# Predicting Financial Distress in Islamic Banking: Evidence from Bank Muamalat Indonesia Using the Springate Model and Financial Ratios

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| Abstract | Informasi Artikel |
|---|---|
| This study assesses the potential for financial distress in Bank Muamalat Indonesia the country's pioneering Islamic bank by integrating financial ratio analysis with the Springate predictive model. Triggered by persistent fluctuations in profitability metrics, the study investigates whether key financial indicators. Return on Assets (ROA), Return on Equity (ROE), Operating Expenses to Operating Income (BOPO), and Financing to Deposit Ratio (FDR) significantly influence financial distress. Using a descriptive quantitative design and quarterly data from 2016 to 2022, multiple regression results indicate that none of the selected ratios exert a statistically significant effect ($p > 0.05$). However, the Springate model consistently produced S-scores above the distress threshold (0.862), indicating financial resilience throughout the study period. The findings suggest that while traditional performance ratios may lack predictive accuracy in this context, the Springate model provides a more reliable early-warning framework for assessing financial health. This study contributes to the literature on financial risk diagnostics in Islamic banking and offers practical implications for enhancing Shariah-compliant internal supervision systems. | |

**Abstrak**

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| Studi ini menilai potensi kesulitan keuangan di Bank Muamalat Indonesia sebagai bank Islam pelopor di negara ini dengan mengintegrasikan analisis rasio keuangan dengan model prediktif Springate. Dipicu oleh fluktuasi terus-menerus dalam metrik profitabilitas, studi ini menyelidiki apakah indikator keuangan utama. Return on Assets (ROA), Return on Equity (ROE), Operating Expenses | |

to Operating Income (BOPO), dan Financing to Deposit Ratio (FDR) memengaruhi kesulitan keuangan secara signifikan. Dengan menggunakan desain kuantitatif deskriptif dan data triwulanan dari tahun 2016 hingga 2022, hasil regresi berganda menunjukkan bahwa tidak ada rasio yang dipilih yang memberikan efek signifikan secara statistik (p > 0,05). Namun, model Springate secara konsisten menghasilkan skor-S di atas ambang batas kesulitan (0,862), yang menunjukkan ketahanan keuangan selama periode studi. Temuan menunjukkan bahwa meskipun rasio kinerja tradisional mungkin kurang akurat dalam konteks ini, model Springate memberikan kerangka peringatan dini yang lebih andal untuk menilai kesehatan keuangan. Studi ini memberikan kontribusi terhadap literatur tentang diagnostik risiko keuangan dalam perbankan Islam dan menawarkan implikasi praktis untuk meningkatkan sistem pengawasan internal yang sesuai Syariah.

**Citation:** To be added by editorial staff during production.

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## INTRODUCTION

Bank Muamalat Indonesia became a historical milestone as the first general sharia bank to operate all its activities in accordance with Islamic sharia principles in Indonesia. This marks a significant step forward in the development of the banking sector based on the values of justice and blessings.(Prahara et al., 2023) To ensure the continuity and success of its business in the competitive banking world, Bank Muamalat Indonesia must continuously strive to compete effectively. One of the key factors is to continuously improve its financial performance sustainably. (Adinugroh:2022) In the end, all Islamic banking institutions must prove the Islamic nature of their transactions and continue to commit to providing maximum services from all sectors, especially to customers and investors.

Bank Muamalat Indonesia has faced several problems in recent years. In 2017, the bank's CAR was below the minimum requirements set by the regulator.(Nosita & Jusman, 2019) In 2019, BMI's NPF increased, raising concerns about the bank's asset quality. In 2020, merger talks with Bank Mandiri and BNI were canceled due to valuation differences. The impact of the COVID-19 pandemic in 2020 and 2021 caused

the bank's profits to decline due to increased provisions and lower revenues. (Daulay: 2023). The presence of Covid-19 indeed poses a real threat to the income of all elements of the economy, including banking institutions.

Islamic banking as a financial institution aims to achieve profit, but still pays great attention to any potential negative impacts, no matter how small.(Rafiqi et al., 2023). Like the decrease in profits from the bank. This is caused because the impact is a risk that must be faced by Islamic banking to avoid the possibility of bankruptcy. (Oktaviana & Miranti, 2024). One of the strategies implemented in financial deepening is accelerating economic growth by spreading access from individuals with more financial resources to those with less (Miranda & Rafiqi, 2025). Financial access, if done well and with caution by Islamic banks, will bring profits and reduce losses.

ROA is a highly relevant measure of a company's profitability, indicating the company's ability to generate profits from its operational activities (Adina Atasya: 2020). The higher the ROA, the more efficient the company is in utilizing its assets to achieve higher profits (Rafiqi & Halimah, 2024). However, if ROA decreases, this indicates a decline in performance or even losses in the company's business activities. (Rafiqi et al., 2021). In this study, ROA will be a key parameter to evaluate the financial performance of Bank Muamalat Indonesia. ROA analysis will provide important insights for company management to overcome challenges and increase profitability, as well as maintain the company's financial stability in a dynamic market (Ishak & Asni, 2020). Profitability is the ability of a company to generate profits which indicates the good or bad performance of a bank. (Iqbal Rafiqi: 2023) This financial ratio is commonly used to measure the extent to which a company can generate profits from its assets. This ratio combines net income with total assets to provide an overview of the efficiency of asset use in generating profits.

Bankruptcy is a condition in which a company experiences failure in carrying out its operations to generate profits. (Imsar et al., 2024). In a bankruptcy situation, a company is unable to meet its financial obligations and does not have sufficient assets to pay its debts. (Argantara & Choiri, 2023). This

condition often results in liquidation or restructuring of the company to overcome the financial problems faced. Bankruptcy can be a warning sign for companies to conduct a thorough evaluation of their financial management and business strategy to avoid similar risks in the future.(Delyana;2018) Internal factors that can cause a company to go bankrupt include inefficient management in running the company and resulting in continuous losses which ultimately cause the company to be unable to pay its obligations. (Surya Sanjaya:2018) The following is the development of Bank Muamalat Indonesia's financial performance from the Return on Assets (ROA) ratio indicator.
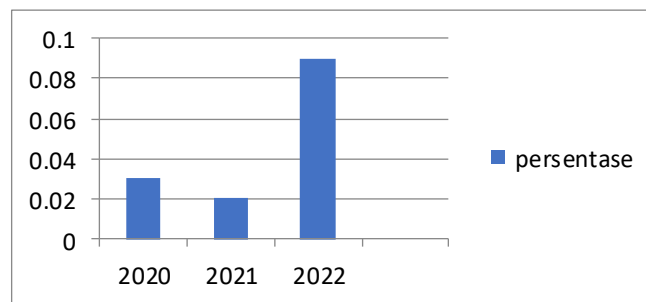


Chart 1.1
ROA Percentage

Bank Muamalat Indonesia's financial performance in terms of ROA (Return on Assets) ratio seems to fluctuate every year based on the data presentation above. In 2020, the bank recorded an ROA ratio of 0.03%, indicating a fairly stable return on assets. However, in 2021 there was a significant decline, with the ROA ratio dropping to 0.02%. However, in 2022 there was an interesting change, where Bank Muamalat recorded a significant increase in its financial performance. The ROA ratio jumped sharply to 0.09%, indicating a significant increase in the efficiency of the bank's asset usage. This change marks the recovery of Bank Muamalat Indonesia's financial performance after the decline in the previous year. There is fluctuation in the ROA ratio (Rafiqi et al., 2020) shows data that Bank Muamalat Indonesia shows a change in financial performance, and this can attract the attention of related parties. In assessing the occurrence of financial distress, financial ratio analysis at Bank Muamalat Indonesia is an important step. By analyzing financial ratios

such as liquidity ratios, solvency ratios, profitability ratios, and so on, a more comprehensive picture of the bank's financial condition can be obtained.

This analysis provides deeper insight into Bank Muamalat's ability to meet short-term financial obligations, capital adequacy levels, and the bank's efficiency and profitability. Thus, through a comprehensive financial ratio analysis, related parties can identify potential financial risks and take the necessary steps to address the possibility of financial distress. Financial ratio analysis is usually carried out to measure a bank's financial difficulties which can lead to bankruptcy. (Raya Argantara, Mujibno, Eko Priyojadmiko, 2021). Bankruptcy of a company is an event that is of particular concern in the business industry (Nor Lailina Ulfa, 2022). One of the factors that causes bankruptcy is the existence of large company debts (Imro Atul Lutfiyah:2023). Overcoming problems before bankruptcy occurs is the most important thing to ensure that the company remains alive and is something that must be done.

Alvidianita's research reveals that the bankruptcy of a company is an event that receives special attention in the business industry. (Dhea Rahma: 2021). This is because bankruptcy can have wide-ranging impacts, both on company owners, employees, customers, and the economy as a whole. Bankruptcy conditions indicate serious problems in the company's financial and operational management, so that it becomes a serious concern for stakeholders. To prevent and overcome the possibility of bankruptcy, companies must conduct a comprehensive evaluation of business strategies, risk management, and financial planning on an ongoing basis. Thus, companies can improve their business resilience and performance and make a positive contribution to economic growth and industrial stability.

## RESEARCH METHOD

This study employs a descriptive quantitative research design to analyze the potential for financial distress in Bank Muamalat Indonesia. The purpose of this method is to systematically present and quantify the characteristics of observed variables in order to reflect the actual financial condition of the bank.(Sugiyono, 2019). The data

used in this study consist of secondary data extracted from the quarterly financial statements of Bank Muamalat Indonesia over a seven-year period (2016–2022), forming a time-series dataset. The population of the study comprises all published financial reports of Bank Muamalat Indonesia, while the sample includes quarterly financial indicators relevant to financial distress prediction, namely Return on Equity (ROE), Return on Assets (ROA), Financing to Deposit Ratio (FDR), and Operating Expenses to Operating Income (BOPO). Data were collected through a documentation technique, utilizing publicly available reports obtained from the official website of Bank Muamalat Indonesia.

For data analysis, the study follows a structured sequence comprising both classical assumption testing and inferential statistics. Classical assumption tests were conducted to assess the validity of the regression model, including normality, multicollinearity, heteroscedasticity, and autocorrelation. Hypotheses were tested using multiple linear regression analysis, accompanied by t-tests, F-tests, and the coefficient of determination ($R^2$) to evaluate the statistical significance and explanatory power of the independent variables (Bahri, 2018). All quantitative analyses were performed to assess the extent to which financial ratios can serve as predictors of financial distress, and to evaluate the empirical robustness of the Springate model in an Islamic banking context.

## RESULTS AND DISCUSSION
### Hypothesis Testing
a. **Multiple Linear Regression Test**
The following are the results of the multiple linear regression test in the table below:

**Table 1. Multiple linear regression test**
**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | -497.310 | 593.889 | | -.837 | .411 |
| | ROA | 100.920 | 118.489 | .372 | .852 | .403 |
| | ROE | -6.805 | 7.650 | -.257 | -.890 | .383 |
| | BOPO | 5.338 | 6.216 | .322 | .859 | .399 |
| | FDR | -.076 | .517 | -.047 | -.147 | .885 |

a. Dependent Variable: FD

Based on the results obtained from the table above, a linear regression equation can be prepared as follows:

$Y=\beta 0+\beta 1X1+\beta 2X2+\ldots+\beta nXn+\epsilon$

The regression output indicates a constant value of –497.310, suggesting that when all independent variables (ROA, ROE, BOPO, and FDR) are held at zero, the predicted level of financial distress is –497.310. While the constant itself may not bear practical interpretation in this context, it establishes the baseline of the model. The regression coefficient for ROA ($X_1$) is 100.920, implying that a one-unit increase in ROA is associated with an estimated increase of 100.920 in the financial distress score, ceteris paribus. This counterintuitive result may indicate that higher asset returns are not necessarily aligned with lower financial distress in this specific case, possibly due to volatility or asset revaluation effects in Islamic financial institutions.

The coefficient for ROE ($X_2$) is –6.805, suggesting that a one-unit increase in ROE is associated with a decrease of 6.805 in the financial distress score. This aligns with theoretical expectations, as greater equity profitability typically signals stronger financial performance and lower distress risk. For BOPO ($X_3$), the coefficient is 5.338, indicating that a one-unit increase in operating expenses relative to operating income contributes to a higher level of financial distress. This result is consistent with the notion that higher operational inefficiency elevates the risk of financial instability.

Lastly, the coefficient for FDR ($X_4$) is –0.076, but with a p-value of 0.885, its effect is statistically insignificant at the 5% level. This implies that, within the observed period, variations in financing-to-deposit ratios do not meaningfully affect the bank's financial distress status.

b. **Uji T (Partial influence analysis)**

This test is conducted to determine the influence of the independent variables individually on the dependent variables tested at

a significance level of 0.05, then a variable is said to have an influence on another variable if t count> t table or if sig <0.05. The results of the SPSS calculation can be seen in the table below, as follows:

**Tabel 2. Uji T**

| Coefficients[a] | | | | | |
|---|---|---|---|---|---|
| Model | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| | B | Std. Error | Beta | | |
| (Constant) | -497.310 | 593.889 | | -.837 | .411 |
| Roa | -4.842 | 53.201 | -.018 | -.091 | .928 |
| 1   Roe | -2.979 | 5.158 | -.113 | -.578 | .569 |
| Bopo | 1.862 | 3.232 | .112 | .576 | .569 |
| Fdr | .036 | .316 | .022 | .114 | .910 |

a. Dependent Variable: fd

**Partial Significance Test (t-Test) of ROA, ROE, BOPO, and FDR Variables in Explaining Financial Distress in Islamic Financial Institutions**

The results of the t-test on the Return on Asset (ROA) variable indicate that ROA does not have a statistically significant partial effect on financial distress. (Rafiqi & Hasanah, 2025) This is evidenced by the significance value of 0.928, which exceeds the 0.05 threshold, and the calculated t-value of 0.91, which is lower than the critical t-table value of 2.06866. Thus, the ability of assets to generate profits cannot be considered a primary predictor of financial distress in Islamic financial institutions. Similarly, the Return on Equity (ROE) variable yields an insignificant result, with a p-value of 0.569 and a t-statistic of -0.578. These findings confirm that the efficiency of equity utilization by management in generating returns does not significantly influence the likelihood of financial distress occurring.

The Operating Expenses to Operating Income (BOPO) variable also demonstrates no significant relationship with financial distress. With a significance level of 0.569 and a t-value of 0.576, operational efficiency

in Islamic banking does not appear to have a direct partial impact on financial vulnerability. Lastly, the Financing to Deposit Ratio (FDR) exhibits a p-value of 0.910 and a t-statistic of 0.114, both indicating that this variable does not exert a statistically significant partial effect on financial distress. This suggests that the level of financing distribution relative to third party funds is not a determining factor in the financial stability of Islamic financial institutions within the sample (Rafiqi & Majdi, 2025).

In conclusion, none of the four independent variables analyzed in this study—ROA, ROE, BOPO, and FDR—demonstrate significant partial effects on financial distress. These findings imply the necessity of exploring other contextual variables aligned with Islamic economic principles and adopting more strategic approaches to strengthen the financial resilience of Islamic financial institutions.

c. **F Test (Simultaneous influence analysis)**

This test is used to determine whether all independent variables simultaneously affect the dependent variable. The following are the results of the simultaneous significance test (F test), namely:

**Tabel 3. Uji F**

|  |  | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| | ANOVA[a] | | | | | |
| Model | | | | | | |
| 1 | Regression | 1380.572 | 4 | 345.143 | .350 | .841[b] |
| | Residual | 22676.364 | 23 | 985.929 | | |
| | Total | 24056.936 | 27 | | | |

a. Dependent Variable: FD

b. Predictors: (Constant), FDR, BOPO, ROE, ROA

Based on the ANOVA output presented in Table 4.16, the overall model indicates no statistically significant relationship between the set of independent variables and financial distress, as evidenced by a significance value of 0.841, which exceeds the conventional threshold of 0.05. Furthermore, the F-statistic of 0.350 is substantially lower than the

critical F-table value of 3.39. These results collectively suggest that, when considered simultaneously, the independent variables do not exert a meaningful influence on the variation of financial distress levels within the observed Islamic financial institutions. Accordingly, the model lacks explanatory power in predicting financial distress based on the variables employed in this study.

**d. Test Of Determination Coefficient (R2)**

The coefficient of determination, commonly denoted as $R^2$ (R-squared), serves as a statistical measure that evaluates the proportion of variance in the dependent variable that can be explained by the independent variable(s) within a regression model. This metric is instrumental in assessing the goodness-of-fit of the model, reflecting how well the observed outcomes are replicated by the model's estimations. Mathematically, the $R^2$ value ranges between 0 and 1. An $R^2$ value of 1 indicates a perfect fit, wherein 100% of the variation in the dependent variable is accounted for by the independent variables. Conversely, an $R^2$ value of 0 signifies that the model fails to capture any of the variability, implying that the independent variables do not contribute to explaining the behavior of the dependent variable whatsoever.

In the context of this study, a relatively low $R^2$ value implies that the explanatory power of the independent variablessuch as return on assets (ROA), return on equity (ROE), operating efficiency (BOPO), and financing to deposit ratio (FDR) is weak in accounting for fluctuations in the level of financial distress observed in Islamic financial institutions. This suggests the possibility that other unobserved or unmeasured variables may exert a more substantial influence on financial distress, and therefore should be considered in future research models.

Furthermore, in Islamic financial contexts where non-financial factors such as governance structure, Shariah compliance quality, ethical practices, and stakeholder engagement may significantly affect

institutional performance, a low R² also signals the importance of incorporating broader multidimensional variables beyond standard financial ratios. (Rafiqi et al., 2025) Such an approach would not only enhance model accuracy but also align with the holistic principles of Islamic economics and finance.

**Table 4. Determination Coefficient Test**

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|------|----------|-------------------|----------------------------|
| 1 | .777ᵃ | .603 | .535 | 6.27990 |

a. Predictors: (Constant), FDR, BOPO, ROE, ROA

Based on the regression output presented in the table above, the coefficient of determination ($R^2$) is reported at 0.535, or 53.5%, while the Adjusted $R^2$ is also shown to be 0.535. This indicates that approximately 53.5% of the total variation in the dependent variable financial distress can be explained collectively by the independent variables incorporated in the model, namely Return on Assets (ROA), Return on Equity (ROE), Operating Expenses to Operating Income (BOPO), and Financing to Deposit Ratio (FDR).

The value of Adjusted $R^2$, which accounts for the number of predictors relative to the number of observations, further validates the explanatory power of the model by adjusting for potential overfitting. In this case, the Adjusted $R^2$ being identical to the $R^2$ suggests a consistent model specification, where the number of predictors is appropriate and does not inflate the goodness-of-fit metric artificially. An $R^2$ value of 53.5% may be interpreted as moderately strong within the context of social and financial sciences, particularly when analyzing complex constructs such as *financial distress*, which are typically influenced by multifaceted internal and external factors. The result implies that the selected financial performance indicators account for just over half of the variance in

financial distress levels experienced by the Islamic financial institutions under study.

Nonetheless, it also highlights that the remaining 46.5% of the variation is attributable to other variables not captured within the current model. These may include qualitative dimensions such as the quality of Shariah governance, compliance culture, risk management efficiency, macroeconomic shocks, or behavioral factors within management elements which are often emphasized within the Islamic finance framework as integral to institutional resilience (Miranda & Rafiqi, 2025). Therefore, while the model demonstrates a satisfactory degree of explanatory power, it also opens avenues for future research to integrate broader, possibly non-financial indicators that align with the *maqāṣid al-sharī'ah* (objectives of Islamic law), thereby offering a more comprehensive understanding of the determinants of financial distress within the unique paradigm of Islamic banking.

e. **Analisis** *Springate*

This study employs the **Springate S-Score model** as a methodological framework to assess the potential risk of bankruptcy. Developed by Gordon L.V. Springate, the model utilizes a weighted linear combination of key financial ratios—namely, working capital to total assets, earnings before interest and taxes (EBIT) to total assets, return on total assets, and sales to total assets to generate a composite score that indicates the likelihood of financial distress. By applying this model, the research aims to provide a predictive diagnostic tool to evaluate the financial stability and insolvency risk of the institution under study. (Nosita & Jusman, 2019) The following is the formula for the Springate model;

$$S = 1.03X1 + 3.07X2 + 0.66X3 + 0.4X4$$

Dimana:

X1= asset lancar / total asset

X2 = EBIT/total asset

X3= laba sebelum pajak (EBT)/ liabilitas lancer

## Table 5. Springate Analysis Results

| Perusahaan | | | 2016 | | | |
|---|---|---|---|---|---|---|
| | **X1** | **X2** | **X3** | **X4** | **S-score** | **Keterangan** |
| | 0.25 | 3.76 | 97.32 | 97.3 | 11.192 | **Berpotensi Sehat** |
| | 0.15 | 2.28 | 99.9 | 99.11 | 3.333 | **Berpotensi Sehat** |
| | 0.13 | 1.89 | 98.89 | 96.47 | 20.32 | **Berpotensi Sehat** |
| | 0.22 | 3.76 | 97.76 | 95.13 | 23.006 | **Berpotensi Sehat** |
| | | | **2017** | | | |
| | **X1** | **X2** | **X3** | **X4** | **S-score** | **Keterangan** |
| | 0.12 | 1.83 | 98.19 | 90.93 | 13.973 | **Berpotensi Sehat** |
| | 0.15 | 2.25 | 97.4 | 89 | 11.919 | **Berpotensi Sehat** |
| | 0.11 | 1.7 | 98.1 | 86.14 | 22.101 | **Berpotensi Sehat** |
| | 0.11 | 0.87 | 97.68 | 84.41 | 26.355 | **Berpotensi Sehat** |
| | | | **2018** | | | |
| | **X1** | **X2** | **X3** | **X4** | **S-score** | **Keterangan** |
| | 0.15 | 1.5 | 98.03 | 88.41 | 13.978 | **Berpotensi Sehat** |
| | 0.49 | 5 | 92.78 | 84.37 | 29.678 | **Berpotensi Sehat** |
| PT Bank Muamalat Indonesia | 0.35 | 3.69 | 94.38 | 79.03 | 26.994 | **Berpotensi Sehat** |
| | 0.08 | 1.16 | 98.24 | 73.18 | 2.813 | **Berpotensi Sehat** |
| | | | **2019** | | | |
| | **X1** | **X2** | **X3** | **X4** | **S-score** | **Keterangan** |
| | 0.02 | 0.25 | 99.13 | 71.17 | 12.691 | **Berpotensi Sehat** |
| | 0.02 | 0.27 | 99.04 | 68.05 | 17.395 | **Berpotensi Sehat** |
| | 0.02 | 0.26 | 98.83 | 68.51 | 17.344 | **Berpotensi Sehat** |
| | 0.05 | 0.45 | 99.5 | 73.51 | 171.144 | **Berpotensi Sehat** |
| | | | **2020** | | | |
| | **X1** | **X2** | **X3** | **X4** | **S-score** | **Keterangan** |
| | 0.03 | 0.3 | 97.94 | 73.77 | 13.911 | **Berpotensi Sehat** |
| | 0.03 | 0.3 | 98.19 | 74.81 | 17.255 | **Berpotensi Sehat** |
| | 0.03 | 0.29 | 98.38 | 73.8 | 17.622 | **Berpotensi Sehat** |
| | 0.03 | 0.29 | 99.45 | 69.84 | 23.121 | **Berpotensi Sehat** |
| | | | **2021** | | | |
| | **X1** | **X2** | **X3** | **X4** | **S-score** | **Keterangan** |
| | 0.02 | 0.23 | 98.51 | 66.72 | 12.87 | **Berpotensi Sehat** |
| | 0.02 | 0.23 | 98.42 | 64.42 | 15.428 | **Berpotensi Sehat** |
| | 0.02 | 0.23 | 98.46 | 63.26 | 16.245 | **Berpotensi Sehat** |
| | 0.02 | 0.2 | 99.29 | 38.33 | 19.321 | **Berpotensi Sehat** |
| | | | **2022** | | | |
| | **X1** | **X2** | **X3** | **X4** | **S-score** | **Keterangan** |
| | 0.1 | 0.96 | 96.31 | 41.28 | 13.46 | **Berpotensi Sehat** |
| | 0.09 | 0.83 | 97.26 | 41.7 | 13.439 | **Berpotensi Sehat** |
| | 0.09 | 0.84 | 96.93 | 39.27 | 14.655 | **Berpotensi Sehat** |
| | 0.09 | 0.53 | 92.62 | 40.63 | 15.864 | **Berpotensi Sehat** |

**Discussion**

**Return on Assets (ROA) Against Financial Distress**

Return on Assets (ROA) is a financial ratio used to assess a company's efficiency in utilizing its assets to create profits. (rafiqi:2023) The ROA ratio provides information about the extent to which a company is successful or not in optimizing its assets in achieving a level of profitability.

Based on the output coefficients, the results of the X1 significance value are 0.928> 0.05, so it can be concluded that there is no direct significant effect of ROA on financial distress. Which means that H0 is accepted and H1 is rejected. The profitability condition of Bank Muamalat Indonesia is at a safe level so that the results of the springate analysis show that the health condition of Bank Muamalat Indonesia has the potential to be healthy. Research conducted by Risma Wilujeng based on the results of her research said that the ROA ratio has a significant negative effect on financial distress, which means that there is an inverse relationship between ROA and financial distress.

In contrast to Risma's research, Nurul Mifta stated that there were 24 banking companies in a financial distress position with a value of less than 0.862. (Mifta Khairiyah et al., 2024). Meanwhile, Ulfha Suryana's research stated that the Z mijewski prediction model showed superior performance with an accuracy level reaching 100%. Meanwhile, the Atman and Springate models were in second place with an accuracy level of 52%, followed by the Grover model in third place with an accuracy level of 50%. The Taffler model had an accuracy level of 34.6%. (Suryana Amara & Fadli, 2024).

In conclusion, the findings related to the Return on Assets (ROA) variable provide a valuable foundation for formulating strategic policy directions in the future. Although the empirical analysis indicates that ROA does not exert a statistically significant influence on financial distress, this should not diminish its relevance as an early indicator of internal performance efficiency. The absence of a direct causal relationship does not negate the importance of continuously enhancing asset productivity, particularly in the

context of Islamic financial institutions where operational excellence and ethical stewardship are paramount.

For Bank Muamalat Indonesia (BMI), strengthening internal financial metrics such as ROA through proactive efficiency improvements, prudent asset allocation, and compliance with Shariah principles can contribute to building a more resilient financial structure. Preventive measures that focus on improving return-generating activities, managing operational costs, and optimizing asset utilization will serve to reinforce institutional stability—even in the absence of immediate financial distress. Therefore, rather than treating ROA as a reactive variable, bank management is encouraged to view it as part of a broader strategic framework aimed at ensuring long-term sustainability. By adopting a forward-looking and integrated management approach that aligns with *maqāṣid al-sharī'ah* (the objectives of Islamic law), Islamic banks can maintain operational health while supporting inclusive and ethical financial growth.

**Return on Equity (ROE) against financial distress**

ROE (Return on Equity) is often used as a strong indicator of profitability. Because ROE measures the extent to which a company can generate net profits from shareholder equity (Sadriawati: 2020). Based on the results of hypothesis testing, ROE does not have a significant effect on financial distress. This can be seen from the t-value of ROE of -0.578 <t Table 2.068 and sig 0.569 > 0.05 so it can be concluded that there is no direct significant effect on financial distress. So H0 is accepted and H2 is rejected.

This finding aligns with the study conducted by Jenny, which concluded that Return on Equity (ROE) does not have a significant effect on the likelihood of financial distress. Jenny's research suggests that fluctuations in a company's ROE—whether increases or decreases—do not substantially impact its ability to avoid profitability-related financial pressures. In contrast, the current result diverges from the empirical evidence presented by Rahma, who found that ROE plays a contributory role in predicting financial distress, indicating that lower equity returns may signal early financial vulnerability.

These contradictory findings highlight the complex and context-dependent nature of ROE as a financial indicator. Differences in sample characteristics, industry sectors, and macroeconomic environments may account for the varying outcomes across studies. Consequently, while the present study suggests that ROE is not a significant standalone predictor of financial distress, this does not negate its importance as part of a broader financial assessment framework. From a managerial perspective, these results imply that although ROE may not directly trigger financial distress, it should not be disregarded in strategic financial planning. Management should adopt a multifactorial approach in risk assessment, integrating other performance indicators and contextual variables. A holistic and adaptive risk management strategy—particularly one that is responsive to changes in market conditions, capital structure efficiency, and operational dynamics—can be instrumental in preserving financial stability.

For Islamic financial institutions, where ethical governance and asset-back financing are fundamental, such strategic awareness becomes even more crucial. Embedding ROE within a larger framework that includes both financial metrics and compliance with *sharī'ah* principles will support not only sustainability but also institutional integrity.

**Operating Costs To Operating Income (BOPO) To Financial Distress**

The Operating Cost to Operating Income (BOPO) ratio is a financial indicator used to measure the operational efficiency of a company or bank. (Koleangan: 2020). Based on the results of hypothesis testing, BOPO does not have a significant effect on financial distress. This can be seen from the BOPO significance value of 0.569> 0.05 so that it can be concluded that there is no direct significant effect on financial distress. So H0 is accepted and H3 is rejected. This study supports the research conducted by Hariono and Imam Aizuddin who said that there was no significant effect of the BOPO ratio on financial distress.

The empirical results indicate that, within the context of this study, the Operating Expenses to Operating Income ratio (BOPO) does not exhibit a statistically significant relationship with financial distress. This finding suggests that BOPO, as a measure of operational efficiency, may not serve as a direct or standalone predictor of financial vulnerability among the institutions observed. The absence of significance implies that fluctuations in operational cost efficiency, while important for overall performance, do not necessarily translate into immediate financial instability. This may be due to the presence of mitigating factors such as capital adequacy, revenue diversification, or risk-sharing mechanisms inherent in Islamic financial models—that buffer the potential negative effects of high operational ratios.

Therefore, although BOPO remains a critical metric in evaluating managerial efficiency, its role in forecasting financial distress should be interpreted with caution and considered in conjunction with other financial and governance variables. For practitioners and regulators in Islamic banking, this underscores the importance of adopting a comprehensive diagnostic approach to early warning systems that account for both quantitative efficiency ratios and qualitative factors rooted in *Sharī'ah*-compliant operations.

**Financing Deposit Ratio (FDR) To Financial Distress**

*The FDR ratio is an important indicator in analyzing a bank's financial health. This ratio measures how much loan a bank has given compared to its total deposits.* (Bachri: 2018). The output results of the study show a significance value of FDR of 0.910> 0.05, so it can be concluded that there is no significant effect on financial distress. So H0 is accepted and H4 is rejected. This study is in line with research conducted by Rahmania and Hermanto which states that FDR has a negative effect on financial distress prediction.

The results of the analysis indicate that, within the framework of this study, the Financing to Deposit Ratio (FDR) does not emerge as a statistically significant predictor of financial distress. This suggests that, at least in a direct and isolated manner, the extent to which Islamic banks channel third-party

funds into financing activities does not substantially influence the likelihood of encountering financial distress.

This finding may reflect the unique operational characteristics of Islamic banking, where profit-and-loss sharing (PLS) principles, risk-averse financing models, and prudent asset management practices mitigate the adverse effects of high or low financing ratios. Additionally, it is possible that FDR's impact is more pronounced when interacting with other variables such as asset quality, liquidity coverage, or macroeconomic conditions, which are not fully captured in the current model. Therefore, while FDR remains an important indicator of financing efficiency and liquidity management, its utility as an early warning signal for financial distress may be limited when assessed in isolation. These results underscore the importance for Islamic financial institutions to adopt a multi dimensional risk assessment framework, incorporating both financial ratios and qualitative indicators that align with *Sharī'ah* governance principles and long-term institutional resilience.

**Springate Model On Financial Distress (Y)**

The Springate Model is a model used to measure financial risk or the possibility of bankruptcy in a company. (Supriati: 2019). The results of Anisa Septiawan's research show that each Islamic commercial bank used as a sample is categorized as distressed based on Springate calculations for the 2017-2021 period, and there are differences in financial distress conditions in each bank.(Septiawan et al., 2024). Meanwhile, research in other sectors in his research by Frido Saritua Simatupang stated that the financial distress model with the highest accuracy is the Zmijewski model with an accuracy level of 92%, while the accuracy levels of the Altman Z-Score, Springate, and Grover models are 76%, 44%, and 76% respectively. With these results, the Zmijewski model is the most suitable model for use in automotive and component sub-sector companies in 2016-2020, (Simatupang et al., 2024).

The Taffler model emerged as the most accurate model in predicting bankruptcy, with an accuracy rate of 100% without error. Meanwhile, the

Zmijewski model achieved an accuracy rate of 81.25% with an error rate of 18.75%, and the Springate model had the lowest accuracy in predicting bankruptcy, only achieving an accuracy of 12.50% with an error rate of 87.50%,(Marsenne et al., 2024). Meanwhile, research by Putri Pypa Nurfadillah in researching Springate stated that the Grover model had the highest accuracy percentage of 76%, followed by the Altman Z-Score model at 24%, Springate at 22%, and Zmijewski at 60%. (Nurfadillah, 2024). Research on financial distress in companies listed on the Indonesian Sharia Stock Index using the Zmejewski, Springate, and Altman Models states that the Altman and Springate models also provide valuable contributions, but are not as accurate as the Zmijewski model.(Achmad & Hayet, 2024).

The assessment of financial distress using the Springate model provides valuable insight into the financial health of Bank Muamalat Indonesia (BMI) over the period 2016–2022. Based on the application of the Springate formula—which incorporates key financial ratios including working capital to total assets, earnings before interest and taxes (EBIT) to total assets, return on total assets, and sales to total assets—the results reveal that BMI consistently achieved **S-scores** above the critical threshold of 0.862. According to the model's classification criteria, this indicates a favorable financial condition, with no indication of impending financial distress during the observed period.

These findings suggest that BMI demonstrated relatively strong financial resilience throughout the years analyzed, maintaining solvency and operational efficiency amidst dynamic economic conditions. The absence of distress signals, as per the Springate model, implies that the bank was able to uphold robust financial management practices, likely supported by effective risk governance, stable asset allocation, and compliance with *Sharīʿah*-based financing principles.

This result is consistent with the empirical study conducted by Ditiro Alam Ben, which found that among 27 companies analyzed using the same model, 8 firms were classified as financially sound (not potentially bankrupt), and 5 firms transitioned from being classified as distressed to non-distressed.

Consequently, the application of the Springate model to BMI supports the assumption that the bank's financial performance during the 2016–2022 period falls within a "healthy" classification, suggesting strong financial fundamentals and a low risk of insolvency. However, it is important to interpret these findings in the context of broader institutional performance, including *Sharīʿah* governance, risk-sharing mechanisms, and macroeconomic influences that may not be fully captured by quantitative financial ratios alone.

## CONCLUSION

This study concludes that the financial ratios—ROA, ROE, BOPO, and FDR—do not have a statistically significant effect on financial distress at Bank Muamalat Indonesia during the 2016–2022 period, as indicated by both individual (t-test) and simultaneous (F-test) analyses. Despite this, the Springate model results consistently show S-scores above the 0.862 threshold, indicating that the bank was financially healthy and not at risk of distress throughout the observation period. These findings highlight the limitations of conventional financial ratios in predicting financial distress within Islamic banking contexts. Future research is encouraged to incorporate alternative models and broader indicators, including *Sharīʿah*-compliant performance metrics, to enhance the accuracy of financial health assessments in Islamic financial institutions.

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