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Altman Z-Score Analysis To Predict Bankruptcy In The Food Industry Industry In Indonesia In 2018-2022

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Abstract. This research aims to assess the extent of corporate insolvency using the Altman Z-Score model in the Food Industry, specifically focusing on companies listed on the Indonesia Stock Exchange from 2018 to 2022. The selection criteria for the sample involved companies that consistently published financial reports during the aforementioned period. The findings of this study demonstrate that the Altman Z-Score model can effectively identify the likelihood of bankruptcy in the Food Industry listed on the Indonesia Stock Exchange. For companies classified as susceptible to bankruptcy, it is crucial for them to exercise caution when formulating corporate policies and strive to enhance overall company performance. They should also endeavor to optimize the utilization of their assets to attain maximum profitability. On the other hand, companies in a financially stable condition should maintain and enhance their performance in generating profits to avoid bankruptcy.

Keywords: Food Industry, Bankrupt, Altman ZScore

A. INTRODUCTION

Corporate bankruptcy is a commonly observed phenomenon in the business world, influenced by various internal and external factors. Factors such as rising costs of raw materials, wages, electricity, or other expenses without corresponding increases in the company's capabilities, the presence of superior competing products that affect sales, and ineffective company management by its executives can all contribute to this occurrence. The consequences of bankruptcy include a decline in company performance, ultimately leading to insolvency. To prevent such unwanted outcomes, it is crucial for companies to be well-prepared and take early measures. Regular assessments of the company's current state are necessary to gain a clear understanding of its condition. By doing so, appropriate actions can be taken to address and improve any existing weaknesses, enabling the company to remain competitive and survive in the market.

To proactively avoid bankruptcy, companies must prepare in advance to mitigate unfavorable circumstances. It is expected that companies will conduct regular assessments of their ongoing condition to gain a comprehensive understanding of their present state. This enables them to identify appropriate actions necessary to sustain and enhance their competitiveness. Financial statements play a crucial role as a tool for companies to evaluate their overall condition. By comparing current financial statements with those from previous periods, companies can obtain a clearer insight into their current standing. Among the bankruptcy models that have demonstrated significant advantages, the Z-Score model stands out. Developed by Edward I. Altman, a financial economist, this model has proven to be highly beneficial.

The Altman model is an advanced statistical technique that integrates multiple variables to assess financial conditions. It represents a significant advancement in financial analysis and has gained extensive usage in the United States.

Bankruptcy analysis holds immense significance as it enables the assessment of indications of company insolvency, thereby determining whether a company is at risk of bankruptcy or not. The repercussions of company bankruptcy extend to various stakeholders, including managers, investors, creditors, and even employees. Recognizing the gravity of this issue, the researcher recognizes the utmost importance of conducting a study to investigate the indications of bankruptcy in the Food Industry listed on the Indonesia Stock Exchange from 2018 to 2022, utilizing the Altman Z-Score model. The primary objective of this research is twofold: (1) to identify indications of bankruptcy in the food industry subsector using the Altman Z-Score model, and (2) to assess the suitability of the Altman Z-Score model as a predictive tool for determining the likelihood of corporate bankruptcy.

In his research, Edward I. Altman identified five crucial financial ratios out of the initial selection of 22 ratios. These five ratios serve as indicators that can detect the likelihood of company bankruptcy before it actually occurs. The ratios include working capital to assets, retained earnings to total assets, earnings before interest and taxes to assets, market value of share capital to book value of debt, and sales to assets. This analytical approach is commonly known as Z-Score analysis. It provides accurate predictions regarding a company's performance and future financial health, indicating whether a company is at risk of bankruptcy, prone to bankruptcy, or in a stable financial condition. Such analysis is highly beneficial for investors, assisting them in making informed decisions about selling, buying, or retaining their investments in a particular company. Moreover, company leaders find value in compiling and evaluating this information, enabling them to make well-informed decisions and be accountable to shareholders and investors.

Based on the background above, the title of this research is "Altman Z-Score Analysis to Predict Bankruptcy in the Food Industry in Indonesia from 2018-2022".

B. LITERATURE REVIEW

A research conducted by Sofi Isma Mahmuda, Yayat Supriyatna, and Heraeni Tanuatmodjo in 2023 titled "Altman Z-Score Analysis in Predicting Company Bankruptcy Before and During the COVID-19 Pandemic" aimed to examine the application of Altman Z-Score analysis in predicting bankruptcy for companies in the hotel, restaurant, and tourism subsector listed on the Indonesia Stock Exchange. The Altman Z-Score model combines liquidity ratios (WC/TA), profitability ratios (RE/TA and EBIT/TA), and solvency ratios (BVE/TL) to predict bankruptcy. The research utilized a descriptive and comparative research method, analyzing data from 30 companies in the hotel, restaurant, and tourism subsector from 2018 to 2021. The findings indicated that prior to the COVID-19 pandemic, 60% of companies were categorized as safe, 23.33% were in the gray zone, and 16.67% were in the danger zone. During the COVID-19 pandemic, 43.33% of companies were in the safe zone, 13.33% in the gray zone, and 43.33% in the danger zone. Hypothesis testing demonstrated a significant difference in bankruptcy prediction values using the Altman Z-Score model before and during the COVID-19 pandemic.

In a separate study conducted by Alif Fikri Alim in 2017, titled "Bankruptcy Prediction Analysis with the Altman Z-Score Model in Food and Beverage Companies Listed on the Indonesia Stock Exchange," the objective was to analyze the potential bankruptcy of food and beverage companies listed on the Indonesia Stock Exchange using the Altman Z-Score model. The sample for this study comprised 14 food and beverage companies listed on the Indonesia Stock Exchange from 2014 to 2016. The data source utilized was secondary data in the form of annual financial reports of the food and beverage companies listed on the IDX. The findings revealed that four companies showed potential for bankruptcy: PT Tiga Pilar Sejahtera Food Tbk, PT Tri Banyan Tirta Tbk, PT Indofood Sukses Makmur Tbk, and PT Pradisha Aneka Niaga Tbk. Additionally, one company was positioned in the gray zone, while nine companies were deemed to be in a financially healthy condition.

C. RESEARCH METHODOLOGY

This research employs a quantitative approach, where each variable and the relationships between variables are assessed using quantitative measurement scales. The population and sample for this study are drawn from the Indonesia Stock Exchange during the period of 2018-2022. The population in question consists of the Food Industry companies listed on the Indonesia Stock Exchange between 2018-2022, as documented by the IDX and the website www.idx.co.id.

Research Sample as follows:

Table 1 Research Samples

No.	Code	Food Industry in Indonesia
1	ICBP	PT Indofood CBP Sukses Makmur Tbk
2	MYOR	PT Mayora Indah Tbk
3	ULTJ	PT Ultrajaya Milk Industry Tbk
4	GOOD	PT Garuda Food Putra Putri Jaya Tbk

Variable identification and operational definitions are as follows:

Table 2 Identification Variable

Variable	Proxy	Measurement
Ratio of working capital to total assets	X1	$X1 = \frac{\text{Modal Kerja}}{\text{Total Aktiva}}$
Retained Earnings to Total Assets Ratio	X2	$X2 = \frac{\text{Laba ditahan}}{\text{Total Aktiva}}$
Earnings before interest and taxes to total assets ratio	X3	$X3 = \frac{\text{EBIT}}{\text{Total Aktiva}}$
Market Value of Share Capital to Book Value of Debt	X4	$X4 = \frac{\text{Nilai Pasar Modal}}{\text{Nilai Buku Hutang}}$
Sales to total assets ratio	X5	$X5 = \frac{\text{Penjualan}}{\text{Total Aktiva}}$

D. RESULTS AND DISCUSSION

1. Calculation of Altman Z-Score Analysis

a. PT Indofood CBP Sukses Makmur Tbk

The results of the calculation for the Z-Score value of PT Indofood CBP Sukses Makmur Tbk. in the period 2018 to 2022 can be seen in table 1 as follows:

Table 3 Z Score of PT Indofood CBP Sukses Makmur Tbk

Period	Z Score					Zi	Classification
	X1	X2	X3	X4	X5		
2018	0.200	0.436	0.188	10.452	1.118	8.859	Healthy
2019	0.260	0.477	0.192	10.801	1.093	9.187	Healthy
2020	0.111	0.221	0.096	2.113	0.451	2.479	Prone to Bankruptcy
2021	0.128	0.229	0.084	1.609	0.481	2.199	Prone to Bankruptcy
2022	0.182	0.254	0.065	2.016	0.562	2.562	Prone to Bankruptcy
Average	0.176	0.323	0.125	5.398	0.741	5.057	Healthy

The data above can be interpreted as follows:

PT Indofood CBP Sukses Makmur Tbk has consistently been in a precarious financial position or can be described as having a susceptibility to bankruptcy for three consecutive years from 2020 to 2022. This is evident from the Zi values ranging between 1.81% to 2.99%. However, in 2018 and 2019, the company was in a stable state, as indicated by healthy Z-Score values during those years.

The gradual decline in Zi from year to year highlights the necessity for the company to enhance its financial performance. Therefore, it can be concluded that PT Indofood CBP Sukses Makmur Tbk is prone to bankruptcy. Figure 1 illustrates the calculated Z-Score values for PT Indofood CBP Sukses Makmur Tbk during the period of 2018 to 2022.

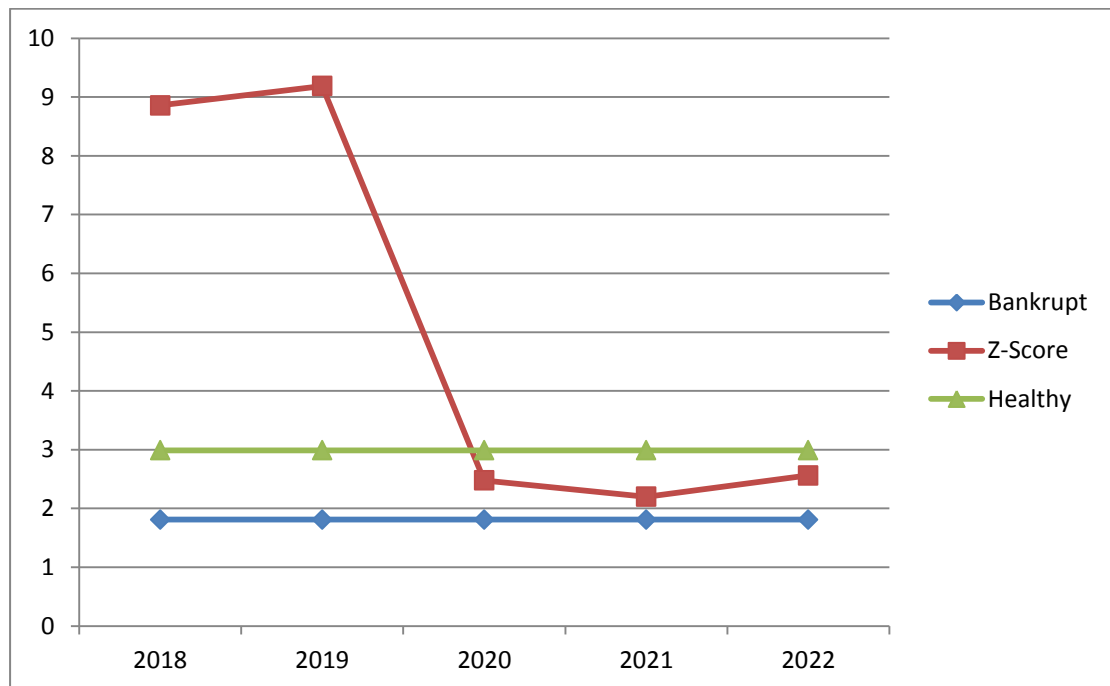


Figure 1 Z Score value of PT Indofood CBP Sukses Makmur Tbk.

b. PT Mayora Indah Tbk

The calculation results for the Z-Score value of PT Mayora Indah Tbk. in the period 2018 to 2022 can be seen in table 2 as follows:

Table 4 Z Score of PT Mayora Indah Tbk

Period	Z Score					Zi	Classification
	X1	X2	X3	X4	X5		
2018	0.448	0.449	0.135	6.474	1.368	6.865	Healthy
2019	0.476	0.485	0.142	5.023	1.315	6.047	Healthy
2020	0.473	0.535	0.136	7.123	1.238	7.276	Healthy
2021	0.908	0.078	0.011	5.330	0.204	4.639	Healthy
2022	0.779	0.002	0.347	5.920	4.249	8.014	Healthy
Average	0.305	0.310	0.154	5.974	1.675	6.568	Healthy

The data above can be interpreted as follows:

PT Mayora Indah Tbk. has maintained a stable and healthy financial position for five consecutive years from 2018 to 2022. This is evident from the Zi values consistently exceeding 2.99%. The increasing Zi values year after year indicate that the company has been consistently improving its financial performance. It is projected that the company will continue to maintain its healthy and stable position in the upcoming years, provided it continues to enhance its performance.

Figure 2 illustrates the calculated Z-Score values for PT Mayora Indah Tbk. during the period of 2018 to 2022.

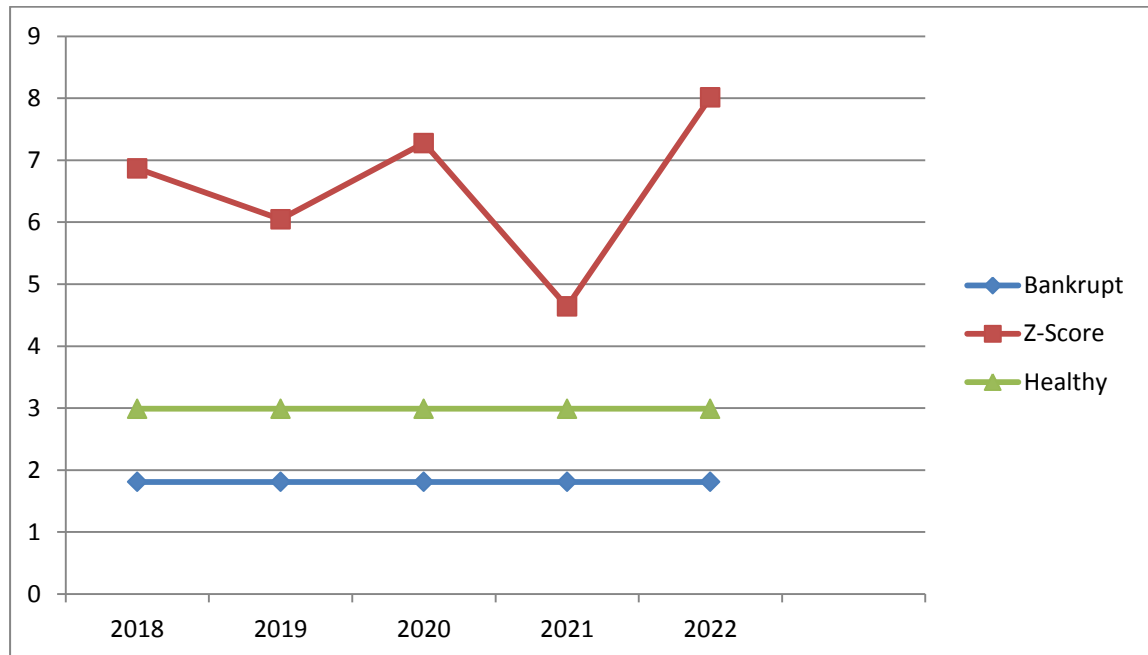


Figure 2 Z Score value of PT Mayora Indah Tbk.

c. PT Ultrajaya Milk Industry Tbk

The calculation results for the Z-Score value of PT Ultrajaya Milk Industry Tbk. in the period 2018 to 2022 can be seen in table 3 as follows:

Table 5 Z Score value of PT Ultrajaya Milk Industry Tbk.

Period	Z Score					Zi	Classification
	X1	X2	X3	X4	X5		
2018	0.388	0.729	0.171	17.976	0.985	13.821	Healthy
2019	0.436	0.748	0.208	18.325	0.944	14.196	Healthy
2020	0.373	0.675	0.162	4.188	0.682	5.123	Healthy
2021	0.444	0.850	0.208	7.196	0.893	7.620	Healthy
2022	0.429	0.949	0.175	5.094	1.038	6.513	Healthy
Average	0.414	0.790	0.185	10.556	0.908	9.455	Healthy

The data above can be interpreted as follows:

PT Ultrajaya Milk Industry Tbk. has consistently maintained a stable and healthy financial position for five consecutive years from 2018 to 2022. The Zi values for these years consistently exceed 2.99%, indicating the company's stability. Although there was a slight decrease in the Zi value in 2020, it still remained above 2.99%. It is expected that the company will continue to remain in a healthy and stable position in the forthcoming years, provided it continues to enhance its performance.

Figure 3 presents the graphical representation of the calculated Z-Score values for PT Ultrajaya Milk Industry Tbk. during the period from 2018 to 2022.

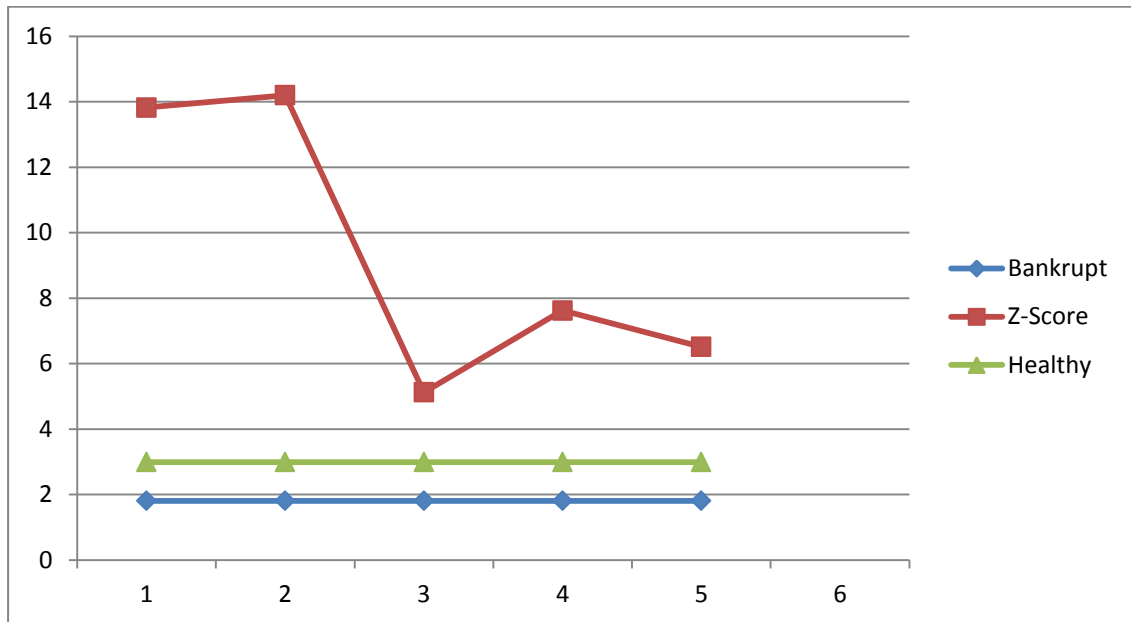


Figure 3 Z Score value of PT Ultrajaya Milk Industry Tbk.

d. PT Garuda Food Putra Putri Jaya Tbk.

The results of the calculation for the Z-Score value of PT Garuda Food Putra Putri Jaya Tbk. in the period 2018 to 2022 can be seen in table 4 as follows:

Table 6 Z Score value of PT Garuda Food Putra Putri Jaya Tbk.

Period	Z Score					Zi	Classification
	X1	X2	X3	X4	X5		
2018	0.057	0.177	0.138	8.031	1.911	5.957	Healthy
2019	0.189	0.192	0.108	0.970	1.567	2.794	Prone to Bankruptcy
2020	0.187	0.162	0.049	0.506	1.108	1.927	Prone to Bankruptcy
2021	0.124	0.210	0.093	5.201	1.300	4.165	Healthy
2022	0.186	0.222	0.092	4.872	1.434	4.271	Healthy
Average	0.149	0.193	0.096	3.916	1.464	3.823	Healthy

The data above can be interpreted as follows:

PT Garuda Food Putra Putri Jaya Tbk. has exhibited a susceptibility to bankruptcy for two consecutive years from 2019 to 2020. This is evident from the Zi values falling within the range of 1.81% to 2.99%. However, in 2018 and 2021-2022, PT Garuda Food Putra Putri Jaya Tbk. is considered to be in a healthy financial state. The decline in Zi values during these two years indicates that PT Garuda Food Putra Putri Jaya Tbk. is encountering financial performance issues. Consequently, the overall assessment suggests that PT Garuda Food Putra Putri Jaya Tbk. is prone to bankruptcy. Figure 4 presents the graphical representation of the calculated Z-Score values for PT Garuda Food Putra Putri Jaya Tbk. during the period from 2018 to 2022.

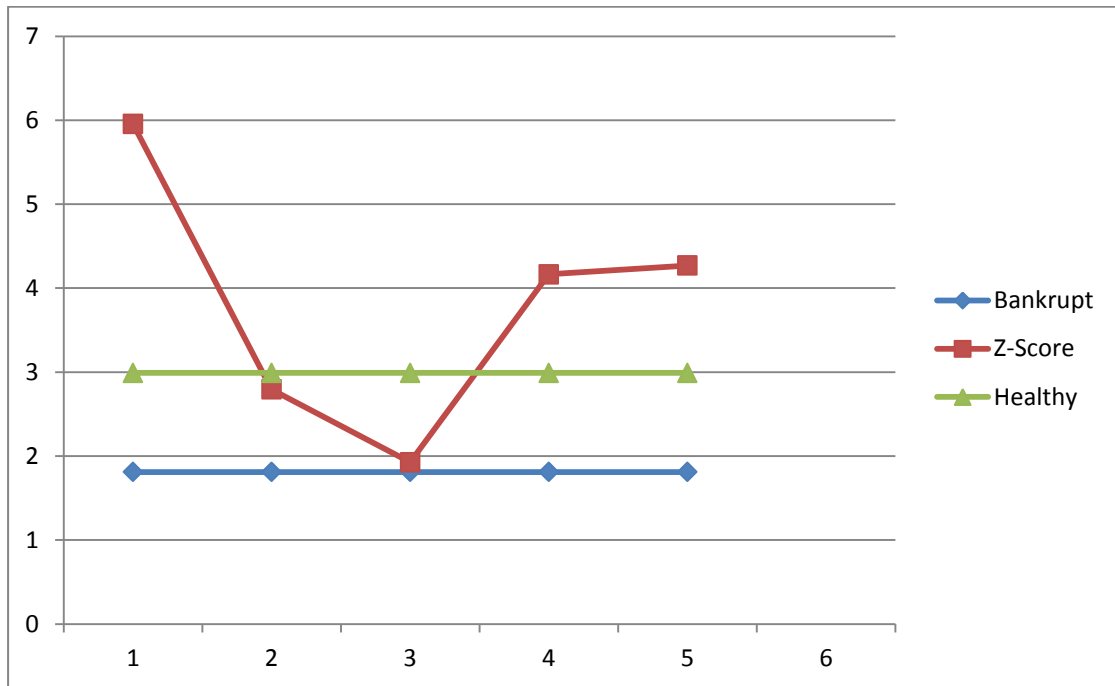


Figure 4 Z Score value of PT Garuda Food Putra Putri Jaya Tbk.

PT Mayora Indah Tbk. and PT Ultrajaya Milk Industry Tbk. have maintained a healthy financial position for five consecutive years. On the other hand, PT Indofood CBP Sukses Makmur has been categorized as prone to bankruptcy from 2020 to 2022, while PT Garuda Food Putra Putri Jaya Tbk. was in the bankruptcy-prone category in 2019 and 2020. These findings indicate the need for these companies to prioritize improving their performance. One potential strategy could involve increasing sales volume by effectively managing existing inventory, thereby generating income and improving the company's cash flow.

These four companies, on average, fall into the healthy category, despite the fact that two of them have experienced a decline and are considered prone to bankruptcy due to Zi values below 1.81%. This evaluation serves as a reminder for these companies to continually enhance their performance. In addition to focusing on financial aspects, companies can also improve and augment their intangible assets. These assets may include the company's management systems, loans from external parties such as banks and other companies, government subsidies, and collaboration agreements with well-established companies. By strengthening these intangible assets, companies can further enhance their overall performance and resilience.

E. CONCLUSIONS AND SUGGESTIONS

Based on Altman Z-Score to predict bankruptcy in Food Companies in Indonesia in 2018-2022 as follows:

Nama Perusahaan	Analisa Altman Z-Score					Zi	Predikat
	2018	2019	2020	2021	2022		
<i>PT Indofood CBP Sukses Makmur Tbk</i>	8.859	9.187	2.479	2.199	2.562	5.057	Sehat
<i>PT Mayora Indah Tbk</i>	6.865	6.047	7.276	4.639	8.014	6.568	Sehat
<i>PT Ultrajaya Milk Industry Tbk</i>	13.821	14.196	14.196	5.123	7.620	10.991	Sehat
<i>PT Garuda Food Putra Putri Jaya Tbk</i>	5.957	2.794	1.927	4.165	4.271	3.823	Sehat
Food Industry Bankruptcy Rate						6.610	Sehat

- According to the Altman Z-Score analysis, PT Indofood CBP Sukses Makmur Tbk. demonstrates a healthy and stable financial position, with an average value of 5.057. This is evident from the Zi value, which exceeds 2.99%.
- The Altman Z-Score analysis indicates that PT Mayora Indah Tbk. is a stable and well-performing company, with an average value of 8.014. The Zi value for the company also exceeds 2.99%.
- PT Ultrajaya Milk Industry Tbk. is deemed to be in a healthy and stable financial position based on the Altman Z-Score analysis, with an average value of 7.620. The Zi value for the company is above 2.99%.
- PT Garuda Food Putra Putri Jaya Tbk., as per the Altman Z-Score analysis, is considered a stable and commendable company, with an average value of 4.271. The Zi value for the company also surpasses 2.99%. These findings are based on the Altman Z-Score analysis as outlined in Hanafi and Halim, 2005: 274.

From the table and explanation above, it can be seen that the four food companies have a Zi value with an average above 2.99%, so the four companies are categorized as healthy or stable, not including companies that are prone to bankruptcy.

Limitations

A limitation of this study is that the analysis conducted is a predictive or financial forecast of the company, meaning that the Zi value cannot be solely relied upon as a definitive measure to determine the actual occurrence of bankruptcy. Management should consider multiple indicators of company failure when making such determinations. Furthermore, the bankruptcy discriminant model developed by Altman relies on variables extracted from financial statements. Consequently, if there are errors in the preparation of financial statements, the accuracy of the Zi value results may be compromised.

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