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Financial Distress Risk in Islamic Rural Banks: Interactions of Ratios and Macroeconomics

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Abstract: *This study aims to determine the extent of financial ratios can predict financial distress in Islamic rural banks on the island of Java. It also examines the influence of Third-Party Funds and inflation in moderating the relationship between financial ratios and financial distress. The independent variables include solvency, profitability, efficiency, liquidity, and leverage ratios. The population for this study is Islamic rural banks located on the island of Java, with a sample size of 82 Islamic rural banks. The study period covers the years 2019-2024, resulting in 492 observations. Data analysis uses panel data regression and Moderated Regression Analysis (MRA). The results indicate that Third Party Funds and inflation can moderate the variables of solvency, profitability, efficiency, and leverage toward financial distress. However, they cannot moderate the influence of the liquidity ratio on financial distress. This study shows that model complexity can yield different policy directions for Islamic rural banks resilience in the face of economic developments.*

Keywords: *Financial Ratio; Financial Distress; Islamic rural banks; Third Party Funds; Inflation*

Abstrak: *Penelitian ini bertujuan untuk mengetahui sejauh mana rasio keuangan memprediksi financial distress pada Bank Pembiayaan Rakyat Syariah (BPRS) di Pulau Jawa. Selain itu juga menguji pengaruh Dana Pihak Ketiga (DPK) dan inflasi dalam memoderasi hubungan antara rasio keuangan dan financial distress. Variabel independen mencakup rasio solvabilitas, profitabilitas, efisiensi, likuiditas, dan leverage. Adapun populasi penelitian ini adalah BPRS di Pulau Jawa dengan jumlah sampel 82 BPRS. Periode penelitian dilakukan tahun 2019-2024 sehingga terdapat 492 observasi. Analisis data menggunakan regresi panel dengan variabel moderasi. Hasil penelitian menunjukkan DPK dan Inflasi mampu memoderasi variabel solvabilitas, profitabilitas, efisiensi, dan leverage terhadap financial distress. Namun, tidak bisa memoderasi pengaruh rasio likuiditas terhadap financial distress. Penelitian ini memberikan gambaran bahwa kompleksitas model dapat memberikan arah kebijakan yang berbeda mengenai ketahanan BPRS dalam menghadapi perkembangan ekonomi.*

Kata kunci: Rasio Keuangan; Financial distress; BPRS; DPK; Inflasi

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INTRODUCTION

Islamic banking tends to be more resilient when facing financial crises because it is free from negative spread situations and is not based on interest (Trinugroho *et al.,* 2018). An indicator that makes the public trust the credibility of Islamic banking is its ability to generate profits (Ayu & Ibrahim, 2024). However, if in its operations it faces economic turmoil such as a pandemic and global crisis, it will give rise to credit risks that affect the inability to repay funds. A decline in revenue impacts the company's financial health, serving as an early indicator of financial difficulties or distress (Mulya *et al.,* 2024).

Financial distress is actually the initial stage of a company on the brink of bankruptcy (Putri *et al.,* 2023). During financial distress, a company experiences two events: a shortage of liquid assets and a situation where the total debt exceeds the assets (Sumarni, 2022). In Indonesia, financial distress occurred at Bank Muamalat, Main Branch Office in Medan from 2017 to 2019. The Non-Performing Financing (NPF) reached 60% due to a decline in income, liquidity challenges, and poor financing quality (Hasibuan & Jannah, 2023). This phenomenon is no exception for Islamic Rural Banks which play a strategic role in financing on a smaller scale than conventional Islamic banks. Islamic Rural Banks are here to support business development by providing funding to Micro, Small, and Medium Enterprises (MSMEs) (Wasiaturrahma *et al*., 2020). However, Islamic Rural Banks tend to experience liquidity problems due to higher margin rates compared to conventional banks (Ayundasari & Kurniawati, 2024).

There are 174 Islamic Rural Banks across Indonesia, with 103 on the island of Java. This indicates that the majority of Islamic Rural Banks operations are concentrated in Java, and it is highly likely that most issues also occur there. Data from the Financial Services Authority shows that 20 Islamic/Conventional Rural Banks have had their business licenses revoked following liquidation actions by the Indonesia Deposit Insurance Corporation (IDIC) during the period 2020-2024, as reported in the news.bisnis.com (19/04/2025). One cause is that the capital adequacy levels of Islamic Rural Banks do not meet the requirements. This worsened by a decline in profits and a rising ratio of non-performing loans, which are the initial triggers of financial distress. To predict financial distress, financial statements can be utilized as a fundamental reference for stakeholders to anticipate risks and assess financial health. There are various models for predicting financial distress, including the Zmijewski model.

The Zmijewski model has higher accuracy than the Altman model and can predict financial distress in Indonesian Islamic banks with 98% accuracy (Ummah & Aisyah, 2024; Ramdhan *et al.,* 2022). In addition, the Altman model is more suitable for manufacturing companies, making it less relevant for service industries such as banking (Beo & Wulandari, 2024). Other studies note that the Springate and Grover models place greater emphasis on profitability and liquidity ratios, thereby providing fewer comprehensive explanations of overall financial condition (Ramdhan *et al.,* 2022).

Several studies have identified factors influencing financial distress. Pamungkas *et al.* (2021) found that financial distress is affected by NPF. However, this finding was contradicted by Aulia *et al.* (2024) and Hananiyah & Jaya (2023). Muzaki & Sumawidjaja (2024) and Dewi (2022) demonstrated that Return on Asset (ROA) significantly affects financial distress, whereas others reported the opposite (Ginting

et al., 2024). Jailani (2024) and Dewi (2022) suggested that financial distress could be influenced by the positive and significant value of the Operating Expenses to Operating Income (OEOI) ratio, a claim refuted by Djariyah *et al.* (2023) and Ferdiansyah & Widyarti (2022). Additionally, Saputri & Sari (2024) state that financial distress can be significantly influenced by the Current Ratio (CR) and the Debt-to-Asset Ratio (DAR), though other studies, such as those by Ugur et al. (2022), have reported different results. The studies discussed highlight variations in findings concerning which financial ratios influence financial distress. This highlights the gaps result of previous studies. However, most previous research has focused on the direct effect of financial ratios on financial distress, without considering the complex interactions among internal and external factors that simultaneously influence bank stability.

The issue of financial distress within financial institutions, such as Islamic Rural Banks, is gaining increasing relevance annually. This trend is attributed to escalating pressures from the global crisis, regulatory requirements, and internal challenges. This study presents an innovative methodology by formulating a comprehensive model to fill an existing research gap. The model integrates Third-Party Funds as an indicator of internal factors and inflation as an external macroeconomic factor, both serving as moderating variables. This is further supported by the use of the latest data from 2019-2024. Consequently, the complexity of the developed model not only enriches the empirical literature on the determinants of financial distress but also provides a more current and contextual overview of Islamic Rural Banks resilience in the face of recent economic developments. Based on this background, this research is encouraged to further explore the influence of financial ratios on financial distress, as moderated by third-party funds and inflation in Islamic Rural Banks.

LITERATURE REVIEW

Signaling Theory

The signaling theory, proposed by Spence in 1973, states that the quality of information determines the credibility of the signal sender and is used by users of financial statements (Cyntara & Apriwandi, 2025). The use of published financial statements will influence investors. The smaller the assets, the easier they are to thoroughly supervise and the lower the risk of financing disbursed (Purwaningtyas & Hartono, 2020). Through financial statements, a bank's performance can be analyzed using financial ratios such as solvency, profitability, efficiency, liquidity, and leverage ratios. Therefore, information from financial statements can be used to predict and promptly address any issues before they lead to financial distress (Miranti, 2018).

Financial Distress

A company may experience financial difficulties in meeting its obligations, a condition known as financial distress. This situation can arise from default, indicated by long-term debt exceeding available cash flow, difficulties in paying dividends, or insufficient income to cover operational costs (Fakhar *et al.,* 2023). The prediction of financial distress in this study uses the Zmijewski model, which requires multiple ratios (Ramdhan *et al.,* 2022; Fauzi *et al.,* 2021). The combination of these ratios is an advantage of this model, as it provides more specific and relevant information from financial statements than other, more general models (Wang *et al.,* 2026).

The ratios utilized encompass the solvency ratio, specifically represented by the average Non-Performing Financing (NPF), to evaluate customers' inability to repay

debts or receivables. Data from the Financial Services Authority (OJK) indicates that 103 Islamic Rural Banks on Java Island experienced an increase in NPF from 6.07% to 11.63% between 2020 and 2024. This escalation in the ratio signifies a deterioration in financing quality, resulting in diminished profits and precipitating financial distress (Jailani, 2024). Therefore, the hypothesis (H1) posits that NPF significantly impacts financial distress.

Furthermore, financial distress can also be signaled by a continuous decline in profitability, as indicated by the ROA ratio (Saputri & Sari, 2024). A higher ROA, specifically ≥ 1.5%, suggests that an asset is more productive in generating net profit (Ayu & Ibrahim, 2024). In 2019, Islamic Rural Banks was in its optimal condition, with values surpassing the BI standard of 1.5%. However, it subsequently decreased significantly by 0.28%. This decline in profit exacerbates financial conditions and heightens the risk of financial distress. Aulia *et al*., (2024) and Silvia & Yulistina, (2022) obtaining ROA has a significant impact on financial distress**.** Therefore, the hypothesis (H2) posits that *ROA significantly affects financial distress.*

Operational efficiency serves as an indicator of financial performance health (Subekti & Wardana, 2022). This is evident when Islamic banks can produce more output than the input they utilize. The ratio of Operational Costs to Operational Income (OEOI) is a tool to assess whether Islamic banks have effectively utilized their production factors. Bank Indonesia deems a OEOI of less than 80% as healthy. However, the average OEOI of Islamic Rural Banks on Java Island exceeds 80%, reaching up to 95.21% in 2024. Signaling theory posits that an elevated Operating Expense to Operating Income (OEOI) ratio, when combined with diminished efficiency in Islamic banking, heightens the likelihood of financial distress. Therefore, the following hypothesis (H3) is proposed OEOI has a significant impact on financial distress.

In contrast to the efficiency ratio, the liquidity ratio suggests that an increase in its value indicates a healthy state for Islamic banking, enabling it to settle short-term debts (Cyntara & Apriwandi, 2025). The CR is employed to evaluate the liquidity ratio by comparing all current assets to total current liabilities (Saputri & Sari, 2024). By utilizing its existing assets, Islamic banking is anticipated to meet its short-term obligations and prevent financial distress. Therefore, Hypothesis 4 (H4) posits that the current ratio (CR) has a significant impact on financial distress.

Other financial ratios, such as the leverage ratio, compare the use of debt by Islamic banks in financing their assets, which is proxied by the Debt to Asset Ratio (DAR). The higher the debt burden, the greater the potential for Islamic banks to encounter financial problems, which is the initial stage of financial distress (Virnanda & Oktaviana, 2022; Saputri & Sari, 2024). So, the Hypothesis (H5) is *DAR significantly affects financial distress.*

In addition to financial ratios, financial distress can be triggered by internal factors, such as third-party funding, and external factors, such as inflation. Third-party funds determine the amount of financing distributed, whether from public savings, deposits, or current accounts (Putra & Riza, 2021). The different third-party funds held

by Islamic banks certainly affect liquidity and profitability. Thus, capital from third parties can affect the smooth fulfillment of financing and operations (Sanjaya & Nasrah, 2024). Meanwhile, the inflation rate from 2019 to 2024 has been quite volatile, declining from 5.51% in 2022 to 1.57% in 2024. These price fluctuations spontaneously influence global economic growth (Yudianto *et al*., 2023). Inflation will impact economic activities, notably increasing credit risk when inflation is high (Pamungkas *et al*., 2021; Ceylan, 2021).

If Islamic Rural Banks are unable to properly manage the above situation, continuously declining income, and the risk of default they face can lead to financial distress (Dewi *et al*., 2023). Third-party funds can moderate the effect of NPF on financial distress (Sanjaya & Nasrah, 2024). According to Signaling theory, a large amount of third-party funds serves as a positive signal of public trust in depositing funds at Islamic Rural Banks. Previous research indicates that even when Islamic Rural Banks have high NPF, additional capital from third-party funds can help balance the situation, thereby avoiding potential financial distress. If third-party funds decrease when NPF rises, it will worsen its impact on financial distress.

H6 : Third-party funds moderate the effect of NPF on financial distress.

The inflationary conditions that lead to decreased purchasing power and a decline in currency value have increased financing or loan activities at financial institutions. However, this has weakened people's ability to pay their loan installments. This is consistent with the research (Amelia *et al.,* 2024; Hanifa *et al.,* 2020). That inflation can exacerbate financial distress, which is worsened by an increase in NPF. Thus:

H7 : Inflation moderates the effect of NPF on financial distress.

Meanwhile, the size of third-party funds strengthens the influence of ROA on financial distress in the opposite direction. This indicates that sufficient capital from both profitability and third-party funds will reduce the potential for financial distress in Islamic Rural Banks (Subagiyo & Septiarini, 2018). Thus, high profitability supported by third-party funds will strengthen the financial resilience of Islamic Rural Banks.

H8 : Third-Party Funds moderates the effect of ROA on financial distress.

Inflation increases, reducing people's purchasing power and making them reluctant to borrow funds from banks (Selayan *et al.,* 2023). According to Signaling theory, when ROA declines and is influenced by the inflation rate, it sends a negative signal about Islamic banking's financial condition, potentially heightening the threat of financial distress.

H9 : Inflation moderates the effect of ROA on financial distress.

The amount of third-party funds strengthens OEOI's influence on financial distress. An increase in OEOI accompanied by insufficient capital such as third-party funds may potentially lead to the risk of financial distress. Similarly, if third-party funds are high but OEOI also rises, customers may withdraw their funds due to a lack of trust in Islamic Rural Banks. This is supported by Silviani (2024), who states that third-party funds and OEOI mutually affect liquidity in Islamic banks.

H10 : Third-party funds moderate the effect of OEOI on financial distress.

The impact of rising operational costs can worsen the efficiency of Islamic banks in managing financial operations. High inflation drives policies to lower interest rates, which leads to customers withdrawing their savings. This will reduce the operational income of Islamic banks (Maulida & Arfiansyah, 2024).

H11 : Inflation moderate the effect of OEOI on financial distress.

A high CR will reduce the risk of financial difficulties (Yosandra & Sembiring, 2022). Thus, with a high CR supported by Islamic banking third-party funds, banks are able to meet their obligations and avoid the threat of financial distress (Mustahidda *et al.,* 2024). This condition serves as a positive signal for investors, indicating financial stability.

H12 : Third-party funds moderate the effect of CR on financial distress.

According to (Safitri & Yuliana, 2021), inflation can strengthen the liquidity ratio's impact on financial distress. The rising cost of living due to inflation may prompt customers to take out loans, putting pressure on Islamic banks' liquidity. Thus, inflation increases the negative impact of the CR on financial distress.

H13 : Inflation moderates the effect of CR on financial distress.

When the Debt-to-Asset Ratio (DAR) is high and Third-Party Funds are low, it can lead to financial difficulties. This is because having substantial available funds allows obligations to be met and facilitates the operations of Islamic Rural Banks (Ningsih *et al.,* 2021). Therefore, when Islamic Rural Banks has a higher debt-to-asset ratio and declining third-party funds, it increases the potential for financial distress (Yasin *et al.,* 2025).

H14 : Third-party funds moderate the effect of DAR on financial distress.

If previously the condition of Islamic Rural Banks was already weak, this would further worsen the financial situation. When inflation is unstable, people tend to withdraw the money they have saved in Islamic Rural Banks to meet their needs, leading to a shortage of funds and low investment capital (Hidayat et al., 2023). This situation will put pressure on liquidity levels, forcing Islamic Rural Banks to rely on debt financing. If they are forced to raise funds from third parties, it will increase the risk of financial distress.

H15 : Inflation moderates the effect of DAR on financial distress.

Conceptual Framework

The conceptual framework in Figure 1 explains that this study aims to examine the partial influence of the independent variables NPF, ROA, OEOI, CR, and DAR on the dependent variable, financial distress, as depicted in hypotheses one through five. Furthermore, hypotheses six through fifteen aim to explore the moderating effects of third-party funds and inflation on the influence of the independent variables on the dependent variable.

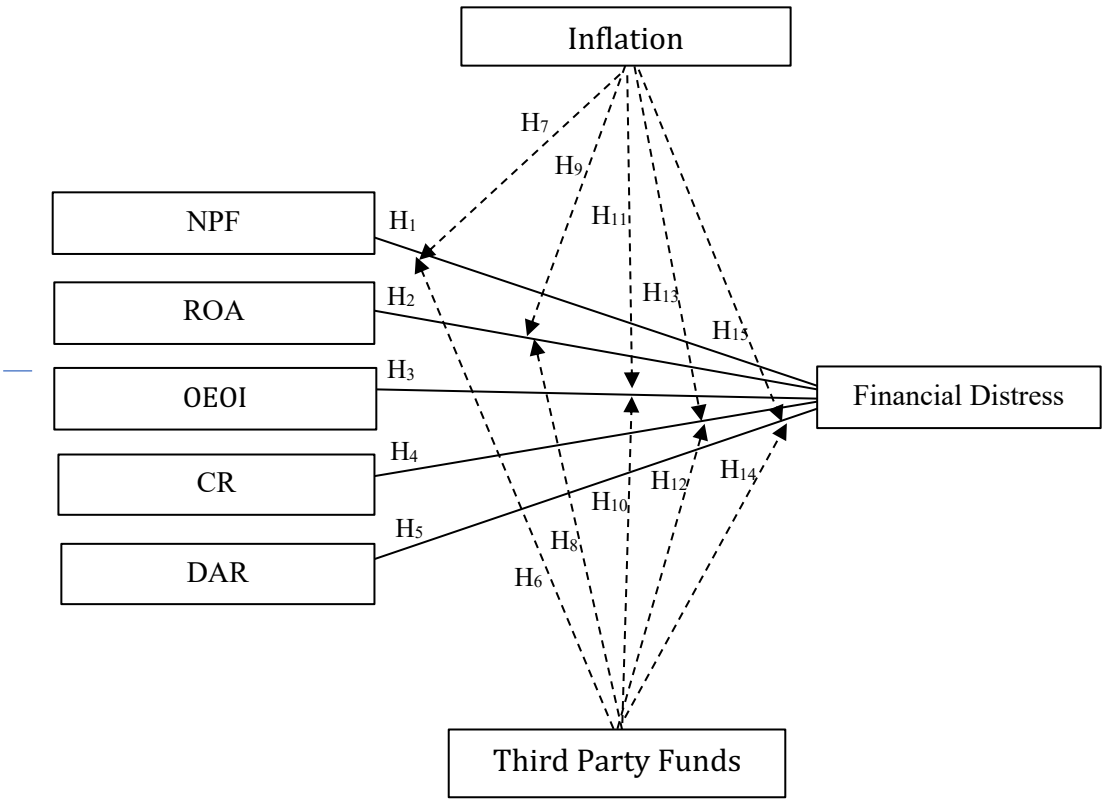

Figure 1. Conceptual Framework

Source: Author's Work (2026)

Notes : ——→ : Direct Effect

- - - - - - - - - - → : Moderate

RESEARCH METHOD

This study utilizes quantitative research with a causal approach (Hardani *et al*., 2020). The population for this research comprises all Islamic Rural Banks on the island of Java, totaling 103 companies. Samples are selected using purposive sampling techniques based on specific criteria (Sulung & Muspawi, 2024). One criterion excludes Islamic Rural Banks in Java that do not publish complete and consecutive financial reports from 2019-2024 on the OJK, reducing the total by 21. Given the sampling criteria and the six-year period, the sample comprises 82 Islamic Rural Banks (n=492). The period from 2019 to 2024 was selected due to the observed increase in the number of Islamic Rural Banks, as reported by OJK, alongside a concurrent rise in the number, and they were also unable to sustain operations. This phenomenon suggests that despite the growth observed during this period, Islamic Rural Banks continue to face financial risks that impact their business stability.

This study examines financial ratios in relation to financial distress. Equation 1 presents the research model. Table 1 provides the operational definitions of the variables and their data sources. The data analysis technique used is panel data regression with the inclusion of Moderated Regression Analysis (MRA). The form of the equation is as follows (Ghozali, 2011):

Equation 1

$$FD_{i.t} = \alpha_{i,t} + \beta 1_{i,t} NPF_{i,t} + \beta 2_{i,t} ROA_{i,t} + \beta 3_{i.t}\, OEOI_{i.t} + \beta 4_{i.t}\, CR_{i.t} +$$
$$\beta 5_{i.t} DAR_{i.t} + \beta 6_{i.t} \text{third} - \text{party funds}_{\ i.t} + \beta 7_{i.t} Inflation_{i.t}$$
$$+\beta 8_{i.t} NPF * \text{Third Party Funds}_{\ i.t} + \beta 9_{i.t} NPF * Inflation_{i.t} +$$
$$\beta 10_{i.t} ROA * \text{Third Party Funds}_{\ i.t} + \beta 11_{i.t} ROA * Inflation_{i.t} +$$
$$\beta 12_{i.t} OEOI * \text{Third Party Funds}_{\ i.t} + \beta 13_{i.t} OEOI * Inflation_{i.t} +$$
$$\beta 14_{i.t} CR * \text{Third Party Funds}_{\ i.t} + \beta 15_{i.t} CR * Inflation_{i.t}$$
$$\beta 16_{i.t} DAR * \text{Third Party Funds}_{\ i.t} + \beta 17_{i.t} DAR * Inflation_{i.t}$$

Table 1. Operational Variable

Variable	Indicator	Formula	Scale	Reference
DEPENDENT VARIABLE				
Financial Distress (FD)	Zmijewski Model (X)	$X = -4{,}3 - 4{,}5X1 + 5{,}7X2 - 0{,}004X3$ X_1= ROA X_2 = Leverage X_3 = Liquiditiy	Ratio	Ramdhan *et al.*, (2022)
INDEPENDENT VARIABLE				
Solvency Ratio	*Non-Performing Financing* (NPF)	$NPF = \frac{Non\ Performing\ Financing}{Total\ Financing} x100\%$	Ratio	Hariono & Azizuddin (2022)
Profitabilities Ratio	*Return On Asset* (ROA)	$ROA = \frac{Net\ Profit}{Total\ Assets} x\ 100\%$	Ratio	Mavengere & Gumede (2024)
Efficiency Ratio	Operating Expenses to Operating Income (OEOI)	$OEOI = \frac{Operational\ Cost}{Operational\ income} x\ 100\%$	Ratio	Muzaki & Sumawidjaja (2024)
Liquidity Ratio	*Current Ratio* (CR)	$CR = \frac{Current\ Assets}{Current\ Liabilities} x100\%$	Ratio	Silvia & Yulistina (2022)
Leverage	*Debt to Asset Ratio* (DAR)	$DAR = \frac{Total\ Liabilities}{Total\ Asets}$	Ratio	Febiana *et al.* (2024)
MODERATING VARIABLE				
Internal Factor	Third-party funds	Third party funds = Check + Savings + Deposit	Ratio	(Putra & Riza, 2021).
External Factor	Inflation	Consumer Price Index development	Ratio	Utami & Sihotang (2024)

Source: Author's Work (2026)

RESULT AND DISCUSSION

Result

The analysis in this study was carried out in multiple stages. The initial stage involved a descriptive analysis of the data, with Table 2 displaying the study's descriptive data. This analysis revealed that the financial distress variable (Y) had an average value of 0.350. According to the Zmijewski model criteria, a Islamic Rural Banks is distress when the Y value exceeds 0 (Ramdhan *et al.,* 2022). Consequently, Islamic Rural Banks on Java Island are not yet sufficiently capable of maintaining their financial condition to avert financial distress. Additionally, the average value of third-party funds stands at 19,869.39, Signaling a positive trend and indicating a high level of public trust in funds held by the Islamic Rural Banks. Regarding inflation, it becomes a concern for financial institutions when it reaches 5.51%, although inflation rates have been quite volatile throughout the 2019-2024 period.

To ensure that the estimated parameters meet the criteria for Best, Linear, Unbiased Estimation (BLUE), a classical assumption test was conducted (Budi *et al*, 2024). The test of the assumption is shown in Appendix 1, including tests for multicollinearity, normality, and heteroscedasticity. The multicollinearity test assesses the relationships among independent variables. Each independent variable has a VIF value below 10, indicating the absence of multicollinearity. The residuals in this research model are normally distributed, with a probability value of 0.091910. Additionally, a heteroscedasticity test was performed to assess whether the residual variances among the variables are constant (homogeneous). The Breusch Pagan Godfrey test was used, and a significance value greater than 0.05 indicates homogeneity (Hutagalung & Darnius, 2022).

Table 2. Descriptive Statistics

Variable	Mean	Median	Maximum	Minimum	Std.Dev	N
FD	0.350339	0.495000	4.644000	-3.961000	0.720743	492
NPF	0.075976	0.053000	2.329000	-0.002000	0.122295	492
ROA	0.015030	0.017000	0.144000	-0.230000	0.03000	492
OEOI	0.903886	0.854000	3.368000	0.003000	0.349907	492
CR	1.542366	1.020000	70.12700	0.111000	3.817231	492
DAR	0.829352	0.860000	1.556000	0.071000	0.122063	492
Third-party funds	19869.39	18207.00	27858.00	10885.00	3684.973	492
Inflation	2660.000	2240.000	5510.000	1570.000	1349.284	492

Source: Author's Work (2026)

The second stage is panel data and Moderating Regression Analysis (MRA) analysis. The initial step is selecting the best model using the Chow test, Hausman test, and Lagrange Multiplier test, as illustrated in Table 3. Based on these three tests, the Random Effects Model (REM) is the most suitable. Next, MRA analysis is conducted to identify its moderating factors.

Table 3. Panel Data Test Result

Panel Data Test	Effects Test	Probability
Chow Test	Cross-section F	0.0000
Hausman Test	Cross-section random	0. 3007
Lagrange Multiplier Test	Breush-Pagan	0.0000

Source: Author's Work (2026)

Table 4 presents the results of the MRA test. The statistical test results show that the independent factors do not have a significant effect on financial distress. However, third-party funds and inflation, as moderating variables, are significant. The interaction results between the financial ratios as independent variables are strengthened by the presence of the moderating variables. However, third-party funds and inflation cannot strengthen the effect of CR on financial distress.

Table 4. MRA Test Result

Variable	Coefficient	t-Statistic	Prob.
C	0.430723	0.791468	0.4291
NPF	0.412330	1.071881	0.2843
ROA	-1.485222	-1.531519	0.1263
OEOI	-0.173854	-1.053089	0.2928
CR	-0.022672	-0.857515	0.3916
DAR	0.169886	0.275511	0.7830
Third-party funds	-0.000150	-5.908993	0.0000***
Inflation	0.000119	1.739382	0.0826*
NPF*Third-party funds	0.023429	2.724534	0.0067***
NPF*Inflation	-0.546587	-4.088065	0.0001***
ROA*Third-party funds	-0.250303	-3.486215	0.0005***
ROA* Inflation	0.923380	2.982447	0.0030***
OEOI* Third-party funds	-2.46E-05	-3.880828	0.0001***
OEOI* Inflation	0.000110	4.216988	0.0000***
CR* Third-party funds	1.11E-06	0.803190	0.4223
CR* Inflation	1.37E-06	0.234421	0.8148
DAR* Third-party funds	0.000205	6.802046	0.0000***
DAR* Inflation	-0.000276	-4.017258	0.0001***

Source: Author's Work (2026)

Note: ***, **, * significant 1%, 5% and 10% consecutively.

Discussion

The Influence of Financial Ratios on Financial Distress

NPF has no significant impact on financial distress. This can occur because several Islamic Rural Banks have strong risk management and maintain loss reserves as a form of anticipation (Bessis, 2011). In addition, although the NPF is high, Islamic Rural Banks with good financing restructuring capabilities can control the potential for financial distress (Jailani, 2024). It can also be concluded that effective management focusing on financing is an effective strategy to reduce the increase of NPF and can mitigate the potential for financial distress (Sutrisno *et al*., 2023). According to Signaling theory, information about NPF value exceeding BI standards serves as a negative signal for Islamic banking. Nonetheless, it has been observed in Islamic Rural Banks in Java that, despite having NPF percentages above healthy standards, they are still able to manage the risk of financial distress. Therefore, a high NPF does not necessarily increase the potential for financial distress if the Islamic Rural Banks addresses it appropriately. These findings align with the research of (Aulia *et al.,* 2024; Muzaki & Sumawidjaja, 2024), which asserts that NPF does not affect financial distress.

According to Signaling theory, banking performance can be assessed by its ability to generate profits. However, research findings indicate that ROA alone is not

strong enough to predict financial distress in Islamic Rural Banks. An increase in ROA does not always reduce financial distress, as seen in Islamic Rural Banks in Java, which experienced a decline in ROA from 2022 to 2024 despite having performed fairly well in previous years. The insignificant impact of the increase in ROA may be due to Islamic Rural Banks still having sufficient capital to bear risks and having other sources of income such as third-party funds (Dahruji & Muslich, 2022). In addition, a high ROA may have little effect because other variables, such as OEOI and DAR, have also increased (Jannah *et al.,* 2025). Thus, both increases and decreases in ROA do not affect the risk of financial distress in Islamic Rural Banks in Java. This finding is consistent with research (Dewi, 2022; Ginting *et al.,* 2024).

This can occur in Islamic Rural Banks on the island of Java, which have an average OEOI ratio that is very high above 80% but are still able to control this figure and thus avoid financial distress. This phenomenon is explained by efficiency theory, which states that when Islamic Rural Banks with high efficiency values manage to endure, it means those institutions are able to perform well and make optimal use of their resources (Muallimah & Haq, 2024). Thus, it is known that if Islamic Rural Banks can effectively manage their operational expenses, the effect will not necessarily increase the potential for financial distress. This is supported by research (Djariyah *et al.,* 2023; Ferdiansyah & Widyarti, 2022), which indicates that OEOI is not strong enough to influence the potential for financial distress. According to Signaling theory, although an increasing OEOI value is a negative signal for Islamic banks, if it is handled appropriately, it will reduce the risk of financial distress. A high OEOI, especially in Islamic Rural Banks approaching distress, does not simply mean excessive operational costs, but can also represent a rescue effort. A high OEOI in certain years indicates its use for risk mitigation, with operational investments aimed at maintaining financial stability and reducing financial distress (Muzaki & Sumawidjaja, 2024). These findings contrast with the research of (Suot *et al*., 2020; Epriliana & Suwandi, 2022), which asserts that financial distress can be significantly influenced by OEOI.

It is understood that an increasing CR hypothesis is expected to lower the risk of financial distress. However, this assumption does not always hold true, as the results show a probability greater than 0.05. CR Islamic Rural Banks on the island of Java has a constant average of 1.5, so changes in CR, whether an increase or decrease, do not affect the potential for financial distress. In addition, according to (Lestari *et al.,* 2025), Islamic Rural Banks with a high CR are able to survive without the need for additional injections. Signaling theory supports the notion that Islamic Rural Banks with liquidity > 1.5 are proven to be safer, even when experiencing fund withdrawals from third parties during the pandemic. Furthermore, CR or current assets, which serve as indicators in assessing short-term financial health, are less able to predict financial difficulties over a longer time frame (Aulia & Hubbansyah, 2024). Consequently, these research findings align with the study by Bawoel *et al.,* (2025) but contradict the research of (Saputri & Sari, 2024).

Regarding the leverage ratio, according to signaling theory, a high DAR ratio can signal to investors the extent to which a company's assets are financed by debt. This is evident in Islamic Rural Banks on the island of Java, which have an average value of 82%. Although there are Islamic Rural Banks with a DAR of 155%, it does not mean that all Islamic Rural Banks have their entire assets supported by debt. Islamic Rural Banks with a high DAR will have minimal impact because other financial ratios are in good condition, such as an excess CR and NPF in a safe range (Jannah *et al.,*

2025). However, despite this finding in the case study, DAR is not sufficiently strong to increase the risk of financial distress (Ugur *et al*., 2022). A high DAR may result from substantial third-party funds sourced by Islamic Rural Banks. Nevertheless, a high DAR ratio does not necessarily suppress liquidity (Christina *et al*., 2025). This is because when borrowed funds are utilized effectively, Islamic Rural Banks can generate profits to reduce liabilities. Therefore, when managed efficiently, borrowed funds can decrease the debt ratio, thereby reducing the potential for financial distress.

Third Party Funds in Moderating Financial Ratios Against Financial Distress

The addition of the third-party funds' variable can strengthen the influence of the NPF, ROA, OEOI, and DAR variables on financial distress. According to Signaling theory, large third-party funds serve as a positive signal of public trust in depositing funds in Islamic Rural Banks. A high NPF, which indicates an increase in non-performing financing, becomes the cause for loans given not to be repaid as they should. When problem loans are not balanced with other sources like third party funds, the opportunity for Islamic Rural Banks to provide further financing becomes increasingly limited. If financing is still pursued, it will increase the bank's dependence on public funds. This can create vulnerability in asset quality and worsen financial conditions. This is in line with the research by (Sanjaya & Nasrah, 2024) which states that third party funds strengthens the NPF variable. Its effect differs on ROA, where if both third-party funds and ROA are high, profitability will increase and financial distress will decrease. This can be attributed to increased Islamic Rural Banks income, as profitability becomes a public consideration for depositing their funds. This aligns with Signaling theory, which posits high profitability supported by third party funds will strengthen the financial resilience of Islamic Rural Banks. These findings are also in line with the research by (Sanjaya & Nasrah, 2024), which explains that third party funds is capable of moderating the ROA variable.

However, when there is insufficient capital, such as third-party funds coupled with an increase in the Operational Efficiency Ratio (OEOI), the risk of financial distress becomes apparent. Similarly, even if third party funds is high, a significant rise in OEOI can lead to customer withdrawals due to diminished trust in the Islamic Rural Banks (Arifin, 2020). Nonetheless, third-party funds remain the cornerstone for Islamic bank (Sartono *et al*., 2023). This is supported by Signaling theory, which holds that information regarding the size of third-party funds and the OEOI ratio is crucial for both in terms of enhancing operational cost management, and external stakeholders, such as investors, in evaluating the financial condition of Islamic Rural Banks. This observation is corroborated by (Silviani, 2024), who asserts that third party funds and OEOI jointly influence liquidity in Islamic banks. Moreover, it is evident that third party funds do not directly indicate financial stability, which affects the CR concerning financial distress. It can also be inferred that CR remains a robust ratio, irrespective of third-party funds size. According to Signaling theory, the CR ratio provides critical information for investors, aiding in their assessment of Islamic Rural Banks's capacity to fulfill its current liabilities (Mustahidda *et al*., 2024). The average CR of Islamic Rural Banks on Java Island is recorded at 154%, which is quite favorable for financial institutions under certain conditions, such as when third party funds declines. However, if the funds are excessively liquid and not optimally allocated, it results in idle funds. This situation serves as a caution for Islamic Rural Banks when funds are not being utilized to their full potential. Therefore, it is crucial to emphasize

effective financial management to ensure that neither an increase in CR nor a decrease in third party funds leads to financial distress (Yosandra & Sembiring, 2022). According to Bawoel *et al*., (2025), exogenous liquidity, such as third party funds, does not significantly impact financial distress.

A high DAR ratio presents a significant threat, especially when coupled with the substantial amount of third-party funds held by Islamic Rural Banks. A high DAR indicates a reliance on liabilities that need to be met. When DAR is elevated but third-party funds is low, financial challenges may arise. This is because having ample funds is crucial for meeting obligations and supporting Islamic Rural Banks operations (Ningsih *et al*., 2021). However, if both DAR and third-party funds are high, the bank faces increased pressure to return funds. Consequently, third party funds not only enhance financing capacity but also intensifies the burden on Islamic Rural Banks's liabilities. As DAR rises, the asset proportion diminishes relative to liabilities, imposing a heavier burden on third parties. This is in accordance with Signaling theory, which states that information regarding a high DAR condition may result to reduced profits and margins received, thereby disrupting the financial stability of Islamic Rural Banks and increasing the risk of financial distress. This is corroborated by research (Ramadani and Ratmono 2023) which found that the leverage ratio influences financial distress.

Inflation in Moderating Financial Ratios toward Financial Distress

The inflation variable is able to strengthen the influence of NPF, ROA, OEOI, and DAR on financial distress. Rising inflation will weaken the public's purchasing power and increase the cost of living as well as business expenses. This results in a reduced ability of people to pay installments, thus pushing up the NPF. Islamic Rural Banks in Java have an average NPF of 7%, and the NPF value increased in 2022 when inflation reached its highest figure during the 2019–2024 period (5.51%). This indicates that during periods of high inflation, the risk of problematic financing increases due to liquidity pressures and a lack of restructuring capacity. These results contradict the research conducted by (Kosasih *et al*., 2020), which states that financial distress cannot be influenced by NPF moderated by inflation. In the case of the ROA variable, inflation can moderate its influence on financial distress. Rising inflation, accompanied by interest rate hikes, encourages people to keep their funds in banks. However, Islamic Rural Banks as Islamic financial institutions do not implement an interest-based system, so the funds they manage remain relatively stable. Nevertheless, inflation increases operational costs, which reduces margins and thus disrupts profitability. Therefore, when inflation is high, it is important for Islamic Rural Banks to maintain their ROA in order to preserve the bank's health and reduce the potential for financial distress, even amid economic turmoil. This finding is supported by Signaling theory, which posits that a low Return on Assets (ROA) may serve as an indicator to investors of the weak financial condition of Islamic Rural Banks, thereby influencing its internal situation, and conversely. These results are consistent with the research of (Hasyim *et al*., 2023; Maulida & Arief Arfiansyah, 2024), which states that inflation can affect the ROA variable.

Financial distress can be influenced by OEOI, and this is further exacerbated by inflation. High inflation leads to operational inefficiency as it drives up operational costs. Cost pressures arise when Islamic Rural Banks cannot efficiently manage these expenses. Consequently, when inflation occurs in a Islamic Rural Banks with a high

OEOI, it can undermine financial stability. This situation requires careful monitoring because external factors like inflation can impact Islamic Rural Banks and, on a macro level, hinder regional economic growth. This finding aligns with research (Pamungkas *et al*., 2021; Maulida & Arief Arfiansyah, 2024), which indicates that inflation can moderate OEOI, leading to financial instability due to a decline in asset volume. However, it was found that inflation has not been able to moderate the effect of CR on financial distress. Although inflation affects operational costs and the public's purchasing power, it alone is not strong enough to alter the financial condition if the CR is at a high level. According to Saefulloh *et al*., (2023), if inflation remains below 10%, it does not increase corporate financial risk. This has been demonstrated in Islamic Rural Banks with a maximum CR of 70.126, which, according to the Zmijewski prediction model, has a value far from 0 (zero), indicating that the Islamic Rural Banks is in a healthy condition even with an inflation rate of 2.7%. According to Signaling theory, the significance of financial information for investors is acknowledged, particularly in relation to whether the CR value exhibits positive fluctuations. Such a scenario will safeguard Islamic Rural Banks from potential financial distress. These results are consistent with the study (Wafi *et al.,* 2021), which state that inflation does not affect financial distress.

Inflation exacerbates the DAR ratio, contributing to the onset of financial distress in Islamic Rural Banks. When inflation is unstable, individuals are more likely to withdraw their savings from Islamic Rural Banks to meet their needs, which depletes Islamic Rural Banks's funds and results in reduced investment capital (Hidayat *et al*., 2023). This scenario strains liquidity levels, compelling Islamic Rural Banks to rely on debt financing. An elevated DAR ratio heightens the risk of financial distress, thereby deteriorating Islamic Rural Banks's financial health. Consequently, it is essential to interpret financial information through the lens of Signaling theory, which posits that the DAR level can indicate the stability of Islamic Rural Banks's condition. Over time, inflation will lead to losses, necessitating effective management to keep financial conditions stable. These findings contrast with studies by (Beno & Masripah, 2023), which assert that inflation does not impact the leverage ratio concerning financial distress.

CONCLUSION

The research shows that financial statements are vital for predicting financial distress among Islamic Rural Banks in Java. The findings indicate that the NPF, ROA, OEOI, and DAR ratios have not been effective in influencing financial distress. However, third party funds and inflation are known to moderate the impact of NPF, ROA, OEOI, and DAR on financial distress, though they do not affect the relationship between CR and financial distress. These observations are evident in the condition of Islamic Rural Banks, which saw an increase in NPF following the onset of the 2020 pandemic, resulting in a rise in third-party loans and, consequently, a higher debt proportion. This situation, naturally, affects the activities and operations of Islamic Rural Banks in Java.

Based on the findings, several recommendations are proposed. Islamic Rural Banks should prioritize the management of problematic financing and debt proportion over a sole focus on profitability. Furthermore, third-party funds likely constitute the primary capital, reflecting public trust in Islamic Rural Banks as financial service institutions. However, effective liquidity management is essential to maintain financial

projections, even in the face of external factors. This study employs the Zmijewski model to assess financial distress. While the model is valid, future researchers should consider alternative financial distress measurement models. Additionally, researchers may employ more complex models by incorporating control variables and additional macroeconomic factors. On a broader scale, future research could also evaluate microfinance institutions in Indonesia and Southeast Asia.

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Appendix 1 Table Classical Assumption Test

Classical Assumption	Variable	Coefficient Variance	Centered VIF
Multicollinearities	NPF	0.000318	1.112064
	ROA	0.006954	1.600929
	OEOI	5.74E-05	1.645778
	CR	3.02E-07	1.028540
	DAR	0.000300	1.046018
	Value	Coefficient	Prob.
Normality Test	Jarque-Bera	4.773892	0. 091910
Heteroskedasticity Test	Obs*R-squared	8.173753	0.1469