PREDICTING FINANCIAL DISTRESS OF CONSTRUCTION COMPANIES IN INDONESIA: A COMPARISON OF ALTMAN Z-SCORE AND SPRINGATE METHODS

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ABSTRACT

In recent years performance of the construction sector is still not stable or in other words increasing fluctuations. If the company experiences unfavorable financial conditions in a certain time, it can be in a state of financial distress. The purpose of this study is to predict financial distress in construction companies in Indonesia by comparing 2 prediction methods. This study uses descriptive analysis by using the Z-Altman Score and Springate Model which is used to predict the financial distress of construction companies in Indonesia. By using a purposive sampling technique obtained a sample of 8 construction companies from 13 companies in Indonesia according to the criteria. The result shows that out of the 8 companies there are 4 companies both in the springate and Z-Altman Score models which are in distress conditions namely Adhi Karya, Nusa Konstruksi Enjiniring, Wijaya Karya and Waskita Karya. The results also show that the Springate Model has good prediction accuracy that justifies their use and supports further investigation than the Z-Altman Score. The results of the study provide the most appropriate method choice for the construction industry in predicting financial distress. Recommendations include using Springate Model in predicting and overcoming financial distress, but can also use other calculation methods using other variables that can predict financial distress more accurately.

Keywords: Z-Altman Score, Springate, financial distress, Construction Companies.

I. INTRODUCTION

The construction sector is one of the mainstay sectors to encourage economic growth and is always required to continue to increase its contribution. The construction and building sub-sector ranked third as a driver of economic growth in Indonesia throughout 2016, with a contribution of 0.51 percent after the manufacturing and trade sectors. Based on data from the Central Statistics Agency (BPS), Indonesia’s economy in 2016 grew by 5.02 percent, higher than in 2015 which reached 4.88 percent. The contribution of the construction and building sector to the formation of gross domestic product (GDP) was quite significant, namely 10.38 percent. This figure makes it ranked 4th after the industrial, agricultural and trade sectors. (Kompas, 2017). But in reality, in the last few years the performance of the construction sector is still not stable or in other words has fluctuated. Many factors have caused this fluctuation and will also have an impact on the financial condition of the construction company itself.

According to Fahmi (2012), if the company experiences unfavorable financial conditions in a certain time, it can be in a state of financial distress. Financial distress can occur in all companies, including construction companies in countries that are experiencing a decline in financial conditions or economic crisis. The occurrence of financial distress is caused by various factors, namely economic, management errors, and natural disasters (Sudana, 2014). While Shaari, et al. (2013) stated that the condition of financial distress is caused by the company's low ability to generate profits or profits from its operations. Likewise with Zhang et al. (2013) stated that financial distress is caused by external setbacks or failure of financial control internally.

Based on these conditions, many things can be done to overcome financial distress that occurs. In other words, the earlier the financial distress condition is known, the better the opportunity for the company to overcome its financial condition, so the company can
immediately make improvements so that the company does not experience financial difficulties. The condition of financial distress can be seen earlier in order to improve financial conditions before arriving at a crisis condition for the company as an early warning effort.

Financial distress can be predicted or measured through financial statements by analyzing financial statements. Financial statements are the result of an activity that is technical in nature based on methods and procedures that require explanations so that the purpose or intent to provide useful information can be achieved. Financial statements can be used as a tool to make projections about various financial aspects of a company in the future.

Whereas financial distress prediction is done by using various analyzes or methods that have been developed by several experts or research including Altman Z Score and Springate models. In the model developed by Altman, using 5 financial ratios in predicting financial distress potential. Altman Z-Score method has undergone three changes in accordance with the development of original Altman research used for manufacturing companies, revised Altman for manufacturing and non-public companies, and modified Altman models applied by non-manufacturing and non-public companies. Whereas the Springate Model uses 4 financial ratios. The difference in the use of financial ratios between the Springate and Altman models is likely to cause differences in predictive results. From the differences in the prediction results of the two models that are not yet known which model is the most accurate in predicting the company's financial difficulties, namely in relation to cosmetics sector companies. In addition to the possibility of differences in prediction results, both financial distress models have different levels of accuracy. According to research conducted by Altman (1968) the accuracy of the Altman Z Score model is around 95%, while the springate method has an accuracy rate of 92.5%, this is based on a test conducted by Springate (1978).

This is reinforced by several previous studies which tried to predict financial distress in a company using this method, including research conducted by Mohammadzadeh and Nofreest (2010) stated that the prospective investors, shareholders and others are recommended to use Altman Model in predicting the bankruptcy of the Companies accepted in Tehran 's Security Exchange. Imanzadeh, et.al., (2011) stated that the Springate model is more conservative in bankruptcy prediction than the Zmijewski model. Arasu, et. al., (2013) stated that Fulmer and Springate models are useful for predicting solvency of financial firms and can be applied to predict solvency of financial firms though they have been developed keeping manufacturing firms in mind. While Sinarti and Sembiring (2015) concludes that there is no significant difference to the prediction of model Z-Score and Springate.

Boďa and Šradniček (2016) stated that Altman's bankruptcy formula is portable into the Slovak economic conditions and useful for predicting financial difficulties in view of the adopted definition of financial distress. Khaddafi, et.al., (2017) was using Z-score to Predict Bankruptcy in Banks Listed in Indonesia Stock Exchange. Matturungan, et.al., (2017) stated that the 87.8% Z-score model was formed. Pakdaman (2018) in his research indicated that in the high bankruptcy models, Grover, Altman, Springate and Zmijewski models are better able to predict financial crises.

So in Turk and Kurku (2017) stated that Altman model shows that 115 (%69) out of 166 companies are not under financial stress while Springate model demonstrates that 95 (%57) companies. Al-Manaseer and Oshaibat (2018) stated that the Z-Score model could be a valuable instrumental indicator, such as financial managers, auditors, lenders, investors, to make right decisions in the face of financial failure. Pertapan, et.al, (2018) that stated the results of financial distress analysis of PT. Blue Bird, Tbk period 2011-2016 using Altman model indicates that companies in the gray area, while the model shows that companies in the category have good conditions.

Whereas the research conducted by Meiliaati & Isharjadi (2017) actually stated the opposite where the Springate model is the most accurate model in predicting the potential financial distress of cosmetics companies listed on the Indonesia Stock Exchange with an accuracy percentage of 91.66%, where the accuracy of the Altman model is only 60.41%. Due to the existence of good gaps from various existing studies related to the prediction of financial distress using this Springate and Altman method or method, the researcher is interested in further investigating how the comparison of these two methods in predicting financial distress in construction companies in Indonesia. So did Talebnia, et.al (2016) stated that the adjusted Springate Model was more efficient than other models in the bankruptcy year.

II. LITERATURE REVIEW

Signaling Theory

Signal theory is a grand theory in this study. Companies can provide signals and are expected to be accepted and interpreted correctly by investors (Hartono, 2005). The principle of this signal explains that each action will contain information for the wearer. In this theory the manager as an agent will provide financial statement information. If the company experiences financial distress, then the financial statements will be able to provide information about the loss or decline in financial conditions in the company so that managers can provide action before the liquidation and also provide a signal to external parties about how the company conditions the following year.
Financial Distress

According to Platt and Platt (2002) financial distress is defined as the stage of the decline in financial conditions that occur before the occurrence of bankruptcy or liquidation. The condition of financial distress is illustrated by the inability of the company or the unavailability of a fund to pay its obligations that are due. According to Brigham and Ehrhardt (2011) giving opinions regarding the bankruptcy of a company are as follows: Financial distress begins when a firm is not able to do so. Five central issues arise.

According to William H. Beaver, Maria Correia and Maurren McNichols (2012) financial distress refers to inability to pay obligations due. According to Berk, DeMarzo, and Harford (2012) giving opinions regarding bankruptcy are as follows: "Financial distress When a firm has difficulty meeting its debt obligations." Stephen A. Ross, Randolph, Westerfield and Jeffrey Jeff (2013) state that financial distress is a situation where a firm's operating cash flows are not sufficient to satisfy current obligations and the firm is forced to take corrective action. Whereas According to Drescher (2014), financial distress is the final stage of the liquidity crisis and potentially included in the stage of bankruptcy. This means that the company has difficulty in fulfilling the obligations that are due to the creditor. On a broader view, a company's financial distress can be identified when the company's economic conditions deteriorate and even violate agreements with creditors resulting in the emergence of a default (legal action).

From some of the meanings that have been stated, it can be said that financial distress is a condition of a company that is in the stage of decreasing financial performance where the company cannot fulfill its obligations, such as payment of bonds, credit, or interest expense, so the company needs corrective steps so that the condition does not take place continuously.

2.3 Distress Financial Prediction Model

Financial distress is calculated using a formula or model called the financial difficulty model. According to Subramanyam (2010), the financial difficulties model, which is generally called a bankruptcy prediction model, provides trends and behaviors for certain ratios. The characteristics of these ratios are used to identify possible future financial difficulties. Some experts as well as previous research stated that many models can be used to predict financial distress which will be discussed in this study, namely the Altman Z Score and Springate models.

a. Altman Z Score model

The Altman Z-Score model is a multivariate model of financial distress that has been developed in several countries. The definition of Altman's Z-Score according to Supardi (2003) is: Scores that are determined by the calculation of the standard times financial ratios that will indicate the level of probability of a company's bankruptcy Altman's Z-Score can be used other than as a financial performance assessment tool but can also be used as a predictor of bankruptcy. Altman's Z-Score is also known as the Altman Bankruptcy Prediction Model. Altman's Z-Score can be used as a tool for evaluating the company's financial performance and as a financial predictor. This is supported by Subramanyam and Wild (2012) which states that: There is no evidence to suggest computation of a Z-Score is a better mean of analyzing long term solutions that are described in this book Rather, we assert that the ZScore is a useful screening, monitoring and attention-directing device. In this study the Altman model used was the Altman Modification model. In connection with the formula Z' = Score Altman III model, Altman eliminates the variable X5 (sales / total assets) because this ratio is very varied in industries with different asset sizes. Here's the Z 'formula - Score Altman III model for various types of companies:

\[ Z'' = 6.56X1 + 3.26X2 + 6.72X3 + 1.05X4 \]

Where as:

- X1 = Working Capital towards Total Assets
- X2 = Profit Withheld to Total Assets
- X3 = Profit Before Interest and Tax on Total Assets
- X4 = Book Value of Equity for Total Debt Book Value

b. springate model

Springate formulated a prediction model for bankruptcy in 1978. In its formulation, Springate used the same method as Altman, namely Multiple Discriminant Analysis (MDA). At first the S-Score consisted of 19 popular financial ratios. After going through the same test conducted by Altman, Springate chose 4 ratios which were believed to be able to distinguish between companies that went bankrupt and those that did not go bankrupt. Springate classifies a bankrupt firm if it has a score of less than 0.862 ($<0.862) Conversely, if the calculation of the S-Score exceeds or equals 0.862 (S 0.862) then the company is classified as a financially sound company. The model produced by Springate (1978) is as follows:

\[ S = 1.03A + 3.07B + 0.66C +0.4D \]

Where as:

- A = working capital / total assets
- B = net profit before interest and taxes / total assets
- C = net profit before taxes / current liabilities
- D = sales / total assets

III. RESEARCH METHOD
The research method used in this research is descriptive method with the approach used is a quantitative approach, namely research using numbers and analyzed using statistics to solve a problem. While the sampling technique in this study used purposive sampling technique, in which a population of 13 construction companies obtained a sample of 8 construction companies. Furthermore, the data analysis in this study is descriptive analysis using the Z-Altman Score modification model and Springate which is used to predict financial distress in construction companies listed on the Indonesia Stock Exchange in 2014-2018.

IV. RESEARCH RESULT

Result

Based on the results of data processing related to financial distress predictions for construction companies in 2014-2018 using the Z-Altman Score and Springate models can be seen in the following table:

Table 1 Comparison of the Calculation Results of the Z-Altman Score and Springate Models

<table>
<thead>
<tr>
<th>No</th>
<th>Name</th>
<th>Z-score Result</th>
<th>S-score Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Adhi Karya</td>
<td>1,962</td>
<td>0,693</td>
</tr>
<tr>
<td>2</td>
<td>Jaya Konstruksi Manggala Pratama</td>
<td>4,934</td>
<td>1,190</td>
</tr>
<tr>
<td>3</td>
<td>Nusa Konstruksi Enjiniring</td>
<td>2,071</td>
<td>0,635</td>
</tr>
<tr>
<td>4</td>
<td>Pudjiadi Prestige</td>
<td>3,9252</td>
<td>0,7766</td>
</tr>
<tr>
<td>5</td>
<td>Surya Semesta Internusa</td>
<td>2,069</td>
<td>1,121</td>
</tr>
<tr>
<td>6</td>
<td>Total Bangun Persada</td>
<td>2,632</td>
<td>0,915</td>
</tr>
<tr>
<td>7</td>
<td>Wijaya Karya</td>
<td>1,806</td>
<td>0,664</td>
</tr>
<tr>
<td>8</td>
<td>Waskita Karya</td>
<td>1,761</td>
<td>0,666</td>
</tr>
</tbody>
</table>

From table 1 above, it can be seen a comparison of the results of the Altman Z - Score and Springate Score formulas in each Construction company listed on the Indonesia Stock Exchange (IDX) in the 2014-2018 period. In the Altman Z method - the highest score at PT. Jaya Konstruksi Manggala Pratama Tbk, with the highest value of 4.934 and the lowest value at PT. Waskita Karya Tbk, with a value of 1.761. Different for Springate Score method - the highest score at PT Jaya Konstruksi Manggala Pratama Tbk, with a value of 1.190 and the lowest value at PT. Nusa Konstruksi Enjiniring Tbk with a value of 0.635.

After getting the value of Z - Score and the value of S - Score above, then the values will be used to classify the company whether it enters the safe zone, gray zone, or distress zone. In the Z-Score method in classifying companies use provisions if the value of Z - Score > 2.99 is classified as safe zone, and if it is at the value of 1.81 < Z < 2.99 the classification of the gray zone, and if the Z-score value < 1.81 then the classification of distress zone is entered. Whereas the S-Score method in classifying companies uses provisions if the value of S - Score > 1.062 is classified as safe zone, and if it is at the value of 0.862 < S <1.062 the classification is gray zone, and if the value of S - Score <0.862 is in the distress zone classification. The classification of each company will be presented in the table as follows:

Table 2 results in the classification of companies using Z-Score and S-Score

<table>
<thead>
<tr>
<th>No</th>
<th>Name</th>
<th>Hasil Z-score</th>
<th>Hasil S-score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Adhi Karya</td>
<td>distress zone</td>
<td>distress zone</td>
</tr>
<tr>
<td>2</td>
<td>Jaya Konstruksi Manggala Pratama</td>
<td>Safe zone</td>
<td>Non distress</td>
</tr>
<tr>
<td>3</td>
<td>Nusa Konstruksi Enjiniring</td>
<td>distress zone</td>
<td>distress zone</td>
</tr>
<tr>
<td>4</td>
<td>Pudjiadi Prestige</td>
<td>safe zone</td>
<td>distress zone</td>
</tr>
<tr>
<td>5</td>
<td>Surya Semesta Internusa</td>
<td>Grey zone</td>
<td>Non distress</td>
</tr>
<tr>
<td>6</td>
<td>Total Bangun Persada</td>
<td>Grey zone</td>
<td>Non distress</td>
</tr>
<tr>
<td>7</td>
<td>Wijaya Karya</td>
<td>distress zone</td>
<td>distress zone</td>
</tr>
<tr>
<td>8</td>
<td>Waskita Karya</td>
<td>distress zone</td>
<td>distress zone</td>
</tr>
</tbody>
</table>

From the table above it can be seen the results of the classification of each construction company listed on the Indonesia Stock Exchange (IDX) in the 2014-2018 period. In the Altman Z-Score method there are 4 companies classified as distress zones, namely Adhi Karya (ADHI), Nusa Konstruksi Enjiniring (DGK), Wijaya Karya (WIKI) and Waskita Karya (WSKT). Then those who experience the gray zone are 3 companies, namely PP (PTPP), Surya Semesta Internusa (SSIA) and Total Bangun Persada (TOTL). And there is one company included in the safe zone classification, namely Jaya Konstruksi Manggala Pratama.

From the comparison between the methods of status prediction of the sample companies using Altman Z - Score, the results are as follows:

Table 3. Level of Accuracy and Level Error Method Altman Z - Score

<table>
<thead>
<tr>
<th>Total Company Listing</th>
<th>Distress Zone</th>
<th>Safe/Gray Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Results Prediction Springate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

The level of accuracy 50%
The Level of Error 50%

Based on the analysis performed on eight company Altman Z - Score method has an accuracy rate of 50%.
While in the Springate Score method there are 5 companies that are classified as distress zones, namely Adhi Karya, Nusa Konstruksi Enjiniring, Pudjiadi Prestige, Wijaya Karya and Waskita Karya. And there are 3 more companies included in the Non-distress classification, namely Jaya Konstruksi Manggala Pratama, Surya Semesta Internusa (SSIA) and Total Bangun Persada (TOTL).

From the comparison between the methods of the status of the companies using Springate, the results are as follows:

<table>
<thead>
<tr>
<th>Total Company Listing</th>
<th>Results Prediction Springate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Distress Zone</td>
</tr>
<tr>
<td>The level of accuracy</td>
<td>62.5%</td>
</tr>
<tr>
<td>The Level of Error</td>
<td>37.5%</td>
</tr>
</tbody>
</table>

Based on the analysis performed on eight company Springate method has an accuracy rate of 62.5%. In addition, from the results of the study, there were 4 companies both in the springate and Z-Altman Score models which were in distress conditions namely Adhi Karya (ADHI), Nusa Konstruksi Engineering (DGK), Wijaya Karya (WIK) and Waskita Karya (WSKT).

Discussion

From the research, it is known that from the financial distress prediction of the Construction company by comparing 2 models, 4 companies were equally in the distress zone which resulted in potential companies experiencing financial distress because the company experienced a decrease in net income and unable to pay the company's long-term debt in accordance with the theory stated by Elloumi and Gueyie in Parulian (2007), potential financial distress can be caused also by the inability of companies to pay their financial obligations at maturity and management cannot use working capital effectively. The value of the solvency ratio and the company's low profitability ratio can result in potential companies experiencing financial distress caused by the decline in financial conditions experienced by companies that occur before bankruptcy or liquidation. According to Munawir (2014) improper management of long-term financial difficulties (unable to pay obligations at maturity) will lead to greater problems, namely being not solvable.

While the results of the analysis of this study also compare two methods, namely the Altman Z –Score method with Springate Score. To obtain accurate results in predicting bankruptcy in Construction companies listed on the Indonesia Stock Exchange (IDX). Then from the results of the analysis of the research it can be seen that the results of the calculation of two methods are the Altman Z-Score method and the Springate Score method. Each method has a different accuracy rate. The method for value accuracy is 62.5% and an error rate of 37.5%, and the second position is occupied by the Altman Z method. - Score to value accuracy rate of 50% and an error rate of 50%. This proves that the Springate Score method has a better level of accuracy in predicting the potential for bankruptcy in Construction companies listed on the Indonesia Stock Exchange in the 2014-2018 period compared to the Altman Z - Score method.

V. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Based on the results and discussion above, it can be concluded as follows:

1. There are 4 companies both springate and Z-Altman Score models that are in distress conditions, namely Adhi Karya (ADHI), Nusa Konstruksi Engineering (DGK), Wijaya Karya (WIK) and Waskita Karya (WSKT).

2. There are 3 companies both in the springate and Z-Altman Score models that are not in distress conditions, namely Surya Semesta Internusa (SSIA), Total Bangun Persada (TOTL) and Jaya Konstruksi Manggala Pratama.

Springate Score method has a better level of accuracy in predicting potential bankruptcy in Construction companies listed on the Indonesia Stock Exchange in the 2014-2018 period compared to the Altman Z - Score method.

Recommendations

Based on the conclusions of the above research, some suggestions for can be done models for predicting financial distress in the construction company, such as using the Springate Score method and the Altman Z method - Score. Future research should expand the research sample to get better research results.

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