

FINANCIAL DISTRESS PREDICTION AND SEEING THE INFLUENCE OF THE ALTMAN RATIO ON COMPANY FINANCIAL DISTRESS

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Abstract

This research aims to determine the level of bankruptcy of the company and to see if the Altman ratio can predict the condition of corporate bankruptcy in mining companies on the Indonesia Stock Exchange, because mining companies have a large role in the Indonesian economy. This study uses the Altman Z-Score model analysis to see how much the company's bankruptcy prediction and uses logistic regression to see how much the influence of the Altman ratio in predicting corporate bankruptcy. The data used is discriminant analysis using a variable from Altman Z-Score, a modification of four, namely X1 = Net Working Capital to Total Assets, X2 = Retained Earning to Total Assets, X3 = Earnings Before Interest and Tax to Total Assets, and X4 = Book Value of Equity to Total Liability. The Altman Z-score formula is $Z = 6.56 X1 + 3.26 X2 + 6.72 X3 + 1.05 X4$. Z-Score > 2.6 is categorized as healthy company, $1.1 < Z\text{-Score} < 2.6$ is categorized as grey area and Z-Score < 1.1 is categorized as financial distress. The results of this study indicate that the Altman Z-Score model can be used to detect the possibility of corporate bankruptcy with the results of 7 companies in 2012, 9 companies in 2013, 10 companies in 2014, 14 companies in 2015 and 14 companies in 2016 experiencing financial distress. The results of this study also show that by using logistic regression, the Altman ratio can affect financial distress with the results of Net Working Capital to Total Assets ($0.016 < 0.05$) and Earnings Before Interest and Tax to Total Assets ($0.000 < 0.05$). It means that these variables can affect financial distress and reveal that among the variables found in the Altman Z-Score ratio, the most dominant variable is Net Working Capital to Total Assets and Earnings Before Interest and Tax to Total Assets.

Keywords: financial distress, the altman z-score, bankruptcy prediction

INTRODUCTION

Indonesia has the same natural resources and human resources, where these assets are spread throughout Indonesia. Thus, Indonesia should have no difficulty in working on and processing everything it has in an effort to improve the quality of national life. These assets include the mining sector such as gold mines in Papua, coal mines in Kalimantan, sand mines in Bangka Belitung, mineral mines, oil and gas mines, and many others.

Managing Director Natural Resources Lead Accenture Indonesia, Saut Maria Santosa, revealed that in the United States (US) geological survey, Indonesia was ranked sixth as a country rich in mining resources. As for the Southeast Asian region, Indonesia occupied the top position for new mining projects to be run, followed by the Philippines and Vietnam.

The revenue of mining companies listed on the Indonesia Stock Exchange

(IDX) in general declined in 2014. The slow-moving global economy caused low demand for commodities such as coal and crude palm oil (two important foreign exchange earners in Indonesia). Slowing economic growth in the People's Republic of China (PRC) was particularly alarming.

Pricewaterhouse Coopers (PwC) research results in 2016 showed that as many as 40 global mining companies suffered the biggest losses in history during 2015. In that year, they suffered a loss of 27 billion US dollars, equivalent to around Rp. 364.5 trillion at an exchange rate of Rp. 13,500 per US dollar. In 2016, mining commodity prices also declined to 25% compared to the previous year. In order to survive, mining companies try to increase their productivity, but some also release assets or close their businesses.

The falling prices of mining commodities and the decline in demand for mining materials from China, have a negative impact on the financial performance of domestic mining companies. In December 31, 2015, the capitalization value of national mining companies in the capital market was Rp. 161 trillion, down considerably compared to December 31, 2014, which reached Rp. 255 trillion.

Judging from the annual index issued by the IDX in 2012 - 2016 the mining sector always experienced a minus percentage.

The purpose of this study is to determine the level of corporate bankruptcy and to see if the Altman ratio can predict the condition of corporate bankruptcy in mining companies on the Indonesia Stock Exchange.

RESEARCH METHOD

Pratama (2016_a) stated that Financial Distress is a condition in which a company's finances are in a state of unhealthy or crisis. Financial distress occurs before bankruptcy. Bankruptcy itself is usually defined as a situation where the company fails or is unable to fulfill its obligations.

In this writing, the author uses a population of manufacturing companies listed on the IDX. The researcher conducted a purposive sampling technique with the criteria of each company. Companies that get a net profit of 2 consecutive years are categorized as healthy companies and are given the number 0 as the category variable. Companies that experience a net loss of 2 consecutive years are included in the criteria of financial distress and are given the number 1 as the category variable that will be used as the dependent variable in this writing, so that a sample of 36 companies is obtained. These criteria were used when using a logistic regression analysis tool to see the effect between the dependent variable and the independent variable using the modified Altman ratio.

Altman has combined several ratios into prediction models with discriminant analysis techniques used to predict a company's bankruptcy, with the term known as Z-score. Z-score is a score determined from a standard count that will indicate the possibility of a company's bankruptcy. Z-score for predicting bankruptcy of Edward Altman's formula is a multivariate measure of financial health and a powerful diagnostic tool that estimates the probability of bankruptcy entering a company within 2 years (Altman, 1986 in Cahyono, 2013).

Along with the times and also changes in economic conditions and market behavior, Altman modified his bankruptcy analysis model. In this Z-Score model Altman removes the Sales / Total Assets variable which is the sales ratio to total assets and replaces the amount of the coefficient value of all the variables used in predicting bankruptcy in a company (Irfan and Yuniati, 2014).

This analysis is named after the Modified Altman Z-Score Model. Altman (1995) in Pratama (2016_b) stated that the Formula of the Modified Altman Z-Score Model (for all companies) is as follows:

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

Where:

$$X_1 = \textit{Working capital/total assets}$$

This analysis is used to determine the ability of a company to fulfill all financial obligations that must be immediately fulfilled, by comparing working capital with total assets. Working capital is obtained by reducing current assets with current liabilities.

$$X_2 = \frac{\textit{Retained earnings}}{\textit{total assets}}$$

From this ratio we can know the amount of capital that comes from internal parties, to finance the company's operations. Retained earnings are accumulated profits as long as the company operates. Retained earnings are obtained by reducing net income with dividends.

$$X_3 = \frac{\textit{Earnings before interest and taxes}}{\textit{total assets}}$$

This ratio shows the company's ability to manage total assets to get profit before interest and tax (EBIT). This ratio looks very important, so Altman wants to give the biggest value to reach 6.72.

$$X_4 = \frac{\textit{Book value of equity}}{\textit{book value of total liability}}$$

The ratio is used to measure the extent to which company assets are financed from debt. This means how much the debt burden borne by the company is compared to its assets. In general it is said that this ratio is used to measure the ability

of a company to pay all of its obligations, both short and long term if the company is dissolved or liquidated (Endri: 2009).

According to Altman (1995) in Pratama (2016), the classification of healthy and bankrupt companies is based on the value of Z-Score, which are:

a. $Z < 1.10$

The company falls into the category of financial distress.

b. $1.10 < Z < 2.60$

The company is included in the gray area category (it cannot be determined whether the company is healthy or experiencing financial distress).

c. $Z > 2.60$

The company falls into the category of not financial distress.

Testing of the hypothesis in this study also uses logistic regression. According to (Ghozali: 2006) this method is suitable for research whose dependent variables are categorical (nominal or non-metric) and the independent variables are a combination of metric and non-metric as in this study.

Logistic regression is used to test if the variables contained in the Altman ratio affect financial distress which is represented by the value of the company's net income.

In this study, researchers do not conduct normative data tests because according to (Ghozali: 2006) logistic

regression does not require normative assumptions on the independent variables. The normal multivariate assumption here cannot be fulfilled because the independent variable is a continuous (metric) and categorical (non-metric) mixture. Gujarati (2003) stated that logistic regression also ignores the problem of heteroscedacity, meaning here the dependent variable does not require homoscedacity for each of the independent variables. However, the testing analysis with Logistics Regression according to Santoso (2004) needs to pay attention to the following matters:

a. Assessing Feasibility of Regression Capital

Note the output of Hosmer and Lemeshow with the hypothesis:

Ho: There is no significant difference between the classifications predicted by the observed classification.

H1: There are significant differences between the classifications predicted by the observed classification.

Basic decision making:

Note to the goodness of fit test value as measured by the chi square value at the bottom of the Hosmer and Lemeshow test

if the probability is > 0.05 , Ho is accepted.

if the probability is < 0.05 , Ho is rejected.

**b. Assessing the Overall Model
(Overall Fit Model)**

The overall assessment of the regression model uses a value of -2 log likelihood (LL) where if there is a decrease in the number -2 log likelihood in the second block (Block Number = 1) compared to the first block (Block Number = 0) or value -2 LL Block Number = 0 > -2 LL Block Number = 1, it can be concluded that good regression.

c. Coefficient of Determination

The magnitude of the coefficient of determination in the logistic regression model is indicated by the value of Nagelkerke R Square (R²), which is a test used to measure how far the independent ability is able to explain and influence the dependent variable. R² values range from 0 to 1, where if the R² value is small, the ability of the independent variable to explain the dependent variable is limited. Whereas, if R² approaches 1, it means that the independent variable is able to provide all the information needed to predict the dependent variable. For regression with independent variables more than 2, adjusted R² is used as the coefficient of determination.

d. Logistic Regression Test

The test with logistic regression model used in this study is to determine the effect of each independent variable on the dependent variable. Partial parameter

significance testing can be done through the Wald test of the test criteria, namely:

The level of trust used is 95% or a significance level of 5% ($\alpha = 0.05$).

Criteria for acceptance or rejection of hypotheses are based on p-value significance. If the significance level > 0.05 H₀ is rejected, if the significance level < 0.05 H₀ is accepted.

RESULTS AND DISCUSSION

Data that has been collected and calculated will then be processed and analyzed using descriptive statistics by the researchers.

The following are descriptive values presented in Table 4.1 in the appendix.

The table above shows that the average amount of data on the net working capital to total assets, retained earnings to total assets, earnings before interest and taxes to total assets and book value of equity to total liability is 180 data which are the total sample study period from 2012 - 2016. Working capital to total assets has a minimum value of -1.781, a maximum value of 0.757 and an average value of 0.079. Retained earnings to total assets variable has a minimum value of -1,731, a maximum value of 1,325 and an average value of 0.058. Earnings before interest and taxes to total assets have a minimum value of -1.736, a maximum value of 1.329 and an average value of 0.042. Book value of

equity to total liability has a minimum value of -0.496, a maximum value of 23,557 and an average value of 2,052.

In this writing, the author uses the Altman Z-Score to predict the bankruptcy of a company.

Calculation results using the Altman z-score model can be seen in Table 4.2 in the Appendix.

The results of the analysis of the modified Altman Z-score model in table 4.2 shows that mining companies listed on the Indonesian stock exchange in 2012-2016 which experienced financial distress were 7 companies in 2012, 9 companies in 2013, 10 companies in 2014, 14 companies in 2015 and 14 companies in 2016.

There were 6 companies that throughout the year had always received a red report card, including companies with the codes ENRG, ARII, BORN, BUMI, BYAN and CTTH.

In this writing, the authors also uses logistic regression method analysis. This logistic regression analysis is used to see the effect between the independent variable and the dependent variable.

The following are the results of the analysis using logistic regression analysis which is presented in table 4.3 in the appendix

The results of logistic regression analysis shows that the ratio of net working capital to total assets and earnings before interest and tax to total assets have a

significant effect on financial distress with each value of 0.16 and 0.000 smaller than 0.05.

CONCLUSION AND SUGGESTION

Based on the results of the analysis conducted in this study, it can be concluded as follows:

1. The results of the analysis of the modified Altman Z-Score method shows that mining sector companies listed on the Indonesian stock exchange in 2012-2016 which experienced financial distress conditions were 7 companies in 2012, 9 companies in 2013, 10 companies in 2014, 14 companies in 2015 and 14 companies in 2016.
2. The results of the research using Logistic Regression Analysis shows that there are several Altman Z-Score ratios that can provide a significant picture in predicting financial distress measured by using net income as the dependent variable which is the ratio of Net Working Capital to Total Assets (X1) obtained the results of significant values of 0.016 <0.05. This means that the variable X1 has a significant influence on financial distress, and the ratio of earnings before interest and tax (X3) obtained significant value of 0.000

<0.05. This means that the variable X3 has a significant effect on financial distress.

3. The results of the study using logistic regression analysis shows that mining sector companies listed on the Indonesian stock exchange in 2012-2016 contained 76 data included in the financial distress category and 104 data included in the non-financial distress category.

Based on the limitations in this study, there are several suggestions for future research, namely:

1. For future researchers, it is expected to add the variables studied so that they can better explain financial distress.
2. Further researchers are expected also to be able to use technical analysis in addition to fundamental analysis.
3. For the next researchers, it is also expected to study more deeply the phenomena that will be raised to fit the results.
4. Subsequent research can extend the observation period, so that more consistent research can be obtained.

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