FINANCIAL DISTRESS ANALYSIS AND COMPARISON OF ALTMAN Z-SCORE, SPRINGATE, AND GROVER MODELS AT PT SRITEX FOR THE PERIOD 2019-2023

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ABSTRACT

This study looks at how well of the Grover models, Springate, and Altman Z-Score in forecasting financial distress at PT Sritex and how useful they are in the Indonesian textile industry. The approach that was taken was descriptive quantitative, and it made employment of supplementary data from the IDX website from the perspective of financial accounts for the years 2019–2023. The Altman Z-Score model's 0% accuracy indicates its inefficiency, in contrast, the Springate and Grover models both have an accuracy of forty percent. Despite the fact that the most recent two models provide a more realistic representation of the company's current financial status, the prediction error rate is still substantial (type error 60%). This shows that the Altman Z-Score is less reliable, while Springate and Grover are more accurate, although still limited. Therefore, it is not recommended to rely on only one model in assessing a company's financial risk. This research also opens up opportunities for further studies with a wider range of industries to obtain more comprehensive and accurate results.

Keywords: *Financial Distress, Grover, Springate, Altman Z-Score*

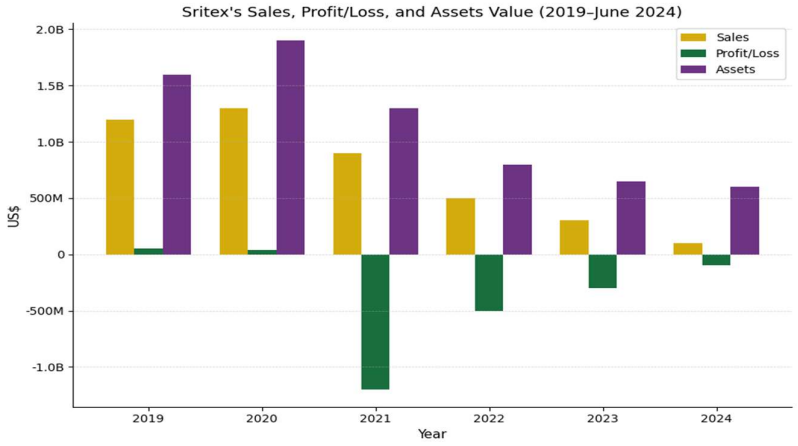
Received : 17-04-2025
Revised : 12-07-2025
Approved : 16-07-2025
Published : 22-07-2025

INTRODUCTION

Financial distress is a critical issue exacerbated by global economic challenges such as commodity price fluctuations, political uncertainty, and the COVID-19 pandemic, all of which exert significant pressure on corporate finance (Nikmah et al., 2022). According to the study conducted by Ardelia & Purwanto (2023), the company's financial statements can be used to determine whether it is in financial distress, where the profit values have declined into negative figures. This condition not only affects the internal stability of the company, but also impacts stakeholders, such as investors, creditors, and employees. Another sign of financial trouble is that businesses often struggle to pay back debt, as seen by their deteriorating capacity to fulfil immediate obligations to creditors, such as liquidity and solvency (Isa et al., 2022). To address this situation, a company can conduct early detection by analyzing financial data presented in its published annual reports. The goal is to enable appropriate actions to strengthen the business's financial standing, thereby avoiding the risk of bankruptcy (Irfan et al., 2023). Financial distress is a highly challenging situation that approaches bankruptcy, which, if not addressed promptly, will have a significant impact on the company, including the loss of trust from stakeholders (Pradita et al., 2024).

Bankruptcy is an inevitable risk in running a business, and this bankruptcy can occur in small, medium, or large companies, so the ability to predict financial distress is really important; besides that, a corporation in financial crisis or distress is one that is on the verge of going bankrupt, the stage that occurs before the company goes bankrupt with the stipulation that the business's operating profits cannot cover its debt (Anggraeni, 2021).

According to Dukalang et al. (2024) financial management is carried out to assess the possible state of a company including the risk of difficulties that can lead to bankruptcy. In such a situation it can be said that the company has decreased capital in its business, which may be caused by a decrease in sales or profits (Indriastuti et al., 2021). One concrete example is the case of PT Sri Rejeki Isman Tbk (Sritex), a giant textile company from Sukoharjo, Central Java, which on October 21, 2024, the Semarang Commercial Court formally declared bankrupt. With a total credit debt of IDR 14.64 trillion to 27 banks and 3 companies.



Source: katadata.co.id, 2024

Figure 1
Financial Statement Chart

Based on its financial report, while the Covid-19 epidemic was in progress, ini 2021 Sritex's sales fell 33.9% (year-on-year/yoy) to US$847.52 million. The textile company also suffered a huge loss in 2021, namely US$1.07 billion or equivalent to IDR15.2 trillion (assuming an exchange rate of IDR14,279 per US$ that year). Since then, Sritex's sales have continued to decline and consistently posted losses until the end of the first semester of 2024. Along with the worsening performance, Sritex's assets were further eroded until the remaining US$617.34 million in June 2024, as shown in the chart. When compared to 2020, Sritex's assets in June 2024 had shrunk by around 66% (Kusnandar, 2024). From this case, it is important to analyze PT Sritex's financial distress to identify factors that cause bankruptcy and evaluate the effectiveness of prediction models that are often used in evaluating the financial health of the business. The Altman Z-Score, Springate, and Grover models are commonly applied methods in predicting financial distress, but their effectiveness can vary depending on the industry sector and the company's financial condition.

Several models for analyzing financial distress have been applied in various companies. Compared to the other models, the Grover model has a greater accuracy rate of 99% than Altman Z-Score model (16%), Springate (2%), and Zmijewski (96%), according to study by Wulandari & Fauzi (2022) on real estate and property businesses on the IDX (Indonesia Stock Exchange) during the 2017–2019 timeframe. The Altman Z-score and Springate models have the highest accuracy rate, reaching 100%, according to Sari & Parulian (2023), research on businesses related to tourism and recreation that are listed on IDX between the years 2018 to 2022, which used these models to predict financial distress. However, according to Sembiring et al. (2022), the accuracy of the Altman Z-Score model is the lowest, coming in at 58%, while the Springate model gets the maximum accuracy at 79%.

Based on various previous studies that discuss financial distress analysis using various models, such as Springate, Grover, and Altman Z-Score, it is found that there are differences while determining the degree of financial hardship a business is facing. These variations suggest that the model's efficacy is impacted by the type of industry and the time period used in the study. Therefore, there are still research gaps that need to be reviewed using the latest data and different research objects. Many studies have examined the accuracy, using the Grover, Springate, and Altman Z-Score models in forecasting financial distress, but the results often vary depending on the industry sector and the year of analysis used. Thus, it is necessary to conduct further studies to ascertain which of three models is more accurate in assessing the potential bankruptcy of PT Sri Rejeki Isman Tbk (Sritex).

This study aims to analyze the accuracy of the Altman Z-Score, Springate, and Grover models in predicting financial distress at PT Sritex and measure the effectiveness of each model. By using the latest data, this research is expected to add insight into academic studies and become a reference for stakeholders in identifying and anticipating financial distress at PT Sritex.

LITERATURE REVIEW

Financial Distress

Financial distress is a condition in which financial health has decreased (Lestari et al., 2022). This happens to companies before going bankrupt or liquidating. In the early stage of financial distress, a company generally shows a declining ability to fulfill its financial obligations (Hutauruk et al., 2021). As a result, it is essential to conduct an investigation into the forecasting of financial distress within the organisation, because the

earlier the bankruptcy signal is seen, the better it will be for management to be able to improve and evaluate to overcome bankruptcy (Adfanin et al., 2023). A corporation that is experiencing financial distress is characterised by the most evident issue, which is the inability to meet its commitments to make payments on its debt, including failure to pay dividends to investors (Williem & Ugut, 2022).

Financial Report

Financial statements serve as a communication tool for management and external interested parties to provide a concise description of the value and profitability of the business in a certain period, and an examination of what can be obtained from these statements, and where the pitfalls lie, is useful in developing programs or strategies for planning and controlling profits (Raharjo, 2022).

Altman Z-Score

The Altman Z-score method can be used to predict whether a company will go bankrupt (Meiske Idi & Darwin Borolla, 2021). According to Lestari et al. (2022), this model provides a formula for calculating the degree of financial difficulty experienced by a corporation. According to Irfan Efendi et al. (2022), the Altman Z-Score method measures a variety of financial ratios that are believed to be important in assessing the health of the company. In this model, the five main ratios are sales to total assets, market value of equity to total liabilities, working capital to total assets, retained earnings to total assets, and earnings before interest and taxes to total assets. According to (Zainudin et al., 2023), the modified Altman Z-Score formula is used to generate an overall Z-score index, which is then shown. The foundation for this calculation is the major financial measurements.

$$Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 1.0X_5$$

Description:

X_1 : Working Capital/Total Assets;
X_2 : Retained Earnings/Total Assets;
X_3 : Earnings Before Interest and Taxes/Total Assets;
X_4 : Market Value of Equity/Total Liabilities;
X_5 : Sales/Total Assets.

The Altman Z-Score interpretation is that if Z> 2.99 the company is not bankrupt, Z 1.81 to 2.99 the company is in a gray area, and if Z < 1.81 the company is at high risk of bankruptcy.

Springate

In addition to the Altman Z-Score, the Springate model developed by Gorgon L.V. Springate in 1978 uses multiple discriminant analysis (MDA) to select four financial ratios from 19 commonly used in financial studies. The four ratios were chosen because they were considered the most effective in distinguishing between companies that experienced bankruptcy and those that continued to operate (Fatmawati et al., 2023). In the formula for the Springate model is presented as follows:

$$S = 1.03X_1 + 3.07X_2 + 0.66X_3 + 0.4X_4$$

Description:
X_1 : Working Capital/Total Assets;
X_2 : Earnings Before Interest and Taxes/Total Assets;
X_3 : Earnings Before Taxes/Current Liabilities;
X_4 : Sales/Total Assets.

Springate's interpretation is $S \geq 0.862$ which the business is doing in well condition (not at risk of bankruptcy). $S < 0.862$ that indicates the business faces a high danger of going bankrupt.

Grover

Grover's model is a development of the Altman Z-Score model created by Altman in 1968, then refined by Jeffery S. Grover. Grover even uses a sample in his study that follows the Altman Z-Score model, which requires a balanced sample size that includes bankrupt and non-bankrupt companies (Farha et al., 2023). Meanwhile, the presentation of the formula for the Grover model in Utama & Hamidah (2024) research is presented as follows:

$$\text{G-Score} = 1.650X_1 + 3.40X_3 - 0.016\ \text{ROA} + 0.057$$

Description:
X_1 : Working Capital/Total Assets;
X_3 : Earnings Before Interest and Taxes/Total Assets;
ROA : Net Income/Total Assets.

G > 0.01 according to Grover's view indicates that the business is doing well and has no bankruptcy danger. G is less than -0.02, indicating a high chance of insolvency for the company.

Accuracy and Error Rate

The financial records of the business can be utilised to assess the degree of accuracy and error in financial distress analysis, particularly by examining the company's negative earnings (Susanti et al., 2022). Based on the calculation of accuracy and error, the most optimal or accurate bankruptcy prediction method can be determined (Kusdiana et al., 2017) Numerous studies have been conducted on tools or methods for detecting bankruptcy, resulting in various prediction models that are used as a means to improve a company's condition before it falls into bankruptcy or liquidation (Harahap et al., 2025). In this context, if a company continues to experience negative profits, then there is a high probability that the company is at risk of bankruptcy.

The presentation of the formula for calculating the level of accuracy and type error in the research of Kusdiana et al. (2023) is presented as follows:

$$\text{Accuracy Level} = \frac{\text{Number of Correct Predictions}}{\text{Sample Quantity}} 100\%$$

The number of correct predictions is the financial condition that falls into the healthy category in the calculation of the Altman Z-Score, Springate and Grover models. While the number of samples is the number of years studied.

$$\text{Error} = \frac{\text{Number of Incorrect Predictions}}{\text{Sample Quantity}} 100\%$$

The number of false predictions is the financial condition that according to the Altman Z-Score, Springate, and Grover models, is classified as bankruptcy. While the number of samples is the number of years studied.

METHODS

This study assesses the accuracy of the Grover, Altman Z-Score, and Springate models while analysing financial distress at PT Sri Rejeki Isman Tbk (Sritex) from 2019 to 2023 using a descriptive quantitative method. The secondary data utilised comes from yearly financial reports that are available on the IDX (Indonesia Stock Exchange's) official website. Statements of income, balance sheets, and cash flow are the three main components of these reports.

Financial reports released by the IDX are downloaded in order to collect data. The Grover, Altman Z-Score, and Springate models are then used to interpret the data in order to analyse financial distress and evaluate each model's accuracy. Variable measurements are based on indicators contained in the three models.

RESULTS AND DISCUSSION

This study examines PT Sri Rejeki Isman Tbk's (Sritex) financial distress during the 2019–2023 timeframe using the Grover, Altman Z-Score, and Springate models and test the accuracy of the three models.

Table 1
Calculation Results Using the Altman Z-Score Model

	2019	2020	2021	2022	2023
Z-Score	2.4173	2.1983	-2.0314	-2.3475	-2.8752
Prediction	Grey	Grey	Bankrupt	Bankrupt	Bankrupt

Source: Processed data, 2024

Based on the Altman Z-Score calculation, in 2019 and 2020 the company is in the gray area category, which means that the financial condition is still within reasonable limits but still at risk of bankruptcy. However, in 2021-2023, the Z-Score is negative, indicating a deteriorating financial condition with a high potential for bankruptcy.

Table 2
Calculation Results Using the Springate Model

	2019	2020	2021	2022	2023
S-Score	1.5001	1.1553	-2.4426	-2.4426	-1.1686
Prediction	Healthy	Healthy	Bankrupt	Bankrupt	Bankrupt

Source: Processed data, 2024

In Table 2 in 2019 and 2020 the S-Score shows that indicates that the business is doing well, which means that the risk of bankruptcy is very small. Meanwhile, in 2021-2023, the S-Score shows that the business may soon have to declare bankruptcy condition, reflecting that the company fails to earn enough profit to cover its liabilities.

Table 3
Calculation Results Using the Grover Model

	2019	2020	2021	2022	2023
G-Score	1.1578	1.0116	-1.2343	-0.6301	-0.3229
Prediction	Healthy	Healthy	Bankrupt	Bankrupt	Bankrupt

Source: Processed data, 2024

Grover's computations' outcomes shown in Table 3. have the same predictions as the Springate model, namely in 2019 and 2020, the G-Score shows that the company is in a healthy condition, which means that the risk of bankruptcy is very small. Meanwhile, in 2021-2023, The company is in a potentially bankrupt state, according to the G-Score, which indicates that it cannot make enough money to pay its debts.

Table 4
Normality Test

	Shapiro-Wilk		
	Statistic	df	Sig.
AltmanZ_Score	.783	5	.059
Springate	.835	5	.152
Grover	.899	5	.404

Source: SPSS Output Data Processed, 2024

The Shapiro-Wilk method's normalcy test findings indicate that the data used to forecast financial distress in all models examined here follows a normal distribution. The significance value (Sig) serves as the basis for this test's decision-making criteria, where the data is said to be normally distributed if Sig> 0.05. The Sig value that the Altman Z-Score model achieved is 0.059, the Springate model had a Sig value of 0.152, and the Grover model reached a Sig value of 0.404. Thus, all models show normal data distribution and can be used for further analysis.

Table 5
Paired Sample T Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	AltmanZ_Score – Springate	.1519800	1.1072746	.4951883	-1.2228830	1.5268430	.307	4	.774
Pair 2	AltmanZ_Score – Grover	-.5241200	1.7117356	.7655114	-2.6495204	1.6012804	-.685	4	.531
Pair 3	Springate – Grover	-.6761000	.9100297	.4069777	-1.8060512	.4538512	-1.661	4	.172

Source: SPSS Output Data Processed, 2024

To determine how the models utilised in this investigation differed from one another, a paired T-test analysis was performed. The decision in this test is based on the significance value (Sig), where if the Sig value is <0.05, then the models under comparison differ significantly from one another. The test findings indicate that the Altman Z-Score model and Springate do not significantly differ from one another (Sig = 0.774), Altman Z-Score and Grover (Sig = 0.531), and Springate and Grover (Sig = 0.172). Because all Sig values> 0.05, it can be concluded that the three models do not have significant differences in predicting PT Sritex's financial distress.

Table 6
Accuracy and Error Rate Calculation Results

	Correct Prediction	Wrong Prediction	Total Sample	Accuracy	Error
Altman Z-Score	0	3	5	0%	60%
Springate	2	3	5	40%	60%
Grover	2	3	5	40%	60%

Source: Processed data, 2024

There is no accuracy in the Altman Z-Score model since none of PT Sritex's financial conditions from 2019-2023 are in the healthy category. Since the grey region does not conclusively show whether a company is bankrupt or healthy, the financial status in 2019–2020 fell into this group and was excluded from the computation of the accuracy or error level. For a type error of 60% from the calculations carried out on PT Sritex in 2021-2023, the business could file for bankruptcy, just like the reality experienced by the company, namely the sales of PT Sritex at that time continued to decline and posted losses until the end of the first semester of 2024.

The Springate model is the same as the Grover model, which obtained an accuracy rate of 40% because in 2019-2020 the financial condition of PT Sritex was in the healthy category. For a type error of 60% of the calculations made, PT Sritex for the 2021-2023 period is in a bankrupt condition. So that correct predictions and wrong predictions using the Grover and Springate models are the same as the reality experienced by PT Sritex.

This study reveals that the Gover and Springate models are more accurate than the Altman Z-Score to predict PT Sritex's financial distress. This is consistent with Wulandari Fauzi (2022) research, which concluded that the Grover model is better suitable for the real estate sector than the Altman Z-Score. Furthermore, this study is consistent with Sembiring Sinaga (2022) research, who found that the springate model outperforms the Altman Z-Score model in terms of accuracy.

However, it is different from Sari & Parulian's research (2023) which shows that Altman Z-Score is more accurate in the tourism sector. This difference shows that the effectiveness of the model still depends on the characteristics of the industry and the economic conditions of the company under study.

Overall, this study confirms that the selection of a financial distress prediction model should consider the characteristics of the industry and the period of analysis. Altman Z-Score may be more suitable for industries that have stable financial patterns, while Springate and Grover models are better at detecting more dynamic financial changes such as in the textile industry.

CONCLUSION AND SUGGESTION

With an accuracy rate of 0%, this study demonstrates that the Altman Z-Score model is ineffective in evaluating PT Sri Rejeki Isman Tbk's (Sritex) financial distress within the

2019–2023 timeframe. This is because the financial status of the business is not clearly classified in the 2019–2020 grey area category. In contrast, the Springate and Grover models show an accuracy rate of 40%, which is better at capturing the financial dynamics of PT Sritex, although it still has a type error of 60%.

The findings of this research have significant ramifications for investors, management, and creditors in assessing the risk of corporate bankruptcy, especially in the textile sector, it is heavily impacted by outside variables including changes in the cost of raw materials, international competition, and unstable economies. The difference in accuracy between the Altman Z-Score, Springate, and Grover models shows that no model is completely accurate, and the effectiveness of predictions may vary depending on industry characteristics and macroeconomic conditions.

It is suggested that additional companies from diverse sectors be investigated in future studies to test the reliability of the models in different industry contexts and use other prediction models, such as Zmijewski, Ohlson, or Fulmer H-Score, to compare accuracy with the models used in this study.

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