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ASSESSING FINANCIAL DISTRESS IN SHARIA-COMPLIANT MANUFACTURING FIRMS USING THE ALTMAN Z-SCORE

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ABSTRACT

This study aims to examine the application of the Altman Z-Score model in assessing financial distress and financial conditions of manufacturing companies in the cosmetics and household needs sub-sectors listed on the Indonesian Sharia Stock Index (ISSI) from 2013 to 2022. Employing a descriptive quantitative approach, the study selects its sample through purposive sampling from the population of relevant manufacturing firms within the ISSI. The findings demonstrate that the Altman Z-Score model effectively analyzes financial distress in these companies. Among the firms studied, PT Akasha Wira Internasional Tbk, PT Mustika Ratu Tbk, PT Unilever Indonesia Tbk, and PT Mandom Indonesia Tbk exhibit healthy financial conditions, whereas PT Martina Berto Tbk shows signs of financial distress. This research provides practical implications for companies by offering a reliable predictive tool to identify potential bankruptcy risks, enabling proactive financial management and strategic decision-making based on current conditions and future prospects.

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1 Introduction

One of the threats and risks faced by the company is financial distress. Risk is part of the divine provision that is unavoidable, but several efforts can be made as a way to minimize or eliminate the risk. Financial distress refers to the financial situation of a company that has experienced a significant decline, but has not yet reached the stage of bankruptcy. Mistakes that can cause financial difficulties in financial management, namely the amount of debt that results in the company's burden increasing, current assets are lower than short-term debt, high bad debts, inappropriate dividend policies, and lack of depreciation funds. In addition, overall macroeconomic conditions, increasingly tight competition, lack of sales or demand for products, price inflation, and so on can also trigger financial distress (Rudianto, 2013). The model that can be applied to determine the risk of financial difficulties by applying several financial ratios is the Altman Z Score or liquidation model (Platt & Platt, 2002).

The cosmetics industry is a trending industry because it has become a basic necessity for women. This industry has an important position as part of the three main sectors emphasized in the National Industrial Development Master Plan (RIPIN) from 2015 to 2035. Statistical data shows that the cosmetics industry in Indonesia is predicted to face an increase in growth rate of 5.91% annually. According to the BPOM (Food and Drug Monitoring Agency) report, there was a significant increase in the number of business actors by 20.6% in 2022 (http://ikft.kemenperin.go.id/). In addition, according to the Indonesian Association of Cosmetics Companies and Associations (PPA Kosmetika Indonesia), there was an increase in the number of cosmetics businesses in Indonesia by 21.9% to reach 1,010 businesses by mid-2023. This increase is quite significant compared to 2022, when there were only 913 businesses (https://economy.okezone.com, 2023).

The following manufacturing firms in the household needs and cosmetics subsector are listed on the Indonesia Sharia Stock Index (ISSI) due to their inclusion in the Sharia Securities List (DES), according to the Indonesia Stock Exchange's official website:

Table 1. List of Manufacturers Listed on the ISSI for Cosmetics and Home Needs Sub-Sector

Number	Code	Issuer Name
1	ADES	PT Akasha Wira Internasional Tbk
2	MBTO	PT Martina Berto Tbk
3	MRAT	PT Mustika Ratu Tbk
4	UNVR	PT Unilever Indonesia Tbk
5	TCID	PT Mandom Indonesia Tbk

Source: *www.idx.co.id*

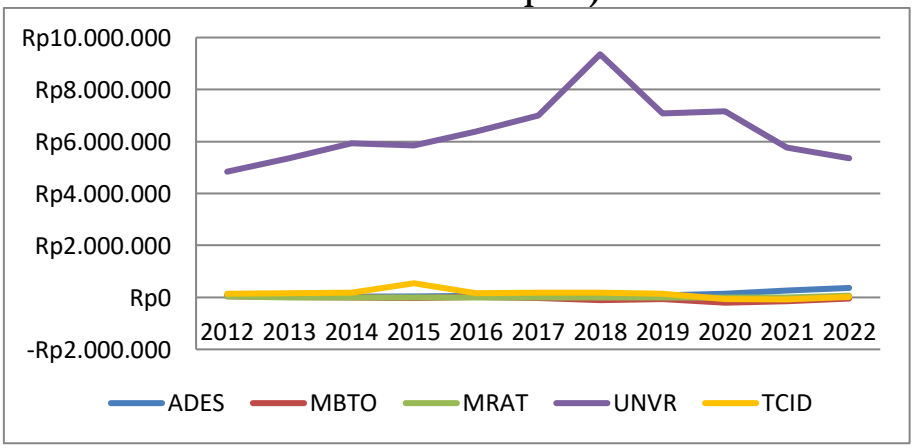
The increasing number of business actors in the cosmetics and household needs industry has led to increased competition. A company's financial records can show how well-equipped it is to survive in a market that is becoming more and more competitive. When assessing a company's financial viability through in-depth analysis, financial statements are essential. The analysis process is carried out to produce information about the financial situation, including the potential for financial distress and the risk of bankruptcy (Putra et al., 2021). Net income is one of the key aspects of financial

statements. If the expenses that have been used can be covered by the amount of revenue generated, then the company can make a profit.

However, if the expenses incurred exceed the revenue generated, the company faces a loss (Shatu, 2016). If associated with sharia-compliant companies in Indonesia experiencing many financial difficulties, one of the causes is the lack of support from the government, there are still regulations from the government that are not strong enough so that the financial performance of sharia companies is still not optimal compared to other companies. However, companies that comply with sharia contribute to improving the national economy. This study can provide considerations for companies in developing countries to maintain financial stability through predictions resulting from the application of the Alttman Z-score method.

Some parties will consider companies that earn a net profit that reaches a negative number. Negative numbers in net income refer to losses that occur as a result of profits not being able to be generated by the company. Losses that occur continuously for two periods reflect an indication of a financial distress situation in the company (Fatmawati & Wahidahwati, 2017). Using the financial documents that each company has made available online, the following table details the net profit of manufacturing firms in the home requirements and cosmetics subsectors listed on the Indonesian Sharia Stock Index (ISSI) for the years 2013 to 2022:

Chart 1. Increase in Net Profit for Manufacturing Companies Listed in the ISSI for the Cosmetics and Household Needs Sub-Sector from 2013 to 2022 (in Millions of Rupiah)



Source: Company financial statements (Data processed, 2024)

The graph above shows changes in the ups and downs of net income for manufacturing companies in the cosmetics and household necessities sub-sectors listed on the Indonesian Sharia Stock Index (ISSI) from 2013 to 2022. In fact, there are several companies that tend to experience a downward trend and obtain a negative net profit. PT Unilever Indonesia Tbk (UNVR) has the highest net profit, while PT Martina Berto Tbk (MBTO) has the lowest net profit. Low net profit indicates that the company's performance in generating profits has not been optimal. In fact, the company earned a negative net profit. This reflects that there is a financial loss in the company. Continued losses can lead to a serious financial crisis for the company.

Consequently, in order to prevent bankruptcy for the organization, it is imperative to anticipate the financial hardship situation as an early warning system. One possible way to estimate the financial hardship status is to use the Altman Z-Score model. Using five financial indicators that were successful in predicting financial crisis in 1968, Edward I. Altman developed this model. These ratios are: Market Value of Equity to Total Liabilities (X4), Sales to Total Assets (X5), Earning Before Interest and Taxes (EBIT) to Total Assets (X3), Retained Earnings to Total Assets (X2), and Working Capital to Total Liabilities (X1). However, in 1995, changes were made by removing X5 and substituting Book Value of Equity for Market Value of Equity. This was done with the intention that it could be applied to other companies, not only US companies, especially those in developing countries (Altman & Hotchkiss, 2006).

Talia et al. (2021) found that the modified Altman Z-Score model predicts financial distress in companies with an accuracy of 84.17%, outperforming the Springate model, which has an accuracy of only 80%. This suggests that the modified Altman Z-Score model is more effective in estimating the likelihood of financial problems compared to the Springate model. Furthermore, several studies—including those by Fifriani and Santosa (2019), Firdaus et al. (2021), Marlinda (2021), Novitasari (2020), Pertiwi and Putri (2021), Siekelova, Kovalova, and Ciurlău (2019), Soputan (2022), and Yohannes (2021)—support the use of the Altman Z-Score model as a tool for anticipating financial distress.

However, contrasting views exist. Kurniawati (2016) argues that the Altman Z-Score model fails to effectively predict financial crises. Differences among studies may arise from variations in the specific Altman model applied, the study periods, and the types of companies analyzed. For example, Rohmah (2015), Nuraini (2015), and Sharfina (2015) conclude that the Altman Z-Score method cannot predict bankruptcy, whereas Endri (2009) reports opposite findings, indicating that the method can indeed forecast company bankruptcy. These discrepancies highlight the need to consider context and methodology when evaluating the model's predictive power.

In order to analyze the financial distress and financial condition of manufacturing companies in the household needs and cosmetics sub-sector listed on the Indonesian Sharia Stock Index (ISSI) from 2013 to 2022, this study attempts to apply the Altman Z-Score model. The novelty of the study is that it examines manufacturing companies from the cosmetics and household needs sectors that have never been studied by other researchers. In addition, the companies studied consist of five companies including PT Akasha Wira Internasional Tbk, PT. Martina Berto Tbk, PT. Mustika Ratu Tbk, PT. Unilever Indonesia Tbk and PT. Mandom Tbk.

2 Literature Review

This section reviews the key concepts of financial distress followed by an examination of the Altman Z-Score model as a widely used tool for predicting financial distress.

2.1. Financial Distress

Financial distress, often referred to as financial difficulty, is a preliminary warning signal preceding a company's bankruptcy. It manifests through persistent losses and the inability to meet financial obligations when due, primarily caused by insufficient cash flow. Hermawan and Fajria (2017) define financial distress as a condition in which a company faces a financial crisis that impedes its capacity to fulfill its liabilities. Similarly, Gamayuni (2011) describes financial distress

as the initial phase preceding bankruptcy, characterized by financial hardship or the threat of liquidation. Platt and Platt (2002) further elaborate that financial distress represents a significant financial decline in a company's condition, although it has not yet progressed to bankruptcy or liquidation. When a company is unable to pay immediate obligations due to cash shortages, strategic interventions become necessary to manage the situation (Indri in Hermawan & Fajria, 2017). In essence, financial distress can be understood as the stage prior to bankruptcy, marked by the inability to meet obligations at their payment deadlines.

Rudianto (2013) identifies various causes of financial distress, which can be categorized into internal and external factors. Internal factors pertain to issues within the company's control, such as ineffective management influencing poor decision-making and company policies. Financial mismanagement examples include excessive debt increasing the company's burden, current assets insufficient to cover short-term liabilities, high levels of bad debts, inappropriate dividend distribution, inadequate depreciation funds, and others. Beyond finance, mismanagement in areas like leadership selection, location decisions, production, purchasing, marketing strategies, product selection, organizational structure, and unchecked expansion can also precipitate financial distress. External factors, on the other hand, arise from outside the company's control. These include adverse macroeconomic conditions, intensified market competition, declining product demand or sales, inflationary pressures, and other environmental challenges that can negatively impact the company's financial stability.

2.2. Altman Z-Score Model

The Altman Z-Score model is a widely used tool to assess the risk of financial distress by applying several key financial ratios. Among 22 financial indicators studied, five have been identified as most influential in predicting financial distress (Rudianto, 2013). The Altman model has evolved into three main versions:

a. The First Altman Model

Developed in 1968 by Edward I. Altman, this model employs Multiple Discriminant Analysis (MDA) to predict corporate financial difficulties through financial ratio analysis. It demonstrated high predictive accuracy—95% correct predictions from a sample of 66 U.S. manufacturing firms. The original formula is:

$$Z = 1{,}2X1 + 1{,}4\ X2 + 3{,}3\ X3 + 0{,}6\ X4 + 0{,}999\ X5$$

Note:
Z = Bankruptcy parameter index
X1 = Working Capital to Total Assets
X2 = Retained Earnings to Total Assets
X3 = Earnings Before Interest and Taxes to Total Assets
X4 = Market Value of Equity to Book Value of Debt
X5 = Sales to Total Assets

Interpretation of the Z-Score follows thresholds: companies with $Z>2.99$ are considered financially healthy; those with $1.8<Z<2.99$ fall into a gray area signaling potential financial distress; and firms with $Z<1.8$ are at high risk of financial failure (Rudianto, 2013).

b. Revised Altman Model

In 1984, Altman revised the model to enhance applicability to private (non-public) companies by substituting Market Value of Equity with Book Value of Equity. The revised formula is (Altman & Hotchkiss, 2006):

$$Z' = 0{,}717X1 + 0{,}847X2 + 3{,}107X3 + 0{,}420X4 + 0{,}998X5$$

Note:
Z = Bankruptcy parameter index
X1 = Working Capital to Total Assets
X2 = Retained Earnings to Total Assets
X3 = Earnings Before Interest and Taxes to Total Assets
X4 = Market Value of Equity to Book Value of Debt
X5 = Sales to Total Assets

The interpretation of the revised Altman equation is based on the threshold value, namely the financial condition of the company is healthy when the Z value is > 2.90. Then, the company is considered a gray area when it has a value of $1.23 < Z < 2.90$. And companies that are indicated to be facing financial difficulties will have a Z value < 1.23 (Altman & Hotchkiss, 2006).

c. Modified Altman Model

Further modification in 1995 removed the Sales to Total Assets ratio (X5X_5X5) to reduce distortions from asset turnover, broadening the model's application to companies in developing countries and non-U.S. firms (Altman & Hotchkiss, 2006). This version is flexible for both public and private firms. The formula is (Rudianto, 2013):

$$Z'' = 6.56X1 + 3.26X2 + 6.72X3 + 1.05X4$$

Note:
Z = Bankruptcy parameter index
X1 = Working Capital to Total Assets
X2 = Retained Earnings to Total Assets
X3 = Earnings Before Interest and Taxes to Total Assets
X4 = Book Value of Equity to Book Value of Debt

According to this model, companies with Z''>2.60 are financially sound; those with 1.10<Z''<2.60 are in a gray zone indicating financial difficulties requiring prompt management; and firms with Z'''<1.10 face a high risk of financial distress (Rudianto, 2013):

1) Working Capital to Total Assets

This ratio measures the proportion of liquid assets relative to the company's total capitalization. Working capital, defined as current assets minus current liabilities, reflects short-term financial health. WCTA has been identified as the most critical ratio in Altman's analysis (Altman & Hotchkiss, 2006; Altman, 1968). Negative working capital suggests the company may struggle to meet current liabilities due to inadequate current assets, while positive working capital indicates sufficient liquidity (Endri, 2009).

2) Retained Earnings to Total Assets

Retained earnings represent accumulated profits reinvested in the company during its operational life (Altman & Hotchkiss, 2006). RETA assesses the company's ability to finance assets using internal funds rather than debt. Newer companies tend to have lower retained earnings due to limited operational history, making them more vulnerable to financial distress (Altman, 1968).

3) Earning Before Interest and Taxes to Total Assets

This ratio evaluates asset productivity by measuring earnings generated from assets before tax and interest deductions. It highlights the efficiency of assets in producing income, a key factor in financial stability and the company's ability to service debt (Altman, 1968; Rudianto, 2013).

4) Book Value of Equity to Book Value of Debt

BVEBVD serves as a solvency indicator, assessing the company's capital structure and ability to cover obligations through equity rather than debt (Humaira, 2023). Book value of debt encompasses all liabilities, both short-term and long-term (Syafifah & Ibrahim, 2024).

3 Research Methods

This study uses a descriptive quantitative approach with purposive sampling to select manufacturing companies in the cosmetics and household sectors listed on the Indonesian Sharia Stock Index (ISSI). The sample includes companies with complete financial data from 2013 to 2022, namely PT Akasha Wira Internasional Tbk, PT Martina Berto Tbk, PT Mustika Ratu Tbk, PT Unilever Indonesia Tbk, and PT Mandom Tbk.

Secondary data from annual financial reports are analyzed using the Altman Z-Score model to assess financial distress. The analysis steps include data collection, ratio calculation, financial distress assessment, company classification based on Z-Score values, and descriptive statistics. The Altman Z-Score model integrates multiple financial ratios to predict bankruptcy more effectively than traditional ratio analysis and is applicable to various company types in developing countries (Ramadhani & Lukviarman, 2009).

4 Results and Discussion

This section presents the findings of the study, followed by an in-depth discussion of the results.

4.1. Result

The initial analysis focuses on the calculation of financial ratios that constitute the Altman Z-Score model.

4.1.1. Altman Z-Score Financial Ratio Calculation Analysis

The Altman Z-Score model comprises several key financial ratios that collectively assess a company's financial health. This section analyzes the following components in detail: (a) Working Capital to Total Assets, (b) Retained Earnings to Total Assets, (c) Earnings Before Interest and Taxes to Total Assets, and (d) Book Value of Equity to Book Value of Debt.

a. Working Capital to Total Assets

WCTA measures the proportion of liquid assets relative to the company's total capitalization, where working capital is defined as current assets minus current liabilities (Altman & Hotchkiss, 2006).

Table 2. Working Capital to Total Assets Calculation Results

KODE	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
ADES	0,20	0,16	0,12	0,16	0,06	0,12	0,21	0,38	0,31	0,34

MBTO	0,56	0,53	0,49	0,45	0,34	0,23	0,11	-0,12	-0,08	-0,12
MRAT	0,60	0,54	0,56	0,58	0,56	0,51	0,51	0,42	0,42	0,50
UNVR	-0,19	-0,18	-0,22	-0,26	-0,24	-0,15	-0,22	-0,22	-0,25	-0,27
TCID	0,36	0,21	0,43	0,44	0,43	0,45	0,46	0,52	0,55	0,58

Source: Company financial statements (Data processed, 2024)

PT Akasha Wira Internasional Tbk (ADES) exhibited an increasing WCTA trend from 2013 to 2022, peaking at 0.38 in 2020, reflecting improved liquidity and ability to cover current obligations. PT Martina Berto Tbk (MBTO) showed a declining trend, with negative ratios from 2020 to 2022, indicating insufficient current assets to cover liabilities. PT Mustika Ratu Tbk (MRAT) experienced some fluctuations but maintained a generally stable and positive WCTA, peaking at 0.60, indicating sufficient liquidity. PT Unilever Indonesia Tbk (UNVR) consistently had negative WCTA values, with the lowest at -0.27, implying persistent liquidity challenges. PT Mandom Indonesia Tbk (TCID) showed an increasing WCTA ratio, reaching 0.58 in 2022, signifying improved liquidity management.

b. Retained Earnings to Total Assets

RETA indicates cumulative profitability reinvested in the company throughout its operational life (Altman & Hotchkiss, 2006).

Table 3. Findings from the Retained Earnings to Total Assets Calculation

KODE	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
ADES	-1,11	-1,03	-0,74	-0,56	-0,46	-0,38	-0,31	-0,12	-0,11	-0,31
MBTO	0,21	0,21	0,17	0,16	0,11	-0,04	-0,15	-0,29	-0,37	-0,42
MRAT	0,50	0,45	0,46	0,46	0,44	0,43	0,41	0,34	0,33	0,38
UNVR	0,30	0,32	0,29	0,27	0,26	0,35	0,25	0,23	0,22	0,21
TCID	0,59	0,52	0,68	0,67	0,66	0,68	0,67	0,67	0,66	0,65

Source: Company financial statements (Data processed, 2024)

ADES consistently recorded negative RETA values, reaching a low of -1.11, indicating inadequate profits to fund assets. MBTO's RETA declined over time, becoming negative after 2017, suggesting growing reliance on debt financing. MRAT's RETA remained positive despite some decrease, implying ongoing use of retained earnings for asset financing. UNVR's RETA decreased but stayed positive, indicating continued profitability to support assets without debt. TCID maintained stable and positive RETA values, peaking at 0.68, highlighting consistent internal financing capacity.

c. Earning Before Interest and Taxes to Total Assets

This ratio assesses asset productivity by measuring earnings generated before interest and taxes relative to total assets (Altman, 1968).

Table 4. Earning Before Interest and Taxes to Total Assets Calculation Results

KODE	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
ADES	0,13	0,08	0,07	0,08	0,06	0,08	0,13	0,17	0,26	0,28
MBTO	0,04	0,01	-0,01	0,02	-0,04	-0,24	-0,15	-0,19	-0,17	-0,06
MRAT	-0,02	0,02	0,005	-0,01	-0,003	0,004	0,005	0,01	0,01	0,07
UNVR	0,54	0,56	0,50	0,51	0,50	0,60	0,48	0,45	0,39	0,41
TCID	0,15	0,13	0,28	0,10	0,10	0,10	0,08	-0,02	-0,04	0,01

Source: Company financial statements (Data processed, 2024)

ADES showed a steady increase in EBITTA, peaking at 0.28 in 2022, reflecting improved profitability. MBTO experienced a decline, with negative EBITTA from 2017 to 2022, indicating challenges in generating profits from assets. MRAT's EBITTA fluctuated but ended positively at 0.07, signaling recovery. UNVR maintained positive EBITTA despite slight decline, indicating stable asset profitability. TCID's EBITTA declined, turning negative in 2020-2021, but showed signs of recovery in 2022.

d. Book Value of Equity to Book Value of Debt

BVEBVD evaluates the company's ability to finance obligations through equity, serving as a solvency indicator (Humaira, 2023).

Table 5. Calculation Results of Book Value of Equity to Book Value of Debt

KODE	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
ADES	1,50	1,39	1,01	1,00	1,01	1,21	2,23	2,71	2,90	4,30
MBTO	2,81	2,74	2,02	1,64	1,12	0,86	0,66	1,50	1,65	1,28
MRAT	6,11	3,13	3,14	3,24	2,81	2,56	2,25	1,58	1,46	1,45
UNVR	0,47	0,50	0,44	0,39	0,38	0,57	0,34	0,32	0,29	0,28
TCID	4,18	2,25	4,67	4,44	3,69	4,17	3,79	4,16	3,78	3,53

Source: Company financial statements (Data processed, 2024)

ADES's BVEBVD increased significantly, reaching 4.30 in 2022, indicating strong equity financing capacity. MBTO's ratio varied but remained positive, peaking at 2.81, reflecting adequate solvency. MRAT showed a downward trend but maintained sufficient equity levels, peaking at 6.11 in 2013. UNVR's BVEBVD fluctuated at low levels, indicating relatively higher reliance on debt. TCID maintained high BVEBVD ratios, peaking at 4.67, signifying robust equity capital to meet liabilities.

4.1.2. Analysis of Financial Distress Indication with Altman Z-Score Model

The financial distress prediction model developed by Altman in 1995 is a modified version of the original Altman Z-Score model. This modification was designed to extend the model's applicability beyond U.S. companies, particularly to firms in developing countries (Altman & Hotchkiss, 2006). The modified model is flexible and can be applied to a wide range of companies, including both public and private entities. The formula for this model is as follows (Rudianto, 2013):

$Z'' = 6.56X1 + 3.26X2 + 6.72X3 + 1.05X4$

Description:

Z" = Bankruptcy parameter index

X1 = WCTA

X2 = RETA

X3 = EBITTA

X4 = BVEBVD

The modified Altman Z-Score model has a parameter index based on the threshold value as follows:

a. The company is considered a safe area when it obtains a Z-Score value of $Z'' > 2.60$. This illustrates a healthy financial situation.
b. If the company's Z-Score falls between 1.10 and 2.60, it is regarded as a gray region. This shows the company's financial crisis position, yet management policies and the

ability to make wise judgments balance the risk of financial hardship and the possibility of rescuing the company.

c. The company is considered a distress area when obtaining a Z-Score value of Z" < 1.10. This illustrates the financial distress situation faced by the company.

Table 6. Z-Score Calculation Results

KODE	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
ADES	0,18	-0,26	-0,12	0,84	0,35	1,32	3,65	6,09	7,19	9,65
MBTO	7,53	7,11	5,72	5,30	3,52	0,71	-0,11	-1,42	-1,11	-1,24
MRAT	11,80	8,47	8,49	8,63	8,03	7,42	7,05	5,62	5,47	6,54
UNVR	3,83	4,13	3,31	3,05	2,99	4,80	2,95	2,65	2,00	1,98
TCID	9,67	6,32	11,79	10,39	9,53	10,20	9,70	9,83	9,43	9,68

Source: Company financial statements (Data processed, 2024)

Description

- *Distress area*
- *Grey area*
- *Safe area.*

Between 2013 and 2017, PT Akasha Wira Internasional Tbk (ADES) was in the distress zone with a Z" consistently below 1.10. In 2018, the score improved to 1.32, placing the company in the gray zone, where financial distress risks were balanced by management's corrective actions. From 2019 to 2022, ADES entered the safe zone with scores exceeding 2.60, reflecting substantial financial recovery.

PT Martina Berto Tbk (MBTO) maintained a safe zone status from 2013 to 2017, with Z" scores above 2.60. However, from 2018 onwards, the company's scores fell below 1.10, indicating entry into the distress zone and signaling significant financial difficulties. PT Mustika Ratu Tbk (MRAT) consistently remained in the safe zone throughout 2013-2022, with scores well above the 2.60 threshold, demonstrating stable and healthy financial conditions.

PT Unilever Indonesia Tbk (UNVR) mostly operated within the safe zone during the observed period, although its scores declined toward the gray zone in later years (2021-2022). This suggests emerging financial risks that require close monitoring and proactive management. PT Mandom Indonesia Tbk (TCID) consistently maintained strong financial health within the safe zone from 2013 to 2022, evidenced by its sustained Z" scores above 2.60.

4.1.3. Descriptive Statistical Analysis

The descriptive statistical analysis presents an overview of financial performance for each company studied, including: (a) PT Akasha Wira Internasional Tbk, (b) PT Martina Berto Tbk, (c) PT Mustika Ratu Tbk, (d) PT Unilever Indonesia Tbk, and (e) PT Mandom Indonesia Tbk.

a. PT Akasha Wira Internasional Tbk

Table 7 presents the descriptive statistics for key financial variables of PT Akasha Wira Internasional Tbk based on 10 observations. The Working Capital to Total Assets

(WCTA) ratio ranges from 0.06 to 0.38, with a mean of 0.206 and a standard deviation of 0.105, indicating moderate variability in liquidity. Retained Earnings to Total Assets (RETA) shows a wider range from -1.11 to 0.31, with a negative mean of -0.429 and higher variability (SD = 0.458), reflecting fluctuations in accumulated earnings relative to assets. Earnings Before Interest, Taxes, and Amortization to Total Assets (EBITTA) averages 0.135 (SD = 0.080), ranging between 0.06 and 0.28, suggesting relatively stable profitability.

Table 7. Descriptive Statistics of PT Akasha Wira Internasional Tbk

	N	Minimum	Maximum	Mean	Std. Deviation
WCTA	10	.06	.38	.2059	.10538
RETA	10	-1.11	.31	-.4290	.45807
EBITTA	10	.06	.28	.1350	.08003
BVEBVD	10	1.00	4.30	1.9263	1.09560
Z-*Score*	10	-.26	9.65	2.8890	3.56606
Valid N (listwise)	10				

Source: SPSS output, 2024

The Book Value of Equity to Book Value of Debt (BVEBVD) varies from 1.00 to 4.30, with a mean of 1.926 and SD of 1.096, indicating variation in capital structure leverage. The Z-Score, a bankruptcy risk indicator, spans from -0.26 to 9.65, averaging 2.889 with a high standard deviation of 3.566, highlighting considerable differences in financial health across observations. All variables contain complete data for the 10 cases.

b. PT Martina Berto Tbk

Table 8 displays the descriptive statistics for PT Martina Berto Tbk based on 10 observations. The Working Capital to Total Assets (WCTA) ratio ranges from -0.12 to 0.56, with a mean of 0.239 and a relatively high standard deviation of 0.275, indicating notable variation in liquidity. Retained Earnings to Total Assets (RETA) varies between -0.42 and 0.21, with a near-zero mean of -0.044 and moderate variability (SD = 0.254), suggesting fluctuations in retained earnings relative to total assets.

Table 8. Descriptive Statistics of PT Martina Berto Tbk

	N	Minimum	Maximum	Mean	Std. Deviation
WCTA	10	-.12	.56	.2390	.27522
RETA	10	-.42	.21	-.0440	.25387
EBITTA	10	-.24	.04	-.0810	.09871
BVEBVD	10	.66	2.81	1.6280	.72345
Z-*Score*	10	-1.42	7.53	2.6008	3.62274
Valid N (listwise)	10				

Source: SPSS output, 2024

Earnings Before Interest, Taxes, and Amortization to Total Assets (EBITTA) shows negative average profitability, with a mean of -0.081, ranging from -0.24 to 0.04 and a standard deviation of 0.099, reflecting a period of losses or low earnings. The Book Value of Equity to Book Value of Debt (BVEBVD) spans from 0.66 to 2.81, with a mean of 1.628 and standard deviation of 0.723, indicating moderate leverage variability. The Z-Score, an indicator of bankruptcy risk, ranges from -1.42 to 7.53, averaging 2.601 with a high standard deviation of 3.623, which points to diverse financial health conditions across observations. All data points are valid for the 10 observations.

c. PT Mustika Ratu Tbk

Table 9 summarizes the descriptive statistics for PT Mustika Ratu Tbk based on 10 data points. The Working Capital to Total Assets (WCTA) ratio demonstrates a narrow range between 0.42 and 0.60, with a mean of 0.520 and a low standard deviation of 0.062, indicating consistent liquidity management throughout the period. Similarly, Retained Earnings to Total Assets (RETA) remains relatively stable, with values spanning 0.33 to 0.50 and an average of 0.420, reflecting steady retention of earnings relative to total assets.

Table 9. Descriptive Statistics of PT Mustika Ratu Tbk

	N	Minimum	Maximum	Mean	Std. Deviation
WCTA	10	.42	.60	.5200	.06164
RETA	10	.33	.50	.4200	.05497
EBITTA	10	-.02	.07	.0093	.02398
BVEBVD	10	1.45	6.11	2.7730	1.36763
Z-*Score*	10	5.47	11.80	7.7520	1.82938
Valid N (listwise)	10				

Source: SPSS output, 2024

Profitability, measured by Earnings Before Interest, Taxes, and Amortization to Total Assets (EBITTA), fluctuates slightly from -0.02 to 0.07, averaging at a modest 0.0093. The company's leverage, indicated by the Book Value of Equity to Book Value of Debt (BVEBVD), shows greater dispersion with a mean of 2.773 and values ranging from 1.45 to 6.11, suggesting variability in capital structure. The Z-Score, representing financial stability, averages 7.752 with a range from 5.47 to 11.80, signaling a generally sound risk profile across the observations. All data points are complete and valid.

d. PT Unilever Indonesia Tbk

Table 10 illustrates the descriptive statistics for PT Unilever Indonesia Tbk based on 10 data points. The Working Capital to Total Assets (WCTA) ratio is persistently negative, varying from -0.27 to -0.15 with an average of -0.220 and a small standard deviation of 0.038, indicating a consistently negative working capital relative to total assets. The Retained Earnings to Total Assets (RETA) ratio remains relatively stable, ranging from 0.21 to 0.35 and averaging 0.270, which reflects consistent earnings retention over the observed period.

Table 10 Descriptive Statistics of PT Unilever Indonesia Tbk

	N	Minimum	Maximum	Mean	Std. Deviation
WCTA	10	-.27	-.15	-.2200	.03771
RETA	10	.21	.35	.2700	.04522
EBITTA	10	.39	.60	.4940	.06501
BVEBVD	10	.28	.57	.3980	.09566
Z-*Score*	10	1.98	4.80	3.1690	.89345
Valid N (listwise)	10				

Source: SPSS output, 2024

The profitability metric, Earnings Before Interest, Taxes, and Amortization to Total Assets (EBITTA), shows relatively strong performance with values spanning 0.39 to 0.60 and a mean of 0.494, accompanied by moderate variation (SD = 0.065). The capital structure, as measured by the Book Value of Equity to Book Value of Debt (BVEBVD), is relatively low, averaging 0.398 with a range from 0.28 to 0.57, suggesting a higher reliance on debt financing. The Z-Score, which gauges bankruptcy risk, varies between 1.98 and

4.80 with a mean of 3.169 and standard deviation of 0.893, indicating a moderate level of financial risk across the sample. All data are complete and valid.

e. PT Mandom Indonesia Tbk

Table 11 provides descriptive statistics for PT Mandom Indonesia Tbk based on 10 observations. The Working Capital to Total Assets (WCTA) ratio ranges from 0.21 to 0.58 with a mean of 0.443 and a standard deviation of 0.104, indicating moderate variability in liquidity management. Retained Earnings to Total Assets (RETA) demonstrates consistently high values between 0.52 and 0.68, averaging 0.645 with low variability (SD = 0.051), reflecting steady accumulation of retained earnings relative to total assets.

Table 11. Descriptive Statistics of PT Mandom Indonesia Tbk

	N	Minimum	Maximum	Mean	Std. Deviation
WCTA	10	.21	.58	.4430	.10436
RETA	10	.52	.68	.6450	.05104
EBITTA	10	-.04	.28	.0890	.09255
BVEBVD	10	2.25	4.67	3.8670	.66837
Z-*Score*	10	6.32	11.79	9.6540	1.35882
Valid N (listwise)	10				

Source: SPSS output, 2024

Earnings Before Interest, Taxes, and Amortization to Total Assets (EBITTA) ranges from -0.04 to 0.28 with a mean of 0.089 and moderate dispersion (SD = 0.093), indicating fluctuating but generally positive profitability. The Book Value of Equity to Book Value of Debt (BVEBVD) shows a relatively narrow range between 2.25 and 4.67, with an average of 3.867 and standard deviation of 0.668, suggesting a strong equity position relative to debt. The Z-Score, a financial distress indicator, ranges from 6.32 to 11.79 with a mean of 9.654 and moderate standard deviation of 1.359, implying generally robust financial health within the sample. All observations are complete and valid.

4.2. Discussion

The application of the Altman Z-Score model identifies PT Martina Berto Tbk as experiencing financial distress, with an average Z-Score of 2.60 falling within the gray zone ($1.10 < Z < 2.60$). This decline over the 2013–2022 period is partly attributable to the economic disruptions caused by the COVID-19 pandemic, which severely impacted various sectors worldwide, including Indonesia's business environmen (Sidik, 2020 Many industries, such as hospitality, retail, and manufacturing, faced operational challenges, and PT Martina Berto Tbk was among those significantly affected.

Conversely, PT Akasha Wira Internasional Tbk, PT Mustika Ratu Tbk, PT Unilever Indonesia Tbk, and PT Mandom Indonesia Tbk consistently maintained Z-Scores above the 2.60 threshold, placing them in the safe zone with stable or improving financial conditions throughout the same period. Despite minor fluctuations, these companies demonstrated resilience amid the pandemic's economic pressures.

Overall, the average Z-Score of the five companies studied was 5.21, well above the distress threshold, indicating generally healthy financial conditions within the cosmetics and household necessities manufacturing sectors on the Indonesian Sharia Stock Index (ISSI). Notably, declines in key ratios—WCTA, RETA, EBITTA, and BVEBVD—were observed in PT Martina Berto Tbk, aligning with previous research that these indicators

effectively predict financial distress (Aditya et al., 2022; Marlinda, 2021). However, some studies dispute the predictive power of certain ratios (Humaira, 2023; Hikmah & Mutmainah, 2021), underscoring the complexity of financial distress forecasting.

This study supports findings by Fifriani and Santosa (2019), Firdaus et al. (2021), Marlinda (2021), Novitasari (2020), Pertiwi and Putri (2021), Siekelova et al. (2019), Soputan (2022), and Yohannes (2021) on the applicability of the Altman Z-Score model for financial distress analysis. Talia et al. (2021) report an 84.17% accuracy rate for the modified Altman Z-Score in distress prediction, though Kurniawati (2016) offers a contrasting view, questioning its predictive validity. Recent studies by Di Natale et al. (2022) validate the model's effectiveness across diverse industries, while Kim and Lee (2021) highlight the Springate model's adaptability in service sectors. Garcia et al. (2022) emphasize the robustness of the Zmijewski model in capturing cash flow dynamics. Collectively, these models offer comprehensive tools to evaluate manufacturing firms' financial health, supporting informed stakeholder decisions.

Differences in company financial performance arise from factors such as sales growth, leverage, liquidity, and firm size, alongside macroeconomic conditions like inflation and exchange rates—both influenced by the pandemic. Bank Indonesia's December 2020 report noted a historic low inflation rate of 1.68%, down from 2.72% in 2019, primarily due to subdued domestic demand amid COVID-19 restrictions (Bank Indonesia, 2020). Controlled inflation across volatile food and administered price groups further contributed to economic pressure, affecting corporate profitability.

5 Conclusion

Based on the analysis conducted using the Altman Z-Score model, several conclusions can be drawn regarding financial distress among manufacturing companies in the cosmetics and household necessities sub-sectors listed on the Indonesian Sharia Stock Index (ISSI) during the 2013–2022 period. The Altman Z-Score model proves to be an effective tool for assessing financial distress in these companies. On average, the sampled companies were categorized within the safe zone, indicating generally healthy financial conditions. Specifically, PT Akasha Wira Internasional Tbk, PT Mustika Ratu Tbk, PT Unilever Indonesia Tbk, and PT Mandom Indonesia Tbk exhibited sound financial performance, whereas PT Martina Berto Tbk showed signs of financial distress.

For future research, it is recommended to explore alternative financial distress prediction models and to expand the sample to include companies from other sectors within the ISSI, which may enhance the robustness and generalizability of the findings.

The practical implications of this study are multifaceted. Company management is advised to implement strategic financial policies and conduct regular performance evaluations—preferably annually—to prevent prolonged financial distress that could lead to bankruptcy. Attention to financial ratio management is crucial for sustaining company health. Investors are encouraged to exercise prudence by thoroughly analyzing a company's financial status before committing funds, thereby minimizing investment risks. Policymakers, meanwhile, should actively monitor companies' financial health and develop protective regulations aimed at reducing bankruptcy risk. Overall, this study provides a valuable predictive tool for anticipating financial distress, enabling proactive risk mitigation strategies, particularly in emerging markets.

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