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Comparative Analysis of the Altman and Zmijewski Models for Predicting Financial Distress Conditions of Textile and Garment Companies Listed on the IDX 2020-2024

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Abstract
This study aims to analyze the financial health of textile and garment companies listed on the Indonesia Stock Exchange during the 2020–2024 period and compare the accuracy of two bankruptcy prediction models, the Altman Z-Score and the Zmijewski model. The study was conducted on eight companies by calculating the financial ratios of each company and then classifying them into safe, gray, or distress zones. The analysis results show that companies BELL, INDR, SSTM, and TFCO are consistently in the safe zone according to both models. Meanwhile, ARGO, HDTX, and SRIL are included in the distress category, with scores indicating a high bankruptcy risk. Company ESTI showed different results, being in the distress zone according to Altman, but showing financial improvement according to the Zmijewski model since 2021. The conclusion of this study is that the combination of the two models can provide a more comprehensive picture of a company's bankruptcy risk level and can be used as a tool in managerial decision-making and investment considerations.

Keywords: Altman Z-Score, Zmijewski, bankruptcy, financial distress, textiles and garments

1. Introduction

Financial distress is a condition in which a company experiences serious financial pressure, characterized by an inability to meet its financial obligations in a timely manner. This condition is the initial phase of bankruptcy, which can threaten the company's operational continuity if not addressed promptly (Irawan & Fajri, 2021). Financial distress is characterized by a significant decline in financial performance, ongoing losses, and a high debt burden disproportionate to the company's ability to generate profits (Darmayanti, 2008; Pranita & Kristanti, 2020), as well as a mismatch between debt and the company's capacity to generate cash flow (Fitriyani, 2022). A company's troubled condition is bad news for information users (Damayanti et al., 2019) and impacts their decision-making. Therefore, early identification and prediction of financial difficulties are crucial for maintaining business continuity (Gantino & Jonathan, 2020).

The textile and garment products industry is a strategic manufacturing sector in Indonesia that has long been a pillar of exports and a provider of national employment. However, post-COVID-19, this industry faces significant pressures, both internally and externally, such as: a) intense competition from global textile-producing countries with low production costs, substantial export incentives, and extensive free trade agreements such as China, Bangladesh, and Vietnam; b) a decline in export demand during and after the Covid-19 pandemic; c) increased raw material and energy costs; d) a fluctuating rupiah exchange rate; and e) a lack of industrial incentives and protection.

One of the textile companies that reportedly experienced financial difficulties after Covid-19 was PT. Sri Rejeki Isman Tbk (SRIL). Several major policies have been implemented, such as debt restructuring, layoffs, and debt repayment deferrals. One of the causes of these financial difficulties is external pressures, such as the global pandemic, changing market demand, and reliance on imported raw materials contributed to the company's financial situation. Failure to detect early signs of financial distress in a timely manner led to delays in strategic decision-making, worsening the company's financial condition. Consequently, the company was declared bankrupt on March 1, 2025.

To address the risk of financial distress, companies can utilize predictive measurement tools based on financial ratios. Two of the most commonly used models in research and practice are the Altman Z-Score

and the Zmijewski Model. Both models are designed to identify the likelihood of corporate bankruptcy, but they have different approaches and variables (Irawan & Fajri, 2021). Fitriyani (2022) suggests that financial ratio-based models can provide a high degree of accuracy in detecting early signs of bankruptcy. These models can provide a quantitative overview of a company's financial health and serve as a key tool in developing risk mitigation strategies before the company experiences an uncontrollable crisis. In the context of textile companies in Indonesia, the use of the Altman and Zmijewski models can help identify companies in high-risk zones early on, allowing management and stakeholders to take proactive action. Furthermore, the government and institutional investors can utilize these models as part of their feasibility assessments and systemic risk mitigation efforts in labor-intensive sectors.

Considering the importance of early detection of financial distress, an accurate and applicable measurement tool is needed to predict corporate bankruptcy. Therefore, this study aims to examine the use of the Altman Z-Score model and the Zmijewski model in textile industry companies listed on the Indonesia Stock Exchange (IDX) between 2020 and 2024 to identify potential financial distress, providing a more comprehensive picture for management and stakeholders in strategic decision-making.

2. Literature Review

2.1. Financial Distress

Financial crisis is a condition in which a company experiences serious financial pressure, leading to an inability to meet financial obligations, such as debt interest payments, operational obligations, and capital expenditures (Darmayanti, 2008). Financial distress occurs when a company is unable to generate sufficient operating cash flow to cover long-term fixed expenses. This can be characterized by a significant decline in profits, negative cash flow, a high debt ratio, and reduced liquidity (Fitriyani, 2022); misalignment between obligations and the company's ability to generate adequate cash (Damayanti et al., 2019). The condition is often an early indicator of bankruptcy if not addressed promptly.

The factors that can cause financial distress are quite diverse, ranging from internal factors such as poor financial management and unhealthy capital structures to external factors such as economic uncertainty, interest rate fluctuations, and competitive pressures. In the context of capital markets, information about a company's financial distress is crucial for investors as a consideration when making investment decisions.

2.2 Altman Z-Score Model

The Altman Z-Score model was developed by Edward I. Altman in 1968 to predict the potential for corporate bankruptcy based on a combination of several key financial ratios, namely liquidity, profitability, leverage, solvency, and activity (Irawan & Fajri, 2021). This predictive model is quite accurate in predicting bankruptcy because it uses more ratios, so it can represent every financial condition of a company (Devi & Merkusiwati, 2014). There are five components of financial ratios, namely: working capital to total assets (X1), retained earnings to total assets (X2), earnings before interest and taxes to total assets (X3), market value of equity to book value of total liabilities (X4), and sales to total assets (X5) (Paleni & Kusuma, 2021). This model calculates a score that divides companies into three categories: safe zone ($Z > 2.99$), grey zone ($1.81 < Z < 2.99$), and distress zone ($Z < 1.81$) (Gantino & Jonathan, 2020).

The Altman Z-Score is very useful as a detection tool (early warning system) that allows company management to identify early symptoms of financial difficulties before they reach a more serious phase (Devi& Merkusiwati, 2014; Fitriyani, 2022). The higher the Altman Z-Score, the better the company is perceived as being in good health (Gantino & Jonathan, 2020). This indicates that the company is considered capable of carrying out operational activities well, meeting maturing obligations, and is unlikely to experience bankruptcy in the short term. The Altman model is widely used in the manufacturing sector because it considers profitability, solvency, and asset efficiency comprehensively.

2.3 Zmijewski X-Score Model

The Zmijewski X-Score model is a bankruptcy analysis model for a company that combines a combination of financial ratios and different weightings for each variable. Therefore, this model is considered more efficient for comparison in predicting bankruptcy in a company. This model was developed by Mark E. Zmijewski (1984) as an alternative with a different approach, namely using probit regression. There are three main variables: net income to total assets (X1), total liabilities to total assets (X2), and current assets to current liabilities (X3). (Irawan & Fajri, 2021). The bankruptcy prediction calculation method using the

Zmijewski X-Score model is based on a situation where the company is unable to meet its short-term and long-term obligations (Fitriyani, 2022). The Zmijewski X-Score model has a simpler approach by using only three financial ratios: Return on Assets, Leverage, and Liquidity (Irawan & Fajri, 2021).

Unlike Altman, the Zmijewski model does not use market data, making it more suitable for unlisted companies or situations where market data is unavailable (Fitriyani, 2022). The resulting X-score indicates whether the company is in distress, with an X-score greater than 0 indicating an unhealthy condition (Dahni, 2019). One of the advantages of this model is its effectiveness in predicting failure without relying on stock market fluctuations (Gantino & Jonathan, 2020). Therefore, the Zmijewski X-Score offers a more robust alternative than Altman in analyzing bankruptcy risk (Irawan & Fajri, 2021).The smaller the Zmijewski X-Score obtained, the company is in a safe condition (declared healthy) and conversely, the larger the Zmijewski X-Score obtained, the company is in a bankrupt (unhealthy) condition (Gantino & Jonathan, 2020). This model is considered simpler and more conservative, but remains accurate in identifying bankruptcy risk.

3. Research methods

3.1. Data Sources, Population, and Sample

his research uses a quantitative approach with a descriptive method. Descriptive research is a research approach that aims to describe, explain, or interpret certain phenomena systematically and factually without manipulating variables (Ramdhan, 2021). In selecting the sample, this study applied a saturated sampling technique or census sampling. Saturated sampling is a sampling technique where the entire available population is used as a sample (Sugiyono, 2022). This technique is generally used when the population is relatively small or limited, allowing for comprehensive observation of all members of the population. The population in this study is all companies in the textile and garment sub-sector listed on the Indonesia Stock Exchange in 2020-2024. The use of saturated sampling in this study aims to increase the accuracy of the analysis results and avoid potential bias in sample selection. By covering all relevant units of analysis, this study can obtain more representative and comprehensive results for the studied population (Hasan, 2020).

The data used in this study comes from secondary data obtained through annual financial reports published on the official website of the Indonesia Stock Exchange, as well as other relevant secondary data sources. From the data sorting process, observations were obtained from 8 (eight) companies which will be the sample.

3.2 Variables and Measurement

The variables used in this study are the variables contained in the Altman Z-Score and Zmijewski models to predict financial distress in textile and garment sub-sector companies listed on the Indonesia Stock Exchange in 2020-2024. The measurement formula for each model (Altman Z-Score Model and Zmijewski Model) is as follows:

a. Altman Z-Score Model

There are several variations of the Z-Score analysis model. This study uses the following modified Z-Score model:

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

Source: Paleni & Kusuma (2021)

Information:
X1 = Working Capital/Total Assets
X2 = Retained Earnings/Total Assets
X3 = Earnings Before Interest and Taxes/Total Assets
X4 = Book Value of Equity/Total Assets

The zone criteria used are, if:

- $Z > 2.6$ then the company is in the green area (safe zone);
- $1.1 < Z < 2.6$, then the company is in the grey area; and
- $Z < 1.1$, then the company is in the red area and has the potential to go bankrupt.

b. Zmijewski X-Score Model

$$X = -4.3 - 4.4X1 + 5.7X2 – 0.004$$

Source: Dahni, 2019

Information:
X1 = Earnings After Taxes/Total Assets
X2 = Total Debt/Total Assets
X3 = Current Assets/Currets Liabilities

The zone criteria used are, if:

- X Score < 0 then the company is considered healthy or not bankrupt;
- X Score ≥ 0 then the company is considered to be in distress or going bankrupt.

3.3 Descriptive Analysis Method

This research uses a descriptive analysis method, which involves analyzing, describing, and explaining data obtained regarding the company being studied. The descriptive analysis method used involves the following steps:

a. Listing companies included in the textile and garment sub-sector group listed on the Indonesia Stock Exchange in 2020-2024.
b. Sorting the completeness of the data according to the needs of the variable measurements that will be carried out for the two prediction models.
c. Calculate the ratios contained in each of the Altman Z Score and Zmijewski methods.
d. The results of the ratio calculations are entered into the equations of each method (each ratio is multiplied by the coefficient of each formula).
e. The scores obtained from each formula will be compared with the criteria of each method.

4. Results and Discussion

The sample companies included 12 companies in the textile and garment sub-sector listed on the Indonesia Stock Exchange for the 2020-2024 period. After going through the data collection process, only 8 observation companies had complete data that met the research requirements. The researchers then calculated financial distress analysis using the Altman Z-Score and Zmijewski methods for the 8 companies. Each method is explained below.

4.1 Altman Z-Score Method

The zone criteria used for the modified Altman Z-Score method are: a) If the Z value > 2.6 (green zone); b) 1.1 < Z < 2.6 (grey zone); c) Z < 1.1 (red zone). The results of the analysis calculation using the Altman Z-Score method are as follows:

Table 1. Altman Z-Score Test Results

Stock Code	Year	Altman Calculation Results				Z-Score	Information
		X1	X2	X3	X4		
ARGO	2020	-1.62	0	-0.08	0.47	-10.67	Red Zone
	2021	-1.39	0	-0.03	4.07	-5.05	Red Zone
	2022	-1.47	0	-0.09	3.44	-6.64	Red Zone
	2023	-0.27	0	-0.03	2.79	0.96	Red Zone
	2024	-0.25	0	-0.01	2.77	1.20	Grey Zone
	Average					**-4.04**	Red Zone
BELL	2020	0.17	0.13	-0.03	2.07	3.51	Green Zone
	2021	0.23	0.14	0.02	2.01	4.21	Green Zone
	2022	0.23	0.14	0.02	2.04	4.24	Green Zone
	2023	0.25	0.15	0.03	1.08	3.46	Green Zone
	2024	0.18	0.14	0.03	0.74	2.62	Green Zone
	Average					**3.61**	Green Zone
HDTX	2020	-0.58	0	-0.15	1.12	-3.64	Red Zone
	2021	-0.7	0	-0.13	1.24	-4.16	Red Zone
	2022	-0.83	0	-0.29	1.62	-5.69	Red Zone

	2023	-0.92	0	-0.07	1.80	-4.62	Red Zone
	2024	-1.07	0	-0.14	2.01	-5.85	Red Zone
	Average					**-23.96**	Red Zone
ESTI	2020	0.08	0	-0.02	0.11	0.51	Red Zone
	2021	0.09	0	0.03	0.28	1.09	Red Zone
	2022	0.06	0	0	0.13	0.53	Red Zone
	2023	0.03	0	0.03	0.12	0.52	Red Zone
	2024	0.08	0	0.02	0.10	0.76	Red Zone
	Average					**0.68**	Red Zone
INDR	2020	0.03	0.29	0.29	0.16	3.26	Green Zone
	2021	0.09	0.34	0.34	4.03	8.22	Green Zone
	2022	0.12	0.35	0.35	0.26	4.55	Green Zone
	2023	0	0.31	0.31	0.14	3.24	Green Zone
	2024	0.02	0.3	0.3	0.14	3.27	Green Zone
	Average					**4.51**	Green Zone
SSTM	2020	0.17	0	-0.04	1.38	2.30	Grey Zone
	2021	0.31	0	0.12	2.01	4.95	Green Zone
	2022	0.16	0	-0.02	2.09	3.11	Green Zone
	2023	0.17	0	-0.02	1.37	2.42	Grey Zone
	2024	0.16	0	-0.05	0.75	1.50	Grey Zone
	Average					**2.86**	Green Zone
TFCO	2020	0.29	0	0	0.44	2.36	Grey Zone
	2021	0.34	0.04	0.05	0.63	3.36	Green Zone
	2022	0.25	0.05	0.01	0.57	2.47	Grey Zone
	2023	0.28	0.06	0.01	0.59	2.72	Green Zone
	2024	0.29	0.07	0.01	0.55	2.78	Green Zone
	Average					**2.74**	Green Zone
SRIL	2020	0.41	0.21	0.05	0.17	3.89	Green Zone
	2021	-0.8	0	-0.96	0.14	-11.55	Red Zone
	2022	0.22	0	-0.39	0.24	-0.93	Red Zone
	2023	0.13	0	-0.23	0.28	-0.40	Red Zone
	2024	0	0	0	0	0	Red Zone
	Average					**-2.25**	Red Zone

Source: Data processed by the researchers, 2025

Based on the 5-year calculation using the Altman Z-Score method, there are four companies that are on average in the safe zone, namely BELL (PT Trisula Textile Industries Tbk) with a value of 3.61; INDR (PT Indo Rama Synthetics Tbk) of 4.51; SSTM (PT Sunson Textile Manufacture Tbk) of 2.86; and TFCO (PT Tifico Fiber Indonesia Tbk) of 2.74. Meanwhile, four other companies are in the distress zone, namely ARGO (PT Argo Pantes Tbk) of -4.04; HDTX (PT Panasia Indo Resources Tbk) of -23.96; ESTI (PT Ever Shine Tex Tbk) of 0.68; and SRIL (PT Sri Rejeki Isman Tbk) of -2.25. Several companies are in the gray zone during the 5 years of observation, namely ARGO, SSTM, TFCO. SSTM and TFCO were able to move out of the grey zone and into the safe zone category, while ARGO ended up in the distress zone for 5 years.

Of the eight Indonesian textile sector companies for the 2020-2024 period, BELL, INDR, SSTM, and TFCO consistently achieved Z-scores above the threshold (2.60), indicating a low risk of bankruptcy and strong financial capacity. INDR and BELL demonstrated consistent performance reflecting operational efficiency and effective cost control, as reflected in Z-Score components such as the ratio of retained earnings to total assets (X4). The companies' presence in the safe zone also reflects the implementation of good corporate governance, which indirectly supports the strengthening of long-term financial performance.

ARGO, SSTM, and TFCO were subsequently recorded as having been in the gray zone several times. For example, ARGO began moving from financial distress to the gray zone in 2024, with a Z-score of 1.20. However, this score remains in the gray zone, facing uncertainty about its viability and requiring internal improvement strategies, particularly in operational efficiency and working capital management. This zone serves as an early warning signal for management to immediately evaluate its cost structure, cash flow, and leverage ratio to prevent slipping into the financial distress zone.

Based on an analysis of several textile sector companies listed on the Indonesia Stock Exchange during the 2020–2024 period, ARGO, HDTX, ESTI, and SRIL were consistently in the distress zone. In fact, several companies, such as HDTX and SRIL, recorded negative Z-scores for almost the entire observation period, indicating a highly concerning financial condition. For example, SRIL experienced a drastic decline in 2021 with a score of -11.55, reflecting a sharp decline in productive assets and profit performance. From a managerial perspective, the presence of companies in the distress zone requires the implementation of restructuring strategies, both operationally and financially. This can include debt renegotiation, cost efficiency, business streamlining, and business model transformation. Without concrete efforts, companies in this zone are at high risk of actual bankruptcy.

4.2 Zmijewski X-Score Method

The Zmijewski X-Score method has the following cutoffs: a) X > 0 indicates the company is experiencing financial distress; b) X < 0 indicates the company is healthy. The following is the calculation of financial distress using the Zmijewski method:

Table 2. Zmijewski X-Score Test Results

Stock Code	Year	Zmijewski's Calculation Results			Z-Score	Information
		X1	X2	X3		
ARGO	2020	-0.06	2.15	0.07	8.22	Red Zone
	2021	-0.03	2.18	0.08	8.26	Red Zone
	2022	-0.09	2.22	0.07	8.76	Red Zone
	2023	-0.03	0.88	0.37	0.85	Red Zone
	2024	-0.01	0.89	0.44	0.82	Red Zone
	Average				**5.38**	Red Zone
BELL	2020	-0.03	0.54	1.37	-1.09	Green Zone
	2021	0.01	0.5	1.53	-1.50	Green Zone
	2022	0.01	0.5	1.53	-1.50	Green Zone
	2023	0.02	0.5	1.58	-1.55	Green Zone
	2024	0.02	0.53	1.38	-1.37	Green Zone
	Average				**-1.40**	Green Zone
HDTX	2020	-0.12	0.95	0.08	1.65	Red Zone
	2021	-0.12	1.06	0.06	2.28	Red Zone
	2022	0.22	1.29	0.05	2.06	Red Zone
	2023	-0.06	1.39	0.04	3.89	Red Zone
	2024	-0.13	1.56	0.02	5.18	Red Zone
	Average				**3.01**	Red Zone
ESTI	2020	-0.01	0.75	1.19	0.02	Red Zone
	2021	0.03	0.71	1.23	-0.39	Green Zone
	2022	0	0.7	1.13	-0.31	Green Zone
	2023	0.03	0.68	1.07	-0.56	Green Zone
	2024	0.01	0.65	1.2	-0.64	Green Zone
	Average				**-0.38**	Green Zone
INDR	2020	0.01	0.51	1.09	-1.44	Green Zone
	2021	0.09	0.49	1.24	-1.92	Green Zone
	2022	0.05	0.47	1.39	-1.85	Green Zone
	2023	-0.05	0.49	1.01	-1.29	Green Zone
	2024	-0.02	0.49	1.07	-1.42	Green Zone
	Average				**-1.58**	Green Zone
SSTM	2020	0.03	0.61	1.49	-0.96	Green Zone
	2021	0.12	0.48	2.29	-2.11	Green Zone
	2022	-0.01	0.46	1.43	-1.64	Green Zone
	2023	-0.01	0.44	1.48	-1.75	Green Zone

	2024	-0.05	0.45	1.43	-1.52	Green Zone
	Average				**-1.60**	Green Zone
TFCO	2020	0	0.09	5.19	-3.81	Green Zone
	2021	0.04	0.09	5.49	-3.99	Green Zone
	2022	0.01	0.08	4.77	-3.91	Green Zone
	2023	0.01	0.07	5.86	-3.97	Green Zone
	2024	0.01	0.07	6.51	-3.97	Green Zone
	Average				**-3.93**	Green Zone
SRIL	2020	0.05	0.64	2.89	-0.89	Green Zone
	2021	-0.88	1.32	0.37	7.18	Red Zone
	2022	-0.52	2.02	2.57	9.54	Red Zone
	2023	-0.27	2.47	1.74	10.99	Red Zone
	2024	0	0	0	0	Red Zone
	Average				**6.71**	Red Zone

Source: Data processed by the researchers, 2025

Based on the 5-year calculation using the Zmijewski method, there are five companies that are on average in the safe zone, namely BELL (PT Trisula Textile Industries Tbk) with a value of -1.40; ESTI (PT Ever Shine Tex Tbk) of -0.38; INDR (PT Indo Rama Synthetics Tbk) of -0.58; SSTM (PT Sunson Textile Manufacture Tbk) of -1.60; and TFCO (PT Tifico Fiber Indonesia Tbk) of -3.93. Meanwhile, three other companies are in the distress zone, namely ARGO (PT Argo Pantes Tbk) of 5.38; HDTX (PT Panasia Indo Resources Tbk) of 3.01; and SRIL (PT Sri Rejeki Isman Tbk) of 6.71. In this method, there is no gray zone, a cut-off point that indicates whether a company is in a safe or unsafe zone.

Companies classified as safe zones demonstrate stable financial performance, supported by positive profitability, manageable debt ratios, and adequate liquidity. Based on data processing, companies such as BELL, INDR, SSTM, TFCO, and ESTI have consistently shown negative X-Scores since 2021 during the 2020–2024 period. This indicates that these companies have a good ability to meet short-term obligations and show no signs of imminent bankruptcy. Companies with low leverage and high liquidity tend to have negative X-Scores, reflecting financial resilience to external pressures. For example, TFCO exhibits a very low X-Score of -3, indicating high liquidity and a very low risk of bankruptcy.

The Zmijewski model does not explicitly recognize the concept of a gray zone like Altman's model, but an X value close to zero can be interpreted as a sign of financial uncertainty. Companies like ESTI in 2020 (X = 0.02) were on the transition threshold between the distress zone and the safe zone. At this stage, financial decisions and managerial policies are crucial in determining whether the company will improve or fall into distress. Meanwhile, SRIL recorded an X score as high as 10.99 in 2023, reflecting very high leverage and the potential for serious default. On the other hand, ARGO and HDTX also showed relatively high scores over the five-year period, with an average above 3, indicating the need for comprehensive financial restructuring.

4.3 Comparison of the Altman Z-Score Model vs. the Zmijewski Model

If a comparison is made between the two models, it is found that both models show consistent results for the majority of companies.

Table 3. Comparison Results of Altaman and Zmijewski Models

Stock Code	Altman Model		Zmijewski Model		Comparison
	Z-Score	Conclusion	X-Score	Conclusion	
ARGO	-4.04	Red Zone	5.38	Red Zone	Consistent
BELL	3.61	Green Zone	-1.40	Green Zone	Consistent
HDTX	-23.96	Red Zone	3.01	Red Zone	Consistent
ESTI	0.68	Red Zone	-0.38	Green Zone	Inconsistent
INDR	4.51	Green Zone	-1.58	Green Zone	Consistent
SSTM	2.86	Green Zone	-1.60	Green Zone	Consistent
TFCO	2.74	Green Zone	-3.93	Green Zone	Consistent
SRIL	-2.25	Red Zone	6.71	Red Zone	Consistent

Source: Data processed by the researchers, 2025

Table 3 shows that using both models simultaneously provides a more comprehensive picture of a company's financial condition, both in terms of asset efficiency (Altman) and short-term financial stability (Zmijewski). Both models indicate that BELL, INDR, TFCO, and SSTM are classified in the safe zone, strengthening the validity of their financial health. Meanwhile, ARGO, HDTX, and SRIL are classified in the distress zone, indicating critical financial condition. A small difference is observed for ESTI, which is in the distress zone according to Altman but has begun to improve according to Zmijewski since 2021.

5. Conclusion

This study aims to compare the accuracy of two financial distress prediction models, the Altman Z-Score and the Zmijewski X-Score, for eight textile and garment sub-sector companies listed on the Indonesia Stock Exchange for the 2020–2024 period. The analysis concludes that financial conditions across companies exhibit significant variations.

The Altman Z-Score model categorizes companies into three categories: the safe zone, the gray zone, and the distress zone. The analysis shows that BELL, INDR, SSTM, and TFCO consistently fall within the safe zone, indicating stable financial performance and low bankruptcy risk. Meanwhile, ARGO, HDTX, ESTI, and SRIL tend to fall within the distress zone, particularly HDTX and SRIL, which have shown negative or very low Z-scores for five consecutive years.

The Zmijewski model, which focuses on profitability, leverage, and liquidity, yields fairly consistent results. Companies such as BELL, INDR, SSTM, TFCO, and ESTI (since 2021) are categorized as safe ($X < 0$), while ARGO, HDTX, and SRIL show X values > 0, indicating financial distress. Interestingly, although ESTI is in the distress zone according to Altman, the Zmijewski model indicates improvement since 2021.

Overall, the two models complement each other in providing a picture of a company's financial health. The consistency of the results between the two models strengthens the validity of the finding that some textile companies face high financial risks and require strategic management to prevent bankruptcy. Conversely, companies in the safe zone can maintain their positive performance by maintaining operational efficiency, a healthy capital structure, and effective risk management.

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