MANUFACTURING COMPANY BANKRUPTCY PREDICTION IN INDONESIA WITH ALTMAN Z-SCORE MODEL

Nur Hasbullah Matturungan
Budi Purwanto
Abdul Kohar Irwanto
Faculty of Economics and Management
Institut Pertanian Bogor

Abstract: Model Altman is one of the models used to predict financial distress. Some of the results of research that conducted in Indonesia showed that Altman model is completely accurate in predicting financial distress but the other found the opposite results. This inconsistency indicates the need to adapt the model by checking whether variables affect Altman model in financial distress companies in Indonesia and the adjustment coefficients Altman to be able to better predict about financial distress. The results showed that the partial test working capital/total assets, retained earnings to total assets, and earning before interest and tax to total assets were able to classify the company’s financial distress. However, the model that formed by five variables were able to classify financial distress well with an accuracy of 87.8%.

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

Bankruptcy is an issue that really needs to be watched by the company. Corporate bankruptcies will certainly have a negative impact on the company’s stakeholders. Before bankruptcy, the company experienced a condition financial distress or financial condition of the company in a bad state that a preliminary indicator bankruptcy (Corina and Chrissa, 2013). At companies that go public, the impact of a company experiencing financial difficulties is the removal of the company’s shares from the stock exchange. It can be seen from 20 companies were delisted in 2011 until 2015 in the activity of listing of shares on the Indonesia Stock Exchange.

Prediction of financial distress is very important as a step in early detection so that both companies and investors can find out a possibility of bankruptcy will happen to the company in the future. Early detection can be beneficial for the company to evaluate and perform the actions need to be done to avoid bankruptcy. This may be one reason for the importance of a tool that can predict the condition of financial difficulties (financial distress).

Bankruptcy prediction can be measured through the financial statements of a company by analyzing the ratio of the financial statements of the company (Adnan and Kurniasih 2000). Results of research conducted by Beaver (1966) found that the financial ratios were able to predict the bankruptcy of the...
company. Beaver research was the beginning of the development of research on the analysis of financial statements that correlate financial ratios, for example, the model of the Altman Z-Score. Z-Score model was created in 1968 by Edward I. Altman.

Altman Z-Score Model can be used to predict the chances of a company that can bankrupt within a period of 2 years (Altman 1968). This model features up to 72% accuracy in predicting a bankruptcy within two years before the bankruptcy occurred and have accuracy up to 80%-90% in predicting bankruptcy one year before the bankruptcy that occurred (Altman 2000). The accuracy in predicting corporate bankruptcies making models Altman Z-Score is a reference for each investor and investment managers in the United States as a tool to assist their investment decisions (Eidleman, 1995).

The accuracy of the model Altman Z-Score has been widely proven in many studies that test the accuracy of these models. The high level of accuracy Altman is supported by research conducted by Prihanthini and Sari (2013) who found that the model of the Altman Z-Score has an 80% accuracy rate on food and beverage company on the Indonesian Stock Exchange. Research on cigarette sub-sector companies in the Indonesia Stock Exchange by Tambunan, et al. (2015) also found that the model of Altman’s Z-Score have a high degree of accuracy based on the analysis performed in two periods before the bankruptcy occurred. Research conducted by Rim and Roy (2013) found that in addition to being able to predict well about potential bankruptcy, Altman model is able to classify the company in the category of small, medium, and large. Additionally, Nugroho and Mawardi (2012) examine the model Altman Z-Score is at 88 manufacturing companies that go public in Indonesia and found that the level of accuracy of Altman model has reached 79.75%. The interesting thing was found by Kusdiana (2014), which conducts research on commercial bank listed on the Indonesia Stock Exchange found that the level of accuracy of the model Altman Z-Score has reached 100%.

However, Altman model does not always show the highest level of accuracy when applied. Research conducted by Marcelinda, et al. (2014) in the manufacturing companies listed in Indonesia Stock Exchange found that the prediction model Altman Z-Score have a low accuracy rate is only 27.96%. The same was found by Nikmah and Sulestari (2014). They found that accuracy rate of Altman Z-Score models is less efficient in predicting bankruptcy, only about 40% of 120 companies listed in Indonesia Stock Exchange. Research Yi Wang (2012) concluded that Altman model suitable for use in the United States but not very suitable for use in China.

The inconsistency regarding the accuracy of Altman model indicates that the need for testing in advance about the effect of the ratios on the model of the Altman Z-Score to financial distress companies in Indonesia and adjust coefficients Altman model that is able to predict financial distress companies in Indonesia.

RESEARCH METHODS

Altman Z-Score Model consists of five ratios that have proven able to better predict a bankruptcy. However, the application of Altman model has an accuracy rate that contradicted so that the necessary checks fifth relationships ratio in financial distress companies and the adjustment coefficients in the Altman Z-Score model before being applied to the company in Indonesia. The dependent variable in this research is financial distress and the independent variable is working capital to total assets, retained earnings to total assets, earnings before interest and tax to total assets, a market value of equity to total liabilities, and sales to total assets.

Operational Definition of Variables

Operational definitions of variables used in this study as follows:

1. Net working capital to total assets is score ratio that shows the company’s ability to generate working capital of the total assets owned by the company obtained from the division of working capital and total assets.
2. Retained earnings to total assets is score ratio which indicates the company’s ability to benefit obtained from the distribution of retained earnings and total assets.
3. Earnings before interest and tax to total assets is score ratio which indicates the company’s ability to generate profits from the assets of the
company itself, before interest payments and taxes generated from the distribution of earnings before interest and tax and total assets.

4. The market value of equity to total liabilities is score ratio that measures the extent to which the company's assets are financed from loans obtained from the result of the division of the market value of equity and total liabilities.

5. Sales to total assets is score ratio that indicates the extent to which the company is using its assets effectively to increase sales obtained from the division of sales and total assets.

6. Financial distress is dummy variable, 1 if the company has negative earnings per share for two years in a row, and 0 for the others.

Population and Sample

The population in this study are all manufacturing companies listed in Indonesia Stock Exchange in 2014 to 2015 consisting of three sectors, namely industry and the chemical sector, various industrial and consumer goods industry.

The sampling technique used purposive sampling method with the criteria of the companies listed on the Indonesia Stock Exchange in 2014-2015 did not include companies that relisting nor delisting and issued annual financial statements from 2014 to 2015. In this study, the number of companies surveyed was 131 companies.

Data Analysis Technique

Data analysis techniques used in this research is discriminant analysis. According to Ghozali (2011), discriminant analysis is a form of regression with the dependent variable is a non-metric or category.

RESULTS AND DISCUSSION

Condition Companies That Are Experiencing Financial Distress in The Stock Exchange Indonesia

This study found that there are 21 companies listed on the Indonesia Stock Exchange is experiencing financial distress, while 110 companies are not experiencing financial distress. It means that companies that are listed on the Indonesia Stock Exchange are not necessarily free from financial distress.
Companies experiencing financial distress can be seen from its financial statements. In this study, the company at least has a negative figure in working capital, earnings before interest and taxes, or profit holding from the financial statements of the companies.

The working capital will negatively affect the growth and profitability of the company. If this continues it will initiate financial distress and could eventually lead to bankruptcy for the company itself (Delavar, et al., 2015). The research conducted by Caballero, et al., (2008) found that companies experiencing financial distress have a lower working capital.

If earnings before interest and tax were negative, that indicated the company had a problem on the company’s ability to generate an operating profit. This obviously makes the company vulnerable to financial distress. John, et al. (1992) described the company’s financial distress can be seen from the negative value of the earnings before interest and tax firm.

Negative retained earnings show that the company is not able to generate profits and to finance the company’s assets. In addition, the negative retained earnings also showed that the inefficient management in managing the company’s activities. If this condition continues, the company is vulnerable to financial distress, although it has a small debt (Byoun, 2007).

In the graph above shows that more companies are not experiencing financial distress than those experiencing financial distress. Seen from the sector, the companies experiencing financial distress condition occurs in every sector.

All the graph above shows all of the companies in the subsectors of cement, wood and its management, machinery and heavy equipment, footwear, cables, electronics, pharmaceuticals, cosmetics and household goods, and housewares are not experiencing financial distress while other sub sectors at least there one company experiencing financial distress.

Companies in the textile and garment sector are the most experienced financial distress as many as seven companies. This condition is caused by competition with imported goods are cheaper in price and the weakening rupiah against the US dollar led to rising raw material prices that make weak growth in

![Figure 3. Comparison of the number of companies experiencing and not experiencing financial distress in the sector and chemical industry](image-url)
this sector. This has led to layoffs of employees is approximately 30,000 employees (Ministry of Industry, 2015).

**Discriminant Result**

The results showed that when tested by partial, there are 3 variables were able to classify the financial distress of the company, namely the working capital to total assets (X1), retained earnings to total assets (X2), and earnings before interest and tax (X3) with significant value below 0.05 while the variable market value of equity to total liabilities (X4) and sales to
Companies experiencing financial distress occur in almost every sub-sector with a total of 21 companies from a total of 131 companies or 16% of all manufacturing companies. Companies experiencing financial distress have negative numbers in working capital, earnings before interest and tax, or on retained earnings. The results showed that the partial test working capital to total assets, retained earnings to total assets, and earnings before interest and tax to total assets were able to classify financial distress while variable market value of equity to total liabilities and sales to total assets was not able to clarify financial distress. However, formed the model of these five variables were able to classify financial distress. The variables in the Altman model able to predict the financial distress of the company amounted to 87.8%. These results were obtained after adjustment coefficient with the condition of manufacturing companies in Indonesia.

Suggestions
In accordance with the data obtained from this research, If you want to get a more accurate discriminant model it is necessary to do the adjustment coefficients for each variable Altman model. This is done because of the condition of the company different in each country. Advisable to add the range in order to obtain more accurate results in future studies. Using others indicators of financial distress. The research object other than a manufacturing company should be considered in order to be confirmed that the model Altman applies not only to manufacturing companies. Advisable to using other financial ratios to be able to obtain a more accurate model.
REFERENCES


