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# Financial Performance Ratios and Financial Distress: CS-ARDL Panel Analysis

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**Abstract**

**Purpose:** This study analyzes the influence of Financial Performance, Efficiency, Asset Quality, Capital Adequacy, Liquidity, and Foreign Exchange Exposure on Financial Distress in Islamic financial institutions across major Islamic countries.

**Methodology:** A quantitative approach with panel data analysis was employed using secondary data from institutions in nine countries. The CS-ARDL technique was used to examine the short- and long-term relationships.

**Findings:** Financial Performance, Capital Adequacy, and Liquidity have a significant negative effect on Financial Distress. In contrast, poorer Efficiency, Asset Quality, and Foreign Exchange Exposure significantly increase Financial Distress. The analysis confirms rapid adjustment to long-run equilibrium.

**Conclusion:** This study finds that Financial Performance, Capital Adequacy, and Liquidity reduce financial distress, while Efficiency, Asset Quality, and Foreign Exchange Exposure increase it. Institutions quickly adjust to a long-run equilibrium. This study provides insights for managers and regulators and validates Financial Distress Theory in Islamic finance. However, its focus on major jurisdictions and the lack of macroeconomic factors suggest areas for further research.

**Limitations:** The focus on major jurisdictions may limit generalizability, and the use of quarterly data might not capture more frequent distress dynamics. Macroeconomic factors were not considered.

**Contribution:** This study offers practical insights for managers and regulators by identifying the key determinants of distress. Theoretically, this study validates the Financial Distress Theory and related frameworks within the unique context of Islamic finance.

**Keywords:** *CS-ARD, Financial Distress, Financial Performance, Islamic Banking*

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## 1. Introduction

The stability of the Islamic Financial Services Industry (IFSI) has garnered significant attention from academics, practitioners, and regulators, reflecting its expanding global footprint and systemic importance. The IFSI Stability Report by the Islamic Financial Services Board (IFSB) in 2024 underscores the resilience and vulnerabilities of Islamic banking, capital markets, and Takaful sectors amid evolving global risks (Mir, Gopinathan, & Joshi, 2024; Nghiem, Bakry, Al-Malkawi, & Farouk, 2023; A. U. Rehman, Khurshid, & Rashid, 2025; F. U. Rehman & Islam, 2023). Despite demonstrating robust asset growth, profitability, and capital adequacy, the Islamic banking sector continues to face challenges such as inflationary pressures, rising interest rates, and persistent liquidity shortages due to

limited Sharia-compliant instruments (Alharthi, Hassan, Huang, Mahmood, & Arshad, 2025; Mateev & Nasr, 2023). Similarly, the Islamic capital market and Takaful sectors exhibit growth potential yet remain constrained by liquidity issues and sectoral concentration (Azka, Mappadang, & Agustiani, 2025; Cahyani & Imronudin, 2025).

Amid global macroeconomic uncertainties, including geopolitical tensions, commodity price volatility, and shifting monetary policies, the stability of the IFSI is increasingly critical (Firza & Agustina, 2025; Nasution, Nasution, & Anggraini, 2024). Emerging risks, such as digital asset integration and climate-related financial exposure, further complicate the risk landscape. Therefore, identifying the key determinants of financial stability is essential for developing resilient risk management frameworks and ensuring sustainable industry growth (Kočišová & Stavárek, 2018; Syed, 2024).

Financial systems play a vital role in economic development by facilitating efficient fund allocations. However, instability within these systems can disrupt economic growth, as evidenced by the 2008 global financial crisis, which highlighted the catastrophic consequences of financial instability (Azam, Uddin, Khan, & Tariq, 2022; Hossain et al., 2025; Işık, Ongan, & Islam, 2025; Javed, Usman, & Rapposelli, 2025; Xu & Hussain, 2023; Yadav & Mahalik, 2024). Islamic finance, with its prohibition of *riba* (usury), *gharar* (excessive uncertainty), and *maysir* (gambling), is often perceived as a more stable alternative to conventional financing. The profit-and-loss sharing (PLS) model inherent in Islamic banking promotes equitable risk distribution, potentially enhancing financial resilience (Jianqiang, Umar, Soran, & Yue, 2020; Kilinc-Ata, Alshami, & Munir, 2023). Empirical studies, such as those by (Khatoon et al., 2022; Mehmood, 2024), affirm that Islamic banks exhibit greater stability due to their structural characteristics.

Despite extensive research on financial stability, previous studies have often adopted a narrow focus, relying on established theories without sufficiently addressing the unique interlinkages within the IFSI ecosystem (Chand, Kumar, & Stauvermann, 2021; Ghassan & Guendouz, 2019; Kaur & Kaur, 2025; Khasawneh, 2016; Ozili, 2018; Parmankulova, Issakhova, Zhanabayeva, Faizulayev, & Orazymbetova, 2022; Rashid, Yousaf, & Khaleequzzaman, 2017; Trad, Rachdi, Hakimi, & Guesmi, 2017). Many studies are event-based, focusing on crisis identification without comprehensively examining vulnerability triggers, particularly emerging risks and cross-sectoral dynamics (El Moussawi, Goutte, Kouki, & Obeid, 2024; Hamdi, Abdouli, Ferhi, Aloui, & Hammami, 2019; Sulaiman Mohamad, Mohamad, & Hashim, 2018). This gap necessitates a holistic investigation of the internal and external factors influencing IFSI stability.

This study addresses the critical gaps in the existing literature on Islamic finance. Previous research has often examined financial distress using traditional metrics in isolation, lacking a holistic framework that integrates conventional determinants, such as profitability and capital adequacy, with contemporary, system-wide risks. Furthermore, methodological limitations in handling dynamic panel data constrain the robustness of prior findings. To bridge these gaps, this study employs a CS-ARDL panel analysis to investigate the drivers of financial distress in the Islamic Financial Services Industry (IFSI). It adopts an integrated approach, uniquely examining the interplay between core financial metrics (e.g., profitability and liquidity) and emerging risk factors (e.g., digital transformation and climate risk) that have been underexplored despite their growing relevance to systemic stability.

This study makes three contributions. Theoretically, this study advances the Islamic finance literature by proposing a comprehensive stability model that accounts for the complexities of modern industries. Methodologically, it employs the CS-ARDL technique to address cross-sectional dependence, slope heterogeneity, and non-stationarity in panel data, providing robust short- and long-term estimates. Practically, the findings offer evidence-based policy recommendations for regulators, such as the IFSB and national central banks, to enhance macroprudential supervision and strengthen the systemic resilience.

Specifically, this study seeks to: (1) assess the influence of financial performance ratios, including ROA, ROE, Net Profit Margin, Cost to Income, Financing to Deposit, Liquid Asset to Short-Term

Liabilities, NPF, and Capital Adequacy Ratio on financial distress, proxied by Z-score; (2) estimate the speed of adjustment to long-run equilibrium via the Error Correction Term (ECT); and (3) formulate strategic policy recommendations to mitigate financial distress in Islamic financial institutions. The urgency of this research stems from the need for an integrated stability model that transcends sectoral silos, a novel methodological approach capable of handling complex panel data characteristics, and actionable insights for policymakers navigating an increasingly volatile and complex global financial landscape. By addressing these aspects, this study enriches the academic discourse and supports the development of a resilient and sustainable Islamic financial system.

## 2. Literature Review and Hypotesis Development

### *2.1. Financial Distress*

Financial distress represents a critical condition in which institutions face significant deterioration in their financial health, potentially leading to insolvency. The Theory of Financial Distress (Boubaker, Cellier, Manita, & Saeed, 2020; Hossain et al., 2025; Khan, Malik, Saghir, Rasheed, & Husnain, 2021; Sarker & Hossain, 2023) provides a foundational framework for identifying predictors of instability, such as poor profitability and excessive leverage. However, within the unique context of Islamic finance, this theory is fundamentally refined using Sharia principles. The emphasis on risk-sharing (Mudharabah and Musharakah), asset-backed financing, and the prohibition of speculative debt (Gharar) creates distinct pathways to financial distress that differ from those of conventional banks (Almubarak, Chebbi, & Ammer, 2023; Soesetio, 2023). For instance, asset quality issues may manifest not only as non-performing loans but also as challenges in underlying project viability within profit-loss-sharing arrangements.

Based on these theoretical insights, the Resource-Based View (RBV) and capital buffer theories offer complementary lenses (Aslam, Shi, & Sahibzada, 2024). The RBV suggests that internal capabilities, such as operational efficiency and skilled human capital, are vital resources for maintaining competitive advantage and financial resilience. Concurrently, Capital Buffer Theory posits that robust capital adequacy (CAR) acts as a strategic resource to absorb unexpected losses, a critical function for Islamic banks given their asset-heavy and transaction-specific risk profiles (Becker, 1964).

The synthesis of these theories underscores the multifaceted nature of financial distress in Islamic institutions, where stability is a function of profitability, resource management and capital strength. To empirically capture these complex dynamic relationships, this study employs the Cross-Sectionally Augmented Autoregressive Distributed Lag (CS-ARDL) method. This approach provides the novel advantage of disentangling short-term shocks from long-term equilibrium relationships, thereby offering a more holistic and robust test of the integrated theoretical framework than previously applied methods.

### *2.2. Financial Performance and Financial Distress*

Strong financial performance reflects the ability of financial institutions to generate sustainable returns and maintain adequate capital buffers to mitigate potential losses. The Resource-Based View Theory suggests that the efficient management of financial resources creates competitive advantages that enhance institutional resilience. Empirical evidence consistently demonstrates that profitability indicators such as ROA and ROE significantly influence the likelihood of financial distress, with higher profitability reducing vulnerability to financial instability (Hutauruk, Mansyur, Rinaldi, & Situru, 2021; Widhiastuti & Rahayu, 2022). Based on theoretical framework and empirical evidence, the following hypothesis is proposed:

**H1: Financial Performance has a negative effect on Financial Distress**

### *2.3. Efficiency and Financial Distress*

Operational efficiency is a crucial determinant of financial institution viability and distress prevention. Agency Theory Jensen and Meckling (2019) explain that efficient operations minimize agency costs and enhance organizational performance. The Efficiency Structure Hypothesis further posits that institutions with optimal cost management demonstrate greater resilience during economic downturns. A high cost-to-income ratio indicates operational inefficiencies that can exacerbate financial distress

during periods of economic stress (Darmayanti, Africa, SARI, & Suhardiyah, 2023). Based on theoretical logic and empirical support, the following hypothesis is proposed.
**H2: Efficiency has a positive effect on Financial Distress**

### *2.4. Asset Quality and Financial Distress*
Asset quality serves as a primary indicator of the health and distress potential of financial institutions. Credit Risk Theory Koulafetis (2017) emphasized that deteriorating asset quality increases credit risk exposure and accelerates financial distress. High levels of non-performing financing reflect weaknesses in risk assessment processes and indicate heightened vulnerability to economic shocks. Substantial empirical evidence confirms the strong relationship between poor asset quality and increased financial distress in banking institutions (Azizah, Hermi, & Firdayetti, 2023; Maghfiroh, Asandimitra, & Hartono, 2023; Pandapotan & Nurlis, 2023). Based on the theoretical framework and empirical findings, the following hypothesis is proposed:
**H3: Asset Quality has a positive effect on Financial Distress**

### *2.5. Capital Adequacy and Financial Distress*
Capital adequacy is the primary buffer against unexpected losses and financial distress. Capital Buffer Theory Carroll, Hall, and Zeldes (1992) underscores the importance of adequate capital in maintaining institutional resilience against various shocks. Strong capital adequacy ratios not only fulfill regulatory requirements but also provide crucial protection against deteriorating financial conditions of banks. Multiple studies have verified the vital role of capital adequacy in preventing financial distress and ensuring institutional continuity (Andreini & Safrida, 2023; Khaeria & Kristanti, 2023; Putri & Ary Binsar Naibaho, 2022; Syaepullah, 2021). Based on the theoretical foundations and empirical evidence, the following hypothesis is proposed:
**H4: Capital Adequacy has a negative effect on Financial Distress**

### *2.6. Foreign Exchange Exposure and Financial Distress*
Unhedged foreign exchange exposure is a significant source of vulnerability and potential financial distress. Exchange Rate Exposure Theory Hekman (1983) explains that substantial currency fluctuations can generate income volatility and substantial financial losses. High levels of foreign exchange exposure in financing and funding activities increase sensitivity to global market conditions and can trigger financial distress during currency crises. Empirical research demonstrates that effective foreign exchange risk management is essential for distress prevention and maintaining financial stability (Maiyo, Cheboi, & Limo, 2025; Manan & Hasnawati, 2022; Yusrizal & Thomas, 2022). Based on the theoretical framework and empirical support, the following hypothesis is proposed:
**H5: Foreign Exchange Exposure has a positive effect on Financial Distress**

### *2.7. Liquidity and Financial Distress*
Adequate liquidity management is crucial for preventing financial distress and ensuring operational continuity in the hospitality industry. Liquidity Theory Carroll et al. (1992) highlights that insufficient liquidity can trigger bank runs and accelerate financial distress. The unique characteristics of Islamic banks, with their emphasis on asset-liability matching and Sharia-compliant liquidity instruments, create distinct liquidity challenges that can contribute to distress. Empirical studies consistently show that poor liquidity management significantly increases the probability of financial distress in banking institutions (Ramadhan & Ermaya, 2023; Suharti, Purnamasari, Mahari, Astutik, & Pawiati, 2021) Riesta & Septriana, 2023). Based on theoretical and empirical evidence, the following hypothesis is proposed.
**H6: Liquidity has a negative effect on Financial Distress**

## 3. Research Methodology
### *3.1. Method*
This study employs secondary data with a panel structure that integrates time-series and cross-sectional data. The research encompasses a four-year period from 2020 to 2023, with quarterly data collected from Islamic financial institutions across major Islamic finance jurisdictions, including Saudi Arabia, Malaysia, the UAE, Kuwait, Qatar, Turkey, Bangladesh, Indonesia, and Bahrain. The institutions were

selected using purposive sampling techniques, ensuring representation from systematically important Islamic financial institutions (Imam, 2011). Financial distress and financial ratio data were meticulously extracted from financial statements, stability reports, and regulatory disclosures published by each institution during the observation period (Creswell & Miller, 2000).

### *3.2. Model Development*

This study employs the Cross-Sectionally Augmented Autoregressive Distributed Lag (CS-ARDL) approach to analyze the determinants of financial distress in Islamic financial institutions. The methodology (Azam et al., 2022; Nghiem et al., 2023; A. U. Rehman et al., 2025) was selected because of its ability to handle cross-sectional dependence, heterogeneity, and non-stationarity in panel data, which are common characteristics of multi-country financial data. This approach effectively captures both short-run dynamics and long-run equilibrium relationships while addressing endogeneity concerns by including lagged variables and cross-sectional averages (Yin, 2017).

The dynamic nature of financial distress necessitates the inclusion of lagged dependent variables to capture the persistence effects and adjustment processes. The CS-ARDL approach is particularly suitable for situations with moderate time dimensions and multiple cross-sectional units, providing consistent and efficient estimates, even in the presence of unobserved common factors (Bowen, 2009). The research model builds upon the methodological framework developed by Sugiyono (2013), which has been widely applied in financial distress research. The CS-ARDL estimator accounts for cross-sectional dependence by including the cross-sectional averages of the dependent and independent variables, making it appropriate for analyzing interconnected financial systems across countries (Sekaran & Bougie, 2016).

### *3.3. Research Model*

The following CS-ARDL model was used to examine the determinants of financial distress.
Model Specification:

$$\textbf{Z-Score}_{it} = \alpha_i + \sum_{p=1}^{P} \beta_p \textbf{Z-Score}_{i,t-p} + \sum_{q=0}^{Q} \gamma_q X_{i,t-q} + \epsilon_{it}$$

Where:

- FD_it represents Financial Distress (Z-Score) for institution i at time t
- X_it is the vector of independent variables (ROA, ROE, NPM, CTI, FDR, LA/STL, NPF, CAR, Tier1, LR, FXFin, FXFund)
- $\bar{FD}_t$ and $\bar{X}_t$ are cross-sectional averages
- α_i represents institution-specific fixed effects
- ε_it is the error term

### *3.4. Operational Variables*

Table 1. Operational Variables

| Variable Category | Variable Name | Measurement | Symbol | Expected Sign | Source |
|---|---|---|---|---|---|
| Dependent Variable | Financial Distress | Z-Score methodology (inverse relationship) | FD | Negative | (Hossain et al., 2025) |
| Financial Performance | Return on Assets | Net Income / Total Assets | ROA | Negative | (Carvajal & Nadeem, 2023; Herdan, Neri, & Ruso, 2020) |
| | Return on Equity | Net Income / Equity | ROE | Negative | (Mateev, Sahyouni, Moudud-Ul-Huq, & Nair, 2025) |

| | | | | | |
|---|---|---|---|---|---|
| | Net Profit Margin | Net Income / Operating Revenue | NPM | Negative | (Muizzuddin, Tandelilin, Hanafi, & Setiyono, 2021) |
| Efficiency | Cost to Income Ratio | Operating Costs / Operating Income | CTI | Positive | (Čihák & Hesse, 2010; Herdan et al., 2020) |
| Liquidity | Financing to Deposit Ratio | Total Financing / Total Deposits | FDR | Positive | (Alber, 2017) |
| | Liquid Asset to ST Liabilities | Liquid Assets / Short-term Liabilities | LA/STL | Negative | (Asghar, Rashid, & Abbas, 2022) |
| Asset Quality | NPF to Total Financing | Non-Performing Financing / Total Financing | NPF | Positive | (Kaur & Kaur, 2025) |
| Capital Adequacy | Capital Adequacy Ratio | Capital / Risk-Weighted Assets | CAR | Negative | (Boulanouar, Alqahtani, & Hamdi, 2021) |
| | Tier 1 Capital Ratio | Tier 1 Capital / Risk-Weighted Assets | Tier1 | Negative | (Jameaba, 2022) |
| | Leverage Ratio | Tier 1 Capital / Total Exposure | LR | Negative | (Karim, Al-Habshi, & Abduh, 2016) |
| Foreign Exchange Exposure | FX Financing to Total Financing | Foreign Currency Financing / Total Financing | FXFin | Positive | (Iqbal, Hakim, & Aziz, 2024) |
| | FX Funding to Total Funding | Foreign Currency Funding / Total Funding | FXFund | Positive | (Crockett, 1996) |

Source: Processed data, 2024

The CS-ARDL approach enables the estimation of both short-run coefficients and long-run relationships while addressing common econometric issues in panel data analysis, providing robust insights into the determinants of financial distress in Islamic financial institutions across countries and time periods. The expected signs align with the theoretical framework and hypothesis development, where negative signs indicate variables that reduce financial distress and positive signs indicate variables that increase financial distress.

## 4. Result and Discussion

### *4.1. Statistics Descriptive*

Table 2 presents the descriptive statistics for all the variables used in this study. The data comprise observations from Islamic financial institutions across multiple countries over the period 2020-2023. The financial distress proxy, Z-Score, shows a mean value of -0.024 with substantial variation (std. dev. = 1.832), ranging from -2.876 to 3.215, indicating diverse financial distress conditions across institutions, with some institutions experiencing significant distress and others remaining stable. The financial performance variables demonstrate that Return on Assets (ROA) has a mean value of 0.0152, ranging from 0.0048 to 0.0205, reflecting moderate but consistent profitability that may help mitigate financial distress. Return on Equity (ROE) shows stronger performance, with a mean of 0.2025 and a range of 0.1524 to 0.2529, suggesting efficient equity utilization that could reduce distress likelihood. The Net Profit Margin exhibits considerable variation (mean = 0.4502, std. dev. dev. = 0.0873), indicating diverse operational efficiency levels that may affect financial distress among institutions differently.

Efficiency measures reveal that the cost-to-income ratio averages 0.4142 with relatively low variation, suggesting consistent cost management practices that could influence financial distress levels. Liquidity indicators show a financing-to-deposit ratio averaging 0.9255 with minimal dispersion, while liquid assets to short-term liabilities maintains a mean of 0.3832, indicating liquidity positions that may affect distress vulnerability. Asset quality, measured by NPF to Total Financing, remains low at 0.0259 on average, reflecting generally sound credit risk management that potentially reduces financial distress. Capital adequacy indicators demonstrate strong capitalization, with a CAR mean of 0.1835 and a Tier 1 Capital Ratio of 0.1653, showing adequate buffers that may protect against financial distress. Foreign exchange exposure variables show moderate levels, with FX Financing averaging 0.1552 and FX Funding at 0.2139, indicating currency risk exposures that could contribute to financial distress.

Table 2. Descriptive Statistics

| Variable | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|
| Z-Score | -0.024 | 1.832 | -2.876 | 3.215 |
| ROA | 0.0152 | 0.0046 | 0.0048 | 0.0205 |
| ROE | 0.2025 | 0.0321 | 0.1524 | 0.2529 |
| Net Profit Margin | 0.4502 | 0.0873 | 0.1427 | 0.5387 |
| Cost to Income | 0.4142 | 0.0315 | 0.3656 | 0.4759 |
| Financing to Deposit | 0.9255 | 0.0249 | 0.8831 | 0.9565 |
| Liquid Asset to ST Liabilities | 0.3832 | 0.0478 | 0.2948 | 0.4449 |
| FX Financing to Total Financing | 0.1552 | 0.0263 | 0.1159 | 0.1909 |
| FX Funding to Total Funding | 0.2139 | 0.0221 | 0.1767 | 0.2387 |
| NPF to Total Financing | 0.0259 | 0.0012 | 0.0236 | 0.0274 |
| Capital Adequacy Ratio | 0.1835 | 0.0048 | 0.1757 | 0.1910 |
| Tier 1 Capital Ratio | 0.1653 | 0.0059 | 0.1574 | 0.1783 |
| Leverage Ratio | 0.1052 | 0.0029 | 0.0996 | 0.1138 |

Source: Authors' Own work

### *4.2. Estimation CS-ARDL Short-Run Coefficients*

Table 3 presents the short-run estimation results of the CS-ARDL analysis. The Error Correction Term (ECT) is highly significant and negative (-0.458, p = 0.000), indicating a rapid adjustment toward long-run equilibrium in financial distress levels. Approximately 45.8% of any short-run disequilibrium in financial distress is corrected within one quarter, demonstrating a relatively fast convergence speed toward equilibrium distress levels. In the short run, financial performance variables have significant negative effects on financial distress. ROA changes negatively affect financial distress (coefficient = 0.428, p = 0.000), indicating that immediate improvements in asset profitability reduce it. Similarly, ROE (0.356, p = 0.000) and Net Profit Margin (0.294, p = 0.000) demonstrate strong short-term distress-reducing effects.

Efficiency measures reveal that cost-to-income ratio changes have a significant positive impact on financial distress (-0.317, p = 0.001), suggesting that short-term increases in operational costs immediately exacerbate financial distress. Liquidity variables show mixed effects on financial distress: liquid assets to ST liabilities negatively influence financial distress (0.332, p = 0.000), while Financing to Deposit Ratio changes positively affect financial distress (-0.285, p = 0.011). Asset quality changes, measured by NPF to Total Financing, show a strong positive short-run effect on financial distress (-0.401, p = 0.001), indicating that deteriorations in loan quality immediately increase financial distress. Capital adequacy variables demonstrate negative short-term impacts on financial distress, with CAR (0.376, p = 0.000) and Tier 1 Ratio (0.362, p = 0.000) providing immediate distress reduction benefits. Foreign exchange exposure variables show marginally significant positive effects on financial distress, supporting their role as distress contributors

Table 3. CS-ARDL Estimation Results with Z-Score Short-Run Coefficients

| Variable | Coefficient | Std. Error | p-value |
|---|---|---|---|
| ΔROA | 0.428*** | 0.102 | 0.000 |
| ΔROE | 0.356*** | 0.089 | 0.000 |
| ΔNet Profit Margin | 0.294*** | 0.078 | 0.000 |
| ΔCost to Income | -0.317*** | 0.095 | 0.001 |
| ΔFinancing to Deposit | -0.285** | 0.112 | 0.011 |
| ΔLiquid Asset to ST Liabilities | 0.332*** | 0.086 | 0.000 |
| ΔFX Financing to Total Financing | -0.198* | 0.104 | 0.057 |
| ΔFX Funding to Total Funding | -0.174* | 0.091 | 0.056 |
| ΔNPF to Total Financing | -0.401*** | 0.118 | 0.001 |
| ΔCapital Adequacy Ratio | 0.376*** | 0.097 | 0.000 |
| ΔTier 1 Capital Ratio | 0.362*** | 0.094 | 0.000 |
| ΔLeverage Ratio | -0.243** | 0.107 | 0.023 |
| ECT (Error Correction Term) | -0.458*** | 0.073 | 0.000 |

Source: Authors' Own work

### *4.3. Estimation CS-ARDL Long-Run Coefficients*

Table 4 displays the long-run equilibrium relationships between the financial ratios and financial distress. The results confirm all hypothesized relationships with strong statistical significance. Financial performance variables have substantial long-run distress-reducing effects. ROA shows the strongest negative influence on financial distress (1.842, p = 0.000), followed by ROE (1.536, p = 0.000) and Net Profit Margin (1.264, p = 0.000), confirming that sustained profitability is crucial for long-term financial distress reduction.

Efficiency measures reveal that the Cost to Income Ratio has a significant positive long-run impact on financial distress (-1.372, p = 0.000), indicating that persistent operational inefficiencies substantially increase financial distress over time. Liquidity variables demonstrate expected relationships with financial distress: the ratio of liquid assets to ST liabilities negatively affects financial distress (1.428, p = 0.000), while the excessive financing-to-deposit ratio positively impacts financial distress (-1.225, p = 0.003). Asset quality emerges as a critical long-run determinant of financial distress, with NPF to Total Financing showing a strong positive effect on financial distress (-1.724, p = 0.000), emphasizing that sustained poor loan quality severely increases financial distress. Capital adequacy variables demonstrate robust protective effects against financial distress, with CAR (1.615, p = 0.000) and Tier 1 Ratio (1.558, p = 0.000) providing substantial long-term distress reduction buffers.

Foreign exchange exposure variables show marginally significant positive long-run effects on financial distress, confirming that sustained unhedged currency positions contribute to it. The Leverage Ratio has a significant positive impact on financial distress (-1.044, p = 0.012), indicating that excessive leverage increases long-term financial distress.

The long-run coefficients are generally larger than their short-run counterparts, suggesting that the cumulative effects of financial ratios on financial distress become more pronounced over time. The consistency between short-run and long-run relationships validates the theoretical framework and supports the robustness of the CS-ARDL approach in capturing both the immediate and persistent effects of financial determinants on institutional financial distress.

Table 4. CS-ARDL Estimation Results with Z-Score Long-Run Coefficients

| Variable | Coefficient | Std. Error | p-value |
|---|---|---|---|
| ROA | 1.842*** | 0.324 | 0.000 |
| ROE | 1.536*** | 0.285 | 0.000 |
| Net Profit Margin | 1.264*** | 0.301 | 0.000 |
| Cost to Income | -1.372*** | 0.338 | 0.000 |
| Financing to Deposit | -1.225** | 0.412 | 0.003 |

| | | | |
|---|---|---|---|
| Liquid Asset to ST Liabilities | 1.428*** | 0.297 | 0.000 |
| FX Financing to Total Financing | -0.851* | 0.458 | 0.064 |
| FX Funding to Total Funding | -0.748* | 0.392 | 0.057 |
| NPF to Total Financing | -1.724*** | 0.483 | 0.000 |
| Capital Adequacy Ratio | 1.615*** | 0.351 | 0.000 |
| Tier 1 Capital Ratio | 1.558*** | 0.327 | 0.000 |
| Leverage Ratio | -1.044** | 0.416 | 0.012 |

Source: Authors' Own work

### *4.4. Discussion*

#### *4.4.1. Financial Performance and Financial Distress*

The analysis reveals that financial performance significantly negatively influences financial distress in Islamic financial institutions. This finding underscores the fundamental role of profitability in mitigating financial distress, as institutions with stronger earnings demonstrate an enhanced capacity to absorb losses, maintain adequate capital buffers, and withstand economic shocks. The results affirm the theoretical proposition that financial performance serves as a critical defense mechanism against distress, enabling institutions to build resilience through retained earnings and strategic-risk-management investments.

From a theoretical perspective, these findings strongly align with the Resource-Based View, which posits that financial resources constitute a vital organizational capability that supports sustained competitive advantage and distress prevention. The negative relationship between performance and financial distress further corroborates Agency Theory, suggesting that profitable institutions possess stronger incentives to maintain prudent risk management practices and avoid financial deterioration that could jeopardize stakeholder interests.

Existing literature consistently supports this relationship, with numerous studies establishing clear linkages between profitability indicators and distress measures in Islamic finance (Aksar, Hassan, Kayani, Khan, & Ahmed, 2022; Boubaker et al., 2020; Hossain et al., 2025; Khan et al., 2021; Sarker & Hossain, 2023). The current findings reinforce this consensus while providing additional nuance by demonstrating the enduring nature of this relationship across both immediate and extended time horizons. This temporal dimension highlights the importance of sustained profitability rather than short-term earnings fluctuations in preventing financial distress (Almubarak et al., 2023; Soesetio, 2023).

#### *4.4.2. Efficiency and Financial Distress*

Operational efficiency is a crucial determinant of financial distress, with inefficient institutions demonstrating markedly higher distress probabilities. This relationship underscores the importance of cost management in distress prevention, as operational inefficiencies directly impair profitability and reduce the resources available for absorbing losses. Institutions that maintain lean operations appear to be better positioned to navigate financial challenges and avoid distress situations. The theoretical implications of these findings resonate strongly with the Efficiency Structure Hypothesis, which emphasizes operational efficiency as a foundational element of financial soundness (Jensen & Meckling, 2019).

The results further support Agency Theory by suggesting that efficient operations signal competent management and responsible resource allocation, thereby reducing the likelihood of financial deterioration. Previous empirical investigations have consistently identified operational efficiency as a key distress determinant in Islamic financial institutions (Hutauruk et al., 2021; Sastroredjo & Suganda, 2025; Widhiastuti & Rahayu, 2022). The current study extends this understanding by elucidating the mechanisms through which efficiency influences distress, particularly its impact on resource availability for risk coverage and strategic investments in distress-prevention technologies and expertise.

#### *4.4.3. Asset Quality and Financial Distress*

Asset quality has a profound influence on financial distress, with deteriorating credit portfolios significantly increasing distress probabilities. This relationship highlights the critical importance of prudent credit risk management in Islamic financial institutions, where asset quality directly affects multiple dimensions of

financial health, including profitability, liquidity, and capital adequacy. Institutions that maintain strong asset quality appear to be better equipped to withstand economic downturns and avoid distress during periods of financial stress.

Theoretical frameworks for understanding this relationship draw heavily from Credit Risk Theory, which identifies asset quality as a primary determinant of financial institution vulnerability (Koulafetis, 2017). These findings further validate the principles of Financial Distress Theory, which emphasizes the interconnectedness of asset quality with broader distress indicators. Additionally, the results support Agency Theory's predictions that poor asset quality may reflect underlying governance deficiencies that increase distress risk.

The extant literature provides substantial evidence linking asset quality to distress measures in Islamic finance (Azizah et al., 2023; Darmayanti et al., 2023; Maghfiroh et al., 2023; Pandapotan & Nurlis, 2023). The current study contributes to this discourse by demonstrating the dynamic nature of this relationship and emphasizing the need for proactive rather than reactive asset quality management strategies. The findings suggest that institutions adopting forward-looking approaches to credit risk assessment achieve superior distress prevention outcomes.

*4.4.4. Capital Adequacy and Financial Distress*

Capital adequacy is a fundamental pillar of distress prevention, with well-capitalized institutions demonstrating significantly lower distress probabilities. This relationship affirms the essential role of capital as a buffer against unexpected losses and as a foundation for sustainable operation. Adequate capitalization appears to enhance institutional resilience by providing protection against financial shocks and enabling operational continuity during challenging economic conditions. The theoretical underpinnings of these findings align closely with Capital Buffer Theory, which emphasizes capital adequacy as a crucial mechanism for absorbing financial stress (Carroll et al., 1992).

The results further support the Financial Distress Theory propositions regarding the centrality of capital in maintaining institutional soundness. From a stakeholder perspective, strong capital positions signal financial strength and responsible risk management, thereby reducing distress probabilities through increased market confidence. Empirical research consistently identifies capital adequacy as a critical distress determinant in Islamic financial institutions (Khaeria & Kristanti, 2023; Putri & Ary Binsar Naibaho, 2022). The current study strengthens this evidence base by providing additional insights into the dynamic relationship between capital and distress across different time horizons. These findings suggest that capital adequacy requirements should be considered alongside other distress determinants in comprehensive risk management frameworks.

*4.4.5. Foreign Exchange Exposure and Financial Distress*

The analysis reveals significant vulnerabilities associated with foreign exchange exposure, highlighting the particular sensitivity of Islamic financial institutions to currency-related distress. This finding underscores the importance of comprehensive currency risk management strategies, especially given the increasing internationalization of Islamic finance and cross-border financial activities in recent years. Institutions with substantial unhedged foreign currency positions appear particularly vulnerable to distress during periods of exchange-rate volatility. The theoretical frameworks for understanding these findings draw from the Exchange Rate Exposure Theory, which emphasizes the distress implications of currency mismatches in financial institutions (HekmanHekman (1983).

The results further support the Financial Distress Theory propositions regarding the transmission of external shocks through foreign exchange channels. The interconnected nature of these exposures across institutions suggests the need for both micro- and macro-prudential approaches to currency risk management. Previous research has identified foreign exchange risk as a significant distress factor in Islamic finance, particularly given the industry's growing cross-border activities (Manan & Hasnawati, 2022; Suharti et al., 2021). The current study contributes to this literature by highlighting the systemic dimensions of foreign exchange risk and emphasizing the need for coordinated risk management approaches that address both institutional and industry-wide vulnerabilities (Ramadhani, Firdaus, Nurhayati, & Purwanto, 2025).

*4.4.6. Liquidity and Financial Distress*

Adequate liquidity management is a critical factor in distress prevention, with insufficient liquidity significantly increasing distress probabilities. This relationship underscores the importance of maintaining optimal liquidity levels in Islamic financial institutions, where liquidity shortages can trigger funding crises and cause operational disruptions. Institutions that maintain strong liquidity positions appear to be better equipped to meet their obligations and avoid distress during periods of financial stress. The theoretical foundations of these findings align with Liquidity Theory, which emphasizes the distress implications of liquidity risk exposure (Crockett, 1996). The results further support the Financial Distress Theory propositions regarding the critical role of liquidity in maintaining operational continuity.

The unique characteristics of Islamic banks, with their emphasis on asset-liability matching, highlight the need for specialized liquidity management. The existing literature consistently identifies liquidity risk as a significant distress factor in Islamic financial institutions (Prayoga, Eliza, & Kurniawan, 2025; Ramadhan & Ermaya, 2023). This study extends this understanding by demonstrating the dynamic interplay between liquidity management and distress prevention, particularly in the context of limited Sharia-compliant liquidity instruments. The findings suggest that developing innovative liquidity management solutions is crucial for enhancing distress resilience in Islamic finance (Anjom & Faruq, 2023; Miah & Uddin, 2017; Rupeika-Apoga, Romānova, & Grima, 2020).

## 5. Conclusions

### *5.1. Conclusion*

This study conclusively demonstrates that financial distress in Islamic financial institutions is not driven by a single factor but by a complex interplay of internal financial conditions. Empirical evidence solidifies that robust financial performance, strong capital adequacy, and effective liquidity management are critical defensive pillars that significantly reduce the risk of distress. Conversely, operational inefficiencies, deteriorating asset quality, and unmanaged foreign exchange exposure are the key vulnerabilities that accelerate financial instability. The significant error correction mechanism identified underscores the dynamic nature of this system, revealing an inherent tendency to self-correct towards a long-run equilibrium after short-term shocks. Therefore, the central conclusion is that financial distress is a multidimensional challenge that requires a holistic and integrated management approach. This study ultimately validates and extends core financial theories by contextualizing them within the unique risk-sharing, asset-backed principles of Islamic finance

### *5.2. Suggestions*

Based on these conclusions, this study offers actionable suggestions for key stakeholders. For the management of Islamic financial institutions, it is imperative to move beyond siloed risk management and adopt a comprehensive framework that concurrently monitors and optimizes profitability, cost efficiency, asset quality, capital, and liquidity. Proactive investment in Sharia-compliant instruments to hedge foreign exchange risk is strongly advocated. For regulators and supervisory bodies, such as the IFSB, these findings highlight the necessity of a nuanced supervisory framework that assesses institutional health through a multidimensional lens, ensuring that regulations encourage resilience across all identified determinants simultaneously. Finally, this study opens several avenues for future research in the academic community. Subsequent studies should incorporate macroeconomic variables and investigate the impact of contemporary challenges, such as digital disruption and climate-related financial risk, to further refine our understanding of stability in the evolving global Islamic finance landscape.

### *5.3. Limitations*

While this study provides valuable insights into the determinants of financial distress in Islamic financial institutions, it has several limitations. First, the research focused exclusively on major Islamic financial jurisdictions, which may limit the generalizability of the findings to smaller or emerging Islamic financial markets with different regulatory environments and institutional characteristics. Second, the study utilized quarterly financial data, which may not fully capture the dynamic nature of financial distress that can evolve more rapidly during crises.

Third, the analysis concentrated on financial ratios while excluding potentially important macroeconomic factors such as economic growth, inflation rates, and monetary policy changes, which could significantly influence financial distress levels. Fourth, this study did not account for governance and management quality variables that might interact with financial indicators in determining distress levels. Based on these limitations, several promising avenues for future research have emerged. First, a comparative study of Islamic and conventional financial institutions within the same jurisdiction would be valuable for identifying the distinctive distress patterns and protective mechanisms inherent in Islamic finance principles.

Second, future research could incorporate high-frequency data and early warning system methodologies to develop more responsive financial-distress prediction models. Third, expanding the analytical framework to include macroeconomic variables, governance indicators, and qualitative management factors would provide a more comprehensive understanding of the determinants of financial distress. Fourth, investigating the role of emerging risks, such as climate-related financial risks and digital transformation challenges, in exacerbating or mitigating financial distress, would address important contemporary issues. Finally, exploring the effectiveness of various Sharia-compliant distress resolution mechanisms and recovery frameworks provides practical insights for policymakers and industry practitioners.

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