

# IMPLEMENTATION OF ALTMAN Z-SCORE IN PREDICTING PT BANK SUMUT'S SUSTAINABILITY

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## *Abstract*

*This research was conducted to determine and analyze the risk of bankruptcy of the company PT Bank SUMUT according to the Altman Z-Score. The population in this study is the financial statements of PT Bank SUMUT and the sample in this study is the financial statements of PT Bank SUMUT for 2017 - 2019. The type of data used is secondary data and the data collection techniques used are documentation from financial reports published through the www site. banksumut.co.id. The data processing technique uses the Altman Z-Score modification method. Based on the results of data processing, the 2017 Z-Score was 1.57; the year 2018 is 1.63 and the year 2019 is 1.19. Based on the results of data analysis, it can be concluded that PT Bank SUMUT is in a gray zone because the standard value is at  $1.1 < Z\text{-Score} < 2.6$  and PT.*

**Keywords:** *Prediction, Bankruptcy, Altman Z-Score*

## **I. INTRODUCTION**

### **A. Background**

Bankruptcy is a very important issue that banks should be aware of. If a bank has gone bankrupt, it means that the bank is truly experiencing failure. Almilia and Herdiningtyas (2005) assess that bankruptcy occurs quickly in countries experiencing economic difficulties or financial crises. Ramadhani and Lukviarman (2009) and Ghosh (2013) state that company bankruptcy is marked by a decline in the company's financial condition that occurs in a prolonged and continuous manner (financial distress). According to research by Gamayuni (2011), the causes of bankruptcy can come from internal and external factors. Internal factors include lack of management experience, lack of knowledge in using assets and liabilities effectively. While external factors, namely inflation, tax and legal systems, foreign currency depreciation, and other reasons. There are parties who will be disadvantaged if a company goes bankrupt. Adriana, et al (2012) explain that the party who is aggrieved is the party that has an interest in company 3 such as investors and creditors. Therefore, we need a tool or prediction model that can be used to detect the potential for company bankruptcy. In predicting bankruptcy, there are several methods of bankruptcy prediction analysis, including the models developed by Zmijewski (XScore), Springate (S-Score), and Altman (Z-Score). In this study, the Altman Z-Score analysis method was chosen because it is able to provide prediction accuracy of 95%. Z-Score uses five ratios in analyzing, namely working capital to total assets, retained earnings to total assets, EBIT to total assets, stock market value to total debt book value, and sales to total assets. Altman Z-Score model is divided into 3 models, (1) Altman ZScore model, (2) Revised Altman Z-Score Model, (3) Modified Altman Z-Score Model. In this study, a Modified Z-Score Model is used because the Modified Altman ZScore is for non-manufacturing companies. In this study, Altman found four ratios that can predict the bankruptcy of publicly traded companies in developing countries such as Indonesia, including: (1) working capital per total assets, (2) retained earnings per total assets, (3) earnings before interest and taxes per total assets, and (4) book value of equity per book value of debt, with the following valuation standards: if the value of  $Z < 1.1$  then the company is categorized as bankrupt, if the value of  $1.1 < Z < 2.6$  then the company is in a gray zone or the company is in a vulnerable condition, and if the value of  $Z > 2.6$  then the company is in a safe or healthy zone (Rudianto, 2013). PT BANK SUMUT is a company engaged in banking finance. Currently PT BANK SUMUT is a regional financial institution in North Sumatra. However, due to the economic turmoil and the tight regulation in the financial sector in Indonesia, this company also experienced a little turmoil. The following is the

financial statement data for PT BANK SUMUT for 2017– 2019: PT BANK SUMUT is a company engaged in banking finance. Currently PT BANK SUMUT is a regional financial institution in North Sumatra. However, due to the economic turmoil and the tight financial regulation in Indonesia, this company also experienced a little turmoil. The following is the financial statement data for PT BANK SUMUT for 2017– 2019: PT BANK SUMUT is a company engaged in banking finance. Currently PT BANK SUMUT is a regional financial institution in North Sumatra. However, due to the economic turmoil and the tight regulation in the financial sector in Indonesia, this company also experienced a little turmoil. The following is the financial statement data for PT BANK SUMUT for 2017– 2019:

Asset and Profit Data Table of PT BANK SUMUT for 2017 - 2019

Year	Asset	Profit
2017	IDR 28,931,823,934,130	IDR 599,664,153,293
2018	IDR 28,121,107,028,840	IDR 531,003,080,182
2019	IDR 31,736,072,910,909	IDR 586,627,780,032

Source: Financial data processed reports, 2020

Based on the table above, it can be seen from 2017 to 2018 that assets have decreased and profits have also decreased. In 2019 assets have increased and profits have also increased. In 2018, assets decreased and profits decreased. Therefore, the author wants to do research on the health of the company using the Altman Z-Score method, because sometimes companies show satisfactory profit figures, but in fact the company is facing difficulties that will lead to bankruptcy. Based on this, then conducted research with the title: Application of the Altman Z-Score in predicting the Bankruptcy of PT BANK SUMUT. Based on the background above, the Problem Formulation is, What are the results of the prediction of PT BANK SUMUT bankruptcy in the 2017 - 2019 period using the Altman Z-Score method?

## II. LITERATURE REVIEW

### Definition of Bank

The definition of a bank according to Law no. 7 of 1992 concerning Banking as amended by Law no. 10 of 1998 are:

- (1) Bank is a business entity that collects funds from the public in the form of deposits, and distributes them to the public in the form of credit and or other forms, in order to improve the standard of living of the community at large.
- (2) Commercial banks are banks which carry out business activities conventionally and or based on sharia principles which in their activities provide services in payment traffic.

### Definition of Bankruptcy

In general, bankruptcy is defined as the failure of a company to carry out operations to achieve its goals (Rudianto, 2013). Meanwhile, according to Law no. 4 of 1998 where an agency is declared bankrupt by a court decision if the debtor has two or more creditors and does not pay at least one debt that is due and can be collected.

### Altman Z-Score Model Analysis

According to Rudianto (2013: 254) Z-Score analysis is a method for predicting the survival of a company by combining several common financial ratios and giving different weights to one another. That means, with the Z-Score method, a company can predict the possibility of bankruptcy. The Z-Score analysis was first proposed by Edward I Altman in 1968 as a result of his research. After selecting 22 financial ratios, we find 5 ratios that can be combined to be able to see which companies are bankrupt and not bankrupt. Altman conducted several studies with company objects in different conditions. Because of this, Altman produced several different formulas to be used in several companies with different conditions. The Altman Z-Score model is divided into 3 models, namely:

1. First Altman Z-Score Model (Original).
2. Revised Altman Z-Score Model.
3. Modified Altman Z-Score Model.

### Altman Z – Score Modification Model

Altman then modified his model so that it could be applied to all companies, such as manufacturers, non-manufacturers, and bond issuing companies in developing countries (emerging markets). The modified Altman Z-Score model is different from the Altman Original or Revised Altman Z-Score model, this is because the two Altman models are models designed to predict the bankruptcy of manufacturing companies, both those that have gone public and those that have not. In the modified Altman Z-Score analysis, Altman eliminates the X5 variable (sales / total assets), because this ratio is highly variable in industries with different asset sizes. Thus, the modified Z-Score equation formula by Altman et al shows the discriminant function as follows:

$$Z = 6.56 (X1) + 3.26 (X2) + 6.72 (X3) + 1.05 (X4)$$

Information :

1. Working Capital to Total Assets (X1)
2. Retained Earnings against Total Assets (X2)
3. EBIT to Total Assets (X3)
4. Total Equity to Total Debt (x4)
5. *Overall Index (Z)*

Where :

$$X_1 = \frac{\text{Modal Kerja}}{\text{Total Aset}}$$
$$X_2 = \frac{\text{Laba Ditahan}}{\text{Total Aset}}$$
$$X_3 = \frac{\text{EBIT}}{\text{Total Aset}}$$
$$X_4 = \frac{\text{Total Ekuitas}}{\text{Total Hutang}}$$

The value provisions for this formula are:

- Z < 1.1 : Danger Zone (Bankrupt)  
1.1 < Z < 2,6 : Gray Zone  
Z > 2,6 : Safe zone

Because the score obtained is a combination of 5 different elements, where each element is a different financial ratio, it is very important to understand the meaning of each of these elements. The definition of Z (Zeta) discrimination is:

1. Ratio X1 (Working Capital: Total Assets)

Measure liquidity by comparing net liquid assets to total assets. Net liquid assets or working capital are defined as current assets minus total current liabilities (current assets - current debts). Generally, when a company experiences financial difficulties, working capital will decrease faster than total assets, thus causing this ratio to fall.

2. Ratio X2 (Retained Profit: Total Assets)

This ratio is a profitability ratio that detects the company's ability to generate profits. This ratio measures the amount of a company's ability to earn profits, in terms of the company's ability to earn profits compared to the operating assets turnover speed as a measure of business efficiency, or in other words, this ratio measures the accumulated profit during the company's operation. The company's age has an effect on this ratio because the longer the company operates, the more likely it is to increase the accumulated retained earnings. This causes a company that is relatively young, whose age will show lower ratio results, except for those with very large profits at the beginning of its establishment. Some of the benefits of the profitability ratio are:

- 1) Knowing the level of profit obtained by the company in one period.
  - 2) Determine the company's profit from the previous year and the current year.
  - 3) Knowing the progress of profit over time
  - 4) Knowing the amount of net profit after tax with your own capital
  - 5) Knowing the productivity of all company funds used both loan capital and own capital.
3. X3 Ratio (EBIT: Total Assets)  
 This ratio measures profitability, which is the rate of return on assets, which is calculated by dividing the company's annual earnings before interest and tax by the total assets on the year-end balance sheet. This ratio explains the importance of achieving company profits, especially in order to meet the interest obligations of investors. The ability to survive depends on the earning power of the asset. Therefore, this ratio is very suitable to be used in analyzing the risk of bankruptcy.
4. X4 Ratio (Total Equity: Total Debt)  
 This ratio is useful for measuring the company's ability to meet its own capital obligations.

### III. RESEARCH METHODS

According to Sugiyono (2012: 80) Population is a generalization area consisting of: objects / subjects that have certain qualities and characteristics that are determined by researchers to be studied and then draw conclusions. As for the population in this study is the financial statements of PT. SUMUT Bank. The sample is a part or representative of the population under study " (Arikunto, 2014: 174). The sample used in this research is the financial statements of PT. Bank SUMUT 2017 – 2019. The data collection technique used in the writing of this final project is to use documentation. "The documentation technique is looking for data about things or variables in the form of notes, transcripts, books, newspapers, magazines, inscriptions, meeting minutes, notes, agendas, and so on"(Arikunto, 2014: 274). Based on data published through the website [www.banksumut.co.id](http://www.banksumut.co.id).

After the data is collected, the data is analyzed by researchers in this report in a descriptive quantitative manner. Sugiono (2012: 13) Descriptive quantitative, namely a method that analyzes a problem based on the calculation of numbers from the results of standard measurement research or the cutt off value in predicting bankruptcy with the first Altman Z-Score method, namely as follows:

$Z = 6.56 (X1) + 3.26 (X2) + 6.72 (X3) + 1.05 (X4)$
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The value provisions for this formula are:

Z < 1.1 : Danger Zone (Bankrupt)

1.1 < Z < 2,6 : Gray Zone

Z > 2,6 : Safe zone

Information :

1. Working Capital to Total Assets (X1)
2. Retained Earnings against Total Assets (X2)
3. EBIT to Total Assets (X3)
4. Total Equity to Total Debt (X4)

### IV. RESEARCH RESULTS AND DISCUSSION

The elements used in the modified Altman Z-Score formula can be seen in the following table:

**Table: Elements used in the modified Altman Z-Score formula  
(in Rp)**

Information	Year		
	2017	2018	2019
Working capital	6,146,766,121	6,426,591,336	2,454,585,415
Retained earning	977,090,953,900	890,700,084,996	967,421,500,222
EBIT	843,415,724,261	673,541,735,866	731,019,922,968
Total Amoun of debt	23,965,599,436,742	22,960,781,879,061	26,138,887,428,758
Total Equity	2,994,537,223,528	3,173,605,799,781	3,501,065,484,000
Total Assets	28,931,823,934,130	28,121,107,028,840	31,736,072,910,909

Source: Data processed, 2020

Based on the table above, it can be predicted that the bankruptcy of PT. Bank SUMUT using the Altman Z-Score method, as follows:

**Altman Z-Score Variable Calculation**

1. Working Capital Ratio to Total Assets (X1)

$$X_1 = \frac{\text{Modal Kerja}}{\text{Total Aset}}$$

$$\text{Tahun 2017} = \frac{6.146.766.121}{28.931.823.934.130} = 0,0002124569$$

$$\text{Tahun 2018} = \frac{6.426.591.336}{28.121.107.028.840} = 0,0002285327$$

$$\text{Tahun 2019} = \frac{2.454.585.415}{31.736.072.910.909} = 7,7343703548$$

**X1 Ratio Calculation Table (Working Capital to Total Assets)  
PT. Bank SUMUT 2017-2019  
(In thousand Rupiah)**

Year	Working capital	Total Assets	Value of X1
2017	6,146,766,121	28,931,823,934,130	0.0002124569
2018	6,426,591,336	28,121,107,028,840	0.0002285327
2019	2,454,585,415	31,736,072,910,909	7,7343703548

Source: Data processed, 2020

2. Ratio of Retained Earnings to Total Assets (X2)

$$X_2 = \frac{\text{Laba Ditahan}}{\text{Total Aset}}$$

$$\text{Tahun 2017} = \frac{977.090.953.900}{28.931.823.934.130} = 0,0337721865$$

$$\text{Tahun 2018} = \frac{890.700.084.996}{28.121.107.028.840} = 0,0316737205$$

$$\text{Tahun 2019} = \frac{967.421.500.222}{31.736.072.910.909} = 0,0304833399$$

**X2 Ratio Calculation Table (Retained Profit to Total Assets)  
PT. Bank SUMUT 2017-2019  
(In thousand Rupiah)**

Year	Retained earning	Total Assets	Value of X2
2017	977,090,953,900	28,931,823,934,130	0.0337721865
2018	890,700,084,996	28,121,107,028,840	0.0316737205
2019	967,421,500,222	31,736,072,910,909	0.0304833399

Source: Data processed, 2020

3. EBIT Ratio to Total Assets (X3)

$$X_3 = \frac{EBIT}{Total Aset}$$

$$\text{Tahun 2017} = \frac{843.415.724.261}{28.931.823.934.130} = 0,0291518338$$

$$\text{Tahun 2018} = \frac{673.541.735.866}{28.121.107.028.840} = 0,0239514658$$

$$\text{Tahun 2019} = \frac{731.019.922.968}{31.736.072.910.909} = 0,0230343535$$

**X3 Ratio Calculation Table (EBIT to Total Assets)  
PT. Bank SUMUT 2017-2019  
(In thousand Rupiah)**

Year	EBIT	Total Assets	Value of X3
2017	843,415,724,261	28,931,823,934,130	0.0291518338
2018	673,541,735,866	28,121,107,028,840	0.0239514658
2019	731,019,922,968	31,736,072,910,909	0.0230343535

Source: Processed Data, 2020

4. Ratio of Total Equity to Total Debt (X4)

$$X_4 = \frac{Total Ekuitas}{Total Hutang}$$

$$\text{Tahun 2017} = \frac{2.994.537.223.528}{23.965.599.436.742} = 0,1249514844$$

$$\text{Tahun 2018} = \frac{3.173.605.799.781}{22.960.781.879.061} = 0,1382185422$$

$$\text{Tahun 2019} = \frac{3.501.065.484.000}{26.138.887.428.758} = 0,1339408762$$

**Ratio Calculation Table X4 (Total Equity to Total Debt)**  
**PT. Bank SUMUT 2017-2019**  
(In thousand Rupiah)

Year	Total Equity	Total Amount of debt	Value of X4
2017	2,994,537,223,528	23,965,599,436,742	0.1249514844
2018	3,173,605,799,781	22,960,781,879,061	0.1382185422
2019	3,501,065,484,000	26,138,887,428,758	0.1339408762

Source: Data processed, 2020

**Table of Z-Score Ratio Calculation Results at PT. SUMUT Bank**  
**2017 - 2019**

Variable (Z-Score Ratio)	Year		
	2017	2018	2019
X1	0.0002124569	0.0002285327	7,7343703548
X2	0.0337721865	0.0316737205	0.0304833399
X3	0.0291518338	0.0239514658	0.0230343535
X4	0.1249514844	0.1382185422	0.1339408762

Source: Data processed, 2020

**Calculation of Z-Score Value**

Modified Altman Z-Score Formula

$Z = 6.56 (X1) + 3.26 (X2) + 6.72 (X3) + 1.05 (X4)$
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2017 year

$$Z = 6.56 (0.0002124569) + 3.26 (0.0337721865) + 6.72 (0.0291518338) + 1.05 (0.12449514844)$$

$$Z = 0.0013937173 + 0.110097328 + 0.1959003231 + 0.1311990586$$

$$Z = 0.438590427$$

$$Z = 0.44 \text{ (rounding)}$$

2018 year

$$Z = 6.56 (0.0002285327) + 3.26 (0.0316737205) + 6.72 (0.0239514658) + 1.05 (0.1382185422)$$

$$Z = 0.0014991745 + 0.1032563288 + 0.1609538502 + 0.1451294693$$

$$Z = 0.4108388228$$

$$Z = 0.41 \text{ (Rounding)}$$

2019 year

$$Z = 6.56 (7,7343703548) + 3.26 (0.0304833399) + 6.72 (0.0230343535) + 1.05 (0.1339408762)$$

$$Z = 50.737469527 + 0.0993756881 + 0.1547908555 + 0.14063792$$

$$Z = 51.132273991$$

$$Z = 51.13 \text{ (Rounding)}$$

From the calculation of the Z-Score value of PT. Bank SUMUT for the period 2017 to 2019 with the modified Altman Z-Score formula, the following figures are obtained:

**Table of Z-Score Calculation Results at PT. SUMUT Bank  
2017 - 2019**

<b>Year</b>	<b>Z-Score</b>
2017	0.44
2018	0.41
2019	51.13

Source: Data processed, 2020

The discussion of the results of the analysis of financial statements using the modified Altman Z-Score method is:

**Table of Z-Score Calculation Analysis Results  
At PT. Bank SUMUT 2017 - 2019**

<b>Year</b>	<b>Z-Score</b>	<b>Z-Score Benchmarks</b>	<b>Analysis Results</b>
<b>2017</b>	0.44	Safe Zone ( $Z > 2.6$ ) Gray Zone ( $1.1 < Z < 2.6$ )	Danger Zone
<b>2018</b>	0.41		Danger Zone
<b>2019</b>	51.13	Danger Zone ( $Z < 1.1$ )	Safe zone

Source: Data processed, 2020

From the results obtained, it can be seen that the magnitude of this financial distress prediction is influenced by the size of the company's financial ratios and the Altman Z-Score scale. If all financial ratios are positive, the company is predicted to be in good health. This is in accordance with the Plat and Plat theory in Fahmi (2012: 158) that financial distress is a stage of declining financial conditions or tends to experience deficits.

When viewed from the high level of profitability it greatly affects the condition of the company because profit is the main capital for the company to expand its business. Competition between companies is characterized by the number of customers who choose the brand or the high market share of a particular brand and from an internal perspective the company is indicated by the high profit generated in a certain period. With this high profit, it can be used to add assets, finance operating expenses and share profits with shareholders. If profit decreases or even loses, it will disturb the company's finances because with decreased profit or loss, the company will use other assets to keep the company's operations running.

Low profitability can cause a company to experience the first symptom of bankruptcy, namely financial distress because it will have a direct impact on the decline in the company's current assets, delay payment of liabilities and decrease other assets to be used as operating capital. In addition, global economic factors have a very high influence on company operations to gain profit, of course this is an observation and consideration for investors to invest in companies engaged in banking by looking at the company's financial ratios and choosing other banking companies that have turnover. higher profit and financial stability. So that the higher the profitability ratio of a company will affect the high Z-Score value.

From the results of calculations based on the modified Altman Z-Score method in 2017 - 2019, it shows that PT. SUMUT Bank in a dangerous zone and a healthy zone. The result of the Z-Score calculation which has the highest value is in 2019, which is equal to 51.13. The increase in the Z-Score

value in 2019 if examined is due to the value of the Working Capital To Total Assets (X1) variable which has the highest ratio or value of 7,7343703548 compared to 2017-2018 and the Total Equity to Total Debt Ratio (X4) variable has a value 0.1339408762, which decreased slightly from 2018. Meanwhile, the X3 variable or Earning Before Tax to Total Assets was only 0.0230343535 which was slightly smaller in value compared to 2018. However, this did not affect the Z-Score value.

In addition, the value of obligations or debts owned by PT. Bank SUMUT in 2019 is relatively large compared to other years, namely Rp26,138,887,428,758. So it can be concluded that the Working Capital to Total Assets and Total Equity to Total Debt Ratio have a greater influence in determining the Z-Score value compared to other variables.

## V. CONCLUSIONS AND SUGGESTIONS

### Conclusion

Based on the results of data processing and discussion, several things can be concluded, namely:

1. The results of the Z-Score of PT. SUMUT Bank in 2017 is 0.44 and SUMUT in 2018 is 0.41. and the year 2019 is 51.13
2. During the research period, PT. Bank SUMUT in 2017 and 2018 are in a condition of bankruptcy because the Z-Score value is smaller than 1.1. And PT. Bank SUMUT in 2019 is in a healthy position and does not experience bankruptcy because the Z-Score value is greater than 2.6.

### Suggestion

Based on the above conclusions that have been described, the authors provide suggestions that would be useful, namely:

1. The management of the company needs to be careful in managing and running company operations by paying attention to financial ratios within the company in order to assess how the performance of the company during a certain period.
2. It is hoped that the management of PT. SUMUT Bank must increase the value of *Net Working Capital* by increasing current assets, because besides that current assets will also increase the level of liquidity, such as managing cash and receivables more effectively, managing debt more effectively. The company must also be able to manage existing profits more effectively so that the company can survive in the long term.

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