Analysis to Predict Bankruptcy on Coal Industry Companies from 2015-2020
(Altman Z Score)

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Abstract: Bankruptcy is a condition of very severe financial difficulties so that the company is unable to run the company's operations properly. Bankruptcy analysis that is often used is Altman's Z-Score analysis, a multiple discriminant model that combines the effects of several variables. Based on the Altman Z-Score to predict bankruptcy at Coal mining companies in Indonesia in 2015-2020 seen from the Altman Z-Score analysis to predict bankruptcy at Adaro Energy Tbk. with an average value of 1,994 is in a position of Prone to Bankruptcy or it can be said that the company has the potential to go bankrupt. This can be seen in the Zi value which is between 1.20%-2.90%. at Bumi Resources Tbk. with an average value of -1,416 is in a position of Bankrupt or it can be said that a company that has the potential to go bankrupt. This can be seen in the Zi value which is between 1.20%-2.90%. at Bayan Resources Tbk. with an average value of 5,455 is in a healthy position or it can be said that the company has no potential for bankruptcy. This can be seen in the Zi value which is between 1.20%-2.90%. at Dian Swastatika Sentosa Tbk. with an average value of 1,406 are in a position of Bankrupt or it can be said that companies that have the potential to go bankrupt. This can be seen in the Zi value which is less than 1.20%. at Golden Energy Mines Tbk. with an average value of 4,438 is in a healthy position or it can be said that the company has no potential for bankruptcy. This can be seen in the Zi value which is less than 1.20%. at Indika Energy Tbk. with an average value of 1,571 is in a position of Bankrupt or it can be said that a company that has the potential to go bankrupt. This can be seen in the Zi value which is less than 1.20%. at Indo Tambangraya Megah Tbk. with an average value of 5,030 is in a healthy position or it can be said that a company that has no potential for bankruptcy. This can be seen in the Zi value which is less than 1.20%. and it can be concluded that to predict the bankruptcy of Coal Mining Companies in Indonesia in 2015-2020 with an average value of 2,640, they are in a position of Prone to Bankruptcy or it can be said that companies with the potential for bankruptcy. This can be seen in the Zi value which is between 1.20%-2.90%. based on Altman Z-Score in Hanafi and Halim, 2005:274.

Keywords: *coal mining company, bankruptcy, altman Z-Score*

INTRODUCTION

Bankruptcy is a condition of financial difficulties so severe that the company is unable to run the company's operations properly. Financial/liquidity difficulties experienced by the company may be the beginning of a bankruptcy.

A company's financial failure is the inability of a company to pay its financial obligations at maturity that leads to bankruptcy. A company is declared bankrupt if the company fails in carrying out business operations to achieve its goals.

According to Karina (2014: 19), bankruptcy (bankcruptcy) is a condition where the company can no longer afford to pay off its obligations" This condition usually does not just appear in the company, there are early indications of the company that can usually be recognized earlier if the financial statements are analyzed more carefully in a certain way. Financial ratios can be used as an indication of bankruptcy in the company. Bankruptcy is a failure that occurs in a company. Failure is defined in some sense.

In the process of achieving the goal, the company is faced with various problems, challenges and risks, so that many companies are unable to maintain their business even the company is in bankruptcy. According to Darsono and Ashari (2005: 101) Financial difficulties can be interpreted as the inability of a company to pay its financial obligations at maturity that leads to bankruptcy in the company. Indicators that can be used to see the signs of bankruptcy in a company are divided into two, namely can be observed by external parties and can be understood by internal parties. In the midst of the occurrence of bankruptcy in a company, the management must make a shake-up as early as possible by conducting a bankruptcy analysis. One indicator that can be used to find out the level of bankruptcy is the financial indicator.

Z-Score analysis of the Altman model, a multiple discriminant model that combines the effects of several variables. Altman is a financial analysis model that has been widely used in the United States. The bankruptcy analysis is known because in addition to its easy way accuracy in determining the prediction of bankruptcy is quite accurate. Bankruptcy analysis is done to predict a company as an assessment and consideration of a company's condition.

To anticipate the occurrence of bankruptcy, the company must have early preparations to prevent unwanted things from happening. The company is expected to assess the company's current condition in order to get a clearer picture of the company's current condition, so as to know what actions are appropriate to maintain and correct the company's shortcomings in order to survive and compete.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Bankruptcy Theory

"Business difficulties are continuum conditions ranging from mild financial difficulties (such as liquidity problems), to more serious difficulties, namely not solvabel (greater debt compared to assets). In this condition the company can practically be said to be bankrupt" (Hanafi, 2010: 638).

Another definition of bankruptcy is put forward by Weston & Copeland (1997: 510), that bankruptcy is as a failure that occurs in the company can be distinguished as follows:
1. Economic Distressed Failure in the economic sense that a company's income can no longer afford to cover its costs, meaning that its profit rate is smaller than its capital costs. The related definition is that the present value of a company's cash flow is smaller than its liabilities.
2. Financial Distressed Insolvency has two forms, namely technical defaults that occur when a company fails to meet one or more conditions in its debt provisions, such as the ratio of current assets to current debts set, and financial failure or technical insolvency

that occurs if the company is unable to meet its obligations at the specified time even though the total property beyond his debt.

Altman's Z-Score Analysis

A number of studies have been conducted to determine the usefulness of financial ratio analysis in predicting failure or bankruptcy of a business. One study of these predictions is the Multiple Discriminant Analysis that Altman has conducted. Research conducted by Edward I. Altman is looking for similar financial ratios commonly used to predict bankruptcy for all countries of study. Bankruptcy Analysis Z is a tool used to forecast a company's bankruptcy rate by calculating the value of several ratios and then being included in a discriminant equation. Altman has combined multiple ratios into predictive models with statistical techniques, namely discriminant analysis used to predict the occurrence of corporate bankruptcy with the term Z-Score. Z-Score is a score determined from a standard count that will indicate the level of possible bankruptcy of the company. Altman's Z-Score formula for predicting bankruptcy is a multivariate formula used to measure the financial health of a company.

Z-Score Ratio

Altman found five types of financial ratios that can be combined to see the difference between a bankrupt and a non-bankrupt company. Altman Z-Score is determined using the following formula:
1. *Working Capital to Total Assets* (Ratio of Working Capital to Total Assets) (X_1)
2. *Retained Earnings to Total Assets* (Ratio of Retained Earnings to Total Assets) (X_2)
3. *Earnings Before Interest and Tax to Total Assets* (Ratio of EBIT to Total Assets) (X_3)
4. *Market Value Equity to Book Value of Total Debt* (X_4)
5. *Sales to Total Assets* (Ratio of Sales to Total Assets) (X_5)

RESEARCH METHODS

This type of research uses a quantitative approach that is each variable and between variables based on the scale of quantitative measurement. Population and sample in this study on the Indonesia Stock Exchange for the period 2015-2020. The population in this study is the Barubara Industrial Company which is listed on the Indonesia Stock Exchange from 2015-2020 based on the idx period 2015-2020. and www.idx.co.id website.

Data analysis used in this research is quantitative data analysis is a technique of data analysis by analyzing using calculations of figures from financial statements, such as balance sheets, profit and loss and sales, which are then used as a basis for decision making.

Table 1. The criteria for bankruptcy according to Altman are as follows

No.	Altman *Z-Score*	Predicate
1	Zi > 2.90	Healthy
2	Zi between 1.20 - 2.90	Prone to Bankruptcy*(Grey Area / zone of ignorance*)
3	Zi < 1.20	Bankrut

Source: Hanafi and Halim, (2005:274).

RESULTS AND DISCUSSION

Altman Z Analysis Calculation – Score
1. Adaro Energy Tbk.

For 5 years from 2016 to 2020 consecutively Adaro energy Tbk. is in a position prone to bankruptcy or can be said to be a company that has the potential to bankruptcy. This can be seen in the value of Zi which is between 1.20%-2.90% only in

2015the company is in a stable condition. This can be seen from the *Z-Score* value in that year is healthy. Zi's year-over-year decline in the company suggests that the company must improve its financial performance. so that overall the company Adaro Energy Tbk. can be said to be **Prone to Bankruptcy**. From the calculation results for *the Z-Score* value Adaro Energy Tbk. in the period 2015 to 2020 can be described the graph seen in figure 1 of the following:
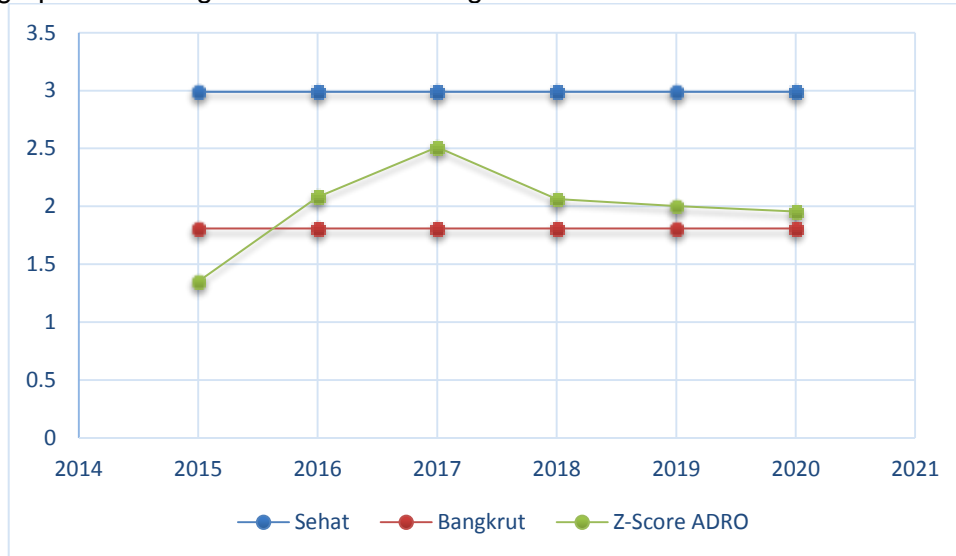

Figure 1. *Z-Score Value* Adaro Energy Tbk.

2. Bumi Resources Tbk.

For 6 years from 2015 to 2020 in a row Bumi Resources Tbk. is in a position of bankruptcy or can be said to be a potentially bankruptcy company. This can be seen in the value of Zi which is between 1.20%-2.90%. Zi's defense from the last 6 years at Bumi Resources Tbk. shows that Bumi Resources Tbk. there are problems in its financial performance so that overall Bumi Resources Tbk. can be said to be **bankrupt.** From the calculation results for *the Z-Score* value Bumi Resources Tbk. in the period 2015 to 2020 can be described the graph seen in figure 2 below:
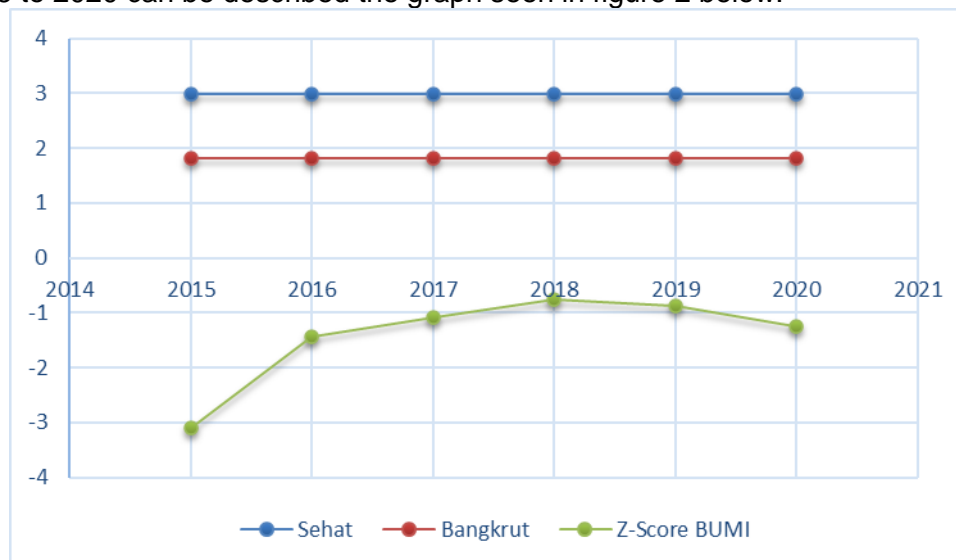

Figure 2. *Z-Score Value* Bumi Resources Tbk.

3. Bayan Resources Tbk.

For 4 years from 2017 to 2020 consecutively Bayan Resources Tbk. is in a healthy position or it can be said that the company does not have the potential to experience bankruptcy. This can be seen in the value of Zi which is between 1.20%-2.90%. Zi's increase from the last four years in Bayan Resources Tbk. shows that Bayan Resources Tbk. Tidak there are problems in its financial performance so that overall Bayan Resources Tbk. can be said to be **Healthy.**From the calculation results for *the Z-Score* value Bayan Resources Tbk. in the period 2015 to 2020 can be described the graph seen in figure 3 below:
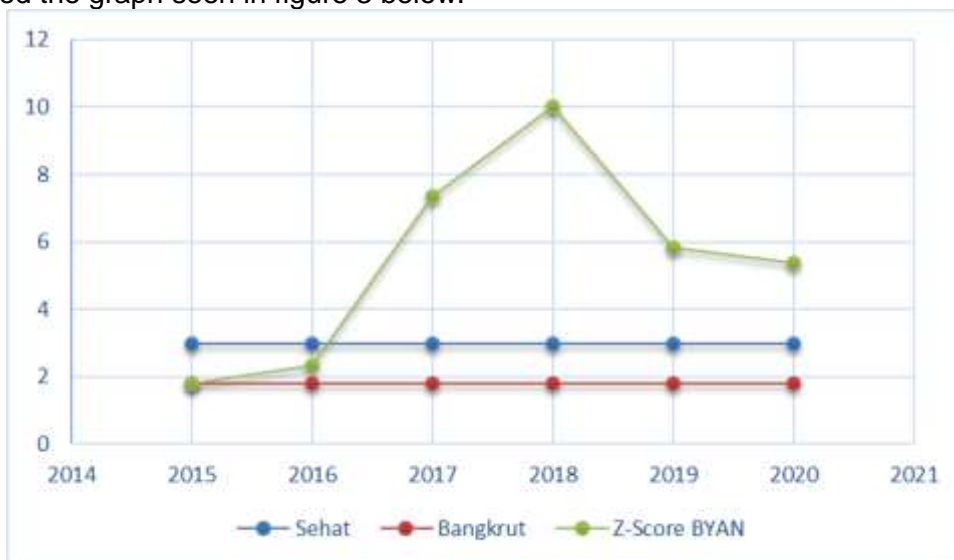

Figure 3. *Z-Score Value* Bayan Resources Tbk.

4. Dian Swastatika Sentosa Tbk.

For 6 years from 2015 to 2020 consecutive Dian Swastatika Sentosa Tbk. is in a position of bankruptcy or can be said to be a potentially bankruptcy company. This can be seen in the value of Zi which is between 1.20%-2.90%. Zi's defense from the last 6 years at Dian Swastatika Sentosa Tbk. shows that Dian Swastatika Sentosa Tbk. there are problems in its financial performance so that overall Dian Swastatika Sentosa Tbk. can be said to be **bankrupt.** From the calculation results for *the Z-Score* value Dian Swastatika Sentosa Tbk. in the period 2015 to 2020 can be described the graph seen in figure 4 below:

Figure 4. *Z-Score* Value Dian Swastatika Sentosa Tbk.

5. **Golden Energy Mines Tbk.**

For six years from 2015 to 2020 consecutively Golden Energy Mines Tbk. is in a healthy position or can be said to be a company that does not have the potential to go into bankruptcy. This can be seen in the value of Zi which is between 1.20%-2.90%. Zi's defense of the last six years on Golden Energy Mines Tbk. shows that Golden Energy Mines Tbk. Tidak there are problems in its financial performance so that overall Golden Energy Mines Tbk. can be said to be **Healthy.** From the calculation results for *the Z-Score* value Golden Energy Mines Tbk. in the period 2015 to 2020 can be described the graph seen in figure 5 below:

Figure 5. *Z-Score Value* Golden Energy Mines Tbk.

6. **Indika Energy Tbk.**

For six years from 2015 to 2020 consecutively Indika Energy Tbk. is in a position of bankruptcy or can be said to be a potentially bankruptcy company. This can be seen in the value of Zi which is between 1.20%-2.90%. Zi's defense of the last six years at Indika Energy Tbk. shows that Indika Energy Tbk. there are problems in its financial performance so that overall Indika Energy Tbk. can be said to be **bankrupt.** From the calculation results for *the Z-Score* value Indika Energy Tbk. in the period 2015 to 2020 can be described the graph seen in figure 6 below:
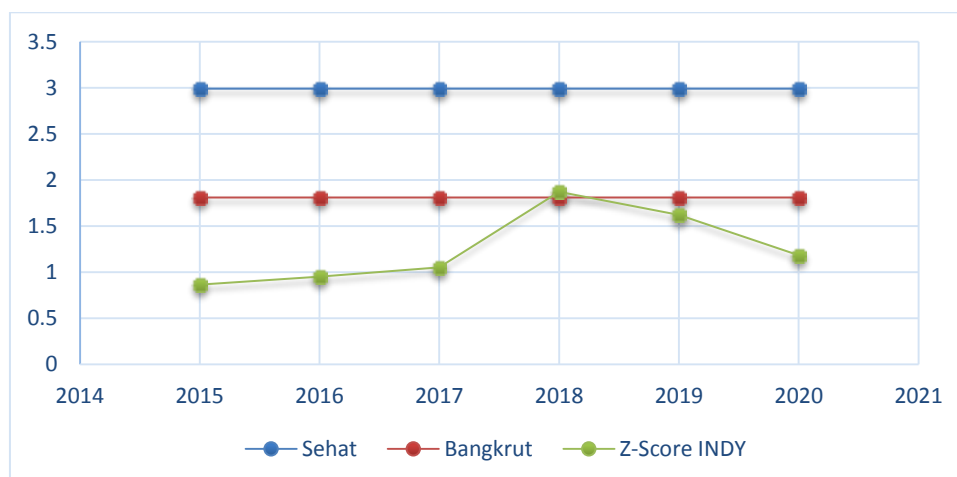
Figure 6. *Z-Score Value* Indika Energy Tbk.

7. **Indo Tambangraya Megah Tbk**

For six years from 2015 to 2020 consecutively Indo Tambangraya Megah Tbk. is in a healthy position or it can be said that the company does not have the potential to experience bankruptcy. This can be seen in the value of Zi which is between 1.20%-2.90%. Zi's defense from the last six years on Indo Tambangraya Megah Tbk. shows that Indo Tambangraya Megah Tbk.There are no problems in its financial performance so that overall Indo Tambangraya Megah Tbk. can be said to be **Healthy.** From the calculation results for *the Z-Score* value Indo Tambangraya Megah Tbk. in the period 2015 to 2020 can be described the graph seen in figure 7 below:
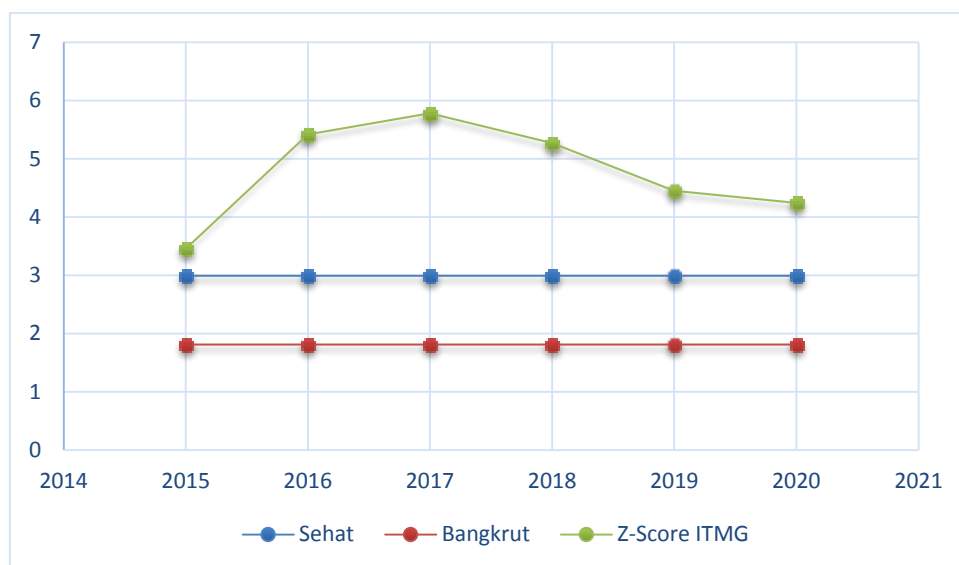

Figure 7. *Z-Score Value* Indo Tambangnya Megah Tbk.

Altman Z-Score Analysis to Predict Bankruptcy in Coal Companies in Indonesia in 2015-2020

Altman Z-Score Results of Coal Companies in Indonesia 2015-2020 Table 8 shows that the average bankruptcy in coal companies in Indonesia is listed on the Indonesia Stock Exchange (IDX) as follows:

Table 2. Bankruptcy of Coal Company in Indonesia in 2015-2020.

No.	Nama Perusahaan Coal Mining yg tercatat di IDX Indonesia	Nilai Z Score					Zi	Predikat
		X1	X2	X3	X4	X5		
1	ADRO -Adaro Energy Tbk.	0,126	0,28	0,09	1,16	0,451	1,994	**Rawan Bangkrut**
2	BUMI - Bumi Resources Tbk.	- 0,387	- 0,86	0,00	0,17	0,140	- 1,416	**Bangkrut**
3	BYAN - Bayan Resources Tbk.	0,113	0,19	0,27	5,35	0,963	5,455	**Sehat**
4	DSSA - Dian Swastika Sentosa Tbk.	0,070	0,23	0,08	0,49	0,431	1,406	**Bangkrut**
5	GEMS - Golden Energy Mines Tbk.	0,212	0,14	0,14	3,94	1,142	4,438	**Sehat**
6	INDY - Indika Energy Tbk.	0,191	0,16	0,06	0,39	0,680	1,571	**Bangkrut**
7	ITMG - Indo Tambangraya Megah Tbk.	0,247	0,42	0,20	3,75	1,241	5,030	**Sehat**

After calculating each variable (X1, X2, X3, X4, X5) in six consecutive years so that the average *Z-Score* in coal mining companies in Indonesia can be known by 2. 640,This indicates that the condition of coal companies in Indonesia as a whole is **prone to bankruptcy.**

There is one company that falls into the category of prone to bankruptcy or can be said to be a coal mining company that has the potential to bankruptcy, namely Adaro Energy

Tbk, and there are three companies that have the potential to go bankrupt, namely: Bumi Resources Tbk, Dian Swastatika Sentosa Tbk, and Indika Energy Tbk. And there are also three companies that fall into the healthy category, namely, Bayan Resources Tbk, Golden Energy Mines Tbk, and Indo Tambangraya Megah Tbk.

The company has been in a row for six years and is predicted to potentially go bankrupt. This shows that the company should focus more on improving the company's performance to increase the five ratios, for example by increasing the volume of sales to existing inventory, so that there is income in the company's cash from the sales results. In addition to improving in terms of corporate finance, the company can also improve and add *intangible assets* owned by the company. *Intangible Assets* include the company's management system, *loans* from both banks and other companies, assistance from the government *(subsidiary),* cooperation contract agreements with reputable companies. Looking at the conditions above, the manager must be more careful and must make improvements as soon as possible.

CONCLUSIONS

Based on *Altman Z-Score* to predict bankruptcy in coal mining companies in Indonesia in 2015-2020 as follows:
1. *Altman Z-Score* analysis to predict bankruptcy in Adaro Energy Tbk. with an average value of **1,994** is in a position prone to **bankruptcy** or can be said to be a potentially bankruptcy company. This can be seen in the value of Zi which is between 1.20%-2.90%.
2. *Altman Z-Score* analysis to predict bankruptcy in Bumi Resources Tbk. with an average value **of -1,416** is in a **bankrupt** position or can be said to be a potentially bankruptcy company. This can be seen in the value of Zi which is between 1.20%-2.90%.
3. *Altman Z-Score* analysis to predict bankruptcy at Bayan Resources Tbk. with an average value of **5,455** is in a **healthy** position or it can be said that the company is not potentially bankruptcy. This can be seen in the value of Zi which is between 1.20%-2.90%.
4. Altman Z-Score analysis to predict bankruptcy at Dian Swastatica Sentosa Tbk. with an average value of **1,406** are in a position of **bankrupt** or it can be said that companies that have the potential to go bankrupt. This can be seen in the Zi value which is less than 1.20%.
5. Altman Z-Score analysis to predict bankruptcy at Golden Energy Mines Tbk. with an average value of **4,438** is in a **healthy** position or it can be said that a company that has no potential for bankruptcy. This can be seen in the Zi value which is less than 1.20%.
6. Altman Z-Score analysis to predict bankruptcy at Indika Energy Tbk. with an average value of **1,571** is in a position of **bankrupt** or it can be said that a company that has the potential to go bankrupt. This can be seen in the Zi value which is less than 1.20%.
7. Altman Z-Score analysis to predict bankruptcy at Indo Tambangraya Megah Tbk. with an average value of **5,030** is in a **healthy** position or it can be said that a company that has no potential for bankruptcy. This can be seen in the Zi value which is less than 1.20%.
8. Altman Z-Score analysis to predict the bankruptcy of Coal Mining Companies in Indonesia in 2015-2020 with an average value of **2,640** being in a position of **Prone to Bankruptcy** or it can be said that companies with the potential for bankruptcy. This can be seen in the Zi value which is between 1.20%-2.90%. based on Altman Z-Score in Hanafi and Halim, 2005:274.

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