Potential Bankruptcy Detection in the Food and Beverage Industry: Altman Z-Score Approach in the Indonesian Stock Exchange

Willa Fatika Sari[1*] , Abdul Hafiz[2] , Berandi Suaryansyah[3] ,
and Andre Riswanto[4]

[1,2,3,4] Faculty of Economics and Business, Universitas Bangka Belitung, Bangka Belitung Province 33172, Indonesia
*willa@ubb.ac.id

Abstract. This study aimed to analyze the potential bankruptcy of manufacturing sector companies, food and beverage industry in particular, which was listed in the Indonesia Stock Exchange (IDX) during 2018-2020 period. The study used the Altman Z-Score method to predict bankruptcy in three companies: PT Indofood CBP Sukses Makmur Tbk (ICBP), PT Indofood Sukses Makmur Tbk (INDF), and PT Mayora Indah Tbk (MYOR). The annual financial statements were analyzed using Altman Z-Score. The results showed that ICBP is in a distress condition with an average Z-Score of 1.368. INDF is in the grey area with an average Z-Score of 2.102, while MYOR is categorized as a healthy company with an average Z-Score of 6.725. Based on these results, advice is given to companies in distress to increase working capital, sales, and manage debt more effectively. Meanwhile, a healthy company is expected to continue to maintain its performance.

Keywords: Bankruptcy, Altman Z-Score, Financial Distress, Financial Statements, Manufacturing.

1   Introduction

Public companies in Indonesia are categorized into many industries, including manufacturing. they are listed on the Indonesia Stock Exchange (IDX). Food and beverage are a significant subsector of the manufacturing industry, with 24 listed businesses as of 2021. These companies were struggling during pandemic in 2018 to 2020, including ICBP, INDF, and MYOR [1].

One commonly used technique to evaluate financial conditio of a company is Altman's bankruptcy prediction model. It was developed by Altman in 1968 to evaluates a company's financial distress. The model calculates the company's financial ratio to figure out their Z-Score. Altman then categorized them into healthy, grey area, or distressed condition based on the Z-Score [4], [6].

Techniques such as the Altman Z-Score are frequently employed to assess bankruptcy risk. This technique uses financial ratios derived from their financial statement

to calculate the Z-Score and offer insight regarding the company financial performance and health [3]. The goal of this study is to analyze financial resillience of ICBP, INDF, and MYOR before and during pandemic from 2018 to 2020.

This introduction explains the importance of analyzing financial statements to determine a company's likelihood of bankruptcy, driven by both internal and external factors, and highlights the Altman Z-Score method as a valuable tool for such analysis.

2   Methods

2.1   Population and Sample

This study assesses manufacturing companies listed on the IDX (Indonesia Stock Exchange) during 2018 to 2020 [1]. Furthermore, the samples used are specifically for food and beverage industry companies that are categorized as blue-chip company.

2.2   Data and Data Sources

This study used annual financial statements of the samples in 2018, 2019, and 2020. The financial statement was retrieved from the Indonesia Stock Exchange's official website (IDX) [1].

2.3   Data Analysis Methods

This study used a quantitative approach to analyze the company's financial statements to identify its resilience to bankruptcy [7], [8]. In this case, it uses the Altman Z-Score model to identify potential bankruptcies in companies.

The steps in analyzing the data in this study are as follows [10], [3]:

Ratio Calculation. The first step is to calculate the five ratios that are the variables to predict Altman Z-Score's bankruptcy. Here is the formula to calculate the five ratios, namely:

$X1$: (Current Assets – Current Liabilities) / Total Assets
$X2$: Retained Earnings / Total Assets
$X3$: Earnings Before Interest and Taxes (EBIT) / Total Assets
$X4$: Market Value of Common and Preferred Stock / Book Value of Total Debt
$X5$: Sales / Total Assets

Calculation with Altman Z-Score Formula. After determining the five ratios, the next step is to find the Z-Score value of each company using the Altman Z-score formula as follows:

$$Z = 1.2\ X1 + 1.4\ X2 + 3.3\ X3 + 0.6\ X4 + 1.0X5$$

Classification of Companies Based on Z-Score. The next step is to assess the results of the Z-Score to detemine the classification of the company's bankruptcy level. The classification value of each company will be determined based on the following criteria:

a. Z-Score > 2.99, This means that the company was categorized as a healthy company.
b. 1.81 < Z-Score < 2.99, This means that the company is categorized as grey area company. It means the company falls in between healthy and experiencing distress
c. Z-Score < 1.81, This means that the company is categorized as experiencing financial distress

Calculation of The Average Z-Score during The Assessment Period. The last step is to calculate the average Z-Score from the three periods studied, namely 2018, 2019, and 2020, so that we can know which companies have the potential to go bankrupt during those three years.

3   Results and Discussion

3.1   The Altman Z-Score Analysis findings for ICBP

The following are the results of the calculation of the Altman Z-Score method of ICBP for the period 2018 to 2020 namely:

Table 1. The Results of the Calculation of the Altman Z-Score Method

Year	Z-Score Value					Zi	Classification
	X1	X2	X3	X4	X5		
2018	0.24	0.611	0.619	0.627	1.118	3.215	Healthy
2019	-2.477	0.667	0.634	0.648	1.093	0.565	Distress
2020	-0.874	0.304	0.317	0.126	0.45	0.323	Distress
Average	-1.037	0.527	0.523	0.467	0.887	1.368	Distress

The data above shows ICBP was in a healthy or stable position in 2018. However, it was in in a distressed position for 2 consecutive years from 2019-2020. During this period, ICBP was on the verge of banktruptcy. This is based on a Zi value that is smaller than 1.81. Furthermore, the three years average z-score was 1,368 which concluded that ICBP was in distress condition. The company's financial ratios have been worsening, which is seen in the working capital to asset ratio (X1), where the value has been negative for the past two years (2019 and 2020). Additionally, as of 2020, the company's other ratios are worth less than they were the year before. ICBP should conduct a more detailed evaluation to figure out the cause of the company's distress condition and improve its performance, aligning with Isnaini et.al. [5].

3.2   The Altman Z-Score Analysis findings for INDF

The following are the results of the calculation of the Altman Z-Score method of INDF for the period 2018 to 2020 namely:

Table 2. The Results of the Calculation of the Altman Z-Score Method

Year	Z-Score Value					Zi	Classifica-tion
	X1	X2	X3	X4	X5		
2018	0.026	0.336	0.255	0.842	0.76	2.219	Grey area
2019	0.084	0.388	0.3	0.994	0.796	2.562	Grey area
2020	0.077	0.266	0.251	0.43	0.501	1.525	Distress
Average	0.062	0.330	0.269	0.755	0.686	2.102	Grey area

The z-score calculation analysis shows that INDF in 2018 and 2019 was in the grey area condition, and in 2020 it worsened into a distress condition with a Z-Score of 1.525 < 1.81. So, it is concluded that INDF is in a grey area condition with an average Z-Score of 2.102. This condition can be caused by an increase in the company's total debt in 2020. However, other financial indicators such as working capital, EBIT, retained earnings, and sales of the company have increased from 2018 to 2020. Therefore, the management should conduct an evaluation figure out the cause of bad decision-making that led the company to be in a grey area condition, as supported by Nugraha and Rismanty [9].

3.3   The Altman Z-Score Analysis findings for MYOR

The following are the results of the calculation of the Altman Z-Score method of MYOR for the period 2018 to 2020 namely:

Table 3. The Results of the Calculation of the Altman Z-Score Method

Year	Z-Score Value					Zi	Classifica-tion
	X1	X2	X3	X4	X5		
2018	0.538	0.625	0.447	3.884	1.368	6.862	Healthy
2019	0.571	0.676	0.469	3.01	1.315	6.041	Healthy
2020	0.568	0.745	0.448	4.274	1.238	7.273	Healthy
Average	0.559	0.682	0.455	3.723	1.307	6.725	Healthy

Based on the the calculation, MYOR for three consecutive years from 2018 to 2020 was free from financial distress, in other words, categorized as a healthy company, with an average Z-Score of 6.725 > 2.99. The most influential ratio is the ratio of stock market value to the total debt book value or X4. MYOR's current assets, total assets, and retained earnings grew from 2018–2020, as shown by other financial ratios. MYOR

must continue its strategy during pandemic to maintain its healthy financial condition, a finding backed by Nugraha and Rismanty [9], aligning with Harahap and Sari [2].

3.4   Overall Altman Z-Score Analysis Results

Based on the calculation of bankruptcy indicators using Altman Z-Score, the following is a summary of the analysis results of the three companies. They are presented in the form of a table below:

Table 4. The Results of the Z-Score Value of Food and Beverage Industry

Company	2018	2019	2020
ICBP	3.215	0.565	0.323
INDF	2.219	2.562	1.525
MYOR	6.862	6.041	7.273

From the results of the Z-Score calculation on food and beverage industry companies for three years starting from 2018 to 2020, it shows that the Z-Score at ICBP continues to decline every year. At INDF Z-Score in 2019 increased from the previous year, but in 2020 it decreased. Meanwhile, MYOR in 2019 experienced a decline, but the Z-Score of MYOR experienced an increase again in 2020. The following is the the Z-Score changing of the three companies during the 2018-2020 period, which can be seen in the following chart:
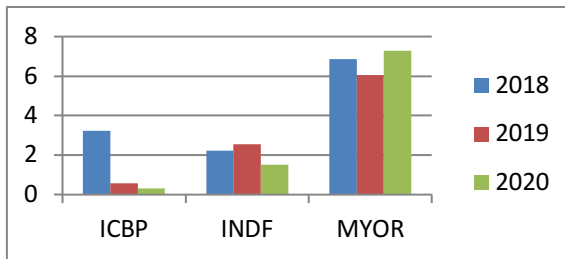

Fig. 1. The Z-Score changing in 2018-2020 Period.

Based on the Altman z-score model, the average z-score value determines the classification of each company. If the average Z-Score is over 2.99, it is said to be a healthy company; if the value is between 1.81 and 2.99, it is said to be in the grey area classification; and if the average Z-Score is less than 1.81, it is said to be a distress company. The average Z-Score value is shown in the table below:

Table 5. The Results of the Average Calculation of Z-Score

Company	Z-Score	Classification
ICBP	1.368	Distress
INDF	2.102	Grey area

Company	Z-Score	Classification
MYOR	6.725	Healthy

The results shows that each company was in a different financial condition. ICBP is in distress with a Z-Score of 1.368 (less than 1.81). Meanwhile, INDF is in the grey area position with a Z-Score of 2.102. And MYOR is included in the classification of healthy companies with a Z-Score of 6.725, which more than 2.99. As found by Isnaini et.al. [5], aligning with Harahap and Sari [2], supported by Nugraha and Rismanty [9].

4   Conclusion

The Altman z-score model shows that the three company are in different financial condition. Below are the brief explanations of each company financial condition:

1. The average z-score for ICBP is 1.368 (less than 1.81). This means that ICBP is in a distressing position. The company should increase its current asset to lift their z-score which represented by variable X1.
2. The average z-score for INDF is 2.102. It is between 1.81 and 2.99, which means that the company is in the grey area position. They should pay attention to their capital composition which is represented by variable X4. Additionally, they also have to generate a more effective strategy to increase their sales to lift their X5 variable score.
3. The average z-score for MYOR is 6.725. It is substantially more than 2.99, which means the company is in a healthy financial condition. Based on the z-score value, MYOR was in a healthy financial condition because their ability to manage their debt. It can be seen in the high score of variable X5. They also successfully manage their profit to maintain their financial stability during the pandemic. It is represented by variable X2 and X3 which having a relatively stable score during 2018 to 2020.

References

1. Bursa Efek Indonesia. (2021). www.idx.co.id.
2. Harahap, N. A., & Sari, E. P. (2024). Analisis Perbandingan Model Altman (Z-Score) Dan Springrate Untuk Memprediksi Financial Distress Pada Perusahaan Sub Sektor Makanan Dan Minuman Yang Terdaftar di Bursa Efek Indonesia Tahun 2017-2021. *Management, Accounting, Islamic Banking and Islamic Economic Journal*, *2*(1).
3. Hariyani, Diyah Santi and Agung Sujianto. (2017). Analisis Perbandingan Model Altman, Model Springate, dan Model Zmijewski dalam Memprediksi Kebangkrutan Bank Syariah di Indonesia. *Jurnal Akuntansi*, 1(1).
4. Imran, Ulfa Mahfiah, et.al. (2021). Analisis Prediksi Kebangkrutan Perusahaan dengan Menggunakan Metode Altman Z-Score dan Springate. *Jurnal Ilmu Manajemen*, 4(4).
5. Isnaini, F., Kusumayuda, Y., & Darwis, D. (2022). Penerapan Model Altman Z-Score Untuk Analisis Kebangkrutan Perusahaan Menggunakan (Sub Sektor Perusahaan Makanan Dan Minuman Terdaftar di Bursa Efek Indonesia). *Jurnal Ilmiah Sistem Informasi Akuntansi*, *2*(1).

6. Kadim, Abdul and Nardi Sunardi. (2018). Analisis Altman Z-Score untuk Memprediksi Ke-bangkrutan pada Bank Pemerintah (BUMN) di Indonesia tahun 2012-2016. *Jurnal Seku-ritas*, 1(3).
7. Kasmir. (2016). Analisis Laporan Keuangan. Jakarta: Raja Grafindo Persada.
8. Munawir, S. (2010). Analisa Laporan Keuangan. Edisi Keempat. Yogyakarta: Liberty.
9. Nugraha, S. K., & Rismanty, V. A. (2024). Analisis Prediksi Kebangkrutan Dengan Model Altman Z-Score Pada Perusahaan Sub Sektor Food and Beverages Yang Terdaftar di Bursa Efek Indonesia Periode 2018-2022. *Journal of Research and Publication Innovation*, *2*(4).
10. Rialdy, Novien. (2017). Analisis Prediksi Kebangkrutan dengan Menggunakan Metode Alt-man Z-Score at PT. Adhi Karya (Persero) Tbk. *Jurnal Keuangan dan Bisnis,* 9(1).