



Analysis Application of Altman (Z-Score) Method and Springate (S-Score) Method to Assess Financial Distress Potential at PT Anugerah

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Abstract. The emergence of potential financial distress is an early indication of a decline in the company's financial condition. The purpose of this research is to determine the potential of financial distress at PT Anugerah, so that it will help management anticipate the potential financial distress in the company. In this research, the assessment of financial distress potential uses the Altman (Z-score) method and Springate (S-score) method. The type of data in this research is quantitative and qualitative sourced from secondary data and obtained through interviews, documentation, and observation. The data analysis technique used is a qualitative/descriptive analysis technique. The results of research study are the financial distress potential of PT Anugerah by using the Altman (Z-score) method in 2016-2019 shows PT Anugerah is in a non-financial distress condition, because the score is in the condition of $Z' > 2.6$. Furthermore, PT Anugerah financial distress potential using the Springate (S-score) method in 2016-2019 shows that PT Anugerah is in a non-financial distress condition, because the score is at $S > 0.862$.

Keywords: *financial distress, Altman (Z-Score), Springate (S-Score)*

1. Introduction

Every company is founded with the hope of obtaining a profit to maintain the prosperity of the owner and the survival of the company, so that it will provide confidence in the health of the company. A reflection of the company's health condition is stated in the form of a financial statement [1]. However, in order to obtain more detailed information, it is necessary to analyse financial statements so as to obtain information that supports decision making.

Basically, financial statement analysis can show a deeper financial health condition, so that companies can determine the right strategy for the various risks that may occur. One of the risks that can be analysed relates to the uncertainty regarding the company's ability to continue its operations if its financial condition has decreased, which has the potential to create a risk of bankruptcy which affects the company's going concern [2].

Anticipation of the possibility of bankruptcy can be seen at the initial stage, a company usually begins with financial distress. Financial distress is a stage of deterioration in financial conditions that occurs

prior to bankruptcy or liquidation. Financial distress begins with the inability to meet its obligations, especially short-term liabilities, including liquidity obligations, and also liabilities in the solvency category [3]. This condition will certainly be detrimental to various parties, so that several theoretical approaches and financial analysis model tools can be used by companies to predict and anticipate potential financial distress, so that the company can anticipate and make the right decisions if the potential financial distress arises in the company.

Bankruptcy prediction methods have been developed with various techniques, one of which is a widely used technique, namely Multiple Discriminant Analysis (MDA). This technique combines several types of related financial ratios to form an equation. There are five bankruptcy prediction methods that are quite popular and have been used by researchers, these methods are Z-Score modification, Y-Score, X-Score, G-Score, dan S-Score [4]. These five methods use different ratios in making decisions about potential financial distress in the company.

The financial distress that must be anticipated is visible in its potential in PT Anugerah's financial statements, which are presented in Table 1.

Table 1. Current Asset, Current Liabilities Total Asset, Total Liabilities, and Profit/Loss PT Anugerah in 2016-2019

Year	Current Asset	Current Liabilities	Total Asset	Total Liabilities	Profit/Loss
2016	5.180.738.049	916.151.640	5.479.377.769	916.151.640	139.140.368
2017	4.807.234.262	978.131.209	5.036.401.552	978.131.209	33.182.029
2018	4.557.030.186	1.077.389.899	4.889.100.046	1.077.389.899	(27.834.171)
2019	4.198.981.834	1.132.194.288	4.436.954.264	1.132.194.288	11.699.432

Table 1 shows that PT Anugerah has the potential to experience debt repayment difficulties due to the continuous increase every year. In addition, the profit generated by the company tends to decline for 3 years, even the company experienced a loss in 2018. The decline in profit and an increase in debt continuously must be considered and how it affects the company, because an increase in debt that occurs in a company will have the potential the emergence of financial difficulties, especially in repaying the debt.

So, it is necessary to make decisions based on the analysis of the right financial statements to determine the potential for financial distress at PT Anugerah. This analysis can be done using the modified Altman (Z-Score) method and the Springate (S-Score) method. Both of these methods are very flexible because they can be used for various business fields, and are accurate in determining potential financial distress. The Altman method (Z-Score) is the first method created with the Multiple Discriminant Analysis (MDA) technique, then the Springate method (S-Score) is a development of the existing method. By using two methods, will get confidence in the prediction results of potential financial distress, because these two methods can complement the shortcomings related to the completeness of the components of the ratios used, so that the liquidity ratios, solvency ratios, profitability ratios, and activity ratios have been analysed and become involved. considerations in seeing the company's potential financial distress [5], [6].

2. Literature Review

Financial statement is a report that shows the company's financial condition at this time or in a certain period. The purpose of financial statements that shows the current condition of the company is the current condition. The current condition of the company is the company's financial condition on a certain date (for balance sheet) and a certain period (for income statement) [7]. Financial statement analysis is a review or study of the relationships and tendencies or trends to determine the financial position and results of operations as well as the development of the company concerned [8]. Financial distress can be defined as a company's inability to pay its financial obligations at maturity which can lead to company bankruptcy [9]. The most famous model of financial distress is the Altman (Z-Score) which uses various

ratios to create a financial distress prediction tool. Altman (Z-Score) uses statistical techniques (multiple discriminant analysis) to produce a prediction tool that is a linear function of several explanatory variables [10]. This prediction tool classifies or predicts the possibility of distress and non-distress for the company [11]. Springate (1978) conducted a study to find a model that could be used to predict the potential (indication) of bankruptcy. Springate uses 19 popular financial ratios that can be used to predict financial distress. After going through the same multiple discriminant analysis statistical test as that done by Altman (1968), namely distinguishing between companies that experience distress and those that are not [12].

3. Research Method

This research uses quantitative and qualitative data types, with secondary data sources in the form of PT Anugerah's balance sheet and income statement for the years 2016-2019. Data collection procedures in this study were interviews, documentation and observation. The data analysis technique used is qualitative/descriptive analysis. The data that has been collected will be processed, described, and explained then a conclusion is drawn with a table, using the following formula.

3.1. Altman (Z-Score) Method

3.1.1. Working Capital to Total Asset (X_1)

The ratio shows the company's ability to generate net working capital from the total assets.

$$WCTA (X_1) = \frac{\text{Working Capital}}{\text{Total Assets}}$$

3.1.2. Retained Earnings to Total Asset (X_2)

This ratio shows the effectiveness of management in generating retained earnings from the company's total assets.

$$RETA (X_2) = \frac{\text{Retained Earnings}}{\text{Total Assets}}$$

3.1.3. Earnings Before Interest and Taxes to Total Asset (X_3)

This ratio shows the company's ability to manage total assets to get profit before interest and taxes.

$$EBITTA (X_3) = \frac{\text{EBIT}}{\text{Total Assets}}$$

3.1.4. Book Value of Equity to Book Value of Debt (X_4)

This ratio shows the company's ability to meet its obligations from the book value of equity.

$$BVEBVL (X_4) = \frac{\text{Book Value of Equity}}{\text{Book Value of Debt}}$$

3.1.5. Altman (Z-Score) Method

$$Z'' = 6,56X_1 + 3,26X_2 + 6,72X_3 + 1,05X_4$$

3.2. Springate (S-Score) Method

3.2.1. Working Capital to Total Asset (Y_1)

The ratio shows the company's ability to generate net working capital from the total assets.

$$WCTA (Y_1) = \frac{\text{Working Capital}}{\text{Total Assets}}$$

3.2.2. Earnings Before Interest and Taxes to Total Asset (Y_2)

This ratio shows the company's ability to manage total assets to get profit before interest and taxes.

$$\text{EBITTA (Y}_2\text{)} = \frac{\text{EBIT}}{\text{Total Assets}}$$

3.2.3. Earnings Before Taxes to Current Liabilities (Y₃)

This ratio shows the company's ability to pay short-term liabilities as seen by the results of the balance of net income before tax.

$$\text{EBTCL (Y}_3\text{)} = \frac{\text{EBT}}{\text{Current Liabilities}}$$

3.2.4. Sales to Total Asset (Y₄)

This ratio shows the company's ability to generate total sales based on the company's total assets.

$$\text{STA (Y}_3\text{)} = \frac{\text{STA}}{\text{Total Assets}}$$

3.2.5. Springate (S-Score) Method

$$S = 1,03Y_1 + 3,07Y_2 + 0,66Y_3 + 0,4Y_4$$

Classifying the score results from the calculation of each method to determine the financial *distress* of a company by looking at the cut off. Table 2 is the classification of the scores for each method.

Table 2. Score Classification

Altman (Z-Score) Method		Springate (S-Score) Method	
Score	Condition	Score	Condition
< 1,1	<i>Financial distress</i>	< 0,862	<i>Financial distress</i>
1,1 > Z < 2,6	<i>Grey area</i>	> 0,862	<i>Non-financial distress</i>
> 2,6	<i>Non-financial distress</i>		

4. Results and Discussion

4.1. Altman (Z-Score) Method

The calculation using the Altman (Z-Score) method combines four financial ratios, the calculation results are presented in the Table 3.

Table 3. Altman (Z-Score) Method Ratio Calculation Results
PT Anugerah in 2016-2019

Year	WTCA (X ₁)	RETA (X ₂)	EBITTA (X ₃)	BVEBVL (X ₄)
2016	0,7783	0,1944	0,0237	4,9809
2017	0,7603	0,2391	0,0046	4,1490
2018	0,7117	0,2531	-0,0085	3,5379
2019	0,6912	0,2726	-0,0013	2,9189

The results of the calculation of the ratio will be used to analyse financial distress predictions using the Altman (Z-Score) method formula, and then will be classified based on the cut-off method which will be compared with the results of the calculation of the Altman (Z-Score) method score at PT Anugerah each year. PT Anugerah's score classification results for 2016-2019 are presented in the table 4.

Table 4. Altman (Z-Score) Calculation Classification
PT Anugerah in 2016-2019



Year	Altman (Z-Score) Score	Cut Off Classification	Condition
2016	11,1984	> 2,6	Non-financial distress
2017	10,2226	> 2,6	Non-financial distress
2018	9,2159	> 2,6	Non-financial distress
2019	8,5411	> 2,6	Non-financial distress

In 2016, the ratio of working capital to total assets/WCTA (X_1) shows a result of 0,7783. This means that the total assets of Rp5.479.377.768 have been operated smoothly in the company's operational activities, so as to generate working capital of Rp4.264.586.408. The ratio of retained earnings to total assets/RETA (X_2) shows a result of 0.1944. This means that the total assets of Rp5.479.377.768 have been operated effectively by the company management, so as to generate retained earnings of Rp1,065,123,597. The ratio of earnings before interest and tax to total assets/EBITTA (X_3) shows a result of 0,0237. This means that the total assets of Rp5.479.377.768 have been operated effectively by the company management, so as to generate profit before interest and tax of Rp129.764.492. The ratio of book value of equity to book value of debt/BVEBVL (X_4) shows a result of 4,9809. This means that the book value of equity Rp4.563.226.129 has been well managed by the company, thus fulfilling the debt of Rp916.151.640. Based on the Altman (Z-Score) method the resulting score is 11,1984, so it's in a condition of $Z'' > 2.6$ or non-financial stress.

In 2017, the ratio of working capital to total assets/WCTA (X_1) shows a result of 0,7603. This means that the total assets of Rp5.036.401.552 have been operated smoothly in the company's operational activities, so as to generate working capital of Rp3.829.103.053. The ratio of retained earnings to total assets/RETA (X_2) shows a result of 0,2391. This means that the total assets of Rp5.036.401.552 have been operated effectively by the company management, so as to generate retained earnings of Rp1.204.263.965. The ratio of earnings before interest and tax to total assets/EBITTA (X_3) shows a result of 0,0046. This means that the total assets of Rp5.036.401.552 have been operated effectively by the company management, so as to generate profit before interest and tax of Rp23.042.746. The ratio of book value of equity to book value of debt/BVEBVL (X_4) shows a result of 4,1490. This means that the book value of equity Rp4.058.270.343 has been well managed by the company, thus fulfilling the debt of Rp978.131.209. Based on the Altman (Z-Score) method the resulting score is 10,2226, so it's in a condition of $Z'' > 2.6$ or non-financial stress.

In 2018, the ratio of working capital to total assets/WCTA (X_1) shows a result of 0,7117. This means that the total assets of Rp4.889.100.046 have been operated smoothly in the company's operational activities, so as to generate working capital of Rp3.479.640.287. The ratio of retained earnings to total assets/RETA (X_2) shows a result of 0,2531. This means that the total assets of Rp4.889.100.046 have been operated effectively by the company management, so as to generate retained earnings of Rp1.237.445.994. The ratio of earnings before interest and tax to total assets/EBITTA (X_3) shows a result of -0,0085. This means that the total assets of Rp4.889.100.046 not operating properly by the company management, so as to generate retained earnings of -Rp41.419.227. The ratio of book value of equity to book value of debt/BVEBVL (X_4) shows a result of 3,5379. This means that the book value of equity Rp3.811.710.147 has been well managed by the company, thus fulfilling the debt of Rp1.077.389.899. Based on the Altman (Z-Score) method the resulting score is 9,2159, so it's in a condition of $Z'' > 2.6$ or non-financial stress.

In 2019, the ratio of working capital to total assets/WCTA (X_1) shows a result of 0,6912. This means that the total assets of Rp4.436.954.264 have been operated smoothly in the company's operational activities, so as to generate working capital of Rp3.066.787.546. The ratio of retained earnings to total assets/RETA (X_2) shows a result of 0,2726. This means that the total assets of Rp4.436.954. have been operated effectively by the company management, so as to generate retained earnings of Rp1.209.611.823. The ratio of earnings before interest and tax to total assets/EBITTA (X_3) shows a result of -0,0013. This means that the total assets of Rp4.436.954. not operating properly by the company management, so as to generate retained earnings of -Rp5.917.186. The ratio of book value of equity to book value of debt/BVEBVL (X_4) shows a result of 2,9189. This means that the book value of equity

Rp3.304.759.976 has been well managed by the company, thus fulfilling the debt of Rp1.132.194.288. Based on the Altman (Z-Score) method the resulting score is 8,5411, so it's in a condition of $Z > 2.6$ or non-financial stress.

4.2. Springate (S-Score) Method

Calculations using the Springate (S-Score) method combines four financial ratios, the results of the calculations are presented in the Table 5.

Table 5. Springate (S-Score) Method Ratio Calculation Results
PT Anugerah in 2016-2019

Year	WTCA (Y ₁)	EBITTA (Y ₂)	EBTCL (Y ₃)	STA (Y ₄)
2016	0,7783	0,0237	0,1519	2,4493
2017	0,7603	0,0046	0,0339	2,6352
2018	0,7117	-0,0085	-0,0258	2,7087
2019	0,6912	-0,0013	0,0103	3,2234

The results of the calculation of the ratio will be used to analyse financial distress predictions using the Springate (S-Score) method formula, and then will be classified based on the cut-off method which will be compared with the results of the calculation of the Springate (S-Score) method score at PT Anugerah each year. PT Anugerah's score classification results for 2016-2019 are presented in the table 6.

Table 6. Springate (S-Score) Calculation Classification
PT Anugerah in 2016-2019

Year	Springate (S-Score) Score	Cut Off Classification	Condition
2016	1,9543	> 0,862	<i>Non-financial distress</i>
2017	1,8736	> 0,862	<i>Non-financial distress</i>
2018	1,7735	> 0,862	<i>Non-financial distress</i>
2019	2,0040	> 0,862	<i>Non-financial distress</i>

In 2016, the ratio of working capital to total assets/WCTA (Y₁) shows a result of 0,7783. This means that the total assets of Rp5.479.377.768 have been operated smoothly in the company's operational activities, so as to generate working capital of Rp4.264.586.408. The ratio of earnings before interest and tax to total assets/EBITTA (Y₂) shows a result of 0,0237. This means that the total assets of Rp5.479.377.768 have been operated effectively by the company management, so as to generate profit before interest and tax of Rp129.764.492. The ratio of earning before tax to current liabilities/EBTCL (Y₃) shows a result of 0,1519. This means that the earning before tax Rp139.140.368 has been well managed by the company, thus fulfilling the current liabilities of Rp916.151.640. The ratio of sales to total assets/STA (Y₄) shows the result of 2,4493. This means that the total assets of Rp5.036.401 has been operated properly by the company, so as to generate sales Rp13.420.632.829. Based on the Springate (S-Score) method the resulting score is 1,9543, so it's in a condition of $S > 0,862$ or non-financial stress.

In 2017, the ratio of working capital to total assets/WCTA (Y₁) shows a result of 0,7603. This means that the total assets of Rp5.036.401.552 have been operated smoothly in the company's operational activities, so as to generate working capital of Rp3.829.103.053. The ratio of earnings before interest and tax to total assets/EBITTA (Y₂) shows a result of 0,0046. This means that the total assets of Rp5.036.401.552 have been operated effectively by the company management, so as to generate profit before interest and tax of Rp23.042.746. The ratio of earning before tax to current liabilities/EBTCL (Y₃) shows a result of 0,0339. This means that the earning before tax Rp33.182.029 has been well managed by the company, thus fulfilling the current liabilities of Rp978.131.209. The ratio of sales to total assets/STA (Y₄) shows the result of 2,6352. This means that the total assets of Rp5.036.401.552 has been operated properly by the company, so as to generate sales Rp13.271.970.891. Based on the

Springate (S-Score) method the resulting score is 1,8736, so it's in a condition of $S > 0,862$ or non-financial stress.

In 2018, the ratio of working capital to total assets/WCTA (Y_1) shows a result of 0,7117. This means that the total assets of Rp4.889.100.046 have been operated smoothly in the company's operational activities, so as to generate working capital of Rp3.479.640.287. The ratio of earnings before interest and tax to total assets/EBITTA (Y_2) shows a result of -0,0085. This means that the total assets of Rp4.889.100.046 not operating properly by the company management, so as to generate retained earnings of -Rp41.419.227. The ratio of earning before tax to current liabilities/EBTCL (Y_3) shows a result of -0,0258. This means that the earning before tax -Rp27.834.171 will not be able to fulfilling the current liabilities of Rp1.077.389.899. The ratio of sales to total assets/STA (Y_4) shows the result of 2,7087. This means that the total assets of Rp4.889.100.046 has been operated properly by the company, so as to generate sales Rp13.243.339.852. Based on the Springate (S-Score) method the resulting score is 1,7735, so it's in a condition of $S > 0,862$ or non-financial stress.

In 2019, the ratio of working capital to total assets/WCTA (Y_1) shows a result of 0,6912. This means that the total assets of Rp4.436.954.264 have been operated smoothly in the company's operational activities, so as to generate working capital of Rp3.066.787.546. The ratio of earnings before interest and tax to total assets/EBITTA (Y_2) shows a result of -0,0013. This means that the total assets of Rp4.436.954 not operating properly by the company management, so as to generate retained earnings of -Rp5.917.186. The ratio of earning before tax to current liabilities/EBTCL (Y_3) shows a result of 0,0103. This means that the earning before tax Rp11.699.432 has been well managed by the company, thus fulfilling the current liabilities of Rp1.132.194.288. The ratio of sales to total assets/STA (Y_4) shows the result of 3,2234. This means that the total assets of Rp4.436.954 has been operated properly by the company, so as to generate sales Rp14.302.189.016. Based on the Springate (S-Score) method the resulting score is 2,0040, so it's in a condition of $S > 0,862$ or non-financial stress.

5. Conclusion

Based on the results and discussion, it can be concluded that the potential for financial distress at PT Anugerah 2016-2019 based on the Altman (Z-Score) method and the Springate (S-Score) method is non-financial distress.

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