

PROCEEDING

The 8th International Conference on Technology, Education, and Social Science
“Navigating Global Transformation in an Uncertain World: Interdisciplinary
Perspective on Economics, Business, Education, Law, Agriculture, Food
Technology, Politics and Society” July 30th, 2026

CREDIT RISK, PROFITABILITY, AND CREDIT RISK MANAGEMENT STRATEGY: EVIDENCE FROM RURAL BANKS IN CENTRAL JAVA DURING PPAP AND CKPN TRANSITION

Septian Adi Sasmita¹, Imanuel Madea Sakti^{1*}

¹Department of Management, Faculty of Economics and Business, Universitas Kristen
Satya Wacana

Jl. Diponegoro No. 52–60, Salatiga, Central Java, Indonesia, 50711

¹Corresponding Author: imanuel.sakti@uksw.edu

ORCID: <https://orcid.org/0000-0001-9296-2482>

ABSTRACT

This study examines the effect of credit risk on profitability, moderated by credit risk management strategy of *Bank Perekonomian Rakyat*/BPR Business Activity 2 (BPRKU 2) in Central Java during the 2021-2025 regulatory transition. Using purposive sampling, 50 OJK-registered rural banks were selected, yielding 250 panel data observations. Analysis was conducted via panel data regression with a Fixed Effect Model (FEM) and Moderated Regression Analysis (MRA). The study further analyzes two sub-periods of provisioning regulations: the Allowance for Losses on Earning Assets (PPAP/*Penyisihan Penghapusan Aktiva Produktif*) period 2021-2023 and the PSAK 71-based Allowance for Impairment Losses (CKPN/*Cadangan Kerugian Penurunan Nilai*) period 2024-2025. Variables include Non-Performing Loans (NPL) as the independent variable, Return on Assets (ROA) as the dependent variable, and Credit Risk Management Strategy (SMRK) proxied by the coverage ratio as the moderator, with BOPO, LDR, and Bank Size as controls. Results show that NPL has a significant negative effect on ROA. Notably, SMRK fails to moderate this negative impact across all models (combined, PPAP periods, and CKPN periods). This anomaly highlights a functional shift of provisioning instruments from dynamic risk protection tools to front-loaded structural expenses to comply with strict PSAK 71 regulations. Among controls, BOPO consistently exhibits a significant negative effect. LDR is significantly positive only during the PPAP period. Meanwhile, Bank Size shows a structural shift, reversing from significantly negative in the PPAP period to significantly positive in the CKPN period. Management must strengthen prudential banking principles during early credit disbursement rather than solely focusing on nominal provisioning adequacy.

Keywords: Credit Risk, Credit Risk Management Strategy, Profitability, Rural Bank

PROCEEDING

The 8th International Conference on Technology, Education, and Social Science
“Navigating Global Transformation in an Uncertain World: Interdisciplinary
Perspective on Economics, Business, Education, Law, Agriculture, Food
Technology, Politics and Society” July 30th, 2026

INTRODUCTION

Rural banks (*Bank Perekonomian Rakyat/BPR*) serve as highly compelling research objects within the Indonesian finance and banking sector due to their strategic role as a pillar of financial inclusion for Micro, Small, and Medium Enterprises (MSMEs) and rural populations that are frequently underserved by commercial banks (Amelia, 2025). According to Financial Services Authority of the Republic of Indonesia (OJK) regulations, BPR business activities are delineated in accordance with applicable rules, where in addition to the core intermediation function, BPRs are authorized to conduct fund transfer activities for their own or their customers' benefit, execute foreign exchange transactions subject to OJK approval, provide safe deposit box services, and establish strategic collaborations with other financial services institutions, such as insurance product marketing and financial technology partnerships (*Undang-Undang Republik Indonesia Nomor 4 Tahun 2023 Tentang Pengembangan Dan Penguatan Sektor Keuangan*, 2023).

Table 1. Number of rural banks based on office networks in 2025

Location	BPR			Total
	KP	KC	KPK	
Central Java	234	629	863	1.726
East Java	241	279	829	1.349
West Java	216	374	286	876

Source: Financial Services Authority of the Republic of Indonesia, 2025

Notes: KP - Head Office, KC - Branch Office, KPK - Cash Office

From a regional perspective, Central Java Province holds the position of having the highest number of BPRs on Java Island based on Indonesian Banking Statistics published by the OJK in June 2025 (Otoritas Jasa Keuangan, 2025). The significance of this region is further substantiated by Widia & Prananta (2021), who conducted a performance comparison between private and local government-owned BPRs in Central Java, while a comparative review of 23 rural bank studies in Indonesia by Akyuwen (2022); Ponziani (2022) consistently indicates that internal factors such as core capital, LDR, and NPL constitute primary determinants of BPR profitability. To streamline supervision, regulations establish asset-based clustering into Business Activity Groups (*Kelompok Usaha/KU*) determined by core capital, namely BPRKU 1 (< IDR 15 billion), BPRKU 2 (IDR 15 billion - IDR 50 billion), and BPRKU 3 ($\geq$ IDR 50 billion) (*Peraturan Otoritas Jasa Keuangan Nomor 12/POJK.03/2016 Tahun 2016 Tentang Kegiatan Usaha Dan Wilayah Jaringan Kantor Bank Perkreditan Rakyat Berdasarkan Modal Inti*, 2016). Nevertheless, recent data reveals that dozens of BPRs in Central Java, predominantly classified under BPRKU 2, continue to encounter difficulties in fulfilling minimum core capital requirements and suffer from elevated NPL levels (Aris, 2025; Ikhsan, 2025; Sasmita and Sakti

PROCEEDING

The 8th International Conference on Technology, Education, and Social Science
“Navigating Global Transformation in an Uncertain World: Interdisciplinary Perspective on Economics, Business, Education, Law, Agriculture, Food Technology, Politics and Society” July 30th, 2026

Kencana, 2025; *Peraturan Otoritas Jasa Keuangan Nomor 12/POJK.03/2016 Tahun 2016 Tentang Kegiatan Usaha Dan Wilayah Jaringan Kantor Bank Perkreditan Rakyat Berdasarkan Modal Inti*, 2016).

The urgency of this study has increased due to macroeconomic shocks in recent years. The Covid-19 pandemic drastically transformed the global economy, causing Indonesia to experience economic contraction and deflation (Hesniati et al., 2024). The phenomenon of a high non-performing loan (NPL) has a systemic impact on overall financial performance. National-level research by Azizah & Nugraha (2024) demonstrates a strong negative relationship between NPL and ROA among BPRs nationwide during the 2017–2022 period. This identical pattern is also confirmed at the regional level; within the East Java province, Panjaitan & Adam (2023) discovered that NPL and BOPO negatively influence ROA across 124 BPRs in East Java, with the OJK-BOX application functioning as a moderating variable. Despite being initially suppressed, market dynamics have exhibited volatility, whereby a gradual recovery characterized by declining NPLs and expanding ROA occurred between 2023 and 2025, supported by economic stability and OJK policies according to Plan for Core Capital Minimum Fulfillment (RP2B) data (Otoritas Jasa Keuangan, 2024).

Structurally, these profitability fluctuations are heavily dictated by internal credit risk management policies. The observed decline in ROA aligns with various empirical studies, such as Hesniati et al. (2024) who found that credit and liquidity risks exerted a negative impact on rural banks' ROA during the pandemic period, Azizah & Nugraha (2024) who verified a robust negative relationship between NPL and ROA in national BPRs for the 2017–2022 period and Panjaitan & Adam (2023), who stated that NPL and BOPO depress ROA in East Java BPRs. To mitigate these adverse outcomes, the establishment of an adequate Allowance for Impairment Losses (CKPN) serves as a critical credit risk strategy to attenuate the detrimental impact of NPLs on profitability (Otoritas Jasa Keuangan, 2024). However, the transition in accounting frameworks introduces novel operational hurdles. The impact of PSAK 71 and CKPN is validated by Rahmawati et al. (2024), who found that CKPN negatively affects the operational performance of BPRs due to the resulting expansion of expense burdens (Rahmawati et al., 2024). This conforms with the findings of Purba et al. (2025), who noted that CKPN and NPL put downward pressure on commercial bank profitability post-2020, as well as Ali & Sihombing (2025), who demonstrated that CKPN only moderates specific relationships without entirely alleviating the financial strain. Although it compresses ROA in the short term, the formulation of CKPN represents an indispensable facet of risk management to safeguard bank performance amid crisis conditions (Ali & Sihombing, 2025; Hesniati et al., 2024; Purba et al., 2025). This matter is highly vital for regional stability because Central Java Province occupies a strategic national position, where BPR credit accounts contribute approximately 6.87% of the total nominal banking credit in the Central Java province, signifying the dominance of BPRs in regional financial penetration

PROCEEDING

The 8th International Conference on Technology, Education, and Social Science
“Navigating Global Transformation in an Uncertain World: Interdisciplinary Perspective on Economics, Business, Education, Law, Agriculture, Food Technology, Politics and Society” July 30th, 2026

(Otoritas Jasa Keuangan, 2024; Santika, 2024). Consequently, to comprehensively evaluate the efficacy of this risk management framework within the proposed research model, it is imperative to control for internal factors inherent to the bank's financial structure.

Based on the background elaborated above, this research addresses two core problems regarding whether credit risk (NPL) exerts a negative effect on profitability (ROA) among BPRKU 2 in the Central Java province, and whether the Credit Risk Management Strategy (SMRK) is capable of moderating this relationship. Consequently, the objectives of this study are to test and analyze the direct effect of credit risk on profitability and to evaluate the moderating role of the SMRK within these specific banking institutions. This study holds both theoretical and practical significance; theoretically, it contributes to the banking financial management literature by integrating contingency risk governance and enriching empirical insights on provisioning instruments (PPAP/CKPN) under the PSAK 71 framework, whereas practically, it serves as an empirical strategic reference for BPRKU 2 management to optimize provisioning formulas while providing objective evaluation inputs for regulators like the Financial Services Authority (OJK) regarding macroprudential policy implementation.

Based on the theoretical framework and empirical dynamics discussed above, this study formulates two primary hypotheses to evaluate the financial structure of BPRKU 2 in Central Java province. The first hypothesis addresses the direct relationship between credit risk and bank profitability. Theoretically, an increase in default rates, proxied by the Non-Performing Loan (NPL) ratio, directly impairs interest income generation while simultaneously demanding larger operational expense allocations for asset impairment. This asset quality deterioration is expected to systematically compress the bank's overall earnings capacity. Therefore, the first hypothesis is proposed as follows:

H1. Credit risk (NPL) has a significant negative effect on the profitability (ROA).

Furthermore, to examine the contingency risk governance framework, this study introduces the moderating role of the Credit Risk Management Strategy (SMRK). The proactive establishment of a robust loss provisioning buffer represented by allowance for earning asset losses (*Penyisihan Penghapusan Aset Produktif*/PPAP) under the legacy framework and CKPN under the PSAK 71 expected credit loss model theoretically acts as a vital self-insurance mechanism. By maintaining an adequate coverage ratio, BPRs should be able to cushion the negative transmission of loan defaults, thereby preventing severe shocks to net operational earnings. Under this interaction framework, the second hypothesis is proposed as follows:

H2. Credit Risk Management Strategy (SMRK) moderates (weakens) the negative effect of credit risk (NPL) on the profitability (ROA).

PROCEEDING

The 8th International Conference on Technology, Education, and Social Science
“Navigating Global Transformation in an Uncertain World: Interdisciplinary
Perspective on Economics, Business, Education, Law, Agriculture, Food
Technology, Politics and Society” July 30th, 2026

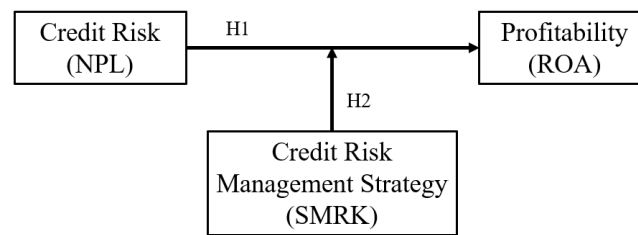


Figure 1. Research framework

METHODS

This study employs a quantitative causal-comparative research design utilizing panel data regression to empirically evaluate the structural impact of credit risk on bank profitability, as well as the potential contingent intervention mechanism provided by credit risk management strategies. The target population comprises all Rural Banks (*Bank Perekonomian Rakyat/BPR*) operating under the BPRKU 2 within the Central Java Province, Indonesia. The temporal scope of this observation spans five fiscal years, from 2021 to 2025, capturing a critical structural transition in Indonesian banking regulatory frameworks.

The year 2021 was selected as the starting point of the observation period to avoid performance bias associated with the COVID-19 era—as bank performance was expected to gradually recover by then—and to ensure a sufficiently long observation period. Meanwhile, the year 2025 was chosen as the end point because the study covers the most recent five-year period and relies on the availability of Rural Bank (BPR) data on the OJK website at the time the research is conducted in 2026. Consequently, the research period is divided into two segments: the 2021–2023 observation years, representing the period of PPAP implementation, and the 2024–2025 observation years, representing the period of CKPN implementation and data availability. Secondary financial data were extracted directly from the official audited quarterly and annual financial publication reports available via the OJK reporting portal and the respective institutional repositories.

To ensure statistical consistency and eliminate survival bias, a strict purposive sampling methodology was executed based on the following criteria:

- The BPR must be classified under the BPRKU 2, maintaining a core capital structural requirement between IDR 15 billion and IDR 50 billion during the observation window, in compliance with OJK Regulation No. 12/POJK.03/2016.
- The institution must maintain continuous and active banking operations throughout the full five-year observation horizon (2021–2025).
- The bank must have published complete, verified, and transparent quarterly and annual financial statements without interruption.
- The bank did not engage in any corporate restructuring activities, including mergers, acquisitions, or voluntary/forced liquidations during the research window.

PROCEEDING

The 8th International Conference on Technology, Education, and Social Science
“Navigating Global Transformation in an Uncertain World: Interdisciplinary Perspective on Economics, Business, Education, Law, Agriculture, Food Technology, Politics and Society” July 30th, 2026

Applying these rigorous filters resulted in a finalized sample of 50 active BPRKU 2 institutions. Given the five-year observation matrix, this selection yields a highly balanced panel data framework with a total of 250 distinct observations (50 cross-sections x 5 years).

Data were gathered utilizing documentation techniques and a literature study. The operational steps are outlined as follows:

- a. Downloading Indonesian Banking Statistics (SPI) publications and BPR financial statements from the Financial Services Authority of the Republic of Indonesia portal for the 2021-2025 period.
- b. Adjusting the Rural Bank BPRKU 2 classification based on the core capital recorded at each fiscal year-end.
- c. Constructing a panel dataset via Google Colabs using the Python Three programming language for data wrangling of NPL, ROA, and PPAP/CKPN variables derived from the BPRKU 2 financial statements.
- d. Importing the structured panel dataset into the Stata 17 statistical software package.

To guarantee econometric accuracy, the variables are operationalized into dependent, independent, moderating, and control parameters, with measurements firmly rooted in institutional banking standards and empirical financial literature.

Profitability represents the fundamental baseline of institutional operational performance and is proxied by Return on Assets (ROA), measuring management's efficiency in generating net earnings utilizing its total asset base (Azizah & Nugraha, 2024; Panjaitan & Adam, 2023). In accordance with the standardization enforced by the OJK, the ratio is calculated as follows:

$$ROA = \frac{\text{Net Income Befor Tax}}{\text{Total Aset}} \times 100\% \quad (1)$$

Credit risk defines the structural asset quality exposure and is proxied via the Non-Performing Loan (NPL) ratio, evaluating the percentage of extended credit suffering from repayment structural distress (Azizah & Nugraha, 2024; Hesniati et al., 2024). The measurement captures loans classified under substandard, doubtful, and outright loss configurations relative to total gross loans:

$$NPL = \frac{\text{Substandard Loans} + \text{Doubtful Loans} + \text{Loss Loans}}{\text{Total Extended Credit}} \times 100\% \quad (2)$$

The Credit Risk Management Strategy (*Strategi Manajemen Risiko Kredit*/SMRK) evaluates the adequacy of institutional provisioning buffers implemented to absorb default shocks (Ali & Sihombing, 2025; Otoritas Jasa Keuangan, 2024). Due to the regulatory overhaul occurring within the 2021–2025 timeline, this study explicitly operationalizes SMRK into two distinct provisioning frameworks using a natural logarithm (ln) transformation to normalize scale variances:

PROCEEDING

The 8th International Conference on Technology, Education, and Social Science
“Navigating Global Transformation in an Uncertain World: Interdisciplinary
Perspective on Economics, Business, Education, Law, Agriculture, Food
Technology, Politics and Society” July 30th, 2026

- a. Allowance for Earning Asset Losses (PPAP Period, 2021–2023): Built upon the legacy "Incurred Loss" accounting principles governed by POJK No. 33/POJK.03/2018, where dynamic reserves are calculated post-hoc based on credit classification downgrades (*Peraturan Otoritas Jasa Keuangan Nomor 12/POJK.03/2016 Tahun 2016 Tentang Kegiatan Usaha Dan Wilayah Jaringan Kantor Bank Perkreditan Rakyat Berdasarkan Modal Inti*, 2016).
- b. Allowance for Impairment Losses (CKPN Period, 2024–2025): Established under the newly implemented "Expected Credit Loss" (ECL) structural standard under PSAK 71 and POJK No. 1/2024, forcing banks to front-load potential future credit decay from the moment of loan origination (*Peraturan Otoritas Jasa Keuangan Nomor 1 Tahun 2024 Tentang Kualitas Aset Bank Perekonomian Rakyat*, 2024; Purba et al., 2025).

$$\text{Coverage Ratio} = \frac{\text{Nominals of PPAP/CKPN}}{\text{Non Performing Loan}} \times 100\%$$

To neutralize external confounding factors and prevent omitted variable estimation bias, three bank-specific internal metrics are integrated into the panel regression architecture:

- a. Operational Efficiency (BOPO): The ratio of operating expenses to operating income, capturing institutional cost management efficiency (Panjaitan & Adam, 2023).
- b. Liquidity Risk (LDR): The Loan to Deposit Ratio, evaluating the deployment of customer deposits into interest-earning credit portfolios (Hesniati et al., 2024).
- c. Bank Size (SIZE): Calculated as the natural logarithm ($\ln$) of total institutional assets to control for structural capacity economies of scale (Ponziani, 2022).

To test the formulated hypotheses, this study applies panel data regression with Moderated Regression Analysis (MRA) utilizing two distinct structural regression models. Prior to model estimation, classic assumption tests consisting of four diagnostic procedures namely normality, multicollinearity, heteroscedasticity, and autocorrelation tests are executed to confirm the Best Linear Unbiased Estimator (BLUE) properties. The regression model used in this study is split into two parts to mitigate the potential bias arising from differences in provisioning policy periods; therefore, the regression models are as follows:

(i) PPAP Period (2021-2023):

$$ROA_{it} = \alpha + \beta_1 NPL_{it} + \beta_2 PPAP_{it} + \beta_3 (NPL_{it} \times PPAP_{it}) + Controls_{it} + \varepsilon_{it}$$

(ii) CKPN Period (2024-2025):

$$ROA_{it} = \alpha + \beta_1 NPL_{it} + \beta_2 CKPN_{it} + \beta_3 (NPL_{it} \times CKPN_{it}) + Controls_{it} + \varepsilon_{it}$$

PROCEEDING

The 8th International Conference on Technology, Education, and Social Science
**“Navigating Global Transformation in an Uncertain World: Interdisciplinary
Perspective on Economics, Business, Education, Law, Agriculture, Food
Technology, Politics and Society” July 30th, 2026**

RESULTS AND DISCUSSION

Empirical data compiled in Table 2 reveals a significant contraction in banking profitability upon transitioning into the CKPN Period, where the average ROA dropped from 3.18% to 2.12%, and the minimum ROA plummeted to an extreme low of -25.98% compared to the -0.55% recorded during the PPAP Period. This profitability degradation aligns with a severe credit risk surge, as the average NPL ratio jumped from 8.02% during the PPAP Period to 12.58% in the CKPN Period, while risk variance expanded with the NPL standard deviation rising from 5.72% to 10.71% and the maximum NPL touching 70.85%. Table 2 highlights severe polarization and a wide performance gap among individual banks; the lowest NPL group recorded an impressive minimum figure of 0.36%, followed by other top-performing institutions at 0.65% and 0.75%, whereas the peak NPL touched 70.85%. This distribution confirms a strong linear correlation between credit distress and severe losses, exemplified by instances where high NPLs of 35.48% and 30.82% directly triggered the lowest negative ROA values of -25.98% and -10.14% respectively, proving that credit spikes directly erode interest income while swelling impairment charges. Furthermore, the credit risk management strategy (SMRK) average ratio declined from 3.66 during the PPAP Period to 2.30 in the CKPN Period, reflecting tighter proportional provisioning relative to total bad loans. Table 2 documents that the highest absolute provisioning during the PPAP era stood at IDR 9.7 billion, whereas the highest allocation in the CKPN era reached IDR 31 billion, which was directly triggered by the maximum NPL exposure.

Financial strain was further compounded by operational inefficiencies, with average operating costs climbing from 80.11% to 88.37%, and liquidity tightening as the average LDR escalated from 83.44% to 102.43%, signaling credit expansion beyond third-party fund collection. Conversely, structural asset sizes remained relatively stable, exhibiting a marginal mean increase from 18.91 to 19.01, though maintaining an expansive structural gap between the largest institution at IDR 610 billion and the smallest at IDR 59 billion. Interestingly, Table Two captures a striking positive anomaly regarding asset scale; despite holding the smallest asset base of IDR 59 billion, an institution achieved the highest profitability with a peak ROA of 20.26%, underpinned by an exceptionally healthy NPL of 0.75%, providing robust empirical evidence that small-scale institutions can optimize profitability and efficiency through strict prudential banking principles.

PROCEEDING

The 8th International Conference on Technology, Education, and Social Science
“Navigating Global Transformation in an Uncertain World: Interdisciplinary
Perspective on Economics, Business, Education, Law, Agriculture, Food
Technology, Politics and Society” July 30th, 2026

Table 2. Descriptive Statistics Result

Variable	Period	Mean	Std. Dev.	Min	Max
ROA (%)	PPAP (2021-2023)	3.17	2.70	-0.55	20.26
	CKPN (2024-2025)	2.11	3.84	-25.98	9.57
	Full (Combined)	2.75	3.24	-25.98	20.26
NPL (%)	PPAP (2021-2023)	8.02	5.72	0.36	31.64
	CKPN (2024-2025)	12.58	10.71	1.13	70.85
	Full (Combined)	9.84	8.38	0.36	70.85
SMRK (<i>ln</i>)	PPAP (2021-2023)	3.69	4.62	0.49	37.27
	CKPN (2024-2025)	2.30	2.40	0.24	12.00
	Full (Combined)	3.13	3.94	0.24	37.27
BOPO (%)	PPAP (2021-2023)	80.11	95.02	47.26	105.08
	CKPN (2024-2025)	88.37	21.77	64.03	243.64
	Full (Combined)	83.42	16.09	47.26	243.64
LDR (%)	PPAP (2021-2023)	83.44	28.02	47.87	274.63
	CKPN (2024-2025)	102.43	41.28	52.30	258.84
	Full (Combined)	91.03	35.13	47.87	274.63
Size (<i>ln</i>)	PPAP (2021-2023)	18.91	0.57	17.72	20.1
	CKPN (2024-2025)	19.01	0.6	17.9	20.23
	Full (Combined)	18.95	0.59	17.72	20.23

Source: Stata Output, 2026

Based on the results of the model feasibility test through the formal Hausman Test, it is empirically determined that the Fixed Effect Model (FEM) is the best estimation method for all observed models in this study.

Table 3. Hausman, Multicollinearity, Heteroscedasticity, and Autocorrelation Test Results

Test	Indicator	Combined Model	PPAP Period	CKPN Period
Hausman Test	Prob > chi2	0.0000	0.0001	0.0004
Multicollinearity Test	NPL	1.67	1.65	1.92
	SMRK	1.44	1.54	1.56
	BOPO	1.36	1.33	1.47
	Size	1.15	1.33	1.29
	LDR	1.12	1.09	1.18
	Mean VIF	1.35	1.39	1.49
Heteroscedasticity test	Prob > chi2	0.0000	0.0000	1.000
Autocorrelation test	Prob > F	0.2590	0.2548	0.4486

Source: Stata Output, 2026

PROCEEDING

The 8th International Conference on Technology, Education, and Social Science
“Navigating Global Transformation in an Uncertain World: Interdisciplinary Perspective on Economics, Business, Education, Law, Agriculture, Food Technology, Politics and Society” July 30th, 2026

The test results in Table 3 for the Combined Model, PPAP Regulation period, and CKPN Regulation period consistently show a Chi-Square probability significance value of < 0.05 , thereby rejecting the null hypothesis. Consequently, the classical assumption testing procedure in this study is adjusted to the econometric characteristics of panel data under the Fixed Effect model, which strictly focuses on ensuring that the estimation is free from multicollinearity, heteroscedasticity, and autocorrelation issues.

Based on Table 3 of the Stata Output Results of multicollinearity test, all three period models have Mean Variance Inflation Factor (VIF) values well below 10 (1.35, 1.39, and 1.49). This indicates that there is no multicollinearity issue in either the overall model or each specific period (PPAP and CKPN).

Based on Table 3 of the Stata Output Results of the heteroscedasticity test, the data in the Combined PPAP and CKPN Model spans a very wide range, with NPL ranging from 0.36% to 70.85%. This condition is highly susceptible to heteroscedasticity. However, given the Prob > F value of 0.0000 in the regression table, the overall model is still declared fit and valid. In the PPAP Period Model (2021-2023), the R-squared value of 0.7302 indicates that the independent variables can explain 73,02% of the variation in ROA. Without using the robust method, the standard error for the NPL variable is 0.0126; thus, despite data fluctuations in the post-pandemic era, the t-test results remain objective even without robust standard errors. In the CKPN Period Model (2024-2025), the data during this era exhibits higher variance, as indicated by the standard deviation of ROA increasing from 2.70 to 3.84.

Based on Table 3 of the Stata Output Results of the autocorrelation test, a probability value of 0.2805 was obtained. Since this probability is greater than 0.05, it is confirmed that the research residuals are free from autocorrelation issues in the Combined Model. Similarly, no autocorrelation issues were found in the PPAP and CKPN Models, which yielded probability values of 0.2548 for the PPAP model and 0.4486 for the CKPN model. Thus, all models confirm that the observation data are not sequentially interrelated or dependent.

The empirical estimation results generated via the Fixed Effect Model (FEM) and Moderated Regression Analysis (MRA) across the three distinct observation frameworks Combined, PPAP (2021-2023), and CKPN (2024-2025) models are structurally consolidated in Table 4. Rather than merely reporting isolated statistical coefficients, the following discussion integrates these findings into banking literature and the ongoing regulatory paradigm shift.

The empirical models firmly validate a negative relationship between credit risk and bank profitability. In Model 1 (Combined Timeline), the Non-Performing Loan (NPL) ratio exhibits a negative coefficient of -0.1831, which is statistically significant at the 1% level ($p < 0.01$). This negative pattern persists into Model 2 ($p < 0.10$). Econometrically, this demonstrates that every unit escalation in bad loans directly suppresses the Return on Assets (ROA) of BPRKU 2 in Central Java. This severe

PROCEEDING

The 8th International Conference on Technology, Education, and Social Science
“Navigating Global Transformation in an Uncertain World: Interdisciplinary Perspective on Economics, Business, Education, Law, Agriculture, Food Technology, Politics and Society” July 30th, 2026

performance erosion is driven by two parallel banking mechanisms: a direct contraction in interest income due to non-accrual loans and a forced expansion in operational expense allocations to cover asset quality deterioration. These results successfully support the first hypothesis (H_1 accepted). From a comparative literature perspective, this finding aligns with the national-level research by Hesniati et al. (2024), who verified a robust negative relationship between NPL and ROA among BPRs nationwide during the 2017-2022 period. It also corroborates regional findings by Panjaitan & Adam (2023) across 124 BPRs in East Java, as well as Hesniati et al. (2024), who proved that heightened credit risk significantly depresses BPR performance during periods of macroeconomic distress (Azizah & Nugraha, 2024; Hesniati et al., 2024; Panjaitan & Adam, 2023).

Table 4. Hypothesis Testing Results

Variable	(1) ROA	(2) ROA	(3) ROA	(4) ROA	(5) ROA
NPL	-0.1831*** (0.0241)	-0.2308* (0.1295)	0.0277** (0.0132)	-0.0064 (0.0126)	0.0570 (0.0474)
SMRK	-	-0.0653 (0.2976)	0.0591** (0.0251)	0.0552** (0.0211)	0.1362 (0.0977)
NPL x SMRK	-	-	-0.1166 (0.1749)	-	-
NPL x SMRK (PPAP)	-	-	-	-0.0814 (0.1440)	-
NPL x SMRK (CKPN)	-	-	-	-	0.0418 (0.4495)
BOPO	-	-	-0.1545*** (0.0053)	-0.1284*** (0.0100)	-0.1293*** (0.0087)
LDR	-	-	0.0011 (0.0027)	0.0052*** (0.0019)	-0.0220 (0.0145)
Size	-	-	0.5103 (0.4548)	-1.6869*** (0.3816)	4.2190** (1.9305)
Cons.	4.5574*** (0.2713)	5.1732** (2.0098)	7.1381 (8.4706)	45.9715*** (7.1607)	-66.0574* (38.7601)
R-squared (Within)	0.2245	0.0663	0.8714	0.7302	0.9093
F-square (F-stat)	57.62	1.70	219.08	42.39	73.53
Model	FEM	FEM	FEM	FEM	FEM
Conclusion	H1 Accepted	H1 Accepted	H2 Rejected	H2 Rejected	H2 Rejected

Source: Stata Output, 2026

Significance levels are indicated by * $p < 0.10$ (10%), ** $p < 0.05$ (5%), *** $p < 0.01$ (1%). Values in parentheses represent the standard errors.

However, the results of the moderation model test showed opposite results. As documented in Table 4, the interaction coefficients for all three periods SMRK Combined (-0.1166, $p = 0.506$), SMRK PPAP (-0.0814, $p = 0.573$), and SMRK CKPN (0.0418, $p = 0.92$) consistently display statistically insignificant values. Consequently, the second

PROCEEDING

The 8th International Conference on Technology, Education, and Social Science
“Navigating Global Transformation in an Uncertain World: Interdisciplinary Perspective on Economics, Business, Education, Law, Agriculture, Food Technology, Politics and Society” July 30th, 2026

hypothesis is rejected across all structural frameworks (H_2 rejected). Theoretically, a credit risk management strategy (SMRK) proxied by provisioning buffers should act as a dynamic self-insurance shield to cushion the negative transmission of defaults onto net earnings. However, the institutional reality of BPRKU 2 in Central Java during 2021-2025 demonstrates that nominal provisioning adequacy fails to mitigate the negative impact of NPLs on ROA.

This empirical failure exposes a critical functional shift in provisioning instruments, heavily dictated by the rigid regulatory transition from the legacy Incurred Loss framework (PPAP under POJK 33/2018) to the stringent Expected Credit Loss model (CKPN under PSAK 71 and POJK 1/2024) (*Peraturan Otoritas Jasa Keuangan Nomor 1 Tahun 2024 Tentang Kualitas Aset Bank Perekonomian Rakyat*, 2024). Instead of functioning as adaptive, risk-mitigating reserves, the mandatory establishment of CKPN forces banks to front-load potential future credit losses at loan inception. This converts provisioning from a dynamic defense mechanism into a rigid, fixed structural expense that directly compresses short-term operational margins. This functional distortion aligns with Rahmawati et al. (2024), who demonstrated that CKPN expands the operational expense burden of BPRs, thereby dragging down their financial health. It is further supported by Purba et al. (2025), who concluded that the strict implementation of PSAK 71 puts long-term pressure on bank profitability post-2020, and Ali & Sihombing (2025), who verified that impairment provisions frequently fail to protect bank earnings under strict reporting landscapes (Ali & Sihombing, 2025; Purba et al., 2025; Rahmawati et al., 2024).

The behavior of the control variables further contextualizes the operational strain encountered by BPR KU 2. Operational efficiency (BOPO) consistently exhibits a highly significant negative coefficient at the 1% level across all MRA models (-0.1545 in Combined, -0.1284 in PPAP, and -0.1293 in CKPN). This indicates that internal operational inefficiencies and overhead costs represent a primary driver of profitability degradation, reinforcing the findings of Panjaitan & Adam (2023). The Loan to Deposit Ratio (LDR) presents a significant positive coefficient (0.0052, $p < 0.01$) exclusively during the PPAP era (2021–2023). This demonstrates that aggressive credit deployment successfully boosted interest income when provisioning rules were less punitive, a dynamic that disappeared during the CKPN era as average LDR tightened to 102.43%.

Most notably, Bank Size (SIZE) undergoes a structural reversal. During the PPAP period, size had a highly significant negative effect (-1.6869, $p < 0.01$), indicating that larger asset structures suffered from higher management friction and scale inefficiencies during the pandemic aftermath. However, in the CKPN period (2024-2025), the size coefficient shifts to significantly positive (4.2190, $p < 0.05$). This structural shift proves that under the rigid environment of PSAK 71, larger BPRKU 2 institutions enjoy superior economies of scale and data infrastructure to absorb the front-loaded costs of expected

PROCEEDING

The 8th International Conference on Technology, Education, and Social Science
**“Navigating Global Transformation in an Uncertain World: Interdisciplinary
Perspective on Economics, Business, Education, Law, Agriculture, Food
Technology, Politics and Society” July 30th, 2026**

credit losses compared to smaller peers, corroborating the structural asset theories discussed by Panjaitan & Adam (2023).

CONCLUSION

This research establishes that credit risk, proxied by the Non-Performing Loan (NPL) ratio, exerts a significant negative influence on the profitability (Return on Assets/ROA) of BPRKU 2 in Central Java during the 2021-2025 period, although this relationship remains statistically insignificant during the 2021-2023 Provision for Productive Asset Losses (PPAP) sub-period due to highly tolerant post-pandemic loan restructuring policies. Furthermore, the Credit Risk Management Strategy (SMRK), evaluated through the coverage ratio, fails to moderate the negative effect of credit risk on ROA, thereby confirming a functional displacement where the provisioning instrument shifts from a dynamic risk mitigation tool into a rigid, front-loaded structural expense under the stringent regulatory demands of PSAK 71 during the 2024-2025 Expected Credit Loss (CKPN) period; nevertheless, SMRK individually exhibits a significant positive impact on ROA, demonstrating that maintaining independent, robust provisioning remains a critical determinant in safeguarding operational earning capacity. Practically, these findings indicate that BPRKU 2 management must redirect its strategic focus from mere nominal regulatory compliance toward early-stage prudential banking principles to preserve portfolio health an operational model, which achieved exemplary profitability by minimizing its NPL ratio despite its small asset scale while recommending that the Financial Services Authority (OJK) conduct periodic evaluations regarding the operational toll of front-loaded expected credit losses on bank viability. Theoretically, this study contributes to risk management literature by empirically documenting how rigid accounting standards can transform dynamic quantitative risk instruments into inflexible structural costs, thereby neutralizing managerial discretion in risk mitigation.

However, several limitations constrain this inquiry, most notably its exclusive focus on the BPRKU 2 population within the Central Java province over a narrow inter-temporal transition window (2021–2025), which restricts the generalizability of these insights to the national rural banking sector or alternative asset clusters such as BPRKU 1 and BPRKU 3. Additionally, the SMRK proxy is confined strictly to the quantitative coverage ratio, leaving unexamined crucial qualitative risk management strategies such as sectoral portfolio diversification or digitalized debtor monitoring systems. The analytical model also assumes an instantaneous relationship, thereby overlooking potential time-lag effects in risk absorption, while simultaneously omitting non-operational expenses (including regulatory fines, asset depreciation, and inventory write-offs) which generates structural heteroskedasticity, and failing to incorporate non-credit income variables (such as fee-based income) that structurally serve as financial buffers against credit volatility. Methodologically, the use of Moderated Regression Analysis

PROCEEDING

The 8th International Conference on Technology, Education, and Social Science
“Navigating Global Transformation in an Uncertain World: Interdisciplinary
Perspective on Economics, Business, Education, Law, Agriculture, Food
Technology, Politics and Society” July 30th, 2026

(MRA) is inadequate for examining the differences between the PPAP and CPKPN regulatory periods in greater depth.

Consequently, future inquiries should expand their geographical scope to a national level and introduce comparative analyses of BPRKU 1 (highly capital-constrained) and BPRKU 3 (highly established) cohorts to mitigate regional bias, while integrating qualitative governance variables, executive demographics, and non-operational cost components to construct a comprehensive view of profitability determinants. Future researchers are encouraged to implement dynamic econometric frameworks, such as autoregressive modeling, to isolate the delayed effects of credit risk on future profitability, and to formally introduce non-credit revenue streams as control or explanatory variables to evaluate their efficacy as structural buffers during credit contractions. Finally, to resolve the methodological limitations of this study, future research should employ Multi-Group Analysis (MGA) to statistically test coefficient variations across the PPAP and CKPN periods, as well as across distinct sub-groups segmented by regional clusters, ownership structures, or capital scales.

REFERENCES

- Akyuwen, R. (2022). Research on the profitability of rural banks in Indonesia: A Comparative Study. *Proceedings of the 2nd International Conference on Social Science, Humanities, Education and Society Development (ICONS 2021)*, 629(IconS 2021), 220–229. <https://doi.org/10.2991/assehr.k.220101.033>
- Ali, H., & Sihombing, S. (2025). Determinants of profitability in digital banking: The moderating role of CKPN. *Jurnal Manajemen Dan Perbankan (JUMPA)*, 12(2), 1–12. <https://doi.org/10.55963/jumpa.v12i2.775>
- Amelia, D. (2025). *Analisis kinerja BPR sebelum dan setelah berkolaborasi dengan Inovasi Fintech*. Universitas Andalas.
- Aris, B. (2025). BPR di Jateng masih hadapi tekanan NPL. *Radioidola*. <https://www.radioidola.com/2025/bpr-di-jateng-masih-hadapi-tekanan-npl>
- Azizah, A., & Nugraha, J. (2024). Pengaruh analisis kinerja keuangan terhadap profitabilitas Bank Perkreditan Rakyat di Indonesia Periode 2017-2022. *Emerging Statistics and Data Science Journal*, 2(2), 196–211. <https://doi.org/10.20885/esds.vol2.iss.2.art13>
- Hesniati, H., Ellen, E., & Marheni, D. K. (2024). Impact of credit and liquidity risk on profitability: The Conventional Rural Banks in Riau Islands Province. *Jurnal Maksipreneur: Manajemen, Koperasi, Dan Entrepreneurship*, 13(2), 684–697. <https://doi.org/10.30588/jmp.v13i2.1667>
- Ikhsan, M. F. N. (2025). Puluhan BPR di Jawa Tengah Kesulitan Penuhi Aturan Modal. *Finansial.Bisnis.Com*. <https://finansial.bisnis.com/read/20251211/90/1936137/puluhan-bpr-di-jawa-tengah-kesulitan-penuhi-aturan-modal>
- Kencana, D. (2025). NPL Jateng Tembus 5 persen, OJK soroti kredit macet dan modal inti 30 BPR. *IDN Times Jateng*. <https://jateng.idntimes.com/news/jawa-tengah/npl->

PROCEEDING

The 8th International Conference on Technology, Education, and Social Science
“Navigating Global Transformation in an Uncertain World: Interdisciplinary
Perspective on Economics, Business, Education, Law, Agriculture, Food
Technology, Politics and Society” July 30th, 2026

- jateng-tembus-5-persen-ojk-soroti-kredit-macet-dan-modal-inti-30-bpr-00-2m8jx-jn1mj
- Otoritas Jasa Keuangan. (2024). *Roadmap pengembangan dan penguatan industri BPR dan BPRS 2024-2027*.
- Otoritas Jasa Keuangan. (2025). *Statistik perbankan indonesia (Juni 2025)*.
- Panjaitan, D. K. A., & Adam, H. (2023). The effect of implementing OJK-BOX (OBOX) application in the relationship among NPL, BOPO, and cash ratio on the profitability of rural bank (BPR) in East Java. *Jurnal Ilmu Keuangan Dan Perbankan (JIKA)*, 12(2), 303–316. <https://doi.org/10.34010/jika.v12i2.9295>
- Peraturan Otoritas Jasa Keuangan Nomor 1 Tahun 2024 Tentang Kualitas Aset Bank Perekonomian Rakyat (2024).
- Peraturan Otoritas Jasa Keuangan nomor 12/POJK.03/2016 tahun 2016 tentang kegiatan usaha dan wilayah jaringan kantor Bank Perkreditan Rakyat Berdasarkan Modal Inti (2016).
- Ponziani, R. M. (2022). Internal and External Determinants of Rural Banks’ Profitability : A Time-Series Analysis. *Jurnal Akuntansi, Manajemen Dan Ekonomi*, 24(1), 33–40.
- Purba, E. Y., Lores, L., & Habibie, M. (2025). Pengaruh penerapan PSAK 71, BOPO dan NPL Terhadap Profitabilitas. *Balance : Jurnal Akuntansi Dan Manajemen*, 4(1), 149–160. <https://doi.org/10.59086/jam.v4i1.648>
- Rahmawati, A., Maulana, R., & Firmansyah, A. (2024). Dampak CKPN terhadap kinerja operasional: Risiko dan Profitabilitas Bank Perkreditan Rakyat. *Ultima Accounting Jurnal Ilmu Akuntansi*, 16(2), 188–199. <https://doi.org/10.31937/akuntansi.v16i2.3588>
- Santika, E. F. (2024). *10 Provinsi dengan kredit macet BPR tertinggi nasional juni 2024*. Databoks Katadata. <https://databoks.katadata.co.id/keuangan/statistik/66d9afa4c1d81/10-provinsi-dengan-kredit-macet-bpr-tertinggi-nasional-juni-2024>
- Undang-Undang Republik Indonesia nomor 4 Tahun 2023 tentang pengembangan dan penguatan sektor keuangan (2023).
- Widia, S., & Prananta, W. (2021). The financial performance comparison of private and government bank: Rural bank case. *Management Analysis Journal*, 10(1), 77–84. <https://doi.org/10.15294/maj.v10i1.46009>