
**DETERMINANTS OF BPRS PROFITABILITY IN WEST JAVA PROVINCE
WITH NPF AS A MODERATING VARIABLE****Tazkia Salsabila Kamila¹**

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Abstract

This study aims to analyze the effect of financial ratios—measured by the Capital Adequacy Ratio, Financing-to-Deposit Ratio, Operating Expenses, and Operating Income—on profitability, specifically Return on Assets, with Non-Performing Financing as a moderating variable. The study employs a quantitative method using panel data regression and Moderated Regression Analysis on data from 27 Rural Banks (BPRS) in West Java Province over the 2015–2025 quarterly period. The results of the study indicate that CAR ($p = 0.656 > 0.05$) and BOPO ($p = 0.988 > 0.05$) do not have a significant effect on ROA; thus, profitability is determined more by the effectiveness of productive asset allocation than by capital strength and cost efficiency. FDR ($p = 0.00 < 0.05$) has a positive and significant effect, confirming that the effective allocation of funds increases profitability. Meanwhile, NPF as a moderating variable ($p = 0.693 > 0.05$) was not significant. All interaction terms had p-values greater than 0.05, indicating that NPF did not alter the direction of the relationship with ROA. Collectively, these findings ($p = 0.00 < 0.05$) indicate that ROA is influenced by CAR, FDR, BOPO, NPF, and interaction variables. This study highlights that the combination of FDR and BOPO is a key factor in profitability resilience. Policy makers OJK and DSAK need to collaborate in implementing more prudent capital regulation for BPRS while focused on the real sector, so that early monitoring of trends in inefficiency and liquidity can strengthen profitability resilience.

Keywords: CAR, FDR, BOPO, NPF, and ROA

INTRODUCTION

The global Islamic finance sector has shown a positive growth trend over the past two decades. According to the 2025 State of the Global Islamic Economy Indicator (SGIE) report by DinarStandard, Islamic banking assets account for 70% of the global market share. Bank size, as a control variable in corporate governance, can have its effects mitigated by high non-performing loan (NPL) ratios in empirical studies in the MENA region. (Aledeimat & Bein, 2025). The banking system in the Asian region is similarly vulnerable to political risks, which significantly reduce liquidity through sudden deposit withdrawals and surging interbank rates (Adeneye et al., 2025).

Major Islamic banks in the GCC region have proven to be more resilient in the face of global shocks, yet more vulnerable to local risks (Fianto & Ibrahim, 2025). Smaller banks exhibit lower levels of inefficiency; the relationship between bank size and efficiency follows a U-shaped pattern, meaning that banks that are either too small or too large are likely to experience diseconomies of scale. Asset sustainability within the Islamic banking sector remains fragmented, as evidenced by the disparity in assets: Islamic Rural Banks (BPRS) account for only 2% of the total assets of Islamic Commercial Banks and Islamic Business Units, which together make up 95% of the nation's Islamic banking assets (OJK, 2025).

According to OJK report (2025) the financial resilience of BPRS is difficult to maintain due to a high NPF ratio exceeding 5%, as their financing portfolio is dominated by the MSME sector. This contradicts the findings of the National BPRS study, which concluded that the risk associated with SME financing does not significantly affect BPRS profitability, even though the BOPO continues to fluctuate (Siregar, 2023). In line with the research by Hapsari & Widarjono (2023) rising operational costs also contribute to a decline in the quality of financing.

Heterogeneous operational capacity and structure contribute to patterns of profitability distress among BPRS. Operational inefficiencies observed among BPRS in West Java Province, despite conditions of increasing returns to scale, indicate that the operational scale has not yet reached an optimal level for generating profits (Dzahidah et al., 2022). Regions where competition among rural banks (BPRS) is particularly intense—namely Banten, Yogyakarta Special Region, and West Java—exhibit signs of urban distress: large-scale operations with weak risk management, characterized by a combination of high FDR and NPF ratios and a weak BOPO (OJK, 2025).

FDR of BPRS in West Java (119.44%) declined from the previous year, although it remains above 100% and higher than the national average (112.26%); similarly, the NPF for both is above 10%, with an average FDR exceeding 110%. The relationship between FDR and NPF and ROA is confirmed by the liquidation process, where the recovery of BPRS assets (24.17%) is significantly lower than that of conventional BPRs (32.77%). as was the case with BPRS Babussalam, BPRS Al Hidayah, and BPRS Gotong Rotong, which are BPRSs located in West Java (Ashari et al., 2024). Report by Lembaga Penjamin Simpanan (2024), the bankruptcy rate for BPRS in West Java reached 30.8%, involving 41 BPRs and BPRSs between 2025 and 2024, making West Java the province with the highest number of liquidations

This paper contributes to the growing of literature on in the field of Islamic Banking by Providing empirical evidence that ROA alone is insufficient to explain the profitability of Islamic rural banks (BPRS) when considered in conjunction with other financial ratios such as CAR and FDR. The findings indicate that operational efficiency is most responsive to financial stress and is therefore suitable as an early-warning indicator, while NPF serves as the primary risk signal in financing decisions.

REVIEW OF LITERATURE

Signal Theory (Mills W., C, 1959; Spence M, 1973) in the form of information that reflects a company's financial condition and is useful to investors. Strong capital is a positive signal for investors or customers because it reduces information asymmetry, reflects financial stability, and demonstrates the bank's ability to absorb losses and minimize the risk of default (Arhinful et al., 2025). The Federal Deposit Insurance Corporation Improvement Act (FDICIA) of 1991 tightened capital requirements and succeeded in improving bank discipline, reducing misallocation of assets, and highlighting profit losses.

Adequate capital is not merely a means of risk protection; rather, it serves as a tool for improving. Similarly, a study conducted in West Java Province yielded conflicting results due to operational differences (business principles), with the study of rural banks in West Java finding that ROA and BOPO are factors influencing the CAR (Nurfauziah, 2020). In addition to these methods, the Stochastic Frontier Analysis (SFA) method indicates that the average profit efficiency of Islamic commercial banks in Indonesia, at 82.24%, is still considered inefficient (Nasution, 2020).

A company's ability to generate profits relative to its total assets is measured using the ROA metric. Excessive concentration on a single type of financing is a concern, as it may increase NPF and reduce profitability (Widarjono et al., 2022). ROA of Islamic banks is often lower than that of conventional banks. Ethical values in profit-sharing financing mechanisms view profit as a natural outcome of fair and non-coercive activities, serving as an absolute indicator (Lailia & Irkhami, 2026). Bank Indonesia defines a good ROA standard as 1.5%, with the ROA calculation formula provided, as follows:

$$\text{Return on Assets} = \frac{\text{Profit Before Tax}}{\text{Total Assets}} \times 100\%$$

PSAK No. 71, which aligns with IFRS 9, relies on forward-looking (macroeconomic) data, thereby placing pressure on small banks. Capital requirements for IMFBs in Nigeria are limiting the scope for financing expansion and reducing the reach of services (Salaudeen & Zakariyah, 2022). Capital regulation are intended to strengthen stability and reduce risky behaviour, however their impact is not always neutral, especially as loss reserve continue to rise, potentially reducing profits (Rizal & Shauki, 2019). Bank Indonesia has a set minimum Capital Adequacy Ratio (CAR) standard of >12, with the CAR calculation formula as follows:

$$\text{Capital Adequacy Ratio} = \frac{\text{Capital}}{\text{ATMR}} \times 100\%$$

Banks must meet their maturing obligations using cash flows and high-quality liquid assets without disrupting financial activities, in accordance with Bank Indonesia Regulation No.13/23/PBI/2011 on liquidity risk. According to liquidity management theory, banks can

survive by obtaining funds from the money market (loans from other bank or the central bank) and Arfiyanti et al (2020) emphasize the importance of managing liabilities in a manner balanced with assets and obligations. Findings reinforce this point, loan/financing restructuring does not have a significant impact on capital and profitability, but it does affect liquidity (Seto, 2025). FDR for Islamic banks falls within the safe range of 85–94%, FDR calculation formula as follows:

$$\text{Financing to Deposit Ratio} = \frac{\text{Financing}}{\text{DPK}} \times 100\%$$

Adam Smith's view, efficiency is based on self-interest, in contrast to Ibn Khaldun, who emphasised specialisation for the common good. The efficiency of Islamic banks lies not merely in reducing costs, but in transforming inputs (capital, customer deposits, operating costs, labour) into productive outputs (revenue, profit, financing), encompassing optimal allocation and the reduction of intermediation costs across three pillars: technical, allocative and economic (Haralayya & Aithal, 2021). A high BOPO is a dominant factor triggering financial distress, while NPF and FDR are key determinants of short-term stability (Wahyuni, 2022). BOPO included in the earnings of the RGEC framework, with a healthy range of 90-100%, BOPO calculation is as follows:

$$\text{BOPO} = \frac{\text{Operating Expenses}}{\text{Operating Revenue}} \times 100\%$$

Non-performing financing (NPF) are classified into collectibility categories based on the status of principal payments, which are further categorized by profit-sharing or profit margin. NPF can deplete capital, but their impact on altering the relationship between the Capital Adequacy Ratio (CAR) and Return on Assets (ROA) is weak (Hafizh & Abdani, 2025). Multiple Discriminant Analysis (MDA) model successfully confirmed NPF as the dominant determinant in distinguishing between healthy and distressed banks (Purbayanti & Afgani, 2020). NPF s are not merely a risk signal but also exert a structural influence on profitability. Bank Indonesia has stipulated that NPF must not exceed 5% of the total amount of financing granted. NPF ratio following formula:

$$\text{Non – performing Financing} = \frac{\text{NPF}}{\text{Total Financing}} \times 100\%$$

Taken together, the literature highlights three critical gaps: (1) Inconsistencies in empirical findings based on bank size, location, type of banks sharia or conventional, and predictive model; (2) It remains unclear which of the determinants (CAR, FDR and BOPO) has the most dominant influence on ROA; and (3) There has been little research focusing on regional studies and NPF as a moderating variable, indicating that NPF is not merely a risk signal but exerts a structural influence on profitability. Efforts to adress these gaps form the basis of this study, which utilises the Multiple Linear Regression and Moderated Regression Analysis (MRA) on BPRS financial performance data (CAR, FDR, BOPO, NPF and ROA) over a 10 years period to identify the determinants affecting the profitability of BPRS in West Java Province as the selected region study, with NPF serving as the moderating variable.

RESEARCH METHOD

This study employs a quantitative approach based on statistical analysis within the framework of positivist philosophy; it is a scientific approach that adheres to the principles of objectivity, measurability, rationality, and systematicity by utilizing secondary data in the form of time-series data and data from multiple objects (panel data) obtained from financial reports published by the Sharia Rural Banks (BPRS) via the official website of the Financial Services Authority (OJK) at [ibpr-s.ojk.go.id](#). The study focuses on BPRS in West Java Province that are registered with the OJK during the 2015–2025 period, with the research taking place over approximately six months, from August 2025 to January 2026.

The variables included are: 1) ROA as a dependent variable (Y); and the independent variables (X) include; 2) CAR (X1) 3) FDR (X2); 4) BOPO (X3); and the moderating variable is; 5) NPF. The study population includes all BPRS in West Java Province, while the sample was selected using a purposive sampling technique, specifically: BPRS in West Java that were officially registered with the OJK and Bank Indonesia between 2015 and 2025, and BPRS in West Java that publish quarterly financial reports. As follows:

Table 1.
Sample of BPRS in West Java

BPRS Amanah Insani	BPRS Amanah Ummah	BPRS Rifatul Ummah
BPRS HIK Insan Cita	BPRS Tegar Beriman	BPRS Gaido
BPRS Amanah Rabbaniah	BPRS Al Masoem	BPRS Al Ihsan
BPRS HIK Parahyangan	BPRS PNM Mentari	BPRS Harumhikmahnugraha
BPRS Baiturridha Pusaka	BPRS Mitra Harmoni	BPRS Al Wadiah
BPRS Almadina	BPRS Daruul Hidayat	BPRS Hasanah Mandiri
BPRS Al Barokah	BPRS Al Hijrah Amanah	BPRS Al Salaam Amal Salman
BPRS Riyal Irsyadi	BPRS HIK Cibitung	BPR Artha Madani
BPRS Patriot Bekasi	BPRS Botani Bina Rahmah	BPRS HIK Bekasi

Source: OJK (2025)

Based on these criteria, 27 BPRS units in West Java were identified. Over the 44-month study period, 1,188 data observations were collected. Data analysis was conducted using panel data regression with the aid of Eviews 12 software, which combines cross-sectional and time-series data to produce panel data estimates that yield more accurate results.

Data analysis was conducted using a panel data regression model, followed by tests of classical assumptions and concluding with hypothesis testing, supplemented by a Moderated Regression Analysis (MRA). The multiple analysis above was supplemented with an MRA analysis by adding the following interaction variables:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 Z + \beta_5 (X_1.Z) + \beta_6 (X_2.Z) + \beta_7 (X_3.Z) + e$$

Note:

Y = Dependent Variable (ROA)

α = Constant

$\beta_1 - \beta_3$ = Regression coefficient of the independent variables (CAR, FDR, BOPO)

β_4 = Coefficient of the moderator variable

$\beta_5 - \beta_7$ = Interaction coefficient (moderating effect)

$X.Z$ = Interaction between the independent variables and the moderator

e = Error term

RESULTS AND DISCUSSION

Descriptive statistical analysis was conducted to provide an overview of the data characteristics, as indicated by the mean, standard deviation, minimum, and maximum. The results of the descriptive statistical analysis are presented below.

Table 2

Results of Descriptive Statistical Tests

	X1	X2	X3	Z	Y
Mean	-27.52892	105.9329	43.80500	10.37464	86.67515
Median	20.08000	90.34000	84.63000	6.335000	1.325000
Maximum	774.0000	8762.000	18694.00	100.0000	32500.00
Minimum	-10704.00	0.000000	-87514.00	-0.230000	-178.8800
Std. Dev.	587.2927	258.7170	2601.490	11.52231	1268.505
Skewness	-13.07635	31.66483	-31.82144	2.665309	19.32142
Kurtosis	193.2265	1056.855	1084.175	13.29297	428.5800
Jarque-Bera	1825070.	55173710	58062960	6650.853	9039276.
Probability	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	-32704.36	125848.3	52040.34	12325.07	102970.1
Sum Sq. Dev.	4.09E+08	79451221	8.03E+09	157590.3	1.91E+09
Observations	1188	1188	1188	1188	1188

Source: Data processed by the researcher (Eviews 12)

Capital Adequacy Ratio (CAR) for variable X1 shows a minimum value (minimum) of -1,070,400 and a maximum value of 774,000. For the period 2015–2025, the mean is -22.11559 and the standard deviation is 587.2927, meaning the mean is smaller than the standard deviation. Deviation, or can be expressed as $-27.52829 < 556.4486$, which means the CAR variable is heterogeneous.

Financing to Deposit Ratio (FDR) variable X2 shows a minimum value of -0.000000 and a maximum value of 8,762.000 for the period 2015–2025. The mean is 105.9329 and the standard deviation is 258.7170, meaning the mean is smaller than the standard deviation. This can be expressed as $105.9329 < 258.7170$, indicating that the FDR variable is heterogeneous.

Operating Expense to Operating Revenue Ratio (BOPO) for variable X3 shows a minimum value (minimum) of -875.1400 and a maximum value of 186.94 for the period 2015–2025; the mean is 43.8050 and the standard deviation is 2601.490, meaning the mean is smaller than the standard deviation. Deviation, or can be expressed as $43.80500 < 2601.490$, which means that the BOPO variable is heterogeneous.

Non-Performing Financing (NPF) variable Z shows a minimum value of -0.2300.00 and a maximum value of 100,000.00 for the period 2015–2025. The mean is 10.37464 and the standard deviation is 11.52231, meaning the mean is smaller than the standard deviation or can be expressed as $10.37464 < 11.52231$, which means the NPF variable is heterogeneous.

Return on Assets (ROA) variable Y shows a minimum value of -178.8800 and a maximum value of 32,500.00 for the period 2015–2025. The mean is 86.67515 and the standard deviation is 1,268.505, meaning the mean is smaller than the standard deviation.

This can be expressed as $86.67515 < 1268.505$, indicating that the ROA variable is heterogeneous.

Panel data regression models are selected to determine the most appropriate model based on the data characteristics and the objectives of the analysis. Commonly used tests include the Chow test, the Hausman test, and the Lagrange Multiplier test to select the model estimation for panel data regression, which includes the Common Effect Model (CEM), the Fixed Effect Model (FEM), and the Random Effect Model (REM). The tests used in this study are shown in Tables 3 and 4.

Table 3
Chow Test Results

Effects Test	Statistic	d.f.	Prob.
Cross-section F	0.929176	(26,1154)	0.5670
Cross-section Chi-square	24.613602	26	0.5409

Source: Data processed by the researcher (Eviews 12)

The results of the Chow test show that the cross-sectional Chi-square test statistic is $0.5670 > 0.05$, so H_0 is accepted; therefore, the selected model is the Common Effect Model (CEM). Meanwhile, the cross-sectional Chi-square test statistic is $0.5409 > 0.05$, so the CEM is selected.

Based on Table 4 below, the Lagrange Multiplier (LM) test was conducted to select a panel data regression model from among two models: the Common Effects Model (CEM) and the Random Effects Model (REM). The results of the Lagrange Multiplier test show a cross-sectional probability of $0.6748 > 0.05$; therefore, H_0 is accepted, and the selected model is the Common Effect Model (CEM).

Table 4
Results of the Lagrange Multiplier Test

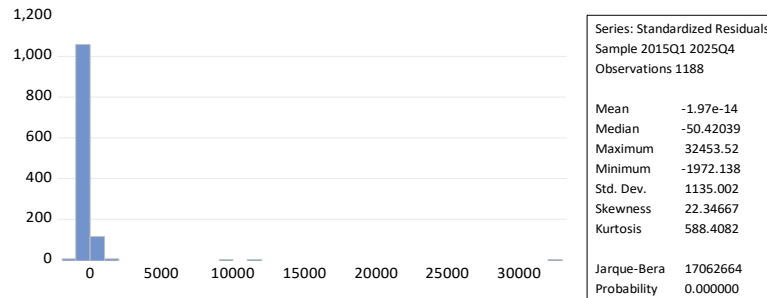
Lagrange Multiplier Tests for Random Effects
Null hypotheses: No effects
Alternative hypotheses: Two-sided (Breusch-Pagan) and one-sided (all others) alternatives

	Cross-section	Test Hypothesis Time	Both
Breusch-Pagan	0.176086 (0.6748)	0.119565 (0.7295)	0.295651 (0.5866)
Honda	-0.419626 (0.6626)	0.345782 (0.3648)	-0.052216 (0.5208)
King-Wu	-0.419626 (0.6626)	0.345782 (0.3648)	-0.119004 (0.5474)
Standardized Honda	-0.241402 (0.5954)	0.458919 (0.3231)	-6.065031 (1.0000)
Standardized King-Wu	-0.241402 (0.5954)	0.458919 (0.3231)	-5.996005 (1.0000)
Gourieroux, et al.	--	--	0.119565 (0.6002)

Source: Data processed by the researcher (Eviews 12)

The next step is to conduct a classical assumption test based on the choice of the panel data regression estimation model. These include testing: 1) a normality test; 2) Multicollinearity test; 3) Heteroscedasticity test; 4) Autocorrelation test.

Table 5
Normality Test



Source: Data processed by the researcher (Eviews 12)

Based on Table 5 shows that the results of the normality test indicate a Jarque-Bera statistic of 17.062.664 with a probability of 0.000000. This indicates that the Jarque-Bera statistic (17.062.664) is greater than 0.05. Therefore, it can be concluded that the residual variables in the multiple linear regression model used in this study are normally distributed.

Table 6
Multicollinearity Test

	X1	X2	X3	Z	X1Z	X2Z	X3Z
X1	1	-0.0099190...	-0.0241815...	-0.0947677...	0.34286509...	0.04475602...	-0.1787758...
X2	-0.0099190...	1	-0.0003937...	-0.0028949...	-0.0102991...	0.00142746...	0.02002736...
X3	-0.0241815...	-0.0003937...	1	-0.0531629...	-0.0101669...	0.01145389...	0.10331982...
Z	-0.0947677...	-0.0028949...	-0.0531629...	1	0.04457460...	-0.1826590...	-0.1354781...
X1Z	0.34286509...	-0.0102991...	-0.0101669...	0.04457460...	1	0.00179953...	-0.3802002...
X2Z	0.04475602...	0.00142746...	0.01145389...	-0.1826590...	0.00179953...	1	0.18579259...
X3Z	-0.1787758...	0.02002736...	0.10331982...	-0.1354781...	-0.3802002...	0.18579259...	1

Source: Data processed by the researcher (Eviews 12)

Based on Table 6 above, it can be concluded that the correlation coefficients between X1 and Z (-0.0947677) are less than 0.85, the correlation coefficient between X2 and Z (-0.0028949) is less than 0.85, the correlation coefficient between X3 and Z is -0.0531629 < 0.85, the interaction coefficient for X1Z is 0.04457460 < 0.85, the interaction coefficient for X2Z is -0.1826590 < 0.85, and the interaction coefficient for X3Z is -0.1354781 < 0.85. Therefore, it can be concluded that the data is free from multicollinearity.

Table 7
Heteroscedasticity Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	37.63619	53.08126	0.709030	0.4784
X1	0.014413	0.056390	0.255597	0.7983
X2	0.213339	0.118734	1.796778	0.0726
X3	0.000204	0.011904	0.017119	0.9863
Z	2.937779	2.755569	1.066124	0.2866
X1Z	2.45E-06	0.009773	0.000250	0.9998
X2Z	0.000233	0.000515	0.452007	0.6513
X3Z	0.000528	0.000573	0.922418	0.3565

Source: Data processed by the researcher (Eviews 12)

Based on Table 7 above, using the Glejser heteroscedasticity test, the analysis concludes that the test of profitability values shows that each variable has a value > 0.05 ; therefore, it can be concluded that the model does not exhibit heteroscedasticity or passes the heteroscedasticity test.

Table 8
Autocorrelation Test

Mean dependent var	64.23135
S.D. dependent var	1205.355
Akaike info criterion	16.78989
Schwarz criterion	16.82412
Hannan-Quinn criter.	16.80279
Durbin-Watson stat	2.012711

Source: Data processed by the researcher (Eviews 12)

Based on Table 8, the Durbin-Watson statistic in the figure above is 2.012711, using a significance level of 5%, a sample size (n) of 297, and the number of independent variables (k) of 4. Therefore, the Durbin-Watson table yields a dU value of 1.7400. Based on the calculation, the autocorrelation-free region is between (dU) 1.7400 and $(4-dU)$ 2.2600. Since DW 2.012711 is still within this range, $dU < DW < 4 - dU = 1.7400 < 2.012711 < 2.2600$. Therefore, there is no positive or negative autocorrelation.

Multiple regression analysis is used to examine the relationship between dependent variables and independent variables. The purpose of multiple regression analysis is to estimate the value of the dependent variable when the independent variables are known. In this study, hypothesis testing was conducted using: 1) the partial significance (T-test); 2) the simultaneous significance (F-test); and 3) the coefficient of determination (R^2) test as follows:

Table 9
T Test (Partial Significance Test)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-196.0670	53.52914	-3.662808	0.0003
X1	0.025297	0.056866	0.444848	0.6565
X2	2.186139	0.119736	18.25800	0.0000
X3	0.000178	0.012004	0.014837	0.9882
Z	1.097195	2.778820	0.394842	0.6930
X1Z	0.000717	0.009856	0.072716	0.9420
X2Z	0.000276	0.000519	0.530879	0.5956
X3Z	0.000209	0.000578	0.362522	0.7170

Source: Data processed by the researcher (Eviews 12)

The t-test is used to measure the extent to which an independent variable influences a dependent variable. If the calculated t-value is greater than the critical value or the p-value is less than 0.05, then the alternative hypothesis is accepted, indicating that there is a significant partial effect on the dependent variable. Based on Table 9, the partial effects between the variables are explained as follows:

First, regarding the effect of CAR on ROA, the calculated F-value (t-statistic) was 0.444848, which is less than the critical t-value ($\alpha = 1.9681214$), and the probability value was 0.6565, which is greater than 0.05. Therefore, $H_{0.1}$ is accepted and $H_{a.1}$ is rejected. It can thus be concluded that CAR does not have a significant positive partial effect on ROA.

Second, regarding the effect of FDR on ROA, the calculated F-value (t-statistic) is 18.2500, which is greater than the critical t-value of 1.9681214, and the probability value of 0.0000 is less than 0.05; therefore, $H_{0.2}$ is rejected and $H_{a.2}$ is accepted. Therefore, it can be concluded that FDR has a significant positive effect on ROA.

Third, regarding the effect of BOPO on ROA, the calculated t-statistic was 0.014837, which is less than the critical t-value of 1.9681214, and the probability value was 0.9882, which is greater than 0.05. Therefore, $H_{0.3}$ is accepted and $H_{a.3}$ is rejected. Thus, it can be concluded that BOPO does not have a significant positive effect on ROA.

Fourth, the effect of NPF as a moderating variable on ROA yielded a total calculated F-value (t-statistic) of $0.394842 < \text{critical t-value of } 1.9681214$, and a probability value of $0.6930 > 0.05$; therefore, $H_{0.4}$ is accepted and $H_{a.4}$ was rejected. Therefore, it can be concluded that NPF does not have a significant positive effect on ROA.

Fifth, for the CAR-NPF interaction variable on ROA, the calculated t-statistic was 0.072716, which is less than the critical t-value of 1.9681214, and the probability value was 0.9420, which is greater than 0.05. Therefore, $H_{0.5}$ is accepted and $H_{a.5}$ is rejected. Thus, it can be concluded that the CAR-NPF variable does not moderate ROA.

Sixth, for the interaction between FDR and NPF on ROA, the calculated F-value (t-statistic) was 0.530879, which is less than the critical t-value of 1.9681214, and the probability value of 0.5956 is greater than 0.05. Therefore, $H_{0.6}$ is accepted and $H_{a.6}$ is rejected. It can therefore be concluded that the FDR-NPF variable does not moderate ROA.

Seventh, for the BOPO-NPF interaction variable on ROA, the calculated t-statistic was 0.362522, which is less than the critical t-value of 1.9681214, and the probability value

was 0.7170, which is greater than 0.05. Therefore, $H_{0.7}$ is accepted and $H_{a.7}$ is rejected. Thus, it can be concluded that BOPO-NPF does not moderate ROA.

The F-test is used to determine whether the independent variables have a combined (simultaneous) effect on the dependent variable. If the calculated F-value is greater than the critical F-value or the significance level is less than 0.05, then there is a significant simultaneous effect on the dependent variable, as follows:

Table 10
F-test (simultaneous significance test)

R-squared	0.220950
Adjusted R-squared	0.216324
S.E. of regression	1067.046
Sum squared resid	1.34E+09
Log likelihood	-9956.801
F-statistic	47.76869
Prob(F-statistic)	0.000000

Source: Data processed by the researcher (Eviews 12)

Based on Table 10, the total F-statistic value of 47.76869 is greater than the critical F-value of 1.211796749, and the significance value of 0.000000 is less than 0.05; therefore, $H_{0.8}$ is rejected and $H_{a.8}$ is accepted. It can therefore be concluded that the variables CAR, FDR, BOPO, NPF, and moderation interaction have an effect on ROA, making the results of this study suitable for use. The F-value is 47.77503 and the p-value is $0.000000 < 0.05$, which means it can be concluded that both the independent variables and the interaction term have a combined effect on the dependent variable.

Table 11
R² test (the coefficient of determination)

R-squared	0.220950
Adjusted R-squared	0.216324
S.E. of regression	1067.046
Sum squared resid	1.34E+09
Log likelihood	-9956.801
F-statistic	47.76869
Prob(F-statistic)	0.000000

Source: Data processed by the researcher (Eviews 12)

Based on Table 11, the adjusted R-squared value is 0.216324, or 21.6324%. This coefficient of determination indicates that the independent variables—comprising CAR, FDR, BOPO, NPF, and their interactions—explain 21.6324% of the variation in ROA for BPRS in West Java Province (100 minus the adjusted R-squared value). The remaining 78.3667% of the variation is attributed to other variables not included in this research model.

Moderated Regression Analysis (MRA) test, based on Table 9 the effect of each increase in the moderating variable on ROA is explained as follows: 1) CAR coefficient is moderated by NPF by 0.000717 with a positive direction coefficient. This means that for every 1% increase in CAR moderated by NPF, the ROA variable will increase by 0.000717,

assuming that the other independent variables in the regression model remain constant; 2) FDR coefficient is moderated by NPF by 0.000276 with a positive direction coefficient This means that for every 1% increase in the FDR moderated by the NPF, the ROA variable will increase by 0.000276, assuming that the other independent variables in the regression model remain constant; 3) BOPO coefficient is moderated by NPF; a 1% increase in BOPO moderated by NPF results in a 0.000209 increase in the ROA variable, assuming all other independent variables in the regression model remain constant.

Discussion

This section presents the main results of the multiple linear regression analysis and moderated regression analysis. Table 12 below presents a summary table showing the variables, probability values (t-value, t-table, and p-value), and the analysis.

Table 12
Hypothesis Test Results

Variable	Probability	Analysis
X1 → Y	t-value = 0.444848, t table = 1,9681214 p-value 0.6565	The hypothesis is rejected (No effect)
X2 → Y	t-value = 18.25800, t table = 1,9681214 p-value 0.0000	The hypothesis is accepted (There is an effect)
X3 → Y	t-value = 0.014837 t-table = 1,9681214 p-value 0.9882	The hypothesis is rejected (No effect)
Z → Y	t-value = 0.394842 t-table = 1,9681214 p-value 0.6930	The hypothesis is rejected (No effect)
X1Z → Y	t-value = 0.072716, t table = 1,9681214 p-value 0.9420	The hypothesis is rejected (Does not moderate)
X2Z → Y	t-value = 0.530879, t table = 1,9681214 p-value 0.5956	The hypothesis is rejected (Does not moderate)
X3Z → Y	t-value = 0.362522, t table = 1,9681214 p-value 0.7170	The hypothesis is rejected (Does not moderate)
X1, X2, X3, Z, X1Z, X2Z, X3Z → Y	f-value = 47.76869, f table = 1.211796749 p-value = 0.0000	The hypothesis is accepted (There is an effect)

Source: Data processed by the researcher (Eviews 12)

The results of the first hypothesis test (H1) indicate that the CAR does not have a significant positive effect on ROA. Therefore, an increase or decrease in the CAR does not affect changes in profitability (ROA). These findings support the previous study by Nurmasari (2022), which concluded that the lack of an effect of the CAR on profitability is due to the fact that BPRS are less effective in maximizing available capital. Since CAR is influenced by ATMR as a denominator that can be taken into account in determining its impact, the high CAR ratio is not due to capital growth but rather to a decline in ATMR (Adawiya et al., 2020).

The results of the second hypothesis test (H2) indicate that the FDR has a positive and significant effect on ROA. It can therefore be concluded that an increase in the FDR will be followed by an increase in ROA; the higher the FDR, the higher the ROA of BPRS in West Java. Conversely, a decrease in FDR will lower profitability (ROA); this positive relationship reflects the structural conditions observed BPRS in West Java Province. The findings of this study support previous research by Yuliana & Listari (2021) which found that the effectiveness of loan disbursement is more important for profitability than the sheer volume of deposit funds. As long as funding management is effective, loan disbursement can be maximized even if liquidity decreases as a precautionary measure (Marlini et al., 2022).

The results of the second hypothesis test (H3) indicate that BOPO does not have a positive and significant effect on ROA. Therefore, it can be concluded that an increase or decrease in BOPO does not affect changes in profitability (ROA). Previous research by Muzaki & Sumawidjaja (2024) found that BOPO does not have a positive and significant effect on financial distress as a signal of bank profitability. Operational inefficiencies remain a major challenge for BPRS in West Java, with financing that is not yet optimal and dominated by the microfinance sector, which experienced fluctuating returns during the 2014–2018 period (Pebrianti, 2021). A study of BPRS in the city and regency of Tasikmalaya, West Java, found that BPRS at risk of bankruptcy are largely in a gray zone, characterized by negative EBIT due to operational losses, negative retained earnings, and a decline in net working capital (Suryanugraha et al., 2025).

The results of the second hypothesis test (H4) indicate that NPF, as a moderating variable, does not have a positive and significant effect on ROA. According to Baron & Kenny's theory, moderation depends on the type of data for the variable, whose direct effect on Y must be tested; however, if Z's effect on Y is not significant, this does not necessarily determine the presence or absence of moderation. This lack of significance also indicates that variations in the NPF are not a major direct factor affecting ROA, a finding supported by the low R^2 value (21.6%). The NPF is influenced not only by the bank's internal conditions but also by external macroeconomic factors (Nugrohowati & Bimo, 2019). The type of moderation selected for this study is Homologous Moderation, in which the moderation variable (NPF) is not significant ($p > 0.05$) and the interaction variables (X1Z, X2Z, and X3Z) are not significant ($p > 0.05$).

The results of the fifth hypothesis test (H5) indicate that the CAR-NPF interaction variable does not moderate ROA, confirming that there is no partial relationship between CAR and ROA. When NPF increases more significantly than capital absorption capacity (CAR), profitability remains suppressed, which explains why many empirical findings, including those regarding BPRS, indicate that CAR does not have a significant effect on ROA (Irawati & Sihotang, 2023). Yunita (2020) asserts that a CAR above the minimum threshold plays a greater role in maintaining stability and mitigating distress than in efforts to improve profitability.

The results of the hypothesis test (H6) indicate that the FDR-NPF interaction variable does not moderate the relationship with ROA. Aggressive yet controlled liquidity management can improve performance. This is consistent with previous research by (Syarif et al., 2023). FDR has a positive effect on profitability, and NPF, as a moderating variable,

does not moderate the relationship between FDR and profitability (ROA). The FDR does not reflect returns on bank assets and is therefore less relevant for assessing profitability; consequently, the underlying relationship between the FDR and ROA is inconsistent, and the NPF is unable to weaken the relationship between FDR growth and ROA (Masmuna et al., 2024).

The results of the hypothesis test (H7) indicate that the BOPO-NPF interaction variable does not moderate the relationship with ROA, confirming that there is no partial relationship between BOPO and ROA. Previous research by Malik & Anwar (2021) found that NPF was unable to moderate the relationship between BOPO and ROA; the interaction proved insignificant because the proportion of BOPO in Islamic banks was too large to demonstrate its impact on profitability. This is a form of managerial rationalization in response to financial pressures, as more than 10 BPRS units in West Java are experiencing inefficiencies, meaning that the low BOPO does not directly affect ROA.

The results of the hypothesis test (H8) indicate that CAR, FDR, BOPO, NPF, and the interaction variable collectively have a significant effect on ROA. This means that these variables, taken together, explain the variation in ROA. This finding is consistent with Yuliana & Listari (2021) who found that CAR, FDR, and BOPO collectively have a significant effect on the ROA of Islamic banks. The high FDR of West Java BPRS, coupled with capital constraints, has led the bank to avoid taking risks, resulting in a lack of aggressiveness in reducing the NPF (Filianti et al., 2020). Furthermore, efficiency has been sacrificed to maintain the bank's reputation amid financial pressures, as West Java BPRS has yet to succeed in improving its ROA.

CONCLUSION

Based on an analysis conducted to determine the effect of CAR, FDR, and BOPO—with NPF as a moderating variable—on ROA at BPRS in West Java Province during the 2015–2025 period, it can be concluded that, in terms of partial effects on ROA, only FDR has a significant positive effect, while CAR, BOPO, and NPF—as moderating variables—have no effect. Furthermore, the interaction variable does not moderate the direction of the relationship between the independent and dependent variables. Collectively, CAR, FDR, BOPO, NPF, and the interaction variable significantly influence the profitability of BPRS, indicating the overall significance of the model despite the severe multicollinearity present in BPRS in West Java; thus, the model is suitable for prediction and interpretation.

This study offers recommendations for academics and practitioners based on the research findings. For future research, it is particularly important to conduct moderation tests prior to statistical model testing to ensure a high probability of statistical significance. Conduct comparative studies in regions with BPRS in underserved areas or with similar institutions such as Sharia Business Units (UUS) or Baitul Maal wat Tamwil (BMT). For the management and association of BPRS in West Java, identify local risks to determine the extent to which BPRS can remain viable through the optimization of community-based savings products. Promoting shared services such as ATMs can reduce competition among BPRS and curb fraudulent practices by strengthening the whistleblowing system. Furthermore, the OJK could implement reserve smoothing as a form of collaboration with the Financial

Accounting Standards Board to align capital standards that are more proportionate for small banks (BPRS).

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