

ANALYSIS OF THE FINANCIAL DISTRESS OF ISLAMIC BANKS AND CONVENTIONAL BANKS USING THE ALTMAN Z-SCORE APPROACH

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(Submitted by Author: 25-10-2025)

(Accepted by Editorial Board: 30-12-2025)

(Published by Editorial Board: 31-12-2025)

ABSTRACT

The financial soundness of banks is an important indicator of their ability to maintain stability, manage risks, and sustain operations under changing economic conditions. In Indonesia, the banking industry consists of conventional and Islamic banking systems that operate under different business principles. Conventional banks mainly rely on interest-based transactions, whereas Islamic banks operate based on profit-sharing principles and comply with Islamic law. These operational differences influence their capital structure, asset management, risk exposure, and overall resilience to financial instability. Therefore, evaluating the financial soundness of both banking systems is essential to understand their ability to withstand potential financial distress. This study aims to analyze and compare the financial soundness of Islamic and conventional banks using the Altman Z-Score approach. The Altman Z-Score is employed as an early warning model to assess the likelihood of financial distress by combining several financial ratios into a single composite score. Based on the results, banks are classified into three categories: safe zone, grey zone, and distress zone. This classification provides a comprehensive overview of the financial condition of banks and their potential exposure to financial difficulties. Furthermore, the study not only compares the Z-Score results between Islamic and conventional banks but also interprets the underlying factors contributing to the observed differences. Variations in capital adequacy, profitability, liquidity management, financing and lending practices, business models, and risk management strategies are expected to influence the financial soundness of each banking system. In addition, differences in regulatory frameworks and operational characteristics may also affect the ability of banks to maintain financial stability during periods of economic uncertainty. The findings of this study are expected to provide a better understanding of the financial soundness of Islamic and conventional banks in Indonesia. They also offer practical implications for bank management, investors, and regulators in developing more effective risk management strategies, strengthening financial resilience, and supporting the long-term sustainability of the banking sector.

Keywords: Altman Z-Score, Conventional Banking, Financial Distress, Islamic Banking, Risk Assessment

Amelia, R., Junaidi, J., & Rahmawati, R. 2025. Analysis Of The Financial Distress Of Islamic Banks And Conventional Banks Using The Altman Z-Score Approach. *Jurnal Syarikah: Jurnal Ekonomi Islam* 11 (2): 322-335

INTRODUCTION

Banking plays a fundamental role in supporting economic growth by acting as a financial intermediary that channels funds from savers to borrowers. Because of this strategic role, maintaining the financial soundness of banks is essential for ensuring financial system stability and sustaining public confidence. A decline in a bank's financial condition may increase the risk of financial distress, reduce public trust, and potentially threaten the stability of the national economy. Therefore, assessing the financial soundness of banks is an important step in identifying potential financial problems at an early stage and supporting effective risk management (Berger & Bouwman, 2017; Altman & Hotchkiss, 2019).

Indonesia operates a dual banking system consisting of Conventional banks and Islam banks. Conventional banks conduct their business primarily through interest-based transactions, whereas Islamic banks operate according to Sharia principles using profit-sharing, trade, and leasing contracts. These differences in operating principles influence capital structure, asset management, financing mechanisms, and risk exposure. Islamic banks are generally considered to have lower exposure to speculative activities because their transactions are linked to real economic activities, while conventional banks are more directly affected by interest rate fluctuations and market volatility (Ibrahim & Rizvi, 2017). Consequently, both banking systems may demonstrate different levels of financial soundness and resilience when facing economic uncertainty.

In recent years, the Indonesian banking industry has experienced significant challenges resulting from global economic uncertainty, post-pandemic recovery, inflationary pressures, and changes in financial regulations. These conditions have increased the importance of continuously monitoring the financial

condition of banks to prevent financial distress. Early identification of financial difficulties allows bank management, investors, and regulators to take appropriate corrective actions before financial problems become more severe. Therefore, reliable analytical tools are needed to evaluate the financial soundness of banks comprehensively.

Previous studies have commonly assessed the condition of banks using individual financial ratios such as profitability, liquidity, solvency, and efficiency. Although these indicators provide useful information, they often evaluate only specific aspects of financial performance and may not adequately reflect the overall risk of financial distress. The Altman Z-Score offers a more comprehensive approach by integrating several financial ratios into a single composite index that functions as an early warning system for detecting potential financial distress (Altman & Hotchkiss, 2019). For this reason, the Altman Z-Score has been widely adopted as a practical tool for evaluating the financial soundness of business organizations, including financial institutions.

However, despite the growing number of studies examining banking performance, several research gaps remain. First, most previous studies have focused on profitability or financial performance indicators rather than evaluating financial soundness and the potential for financial distress. Second, empirical studies directly comparing Islamic and conventional banks in Indonesia using the Altman Z-Score approach remain relatively limited, particularly in the context of recent economic developments and regulatory changes. Third, existing studies generally report differences in financial conditions between the two banking systems without providing sufficient explanation of the underlying factors, such as differences in capital adequacy, liquidity management, financing structures, business models, and risk management practices (Kashif et al.,

2023). As a result, a comprehensive understanding of why these differences occur is still lacking.

Based on these considerations, this study aims to analyze and compare the financial soundness of Islamic and conventional banks in Indonesia using the Altman Z-Score approach. In addition to identifying the level of financial distress risk, this study seeks to explain the factors that contribute to differences in financial soundness between the two banking systems. The findings are expected to enrich the literature on banking financial soundness, provide empirical evidence regarding the applicability of the Altman Z-Score in the Indonesian banking sector, and offer practical recommendations for bank management, investors, and regulators in strengthening financial stability and improving long-term risk management strategies.

MATERIALS AND METHODS

Altman Z-Score Model

The Altman Z-Score analytical method is crucial for identifying potential bankruptcy or financial stress early on. This model was developed by Edward I. Altman in 1968 and has been widely used in financial research to analyze the financial risk of companies, including banks. The Z-Score is quite accurate because it combines financial ratios such as working capital to total assets, retained earnings, earnings before interest and taxes, market value of equity to debt, and sales to assets. According to Kamal & Visita (2020), the Z-Score can assess the condition of banks in Indonesia and categorize them into safe, gray, or unsafe zones based on the score obtained.

In the context of Islamic banking, several studies indicate that Islamic banks in Indonesia have successfully maintained relatively safe Z-Score scores in recent years. Anggraini *et al.* (2022) found that the Islamic banks studied had scores above the threshold of 2.6, indicating good financial

health. Another study, Syamsuddin & Hasan (2022), modified the Z-Score and showed that despite financial pressure before and during the pandemic, Islamic banks were still able to avoid the distress zone with relatively stable scores.

However, the literature also notes that applying the Altman Z-Score has some limitations, especially if used without modification in the Islamic financial sector. One issue is the market value of equity data, which is less available or volatile for unlisted Islamic banks. An article by Assidiki & Fauziah (2021) notes that control variables such as NPF/NPL, CAR, and liquidity ratios must be included for the model to yield more valid results. Recent research also indicates that modifications to the Altman Z-Score formula are necessary to make it more suitable for the characteristics of banking, especially Islamic banks. Mauluddi & Fauziah (2021) found that score modification and variable adjustment helped capture financial fluctuations due to pandemic conditions.

Thus, Altman's Z-Score theory remains relevant and useful for analyzing the financial performance of both Islamic and conventional banks, especially when used with modifications according to the characteristics of banking and current economic conditions. This approach allows for early prediction of financial risk and provides guidance for regulators and bank management. This study aims to reexamine the performance of both types of banks using a modified Z-Score, incorporating control factors such as capital adequacy ratio and non-performing financing to achieve more accurate results.

Financial Performance Of Conventional & Sharia Banks

The financial performance of sharia and conventional banks is an important topic in banking studies because they have different operational systems but both play a role in supporting economic stability. Conventional banks rely on the interest system as their primary source of income, while Islamic banks operate on the

principles of profit sharing and Sharia-compliant contracts (Setyaningsih & Pramudito, 2019). This fundamental difference affects the risk structure, financing strategies, and profitability patterns of both types of banks. Financial performance, measured thru indicators such as Return on Assets (ROA), Capital Adequacy Ratio (CAR), and liquidity ratios, becomes an important tool for comparing their competitive advantages.

Recent research indicates that although Islamic banks have lower profitability compared to conventional banks, their resilience to crises tends to be better. Rahmawati & Anwar (2019) found that during global economic fluctuations, Islamic banks are relatively more stable because they do not rely on interest and are more cautious in disbursing financing. This supports the view that the financial performance of Islamic banks more accurately reflects the principles of prudence and long-term sustainability. Conversely, conventional banks typically record higher profitability growth under normal conditions but are more vulnerable during economic shocks.

In the context of bankruptcy prediction, the Altman Z-Score is widely used to analyze the financial health of both Islamic and conventional banking. Nugroho & Hapsari (2018) emphasize that although the Z-Score model was initially developed for manufacturing companies, its application to banking remains relevant because the financial ratios used are universal. The study by Susilowati et al. (2019) shows that Islamic banks in Indonesia during the period 2013–2017 were mostly in the safe zone according to Z-Score calculations, while some conventional banks were in the vulnerable zone. This suggests that the financial stability of Islamic banks is better maintained even tho profitability is lower.

Additionally, risk management factors also influence the differences in their financial performance. Anggraini et al. (2022) showed that Islamic banks that

maintain a healthy Non-Performing Financing (NPF) ratio have stronger stability. Meanwhile, conventional banks often face challenges from high Non-Performing Loans (NPLs), which impact liquidity and profitability. This difference in risk management reflects the characteristics of each banking system, where Sharia banking prioritizes the principle of prudence and conventional banking focuses more on credit expansion.

Thus, the financial performance of Islamic banks and conventional banks has different patterns, but both are important in supporting the national financial system. Sharia banks demonstrate long-term stability with a relatively lower risk of bankruptcy, while conventional banks excel in profitability but are more sensitive to economic fluctuations. The Altman Z-Score, as a method for predicting bankruptcy, provides an objective overview of the financial condition of both, while also assisting regulators, investors, and the public in assessing the health of the banking sector (Syamsuddin & Hasan, 2022).

Working Capital to Total Assets

Working Capital to Total Assets reflects the extent to which a company can meet its short-term obligations by utilizing its assets. This ratio describes management's efficiency in maintaining a balance between current assets and current liabilities to support the company's operational sustainability without liquidity pressure (Altman, 1968). The higher this ratio, the greater the company's ability to maintain liquidity and ensure smooth cash flow, especially in the face of economic fluctuations and unstable market conditions (Altman & Hotchkiss, 2019).

In the context of banking, this ratio is crucial for assessing the liquidity level and cash health of a financial institution. Banks with a high Working Capital to Total Assets ratio demonstrate good ability in managing working capital to finance short-term operations without relying on external loans (Nugroho & Hapsari, 2018). Conversely, a low ratio indicates potential liquidity

pressure that could increase the risk of financial distress, especially during a surge in third-party fund withdrawals.

Research by Anggraini *et al.* (2022) and Rahmawati & Anwar (2019) found that this ratio has a significant influence on the financial stability of banks. An adequate level of working capital has been proven to reduce the potential for financial distress and increase the company's Z-Score. In Islamic banking, this ratio is also linked to the principle of prudence, which emphasizes the importance of managing funds efficiently and in accordance with Islamic principles.

Thus, Working Capital to Total Assets serves as a key indicator in measuring a company's short-term liquidity strength and stability. This ratio not only reflects the bank's ability to maintain cash and current asset availability but also indicates the effectiveness of management in sustainably managing liquidity risk.

Retained Earnings to Total Assets

Retained Earnings to Total Assets indicates the extent to which a company's retained earnings can be used to finance asset growth and operational activities without relying on external funding. This ratio indicates the level of financial independence and the company's ability to build internal capital reserves from its operating results (Altman, 1968). A high ratio value indicates that the company is able to finance its expansion and maintain its financial stability thru the profits it has generated (Altman & Hotchkiss, 2019).

In banking, especially in Islamic banks, retained earnings are an important source for strengthening capital structure and increasing public trust in the bank's financial stability. According to Rahmawati & Anwar (2019), a high retained earnings ratio reflects healthy financial performance and the bank's ability to withstand economic pressure and market volatility. Conversely, a low ratio indicates a high reliance on external funding, which can increase the risk of financial distress during economic downturns.

Empirical research by Mauluddi & Fauziah (2022) shows that Retained Earnings to Total Assets is one of the dominant components in the Altman Z-Score model, significantly influencing the prediction of bank bankruptcy. This finding is also supported by Anggraini *et al.* (2022), who stated that the accumulation of retained earnings plays an important role in strengthening capital resilience and reducing the potential for financial risk in Islamic banks.

Thus, Retained Earnings to Total Assets not only reflects long-term profitability but also indicates the extent to which a company can manage profits to strengthen its capital position and financial independence.

Earnings Before Interest and Taxes to Total Assets

Earnings Before Interest and Taxes (EBIT) to Total Assets is used to measure a company's ability to generate operating profit from its total assets. This ratio serves as a primary measure of managerial efficiency and asset productivity in generating revenue before interest and taxes (Altman, 1968). The higher this ratio, the more effectively the company manages its assets to generate sustainable operating profits, ultimately strengthening its financial position (Altman & Hotchkiss, 2019).

In the banking sector, EBIT to Total Assets reflects an institution's ability to optimize productive assets such as financing, investments, and securities to generate income. Chandra & Diana (2020) explain that this ratio can be used to assess the bank's core profitability, particularly because it is not influenced by external factors such as interest rates and tax policies. In Islamic banks, a stable EBIT value indicates the effectiveness of the profit-sharing system, which is more sustainable compared to interest-based income in conventional banks (Rahmawati & Anwar, 2019).

Anggraini *et al.*'s (2022) research shows that the EBIT-to-total assets ratio has a significant positive influence on the Z-

Score value, making it an important indicator in detecting bankruptcy risk. A low value indicates inefficiency in asset utilization or a decline in profitability, while a high value reflects strong and efficient operational conditions.

Thus, Earnings Before Interest and Taxes to Total Assets serves as an important measure in assessing a company's operational efficiency and fundamental strength. This ratio reflects management's ability to optimally manage productive assets to generate sustainable profits.

Book Value of Equity to Book Value of Total Debt

Book Value of Equity to Book Value of Total Debt measures the extent to which the book value of a company's equity can cover its total liabilities. This ratio reflects the strength of the capital structure and the company's ability to bear long-term financial risk (Altman & Hotchkiss, 2019). The higher the value of this ratio, the stronger the equity position in supporting financial stability and reducing dependence on debt-based funding.

In the context of banking, this ratio is often used to assess capital adequacy. According to Alam & Rizvi (2018), banks with a high equity-to-total liabilities ratio are considered to have a better ability to absorb losses and maintain public trust. Meanwhile, Nurfadilah & Firmansyah (2020) found that an increase in this ratio positively affects the Altman Z-Score value, which means it strengthens the bank's financial resilience against potential financial distress.

This ratio is rooted in capital structure theory (Modigliani & Miller, 1963), which explains the importance of balance between equity and debt financing. In the context of the Altman Z-Score, this ratio is used to measure long-term financial stability, with equity serving as the primary buffer against the risk of asset devaluation.

Thus, the Book Value of Equity to Book Value of Total Debt becomes a fundamental indicator that reflects the company's capital strength, solvency level, and resilience to

financial pressure. This ratio also reflects public and investor confidence in the company's ability to maintain its financial stability.

Based on what has been explained above, the following framework for thinking has been created:

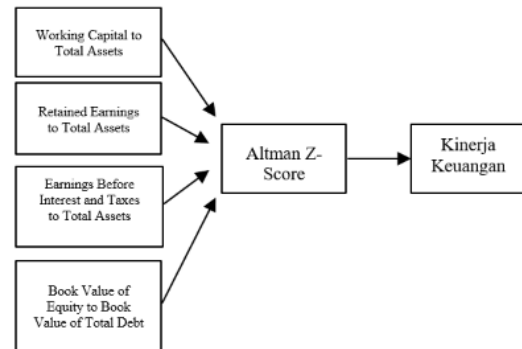


Figure 1 Conceptual Framework

Methods

This study uses the Altman Z-Score approach as one of the analysis methods capable of detecting potential financial problems early on. This model was developed by Edward I. Altman in 1968 and has been widely used to analyze potential problems that may arise in companies. The Altman Z-Score model develops a statistical model that successfully formulates the best financial ratios in predicting bankruptcy (Suteja, 2018). The advantage of this method is its ability to present simple yet accurate results thru a combination of liquidity, profitability, solvency, and activity ratios.

The population in this study consists of several Islamic banks and conventional banks listed on the Indonesia Stock Exchange (IDX) during the period 2020-2024. The selection of this population was based on the availability of audited financial statements and the consistency of annual publications. The research sample was selected using a purposive sampling technique, which is a method of selecting samples based on specific criteria. These criteria include banks that consistently publish annual reports, have complete financial ratio data, and have not undergone mergers or liquidations during the research

period. Purposive sampling is widely used in financial research because it can ensure that the data obtained meets the needs of the analysis (Susilowati et al., 2019).

The data source in this study is secondary data in the form of annual financial reports from Islamic banks and conventional banks. Secondary data was chosen because it is more efficient, easily accessible, and has undergone an audit process, making it more reliable. The financial statements were obtained from the official website of the Indonesia Stock Exchange (www.idx.co.id) and the official websites of each bank. Data collection methods were carried out using documentation techniques, namely downloading annual financial reports containing balance sheet information, income statements, and notes to the financial statements.

According to Setiawan & Rahmawati (2017), the use of secondary data in financial research is highly relevant because the data is more objective and standardized.

The variables used in this study include independent and dependent variables. The independent variable (X) is financial performance measured thru Altman Z-Score financial ratios, such as working capital to total assets, retained earnings to total assets, earnings before interest and taxes to total assets, and market value of equity to book value of debt. The dependent variable (Y) is the level of bankruptcy risk or financial stability indicated by the Z-Score category, namely the safe zone, the gray zone, and the distress zone. The Z-Score model was chosen because it has been proven as an effective bankruptcy prediction tool across various sectors, including banking (Nugroho & Hapsari, 2018).

Next, the author uses the Altman Z-Score method as the main tool for processing and analyzing the data. According to Chandra & Diana (2020), the use of the modified Z-Score is highly relevant for assessing the stability of the

banking sector because it considers the characteristics of service companies, which differ from those of manufacturing companies. The model known as the Revised Altman's Z-Score with the following discriminant function (Altman, 2000):

$$\text{Z-Score Formula} = Z = 6,56X_1 + 3,26X_2 + 6,72X_3 + 1,05X_4$$

Description :

X_1 = Working capital / Total Asset

X_2 = Retained Earnings / Total Asset

X_3 = Earning Before Interest and Texas / Total Asset

X_4 = Book Value of Equity / Book Value of Total Debt

Tabel 1.2 Klasifikasi Nilai Altman Z-Score

Skors	Zone	Description
Z > 2,60	green (safe zone)	Where the company is in a safe condition, the likelihood of bankruptcy is very low.
1,1 < Z < 2,60	Grey (grey zone)	Where the company is in a cautionary condition, indicating that there are issues within the company that must be addressed properly. However, the risk of bankruptcy is not too high.
Z < 1,1	Red (distress zone)	Where the company is in a dangerous condition, as the risk of bankruptcy is high.

RESULT AND DISCUSSION

To evaluate the financial soundness of Islamic banks, the Altman Z-Score model is applied by calculating the required financial ratios based on the banks' financial statements. The calculation results provide an overview of the financial condition of each Islamic bank and indicate its level of vulnerability to financial distress. The detailed calculation of the financial performance analysis for Islamic banks is presented in the following table.

Tabel 1.3 Calculation of financial performance analysis for Islamic banks

NO	KODE	YEARS					MEAN	KET.
	BANK	2020	2021	2022	2023	2024		
1	BRIS	1.08	1.20	1.48	1.23	1.20	1.24	safe
2	BTPS	3.35	3.97	4.08	4.32	8.79	4.90	safe
3	PNBS	6.11	3.99	2.13	1.48	2.11	3.16	safe
4	BAS	1.94	1.98	1.73	1.79	1.97	1.88	safe
5	BBMI	1.23	1.15	1.32	1.12	1.16	1.20	safe
6	KBBS	0.88	1.26	1.09	1.05	1.06	1.07	safe
7	BMS	0.91	2.52	3.10	2.02	1.78	2.07	safe
8	BVS	0.10	0.13	-0.67	0.29	0.28	0.03	Unsafe
9	BCAS	1.77	1.33	0.71	0.61	1.62	1.21	safe
10	BJBS	1.69	0.69	0.50	0.47	0.40	0.75	Unsafe

Source: Data processed

Table 1.4 Calculation of financial performance analysis for conventional banks

NO	KODE	YEAR					MEAN	KET.
	BANK	2020	2021	2022	2023	2024		
1	BBCA	0.44	0.43	1.27	0.46	0.50	0.62	Unsafe
2	BBNI	1.16	1.18	1.20	1.21	1.22	1.19	Safe
3	BBRI	0.34	0.40	0.39	0.39	0.39	0.38	Unsafe
4	BBKP	0.11	0.21	0.07	0.15	0.00	0.11	Unsafe
5	BNGA	0.33	0.33	0.54	0.37	0.36	0.39	Unsafe
6	BBTN	0.18	0.20	0.22	0.23	0.23	0.21	Unsafe
7	MEGA	0.42	0.38	0.38	0.41	0.39	0.40	Unsafe
8	BMRI	1.20	1.21	0.44	0.47	0.46	0.76	Unsafe
9	BDMN	-0.49	-0.44	-0.40	-0.44	0.52	-0.25	Unsafe
10	PNBN	0.53	0.33	0.35	0.37	0.34	0.38	Unsafe

Source: Data processed

Based on the calculation results obtained the Altman Z-Score model for ten

Islamic banks in Indonesia during 2020–2024 period, the analysis revealed that most banks are in the safe zone, indicating strong financial soundness and the ability to avoid a risk of financial distress. The average Z-Score value exceeding indicates that Islamic banks are generally maintained sound financial conditions throughout the observation period, although variations in financial soundness were observed across individual banks.

The comparative analysis presented in Tables 1.3 and 1.4 reveals significant differences in the financial soundness of Islamic and conventional banks during the 2020–2024 period. Based on the Altman Z-Score classification, eight out of ten Islamic banks were categorized as safe, whereas only one conventional bank (BBNI) achieved the same classification. The remaining nine conventional banks were classified as unsafe, indicating a higher potential for financial distress. These findings suggest that Islamic banks generally maintained stronger financial resilience throughout the observation period. However, this difference should not be interpreted as evidence that the Islamic banking system is inherently superior. Instead, the results indicate that financial soundness is influenced by the interaction of profitability, liquidity, retained earnings, and capital strength, rather than by the banking system alone. Therefore, the comparison highlights that differences in financial performance arise from both operational characteristics and the effectiveness of financial management within each institution.

Among the Islamic banks, Bank Tabungan Pensiunan Nasional Syariah (BTPS) recorded the highest average Z-Score (4.90), substantially exceeding the highest-performing conventional bank, Bank Negara Indonesia (BBNI), which

achieved an average score of only 1.19. Although both banks were classified as safe, the considerable difference in their scores indicates varying degrees of financial resilience. BTPS consistently generated strong operating performance while maintaining sufficient liquidity and capital, resulting in stable values of X1 (Working Capital to Total Assets), X3 (EBIT to Total Assets), and X4 (Book Value of Equity to Book Value of Total Debt). In contrast, BBNI's lower Z-Score suggests that although profitability remained relatively stable, improvements in liquidity and capital efficiency were less pronounced. These findings imply that high profitability alone does not guarantee a high level of financial soundness unless supported by balanced financial structures. Compared with previous studies that primarily associated banking stability with profitability, this study demonstrates that the interaction among several Altman Z-Score variables provides a more comprehensive explanation of financial resilience.

Next, A similar comparison can be observed between Bank Panin Dubai Syariah (PNBS), which achieved an average Z-Score of 3.16, and several large conventional banks such as Bank Mandiri (BMRI) and Bank Central Asia (BBCA), which recorded average scores of 0.76 and 0.62, respectively. Although PNBS experienced a decline in its Z-Score after 2022, the bank remained in the safe category because the reduction in profitability (X3) was not accompanied by significant deterioration in liquidity (X1) or capital strength (X4). Conversely, BMRI and BBCA remained in the unsafe category despite possessing substantially larger asset bases. This finding indicates that asset size alone is insufficient to ensure financial

soundness when profitability, liquidity, and capital adequacy weaken simultaneously. The results differ from several previous studies that emphasized bank size as an indicator of financial strength. Instead, this study suggests that operational efficiency and balanced financial ratios play a more decisive role in determining financial resilience than institutional scale.

The comparison also demonstrates that the dominant variables influencing the Altman Z-Score differ in their economic interpretation when applied to banking institutions. In Islamic banks, relatively stable values of X1 and X4 indicate prudent liquidity management and stronger capitalization, enabling banks to absorb financial shocks while maintaining financing activities. In conventional banks, however, fluctuations in X3 and X2 were more pronounced because profitability and retained earnings were directly affected by changes in interest rates, credit quality, and macroeconomic conditions. This finding highlights that the same Altman Z-Score variables may represent different financial dynamics depending on the banking system. Although the Altman Z-Score was originally developed for manufacturing firms, the present results demonstrate that the model remains relevant for banking institutions when interpreted according to sector-specific characteristics. Therefore, the model should be viewed as an early warning tool for assessing financial soundness rather than as a standalone measure of banking performance, thereby extending its application within the financial distress literature.

A broader comparison between the two banking systems also shows that financial soundness is not determined solely by whether a bank is classified as Islamic or conventional, but by how effectively each

institution manages its financial resources. Islamic banks such as BRIS (1.24), BAS (1.88), BCAS (1.21), BBMI (1.20), KBBS (1.07), and BMS (2.07) consistently remained in the safe category, indicating relatively balanced financial structures throughout the observation period. In contrast, conventional banks with comparable market positions, including BBKA (0.62), BMRI (0.76), BBRI (0.38), and PNBK (0.38), generally remained below the safe threshold. This comparison suggests that Islamic banks were more successful in maintaining stability across several financial dimensions simultaneously rather than relying on a single source of financial strength. Consequently, the results indicate that balanced financial management contributes more significantly to financial soundness than institutional size or market dominance alone.

The differences between the two banking systems become clearer when the Altman Z-Score components are examined individually. Variable X1 (Working Capital to Total Assets) reflects a bank's ability to maintain liquidity while supporting operational activities. Islamic banks generally recorded more stable X1 values because financing activities were closely linked to underlying assets and were conducted under more prudent financing principles. By contrast, many conventional banks experienced lower X1 values as increasing short-term liabilities and fluctuations in funding costs reduced working capital relative to total assets. Variable X3 (EBIT to Total Assets) also played a critical role because it measures how efficiently assets generate operating income. Banks with consistently positive operating returns were able to maintain higher Z-Scores, whereas declining operating profitability immediately

reduced financial resilience. These findings indicate that liquidity management and operating efficiency jointly determine the financial condition of banks rather than functioning as independent indicators.

Although several previous studies have reported that Islamic banks generally demonstrate greater financial stability than conventional banks, the present findings provide a more nuanced interpretation. Earlier research often attributed this advantage primarily to the profit-sharing principle and the prohibition of interest-based transactions. However, the current analysis suggests that these institutional characteristics alone do not fully explain the observed differences. For example, Bank Victoria Syariah (BVS) and Bank Jabar Banten Syariah (BJBS) remained in the unsafe category despite operating under Islamic principles, while BBNI successfully maintained a safe classification within the conventional banking system. These results imply that governance quality, operational efficiency, asset utilization, and capital management are equally important determinants of financial soundness. Therefore, differences between Islamic and conventional banks should be interpreted as the result of managerial effectiveness in optimizing financial resources rather than as an automatic consequence of their operating systems.

The findings also contribute to the theoretical development of financial distress prediction in the banking industry. Although the Altman Z-Score model was originally designed for manufacturing firms, this study demonstrates that the model remains useful for banking institutions when its variables are interpreted according to banking characteristics. Rather than focusing on inventory turnover or manufacturing efficiency, the banking application

emphasizes liquidity management, profitability, retained earnings, and capital adequacy as indicators of financial resilience. Nevertheless, the model has limitations because banking operations are highly regulated and involve financial structures that differ substantially from those of non-financial firms. Therefore, the Altman Z-Score should be regarded as an early warning indicator rather than a definitive measure of bankruptcy risk. This perspective extends previous literature by showing that the model can effectively support comparative assessments of financial soundness between Islamic and conventional banks while acknowledging the need for complementary indicators in evaluating banking performance.

The comparison between banks classified as unsafe also reveals important differences in the severity of financial distress across the two banking systems. Among Islamic banks, only BVS (0.03) and BJBS (0.75) were categorized as unsafe, whereas nine out of ten conventional banks fell into the same category, including BDMN (-0.25), BBKP (0.11), BBTN (0.21), BBRI (0.38), BNGA (0.39), PNB (0.38), MEGA (0.40), BBKA (0.62), and BMRI (0.76). This pattern indicates that financial distress was more widespread among conventional banks during the observation period. However, the causes of financial weakness differed across institutions. In Islamic banks, low Z-Score values were mainly associated with limited retained earnings and weaker capitalization, whereas in conventional banks financial pressure was more strongly related to declining profitability, tighter liquidity, and greater exposure to macroeconomic conditions. Therefore, the comparison demonstrates that similar Z-Score classifications may

result from different underlying financial characteristics.

A more detailed interpretation of the Altman Z-Score variables further explains these differences. Variable X2 (Retained Earnings to Total Assets) represents the cumulative ability of a bank to generate internal capital over time. Banks with consistently higher retained earnings strengthen their equity base and reduce dependence on external funding, thereby improving long-term financial resilience. Meanwhile, X4 (Book Value of Equity to Book Value of Total Debt) reflects the extent to which capital is capable of absorbing financial risk. Islamic banks generally maintained relatively stronger capital positions because profit-sharing arrangements encourage a more prudent approach to financing and risk allocation. In contrast, several conventional banks experienced weaker X4 values as higher debt obligations and lower accumulated equity reduced their financial flexibility. These findings indicate that capital accumulation and prudent leverage management are essential determinants of financial soundness regardless of the banking system adopted.

The present findings also offer important implications for the development of financial distress prediction models in banking. Previous studies have often focused on determining whether Islamic or conventional banks perform better under different economic conditions. This study extends that discussion by demonstrating that differences in financial soundness are better explained through the interaction of liquidity (X1), retained earnings (X2), profitability (X3), and capital structure (X4) rather than by banking classification alone. Consequently, the results contribute to the financial distress literature by emphasizing

that the predictive ability of the Altman Z-Score depends on understanding the economic meaning of each variable within the banking context. This approach provides a more comprehensive explanation of why banks with similar asset sizes or market shares may display substantially different levels of financial resilience.

Overall, the comparative analysis indicates that Islamic banks achieved stronger financial soundness than conventional banks during the 2020–2024 period, as reflected by the higher proportion of banks classified in the safe category and their generally higher average Z-Score values. Nevertheless, the results also demonstrate that financial stability cannot be attributed solely to differences in banking principles. Effective liquidity management, sustainable profitability, accumulated retained earnings, and adequate capitalization remain the primary factors determining financial resilience in both banking systems. Although the Altman Z-Score model was originally developed for manufacturing firms, this study confirms that it can serve as a relevant early warning tool for evaluating banking financial soundness when interpreted according to the specific characteristics of financial institutions. Therefore, this research contributes not only by providing empirical evidence on the comparative resilience of Islamic and conventional banks in Indonesia but also by strengthening the theoretical application of the Altman Z-Score model in banking research and supporting its use as an analytical framework for financial distress assessment.

CONCLUSION AND IMPLICATION

Based on the research results using the Altman Z-Score method on the financial performance of Islamic banks and conventional banks in Indonesia for the period 2020–2024, it can be concluded that, in general, Islamic banks have more stable and healthy financial conditions compared to conventional banks. The majority of Islamic banks fall into the safe zone category, indicating good ability in maintaining their liquidity, solvency, and operational efficiency. This is due to the implementation of the profit and loss sharing principle, which reduces the risk of income volatility and increases resilience to economic fluctuations. Meanwhile, most conventional banks fall into the unsafe zone category, indicating a higher potential for financial distress due to their reliance on the interest rate system and the impact of interest rate fluctuations on profitability.

The most influential factors on the Z-Score value for both types of banks are Working Capital to Total Assets (X1) and Earnings Before Interest and Taxes to Total Assets (X3). These two ratios reflect the importance of efficient working capital management and the ability to generate operating profits in maintaining long-term financial health. Banks with high X1 and X3 values indicate stable financial conditions and are free from potential bankruptcy. Based on these findings, it can be suggested that banks, particularly conventional banks, improve asset management efficiency and strengthen their capital structure to mitigate financial risk.

Additionally, the research findings confirm that the Altman Z-Score model is still relevant for use as an analysis tool and early warning system for potential bankruptcy in the banking sector. For regulators and stakeholders, these results can serve as a basis for strengthening banking supervision and risk management policies in Indonesia, in order to maintain the stability of the national financial system sustainably.

ACKNOWLEDGMENT

The author would like to express sincere gratitude to Universitas Muhammadiyah Palopo, particularly the Faculty of Economics and Business, Department of Accounting, for the facilities, resources, and academic guidance provided throughout the completion of this research titled "Analysis Of The Financial Performance Of Islamic Banks And Conventional Banks Using The Altman Z-Score Approach"

Deepest appreciation is extended to Mr. Junaidi, SE., Ak., M.Ak., CA., Ph.D & Mrs.Dr.Rahmawati,S.E.,M.Si.AK.CA.,CSRS,C SRA, who has provided invaluable advice, direction, and encouragement during the research and writing process. Special thanks are also given to the peer reviewers for their insightful feedback and constructive suggestions that have helped improve the quality of this manuscript. Lastly, heartfelt appreciation goes to the author's family, friends, and colleagues for their unwavering moral support and motivation throughout this academic journey. Without the guidance, assistance, and encouragement of these individuals and institutions, this research would not have been successfully completed.

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