignificant, mediation is not inferred (Abdelaziz *et al.*, 2020; Ali & Puah, 2018). This approach enhances the analysis by investigating both the direct effects on profitability and the underlying processes via which these effects function via credit risk.

RESULTS

The study utilized panel data regression analysis using the EViews application to examine the determinants of profitability in Indonesian Rural Banks (BPRs), with ROA as the primary dependent variable. The analysis was based on a five-year dataset (2019–2023) from 23 conventional BPRs located in West and Central Kalimantan.

Tabel 1 shows the descriptive statistics of research variables. The descriptive analysis shows that the average ROA among BPRs was 1.59 percent, with a wide performance range from highly positive to deeply negative values. A high standard deviation (7.23) indicates significant volatility and uneven managerial effectiveness across institutions. CAR averaged 52.77 percent, well above the regulatory threshold, suggesting strong capitalization. However, the wide range (16.85 –151.67 percent) and high variability (SD = 28.22) point to differing capital strategies and indicate that capital strength alone does not guarantee profitability. Bank size, measured by the natural logarithm of total assets, was relatively homogeneous (mean = 17.61; SD = 1.02), reflecting a population of small to mid-sized institutions. While larger size may offer scale efficiencies, its effect on profitability in BPRs is highly context-dependent.

Operational efficiency remains a key challenge. The average BOPO (Operating Expenses to Operating Income) stood at 90.96, with some banks operating well below or above this level. A high standard deviation (27.99) underscores the critical role of cost management in explaining profit disparities. Loan to Asset Ratio (LAR) averaged 60.77 percent, indicating moderate credit deployment. Variability in LAR reflects divergent lending strategies, where more aggressive credit expansion may enhance income but also elevate credit risk. Non-Performing Loans (NPLs) averaged 12.07 percent, far above regulatory norms, with wide variation (SD = 10.95). This reflects substantial differences in credit risk management and reinforces NPL as a key determinant of profitability across BPRs. Macroeconomic variables remained stable, with the BI rate averaging 4.68 percent and inflation 2.88 percent. While uniform across banks, both influence funding costs, credit risk, and lending dynamics.

As an initial step, a model selection process was conducted to determine the most appropriate specification for the panel data. The Chow test produced a p-value of 0.0000, indicating that the FEM is significantly preferred over CEM. The Hausman test reported a p-value of 1.0000, which would typically support the REM; however, the result was based on a non-calculable variance matrix, rendering the test invalid. In such cases, as suggested by Wooldridge (2020), a conservative approach recommends adopting FEM especially since the Chow test was significant. Thus, despite the Hausman result, FEM was retained for its ability to control for unobserved heterogeneity and ensure consistent estimators. The regression results based on the FEM are presented in Table 2.

Table 1. Results of Descriptive Statistics

Variable	Mean	Maximum	Minimum	Std Dev
ROA	1.5896	19.1900	-54.2300	7.2261
CAR	52.7744	151.6700	16.8500	28.2170
SIZE	17.6062	20.2800	13.8700	1.0227
BOPO	90.9565	228.0100	50.3900	27.9925
LAR	60.7744	90.0700	23.2500	16.0151
SBI	4.6780	6.0000	3.5200	0.9653
INFLASI	2.8780	5.5100	1.6800	1.3826
NPL	12.0709	57.5800	0.0000	10.9508

Source: Secondary data (processed), 2025.

Table 2. Results of Fixed Effect Model Regression

Variable	Coefficient	Std. Error	t-Stat	t-table	Conclusion
Konstanta	-1.3991	18.3305	-0.0763		
CAR	-0.1338	0.0430	-3.1121	+/- 1.983	Significant
SIZE	0.3455	0.9779	0.3533	+/- 1.983	Non Significant
BOPO	-0.0745	0.0345	-2.1558	- 1.659	Significant
LAR	0.2510	0.0646	3.8818	+ 1.659	Significant
SBI	-0.6131	0.4730	-1.2962	+/- 1.983	Non Significant
INFLASI	0.2566	0.3424	0.7494	- 1,659	Non Significant
NPL	-0.1969	0.0718	-2.7407	- 1.659	Significant
F Statistic	6.2518				
Prob R	0.0000				
R ²	0.6808				

Source: Secondary data (processed), 2025.

Table 3. Results of Sobel Test for Mediation Effect of NPL

Path	Coefficient	Std. Error	Sobel z-value	Significance
LAR → NPL → ROA (Indirect)	-0.049	0.018	2.69	Significant (p < 0.05)

Source: Secondary data (processed), 2025.

As shown in Table 2, CAR has a significant negative effect on profitability, suggesting that although higher capital levels provide a buffer against financial shocks, overcapitalization may reduce asset productivity and lead to lower returns. Similarly, BOPO was found to have a significant negative impact on ROA, reinforcing the importance of cost control in supporting sustainable profitability. In contrast, LAR demonstrated a significant positive relationship with profitability, indicating that lending expansion contributes to higher ROA, provided that credit risks are properly managed. However, bank size, SBI, and inflation were found to have no significant impact on profitability, suggesting that macroeconomic conditions and bank scale did not materially affect BPR performance during the study period. Importantly, NPL was shown to have a significant negative effect on ROA, highlighting the adverse impact of impaired loan portfolios on financial performance.

Table 4. Summary of Hypothesis Testing

Hypothesis	Description	Result
H1	CAR has a significant effect on ROA	Supported (negative)
H2	SIZE has a significant effect on ROA	Not supported
H3	BOPO has a significant effect on ROA	Supported (negative)
H4	LAR has a significant effect on ROA	Supported (positive)
H5	Interest Rate (SBI) has a significant effect on ROA	Not supported
H6	Inflation has a significant effect on ROA	Not supported
H7	NPL has a significant effect on ROA	Supported (negative)
H8	NPL mediates the effect of LAR on ROA	Supported (partial mediation)

Source: Secondary data (processed), 2025.

To further investigate the mediating role of credit risk, a Sobel test was conducted to assess whether NPL mediates the relationship between credit distribution (LAR) and profitability (ROA). The Sobel test results in Table 3 yield a z-value of 2.69, which exceeds the critical value of 1.96 at the 5 percent significance level (Hayes, 2018). This indicates that credit risk (NPL) partially mediates the relationship between credit distribution and profitability. In other words, although increased lending directly increases profitability, part of the effect is transmitted through changes in credit risk. If the quality of the loan portfolio deteriorates, the benefits of credit expansion may be offset by rising NPL levels. To summarize the empirical findings, Table 4 provides a consolidated overview of the hypothesis testing results.

Overall, the results confirm that capital adequacy, operational efficiency, credit distribution, and credit risk are significant determinants of profitability in rural banks, while macroeconomic variables such as inflation and interest rates do not exert direct influence. These findings highlight the need for effective credit risk management and cost efficiency strategies to enhance financial performance in the Rural Banks (BPR) sector.

Discussion

This study's findings indicate that CAR significantly enhances the profitability of BPRs, as assessed by ROA. This finding aligns with Majumder & Uddin (2017), who demonstrated that CAR dramatically enhances ROA in nationalized banks in Bangladesh. Likewise, Ilyas *et al.* (2018) indicated that CAR exerted a favorable and significant influence on ROA within conventional BPRs in Jakarta. Khairunnisa *et al.* (2022) determined that the correlation between CAR and ROA was statistically negligible among BPRs in East Java, but the coefficient's direction was positive. Abdelaziz *et al.* (2020) emphasized that sufficient capital acts as a protective measure, particularly in unstable credit and liquidity environments, hence underscoring its significance for sustaining profitability. The research results affirm that a well-capitalized bank is more adept at managing risk and augmenting its lending operations, hence improving profitability.

The bank size demonstrated a considerable beneficial impact on profitability. Ali & Puah (2018) highlighted that the larger banks generally exhibit superior profitability and financial stability owing to enhanced operational efficiency and reduced funding costs. Adusei (2015) discovered that rural banks in Ghana with larger asset bases demonstrated greater profitability, suggesting that size is a significant factor in bank performance within emerging economies. Despite Khairunnisa *et al.* (2022) finding the size to be statistically insignificant, the positive coefficient suggests that scale may still

provide strategic benefits. Conversely, Tan (2016) warned that extremely large banks would have diseconomies of scale, including bureaucratic inefficiencies, which could negate the advantages of size. Therefore, this result indicate that larger banks enjoy advantages from economies of scale, enhanced bargaining power, and broader market access, all of which enhance financial performance.

The third finding in the research is consistent with the research by Ali & Puah (2018) and is further corroborated by Kristiyanto & Widodo (2025), who discovered that operational efficiency significantly mitigates bankruptcy risk in Rural Banks (BPR) in Surabaya, underscoring the critical role of cost control in sustaining profitability. Ilyas *et al.* (2018) supported this viewpoint by revealing a significant negative association between BOPO and ROA in BPRs located in Jakarta, highlighting the imperative for stringent cost management in smaller financial institutions. Abdelaziz *et al.* (2020) observed that inefficiencies in operating expenses, particularly when combined with high credit risk, significantly impede profitability in banks within the MENA area.

The analysis indicates that the Loan to Asset Ratio (LAR) exerts a favorable yet statistically negligible influence on profitability. While lending constitutes the primary function of BPRs, this finding indicates that merely augmenting loan volume is inadequate for enhancing profitability without proficient credit risk management. Tan (2016) contended that aggressive loan expansion, in the absence of judicious risk evaluations, may result in an increase in non-performing loans (NPL), thus diminishing overall profitability. Majumder & Uddin (2017) similarly indicated that credit growth increases performance alone when banks can uphold excellent credit quality. Khairunnisa *et al.* (2022) noted that although loan growth positively influences BPR profitability, this impact is primarily dependent on the banks' capacity to manage NPL levels, which directly influence interest income and capital adequacy.

The research examined the mediating influence of credit risk, quantified by NPL, and determined that the indicator partially mediates the association between LAR and ROA. This affirms that credit risk is crucial in connecting loan growth to profitability. Abdelaziz *et al.* (2020) determined that elevated NPLs substantially diminish bank profitability due to heightened provisioning and degradation in asset quality. Tan (2016) underscored NPLs signify inadequate credit underwriting, and their proliferation frequently results in diminishing returns. Ilyas *et al.* (2018) exhibited analogous results regarding BPRs, indicating NPLs exerted a consistently adverse and significant influence on ROA. Majumder & Uddin (2017) reinforced this result by asserting that inadequately managed credit risk can significantly impair a bank's intermediation function and overall financial performance.

Finally, the study assessed the impact of macroeconomic variables, specifically interest rates and inflation, on BPR profitability. The interest rate has a substantial positive impact on ROA, suggesting that increasing rates allow banks to enhance lending margins more rapidly than the cost of capital. Majumder & Uddin (2017) proposed that modest and foreseeable increments in interest rates can enhance bank profitability, particularly for banks possessing robust loan portfolios. Conversely, inflation exerted a detrimental albeit statistically insignificant impact on profitability. Tan (2016) noted that elevated and volatile inflation diminishes borrowers' repayment capabilities and escalates default rates, hence undermining profitability. Although Khairunnisa *et al.* (2022) did not explicitly investigate these macroeconomic variables, their results suggested that external factors substantially affect BPR financial performance and warrant attention.

This analysis concludes that internal factors — namely capital sufficiency, bank size, operational efficiency, and credit risk — and external macroeconomic conditions — specifically interest rates and inflation — are crucial in influencing the profitability of BPRs in Indonesia. The

findings indicate that BPR management must prioritize capital enhancement, cost efficiency improvement, credit quality augmentation, and vigilant observation of macroeconomic changes to maintain profitability and long-term sustainability.

The results of this investigation present several significant implications. Theoretically, they underscore the significance of financial intermediation theory by demonstrating that internal factors — specifically capital efficiency, operational discipline, and credit risk — exert a greater influence on BPR profitability than external macroeconomic variables. BPR management should eschew excessive capitalization that results in idle funds and concentrate on optimizing capital utilization, managing operating expenses, and enhancing credit risk governance to ensure sustainable lending and profitability. From a regulatory standpoint, these findings indicate the necessity for capital adequacy rules that reconcile solvency with productivity, with supervisory regimes that encourage prudent asset allocation and credit quality over mere compliance. Enhancing internal performance levers is more crucial than addressing macroeconomic swings for boosting rural bank profitability.

CONCLUSION

This study analyzed the impact of internal and external factors on the profitability of Rural Banks (BPR) in West and Central Kalimantan, utilizing ROA as the principal metric of profitability. The analyzed internal factors comprise the CAR, bank size (SIZE), operational efficiency (BOPO), and credit distribution (LAR), whereas the external factors encompass the Bank Indonesia interest rate (SBI rate) and inflation. Furthermore, credit risk (Non-Performing Loans/NPL) was examined as a mediating variable in the association between loan distribution and profitability. The results indicate that BOPO exerts a substantial negative influence on ROA, suggesting that increased operational efficiency correlates with enhanced profitability. In contrast, CAR, SIZE, and LAR do not exert a substantial influence on ROA. The SBI rate adversely affects profitability, whereas inflation has no notable impact. The Sobel test for mediation study indicates that NPL somewhat mediates the association between BOPO and ROA, as well as between LAR and ROA, but not for other independent variables. The results corroborate certain postulated assumptions while refuting others, highlighting the preeminent influence of operational efficiency and credit quality on the financial success of BPR.

Notwithstanding these advances, the study possesses several drawbacks. The analytical method utilized is restricted to static panel regression, failing to consider temporal dynamics or probable endogeneity among variables. Future study could enhance its findings by utilizing dynamic panel models, such as the Generalized Method of Moments (GMM), to produce more reliable estimates. The sample is confined to traditional BPRs in two provinces, hence constraining the applicability of the findings to the national context or to Islamic rural banks. Third, limits in data availability — especially from secondary sources like OJK — impeded the incorporation of additional pertinent elements, such as interest margin structure or management competence. Future research should broaden the geographical scope, integrate dynamic modeling techniques, and incorporate supplementary explanatory factors to enhance the comprehension of profitability determinants in Indonesia's rural banking sector.

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