

ANALYSIS OF FINANCIAL DISTRESS IN PHARMACEUTICAL COMPANIES LISTED ON IDX

Widiastuti Murtiningrum*

Perbanas Institute

*Corresponding Author: widiastuti.murtiningrum@perbanas.id

Bella Arantika Rizky

Perbanas Institute

Abstract – *The emergence of the Covid-19 pandemic in 2020 made the economy weaken. the virus spread very quickly and spread to various countries around the world, lasting until 2021. This condition requires business actors to continue to grow and develop amidst a weakening economy so that they can maintain their business by using corporate strategies to obtain maximum income, this makes competition business is getting tougher. Almost all sectors experience the same impact, namely financial distress, including pharmaceutical companies. This study aims to analyze the prediction of financial distress of pharmaceutical companies in Indonesia using the Altman, Grover, Springate, and Zmijewski models. The data used in this research is secondary data, in the form of the company's financial reports for the 2020-2023 period. The samples used in this study were 8 pharmaceutical companies out of a total of 30 health and pharmaceutical companies listed on the Indonesia Stock Exchange. There is 1 company experiencing financial distress using the Altman method, 1 company using the Grover method, 6 companies using the Springate method and 1 company using the Zmijewski method. When viewed based on the overall results during the observation period, there was 1 company that experienced continuous financial distress during the 2020-2023 period, namely PT Indofarma Tbk (INAF). From the results of the ANOVA test it is known that there are differences in the four methods used and shows that the Grover model has the highest level of accuracy, with 98% accuracy and 2% error type.*

Keywords: Financial Performance, Financial Ratios, Financial Distress

I. INTRODUCTION

Bankruptcy prediction is an important thing that must be done to find out the potential for bankruptcy or not the company. Factors that can affect bankruptcy can be caused by external or internal conditions of the company. Internal conditions are caused by wrong decision making and errors in strategy setting. While external conditions occur beyond management's control such as the emergence of business competitors, inflation, global crises, and recessions. The occurrence of prediction errors will result in business continuity and cause a decrease in income levels. Based on the description above, the author is interested in researching the bankruptcy of companies using the Altman Z-Score, Grover, Springate and Zmijewski models in a research report entitled "Analysis of Financial Distress in Pharmaceutical Companies Listed on the IDX"

II. METHODS

This research uses secondary data sourced from the company's financial statements for 2020-2023 obtained through the official website of the related company or the website

of the Indonesia Stock Exchange (www.idx.co.id). The variables used in this study are the dependent variable and the independent variable. The dependent variable in this study is financial distress while the independent variable in this study is Working Capital to Total Assets, Retained Earning to Total Assets, Earning Before Interest and Tax (EBIT) to Total Assets, Book Value to Equity to Total Liabilities, Net income to (EBIT) to Total Assets, Book Value to Equity to Total Liabilities, Net income to Total Assets, Earning Before Taxes (EBT) to Current Liabilities, Sales to Total Assets, Return on Assets, Debt Ratio, Current Ratio. The samples used in this study were 8 pharmaceutical companies from a total of 30 health and pharmaceutical companies listed on the Indonesia Stock Exchange. The sampling technique is purposive sampling based on certain criteria. The following criteria are used in sampling: A pharmaceutical company listed on the Indonesia Stock Exchange. Companies that publish complete quarterly and annual financial statements for the period 2020-2023. Pharmaceutical companies that experience financial problems and are indicated to be bankrupt or healthy. Pharmaceutical companies listed on the Indonesia Stock Exchange that have complete data needed by the author.

In this study, researchers will use 4 methods that are quite popular in analyzing or predicting financial distress, namely:

Altman Z-Score Modification Model

The first model used is Altman Z-Score Modified, the formula used is: $Z = 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4$ with the following category criteria:

- If the Z value < 1.1 is included in the category of financial distress.
- If the value of $1.1 < Z < 2.6$ is included in the gray area category. If the Z value > 2.6 is included in the non-financial distress category.
- If the Z value is $1.81 < Z < 2.99$ gray area (the company is experiencing mild financial problems and has the potential to experience financial distress);

Where:

- X_1 = Working Capital to Total Assets
- X_2 = Retained Earnings to Total Assets
- X_3 = Earnings Before Interest and Tax on Total Assets
- X_4 = Book Value of Equity to Book Value of Total Debt

Grover's Model

The second model in this study is the Grover, the formula used is: $G = 1.650X_1 + 3.404X_2 + 0.016X_3 + 0.057$ with the following category criteria:

- If the value of $G \leq -0.02$ is included in the category of financial distress.
- If the G value ≥ 0.01 is included in the non-financial distress category.

Where:

- X_1 = Working Capital to Total Assets
- X_2 = Earnings Before Interest and Taxes on Total Assets
- ROA = Return on Assets

Springate Model

The third model in this study is the Springate, the formula used is $S = 1.03A + 3.07B + 0.66C + 0.4D$ with the following category criteria:

- If the value of $S < 0.861$ is included in the category of financial distress.
- If the value of $S > 0.861$ is included in the category of non-financial distress.

Where:

- A = Working Capital to Total Assets
- B = Earnings Before Interest and Taxes on Total Assets
- C = Profit Before Tax against Current Liabilities
- D = Sales to Total Assets

Zmijewski Model

The fourth model in this study is the Zmijewski, the formula used is: $Z = -4.3 - 4.5X_1 + 5.7X_2 - 0.004X_3$ with the following category criteria:

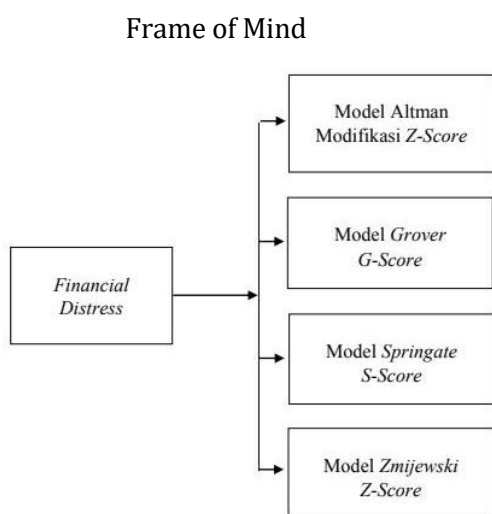
- If the value of $Z \geq 0$ the company is experiencing financial distress.
- If the Z value ≤ 0 the company is not experiencing financial distress.

Where:

$X1$ = Profit After Tax to Total Assets

$X2$ = Total Debt to Total Assets

$X3$ = Current Assets to Current Liabilities



III. RESULTS AND DISCUSSION

From prediction analysis calculations bankruptcy using 4 methods, then obtained descriptive statistical results as follows:

Table 1. Descriptive statistics

Model	N	Mean	Min	Max	Standard Deviation
Altman	104	6,7171	-2,25	16,24	4,2719
Grover	104	1,0254	-0,32	3,63	0,6081
Springate	104	0,9834	-0,23	3,96	0,6269
Zmijewski	104	-2,2519	-4,87	2,33	1,5616

Source: processed data

Based on the table above, the average bankruptcy prediction value with the Altman model of 6.7171, the minimum value of -2.25 is owned by PT Indofarma Tbk (INAF) in quarter 2022, the maximum value of 16.24 is owned by PT Industri Jamu and Pharmaceutical Sido Muncul Tbk (SIDO) in quarter 3 of 2022, and the deviation standard of 4.2719. In Grover model, the average obtained by 1.0254, the minimum value of -0.32 is owned by PT Indofarma Tbk (INAF) in quarter 2022, the maximum value of 3.63 is owned by PT Industri Jamu and Pharmaceutical Sido Muncul Tbk (SIDO) in quarter 2021, and the deviation standard of 0.6081. Using the Springate model obtained that the average value of 0.9834, the minimum value of -0.23 is owned by PT Indofarma Tbk (INAF) in the 4th quarter of 2022, the maximum value of 3.96 is owned by PT Industri Jamu and Pharmaceutical Sido Muncul Tbk (SIDO) in the 3rd quarter of 2021, and the deviation standard of 0.6269. While in the Zmijewski model, the average value of 2.2519, the minimum value of -4.87 is owned by PT Industri Jamu and Pharmaceutical Sido Muncul Tbk (SIDO) in quarter 2021, the maximum value of 2.33 is owned by PT Indofarma Tbk (INAF) in quarter 4 of 2022, and the deviation standard of 1.5616.

Altman Z-Score Modified method

Table 2. Altman Z-Score Modified results

Period	Financial Distress	Grey Area	Non Financial Distress
2020	5 Company	3 Company	24 Company
2021	3 Company	5 Company	24 Company
2022	5 Company	3 Company	24 Company
2023	1 Company	2 Company	5 Company

Source: processed data

Overall from 2020 to 2023, there are two companies that continue to experience financial distress every year, namely: PT Kimia Farma Tbk (KAEF) and PT Indofarma Tbk (INAF).

Grover Method

Tabel 3. Grover Result

Period	Financial Distress	Non Financial Distress
2020	0 Company	32 Company
2021	0 Company	32 Company
2022	1 Company	31 Company
2023	1 Company	7 Company

Source: processed data

There are 2 samples of companies that fall into the financial distress category with a score of ≤ -0.02 which means that the company has the potential to go bankrupt. Then there are 102 samples of companies that fall into the category of non-financial distress with a score of ≥ 0.01 which means that the company is in a healthy financial condition.

Springate Method

Tabel 4. Springate Result

Period	Financial Distress	Non Financial Distress
2020	15 Company	17 Company
2021	10 Company	22 Company
2022	13 Company	19 Company
2023	6 Company	2 Company

Source: processed data

There are 44 companies that fall into the financial distress category with a score of < 0.861 which means that the company has the potential to go bankrupt. Then there are 60 samples that go into non-financial distress with score > 0.861 which means that the company is in good financial condition.

Zmijewski Method

Tabel 5. Zmijewski Result

Period	Financial Distress	Non Financial Distress
2020	8 Company	24 Company
2021	12 Company	20 Company
2022	12 Company	20 Company
2023	3 Company	5 Company

Source: processed data

There are 12 companies that fall into the category of financial distress with a score of < 0 means that the company has the potential to go bankrupt. There are 92 samples that fall into the category of non-financial distress with score > 0 which means that the company is in good financial condition.

Normality Test

Table 6. Normality Test Results

Method	Kolmogorov Smirnov			Shapiro Wilk		
	Statistic	df	Sig	Statistic	df	Sig
Altman	0,143	10	0,200	0,968	10	0,871
Grover	0,241	10	0,103	0,891	10	0,175
Springate	0,135	10	0,200	0,976	10	0,943
Zmijewski	0,143	10	0,200	0,951	10	0,685

Source: processed data

The results of testing the standardity of financial distress predictions data in pharmaceutical companies are, the model of Altman $0.871 < 0.05$, Grover $0.175 > 0.05$, Springate $0.943 > 0.05$ model, and Zmijewski $0.685 < 0.05$ model. Of the 4 models used, the results of significance indicate a value of > 0.05 then the assumption of data normality can be met.

One Way Anova Test

Table 7. One Way Anova Test results

Hasil Prediksi	Sum of Squares	df	Mean Square	F	Sig
Between Groups	4339,972	3	1446,657	269,763	0,000
Within Groups	2209,428	412	5,363		
Total	6549,400	415			

Source: processed data

In anova test when the significance value of < 0.05 means that there is a difference between 4 models and if the significance value > 0.05 there is no difference in the 4 models. Based on the table above, it is obtained that the significance value of $0.000 < 0.05$, which means there is a difference between the 4 models used.

Accuracy Level Test

Table 8. Accuracy Level Results

Method	Accuracy Level	Error Type
Altman	85%	15%
Grover	98%	2%
Springate	58%	42%
Zmijewski	88%	12%

Source: processed data

Results in 4 models used in predicting financial distress, it is known that Grover model is the highest accuracy rate of 98% with error type of 2%.

Interpretation

In Altman models there are 5 companies that fall into the financial distress category in 2020, 3 companies in 2021, 5 companies in 2022, and 1 company in 2023. That falls into the category of grey areas, namely 3 companies in 2020, 5 companies in 2021, 3 companies in 2022, and 2 companies in 2023. While those fall into the category of non-financial distress are 24 companies in 2020, 24 companies in 2021, 24 companies in 2022, and 5 companies in 2023. When viewed based

on overall results during the observation period, there are two companies that experience continuous financial distress during the period 2020-2023, namely PT Kimia Farma Tbk (KAEF) and PT Indofarma Tbk (INAF).

PT Kimia Farma Tbk (KAEF) experienced a decrease in profit in 2022 to amount to - Rp 109,782,957,000.00 compared to 2021 which is worth Rp 289,888,789,000.00. This is also experienced by PT Indofarma Tbk (INAF) which experienced a significant reduction in profit in 2022 to amount - Rp 428,487,671,595.00 compared to 2021 which is worth - Rp 37,571,241,226.00.

The results obtained in the Grover method, there are 0 companies in the financial distress category in 2020, 0 companies in 2021, 1 company in 2022, and 1 company in 2023. The Non-Financial Distress category is 32 companies in 2020, 32 companies in 2021, 31 companies in 2022, and 7 companies in 2023. In this method, more companies are categorized into non-bankrupt conditions in the period 2020-2023.

Then on the Springate method, 15 companies were obtained into the financial distress category in 2020, 10 companies in 2021, 13 companies in 2022, and 6 companies in 2023. While those fall into the category of non-financial distress are 17 companies in 2020, 22 companies in 2022, 19 companies in 2022, and 2 companies in 2023. When viewed based on overall results during the observation period, there are seven companies that are predicted to experience financial distress, namely:

1. PT Daya Varya Laboratories Tbk (DVLA)
2. PT Kimia Farma Tbk (KAEF)
3. PT Indofarma Tbk (INAF)
4. PT Merck Tbk (MERK)
5. PT Pyridam Farma Tbk (PYFA)
6. PT Industri Jamu dan Farmasi Sido Muncul Tbk (SIDO)
7. PT Tempo Scan Pacific Tbk (TSPC)

The Springate model is a model that shows the most financial distress predictions among other methods. Of the 7 companies predicted to go bankrupt, PT Kimia Farma Tbk (KAEF) and PT Indofarma Tbk (INAF) are back included in the results of the financial distress prediction. This can be seen through a decrease in profit.

In the last method, Zmijewski, it was obtained that there were 0 companies that were entered into the financial distress category in 2020, 5 companies in 2021, 6 companies in 2022, and 1 company in 2023. While those included in the category of non-financial distress are 32 companies in 2020, 27 companies in 2021, 26 companies in 2022, and 7 companies in 2023. In this method there are two companies that are predicted to experience financial distress namely PT Indofarma Tbk (INAF) and PT Pyridam Farma Tbk (PYFA).

To prove the existence or absence of equations in four predictive models, statistical calculations of one way anova test using SPSS software. If the value of significance obtained <0.05 means that there is a difference, vice versa if the value of significance >0.05 then there is no difference. In this study, the results of one way anova test obtained at $0.037 < 0.05$ meant that there were differences in the four models of financial distress predictions performed in pharmaceutical companies.

IV. CONCLUSION

From the results of the research that has been done, the following conclusions are obtained:

- a. Using Altman model shows that there are 18 samples of companies that are predicted to experience financial distress, and there are two companies that are in the condition of continuous financial distress namely PT Kalbe Farma Tbk (KAEF), and PT Indofarma Tbk (INAF). In Grover model, only two companies are expected to experience financial distress. In Springate model there are 44 samples of companies that are predicted to experience financial distress, and there are 6 companies that are

in the condition of financial distress namely PT Daya Varya Laboratories Tbk (DVLA), PT Kimia Farma Tbk (KAEF), PT Indofarma Tbk (INAF), PT Merck Tbk (MERK), PT Pyridam Farma Tbk (PYFA), PT Industri Jamu and Pharmaceutical Sido Munis Tbk (SIDO), PT Tempo Scan Pacific Tbk (TSPC). while the Zmijewski model there are 35 company samples that are predicted to experience financial distress.

- b. From the level of accuracy that has been done, Grover method has the highest accuracy rate in predicting financial distress in pharmaceutical companies with an accuracy rate of 98% and an error rate of 2%. Therefore, Grover models are considered good for predicting financial distress compared to Altman, Springate, and Zmijewski models.

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