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Financial Distress Analysis of IDX Textile Companies 2019-2024: Zavgren and Altman

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Abstract

As a developing country, Indonesia relies heavily on the industrial sector as a key driver of employment. Among various types of industries, labor-intensive industries dominate, particularly the textile industry, which serves as a major source of employment. This study aims to analyze the potential for financial distress in five textile sector companies listed on the Indonesia Stock Exchange (IDX) during the period 2019–2024. The analysis employs two bankruptcy prediction models: the Zavgren model and the Altman Z-Score model. Additionally, the Wilcoxon Signed-Rank Test is used to determine whether there is a significant difference between the results of the two models in predicting financial distress. The results show that, according to the Altman model, 21 samples (70%) are predicted to be in bankruptcy, 8 samples (26.67%) are in the critical zone, and only 1 sample (3.33%) is in a healthy zone. In contrast, the Zavgren model predicts 4 samples (13.33%) to be in bankruptcy, 4 samples (13.33%) in a critical condition, and 22 samples (73.33%) to be financially healthy. The Wilcoxon test results indicate a significant difference between the Zavgren and Altman models in predicting financial distress among the textile companies studied.

Keywords :Financial Distress, Zavgren, Altman, Wilcoxon Test

1. Introduction

As a developing country, Indonesia relies heavily on the industrial sector as one of the main sources of employment. One of the industries that absorbs a significant amount of labor is the labor-intensive industry. This type of industry is considered the most relevant for absorbing a large number of workers. Among various types of industries, labor-intensive industries are the most commonly established in Indonesia. They are chosen because they can absorb a large workforce to accelerate the production of goods. The textile industry is one such labor-intensive industry that plays a major role in labor absorption. The production process of textiles—such as shirts, pants, socks, and others—requires substantial manpower for both manufacturing and quality control stages. [1]

As a labor-intensive sector, the textile and garment industry is one of the most important sectors in Indonesia and serves as a major driver of the national economy. The rapid growth of the textile and textile product (TPT) industry is largely driven by significant investments in the upstream sector. Moreover, the increase in upstream supply has boosted the performance of the intermediate and downstream sectors, which cumulatively has revitalized the industry. This sector contributes significantly to Indonesia's economy through high export value. [2]

The high growth occurring in the textile and apparel industry is mainly due to significant investments in the upstream sector. In addition, the increased supply from upstream also boosts the performance in the downstream and intermediary industries, resulting in a cumulative revitalization of the industry, which is participating greatly in the Indonesian economy thanks to high export values. [3,4]

However, over the past two years, the textile and garment sub-sector has experienced a notable decline compared to previous years. Based on data provided by Statistics Indonesia (BPS) on textile exports from 2019 to 2024, the export volumes are as follows:

Table 1. Textile Exports Volume (2019 – 2024)

Years	Export Volume
2019	331.1 tons
2020	284.6 tons
2021	318.3 tons
2022	327.3 tons
2023	273.1 tons
2024	312.2 tons

Source: Central Bureau of Statistics [5]

This research focuses on the analysis of financial distress that may be experienced by the companies SRIL, PBRX, INDR, POLY, and ADMG. The study specifically analyzes financial distress in these five textile companies in Indonesia using the Zavgren and Altman Z-Score models. The analysis is based on financial statements of the five companies from the period 2019–2024, which were accessed from the Indonesia Stock Exchange (idx.co.id) and each company's official website.

A previous study using the Zavgren model on Bukalapak found indications of potential bankruptcy in the company. Meanwhile, a separate study using the Altman Z-Score model on a retail company found that the company entered the distress zone in 2020. [6]

The objectives of this research are to identify the potential financial distress of the five textile companies (SRIL, INDR, PBRX, POLY, and ADMG) from 2019 to 2024 using both the Zavgren and Altman Z-Score models and determine whether there is a significant difference in the prediction results between the Zavgren and Altman Z-Score models.

By using these two models, it is expected that the analysis can provide deeper insights into the financial condition of each company and assist various stakeholders in making more accurate and comprehensive investment or management policy decisions.

Based on the framework and background described, the hypotheses proposed are as follows:

H₀ (Null Hypothesis): There is no significant difference between the bankruptcy prediction results using the Zavgren model and the Altman Z-Score model based on the Wilcoxon Signed-Rank Test.

H₁ (Alternative Hypothesis): There is a significant difference between the bankruptcy prediction results using the Zavgren model and the Altman Z-Score model based on the Wilcoxon Signed-Rank Test.

2. Research Methods

This research highlights a study of the textile and garment subsector in Indonesia listed on the IDX for the period 2019-2024, selecting 5 of the largest textile companies in terms of labor absorption as a sector known for its labor-intensive industry, namely Sri Rejeki Isman (SRIL), Pan Brothers (PBRX), Indorama Syntetix (INDR), Asia Pacific Fibers (POLY), and Polychem Indonesia (ADMG). This study employs a quantitative method, utilizing secondary data, specifically financial report indicators from each company, with data selection using purposive sampling techniques and processed using financial ratios provided by the Zavgren and Altman models. [7]

2.1. Research Site and Times

The research was conducted on 5 textile and garment companies, by processing the financial statements of each company for the period 2019-2024.

2.2. Population, Sample and Sampling Techniques

A sample is a representative or a part of a population that has the same properties and characteristics, being representative and describing the population so it is considered able to represent the entire population being studied. Sampling techniques are useful to assist researchers in generalizing about the population represented. [8] The population taken by the author consists of 22 textile companies in Indonesia, where the author uses purposive sampling to select 5 sample companies, with the criteria set by the author being that : they have audited annual

financial statements for the period 2019-2024 presented on the IDX, as well as being among the top 5 companies with the highest labor absorption representing the operational scale of the industry nationally. [9]

2.3. Data Types and Sources

This research uses a quantitative method. Research is a series of activities aimed at seeking the truth of a study, starting with an idea that forms the problem statement and leads to an initial hypothesis. The quantitative method is a research method with a more complex level of variation, as it involves studying a larger sample size. However, quantitative research is more systematic. Based on its objective, this study is a descriptive quantitative research. Descriptive quantitative research processes the data collected and analyzes it for presentation in various formats. [7,11]

The researcher selected the sample using purposive sampling. Purposive sampling is a technique for selecting research subjects based on specific characteristics determined by the researcher. [7]

This study uses a series of formulas by Zavgren and Altman to test each financial ratio of the companies. The financial ratios are obtained from the annual financial statements of each company listed on the Indonesia Stock Exchange (IDX). The data is processed to determine the symptoms of financial distress experienced by the company. Financial distress is a situation that begins with the company's inability to meet its obligations, especially those of a current nature, namely liquidity and solvency. [10]

2.4. Method of collecting data

The data collection method used is by collecting annual financial statements for the period 2019-2024 from the companies SRIL, PBRX, INDR, POLY, ADMG. Subsequently, the data is processed using the Zavgren and Altman formulas. After obtaining the results, the author determines a cutoff point to draw conclusions about the condition of each company. The conditions of the companies are divided into three categories: healthy, grey area, and bankrupt. [6,11]

2.5. Data Analysis Method

The results of data processing using the Zavgren and Altman methods were processed and analyzed using SPSS. The author found that the data processed through SPSS was not normally distributed, so the author conducted the Wilcoxon Test to analyze the comparison of bankruptcy predictions between the Zavgren and Altman models to obtain significant difference results. [12]

2.6. Research Instruments and Variables

The author summarizes the variables used in the table below.

Table 1 Predictive Variables of Financial Distress

Variable	Indicator	Scale	References
Altman Model: $Z = 1,2 X_1 + 1,4 X_2 + 3,3 X_3 + 0,6 X_4 + 1,0 X_5$	Z =bankruptcy index X1 =working capital /total assets X2 =retained earnings /total assets X3 =earnings before interest and taxes /total assets X4 =market value /total book value of debt X5 = sales /total assets	Ratio	[13,14]
Zavgren Model : $Y = 0,23883 - 0,108 (INV) - 1,583 (REC) - 10,78(CASH) + 0,481 (ROI) + 4,35 (DEBT) + 0,11 (TURN) + 3,074(QUICK)$	INV = inventory / sales REC = receivables / inventory CASH = cash / total assets QUICK = current assets /current liabilities ROI = net operating income / (total assets – current liabilities) DEBT = long term debt / (total assets – current liabilities) TURN = sales / (working capital + fixed assets)	Ratio	[13,15]

3. Results and Discussions

3.1. Data Description

In analyzing the data, the author uses the Zavgren and Altman Z-Score model techniques to analyze financial distress in the companies SRIL, PBRX, INDR, POLY, and ADMG. After that, to describe the results of the

financial distress calculations, the author uses descriptive analysis. Then, to find the best model, the author uses the error percentage formula, which is a formula to determine the level of suitability of the financial distress analysis model. The explanation of the analytical techniques used in the study is as follows:

3.1.1 Calculating variables in the Zavgren Model

In the Zavgren model, the steps to calculate financial distress analysis are as follows:

First, calculate the financial ratios used as independent variables in Zavgren:

$$\text{INV} = \text{Inventory} / \text{Sales} \quad (1)$$

$$\text{REC} = \text{Receivables} / \text{Inventory} \quad (2)$$

$$\text{CASH} = \text{Cash} / \text{Total Assets} \quad (3)$$

$$\text{QUICK} = \text{Current Assets} / \text{Current Liabilities} \quad (4)$$

$$\text{ROI} = \text{Net Operating Income} / (\text{Total Assets} - \text{Current Liabilities}) \quad (5)$$

$$\text{DEBT} = \text{Long-term Debt} / (\text{Total Assets} - \text{Current Liabilities}) \quad (6)$$

$$\text{TURN} = \text{Sales} / (\text{Capital} + \text{Fixed Assets}) \quad (7)$$

Second is calculating multivariable functions, and then calculate the value of “y” for each company

$$Y = 0.23883 - 0.108(\text{INV}) - 1.583(\text{REC}) - 10.78(\text{CASH}) + 3.074(\text{QUICK}) + 0.486(\text{ROI}) - 4.35(\text{DEBT}) + 0.11(\text{TURN}) \quad (8)$$

After that calculating the probability value of a company's financial distress is calculated using the logit probability function, using the formula:

$$Pi = \frac{1}{1+e^y} \quad (9)$$

Where “y” rank is a multivariable function consisting of constants and coefficients from a set of variables, namely financial ratios. Meanwhile, e is a natural number with a value of 2.1828. Probability values close to 1/1 or 100% are categorized under financial difficulties.

After obtaining the results from the above logit method, the existing data is tested again with statistics because the logit model does not have a cut-off point to achieve a high level of certainty. The statistical tools used are as follows: Standard deviation (for $n \leq 30$), with the formula:

$$SD = \sqrt{\frac{\sum (xi - \bar{x})^2}{n-1}} \quad (10)$$

Where: xi = data 1, \bar{x} = industry average, n = sample size

Next, look at the range of intervals, with a confidence level of 95% ($\alpha = 0.05$) using the formula:

$$\bar{x} - t \alpha / 2 \frac{sd}{\sqrt{n}} < \mu < \bar{x} + t \alpha / 2 \frac{sd}{\sqrt{n}} \quad (11)$$

Where: \bar{x} = industry average, t = t-table coefficient, α = alpha coefficient, sd = standard deviation, n = sample size

3.1.2 Calculating variables in the Altman Model

First, a series of 5 financial ratios is calculated.

$$X1 = \text{working capital} / \text{total assets} \quad (12)$$

$$X2 = \text{retained earnings} / \text{total assets} \quad (13)$$

$$X3 = \text{earnings before interest and taxes} / \text{total assets} \quad (14)$$

$$X4 = \text{market value of common and preferred stock} / \text{book value of total debt} \quad (15)$$

$$X5 = \text{sales} / \text{total assets} \quad (16)$$

Second, each financial ratio is multiplied by a specific coefficient, after that the scores/results obtained are summed together (z)

$$Z = 1.2 X1 + 1.4 X2 + 3.3 X3 + 0.6 X4 + 1.0 X5 \quad (17)$$

And then grouping according to the cutoff Z-Score value determined by Altman with the categories:

1. If the Z value < 1.81, then it is classified as a company experiencing financial distress.
2. If the value $1.81 < Z < 2.99$, then it falls into the grey area (it cannot be determined whether the company is healthy or experiencing financial distress).
3. If the Z value > 2.99, then it is classified as a company that is not experiencing financial distress.

The author presents the results of the calculations using the zavgren and altman model in tabular form.

Table 2 The prediction results of Zavgren model for each company for the period 2019-2024:

Company	2019	2020	2021	2022	2023	2024
SRIL	Healthy					Critical
PBRX						
INDR						
POLY						Critical
ADMG						
Upper Limit	0.3596	0.4163	0.7036	0.3925	0.7472	0.7980
Lower Limit	(0.1305)	(0.1212)	(0.2295)	(0.1072)	(0.1827)	(0.1286)

Source: Data processed (2025)

Table 3 The prediction results of Altman model for each company for the period 2019-2024:

Company	2019	2020	2021	2022	2023	2024
SRIL	Critical		Bankrupt			
PBRX						
INDR	Critical					
POLY						
ADMG						

Source: Data processed (2025)

Information:

	Bankrupt
	Critical
	Healthy

3.2 Test Of Normality

Table 4 Test Of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Zavgren	.161	30	.045	.746	30	<.001
Altman	.283	30	<.001	.695	30	<.001

Based on the above, normality tests were conducted using 2 methods, namely Kolmogorov-Smirnov and Shapiro-Wilk. Because the sample size used is 30, the main reference in decision-making is the significance value of Shapiro-Wilk, which is more suitable for data sizes less than 50. Based on the results of the normality test displayed in table 4, it is known that:

- For the Zavgren model, the Shapiro-Wilk significance value is <0.001
- For the Altman model, the Shapiro-Wilk significance value is <0.001.

The significance values of both models are smaller than the significance level of 0.05, so it can be concluded that the data is not normally distributed. Since the data from both models is not normally distributed, the analysis of the comparison of bankruptcy predictions between the Zavgren and Altman models must be conducted using non-parametric statistical tests. The test used next is the Wilcoxon Signed-Rank Test.

3.3 Non-Parametric Wilcoxon Test

Table 5 Non-Parametric Wilcoxon Test

Test Statistics ^a	
	Altman - Zavgren
Z	-4.247 ^b
Asymp. Sig. (2-tailed)	<.001

a. Wilcoxon Signed Ranks Test
 b. Based on positive ranks.

Source: Data processed with SPSS (2025)

Based on the results of the Wilcoxon test shown in table 5, the Asymp.Sig (2-tailed) value obtained is <0.001, where this significance value is smaller than 0.05, thus it can be concluded that there is a significant difference between the bankruptcy prediction results of the Zavgren and Altman models.

Thus, Ho is rejected and H1 is accepted that there is a significant difference between the bankruptcy prediction results using the Zavgren model and the Altman Z-Score model based on the Wilcoxon Signed-Rank Test.

3.4 Suitability of Bankruptcy Prediction

The level of suitability of the bankruptcy prediction analysis model can be done by comparing the company's net profit with the results of bankruptcy predictions. If the net profit is positive, the company is categorized as healthy; if the net profit is negative, the company is categorized as unhealthy. The table below is a summary of the company's profit earnings and bankruptcy predictions from the Zavgren and Altman model:

Table 6 Prediction Suitability

Company & Years	Net Profit (USD)	Description of Net Profit	Zavgren Model		Altman Model	
			Y	Description	Z-Score	Description
SRIL	2019 87.652.548	Healthy	17.8918	Healthy	2.0356	Grey Area
	2020 85.325.108	Healthy	9.2111	Healthy	1.9072	Grey Area
	2021 (1.081.338.372)	Unhealthy	2.1283	Healthy	(4.0412)	Bankrupt
	2022 (391.569.292)	Unhealthy	3.3501	Healthy	(2.2443)	Bankrupt
	2023 (173.806.906)	Unhealthy	(3.4335)	Bankrupt	(2.7606)	Bankrupt
2024 (25.734.056)	Unhealthy	(6.2771)	Bankrupt	(2.6683)	Bankrupt	
PBRX	2019 17.050.942	Healthy	23.3130	Healthy	2.5215	Grey Area
	2020 19.367.114	Healthy	7.1803	Healthy	2.0614	Grey Area
	2021 15.403.762	Healthy	5.2240	Healthy	1.7726	Bankrupt
	2022 2.336.379	Healthy	64.5888	Healthy	2.2841	Grey Area
	2023 (4.336.274)	Unhealthy	11.5338	Healthy	1.9816	Grey Area
2024 (455.987.733)	Unhealthy	1.9001	Healthy	(1.1979)	Bankrupt	
INDR	2019 41.626.269	Healthy	3.2673	Healthy	1.8038	Bankrupt
	2020 6.231.992	Healthy	5.9057	Healthy	1.4542	Bankrupt
	2021 84.568.285	Healthy	4.9016	Healthy	2.1799	Grey Area
	2022 42.534.663	Healthy	6.0259	Healthy	2.2754	Grey Area
	2023 (40.810.864)	Unhealthy	28.3981	Healthy	1.3844	Bankrupt
2024 (18.803.608)	Unhealthy	3.8079	Healthy	1.6213	Bankrupt	
POLY	2019 (11.920.285)	Unhealthy	0.0480	Grey Area	10.5732	Healthy
	2020 (20.139.803)	Unhealthy	(0.3008)	Bankrupt	(10.0326)	Bankrupt
	2021 3.424.161	Healthy	(3.9010)	Bankrupt	(8.9158)	Bankrupt
	2022 12.313.779	Healthy	0.3847	Grey Area	(16.5807)	Bankrupt

	2023	(11.213.407)	Unhealthy	0.4314	Grey Area	(18.6616)	Bankrupt
	2024	(48.500.634)	Unhealthy	0.4428	Grey Area	(37.3579)	Bankrupt
	2019	(29.590.834)	Unhealthy	14.7729	Healthy	1.1661	Bankrupt
	2020	(38.676.045)	Unhealthy	15.8749	Healthy	(0.2672)	Bankrupt
ADMG	2021	761.546	Healthy	16.1959	Healthy	(0.0269)	Bankrupt
	2022	(26.746.256)	Unhealthy	13.8851	Healthy	(1.4687)	Bankrupt
	2023	(19.119.581)	Unhealthy	10.1130	Healthy	(2.7791)	Bankrupt
	2024	(10.93.213)	Unhealthy	7.9851	Healthy	(0.3483)	Bankrupt

Source: Data processed (2025)

3.5 The Suitability Level of the Zavgren and Altman Model

To calculate the level of accuracy in predicting financial distress for each model used, this study employs the error percentage formula. The following is the calculation formula used:

$$\text{Accuracy Rate} = (\text{Number of Correct Predictions}) / (\text{Number of Samples}) \times 100 \quad (18)$$

$$\text{Type Error} = (\text{Number of Incorrect Predictions}) / (\text{Number of Samples}) \times 100 \quad (19)$$

Table 7 Accuration Table

	Zavgren Model	Altman Model
Match	17	16
Mismatch	13	14
Accuracy	17/30 = 0.5667	16/30 = 0.53
Inaccuracy	13/30 = 0.4333	14/30 = 0.47
Accuracy Rate (%)	57%	53%
Inaccuracy Rate (%)	43%	47%

Source: Data processed (2025)

4. Conclusion

Based on the analysis conducted, the author draws the following conclusions: Using the Altman model, five textile sector companies listed on the Indonesia Stock Exchange (IDX) during the 2019–2024 period were predicted to experience bankruptcy in 21 samples or 70%, fall into the grey (critical) area in 8 samples or 26.67%, and be categorized as healthy in 1 sample or 3.33%. Meanwhile, using the Zavgren model, companies predicted to be bankrupt amounted to 4 samples or 13.33%, in the critical area 4 samples or 13.33%, and healthy companies totaled 22 samples or 73.33%. Based on the results of the difference test using the Wilcoxon Test, there is a visible difference between the two models in predicting the bankruptcy of the five textile and garment companies. In this study, the Zavgren model had a higher accuracy rate of 57%, compared to the Altman model which had an accuracy rate of 53%. The Zavgren model applies a logit-based calculation and includes a bankruptcy probability in percentage form, which makes it easier for readers to interpret the results. The findings indicate that each bankruptcy prediction model has its own strengths and limitations in identifying the financial condition of textile companies listed on the IDX. The Altman model tends to be more conservative with a higher bankruptcy prediction rate, while the Zavgren model provides a more realistic outlook, showing a greater proportion of financially healthy companies. This highlights the importance of using more than one model in bankruptcy analysis to support more accurate and comprehensive investment decisions or management policies.

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