

THE APPLICATION OF BANKRUPTCY PREDICTION ANALYSIS USING ALTMAN Z-SCORE AND SPRINGATE METHODS AT PT. GUDANG GARAM TBK

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ABSTRACT

Globalization era, business is something that is familiar and contributes to the economy of a country. The business world continues to develop in accordance to the demands of changing times. Given these developments, a company is required to be able to adapt in order to maintain the viability of the company. Companies must be able to survive in the fierce competition and outperform competing products, especially in dealing with the crises that occur. The objective of this research is: To find out what are the results of the analysis in PT. Gudang Garam Tbk period 2008 - 2012 using method of Altman Z-Score and Springate. Theory supporting research is bankruptcy prediction. Population is manufacturing company engaged in the industrial sector of the consumer goods with sub-sector of cigarettes and listing on the Indonesian Stock Exchange with sample of financial report from 2008 until 2012. Results and conclusions are bankruptcy analysis using the Altman Z-score model of PT. Gudang Garam Tbk. for the period 2008-2011 is in a position of the healthy company. While in 2012 the company touched the position of grey area and the Springate models classified the company not potentially bankrupt. Based on the analysis results by using the Altman Z-score and Springate models, it can be seen that the liquidity and inefficient management extremely affect to financial performance of the company.

Keyword: *bankruptcy prediction, altman z-score, springate*

INTRODUCTION

Research Background

Globalization era, business is something that is familiar and contributes to the economy of a country. The business world continues to develop in accordance to the demands of changing times. Given these developments, a company is required to be able to adapt in order to maintain the viability of the company. Companies must be able to survive in the fierce competition and outperform competing products, especially with the many crises that occur.

Corporate established by an individual or organization with the main objective to maximize shareholder wealth. The Company is a for-profit organizations as a primary goal, although did not rule expect to prosper as other purposes (Keown et al, 2005:8). Company financial statements are critical in a publicly traded. The financial report is a summary of the recording process, a summary of the financial transactions that occurred during the financial year in question. Financial statement analysis is needed to understand the information which will be useful for decision making in the future. Financial accounting information intended specifically for external users, generally is party investors and creditors (Keown et al, 2005:50). In connection with efforts to look at the financial aspects and appropriate risk in the property industry, it is necessary to use an indicator to look at the health and performance of the company that used to make predictions of whether a company has the potential to bankrupt or not. One way to measure the performance are by using financial ratios.

Crisis in Indonesia since the mid of 1997 was starting with the sharp declining value of the rupiah, due to increased demand for the U.S. Dollar. Cause of this crisis is not only due to the weak economic structure, but because foreign private debt that has reached a sizeable amount. As a result, interest rates and inflation rose sharply and investment is well reduced that made the company's health declined even potentially bankrupt, including property industries that being affected significantly. Inflation reaches 6.22% in the year 2010, the SBI interest rate of 6.5%, the deposit interest rate at an average of 7.52%, and the loan interest rate reaches 15.34% in early quarter two 2010 (Bank Indonesia, 2011:14). It also led to the production costs and operating expenses to swell, resulting in the selling price to be expensive but decreased purchasing power. Since real estate collapsed, almost no developers build new projects and development company to be a little patient Bank Restructuring Agency (IBRA). Judging from the investor's point of view, before investors decide to

invest in stocks, investors should consider the reputation and prospects of the business that is reflected in the value of shares in the capital market. This is conducted to avoid capital loss in a long term or not receive dividends.

The global economic crisis had a significant impact on Indonesian capital market conditions. The global economic crisis is popularly called the financial crisis that occurred in the United States is clearly produced a significant impact for the majority of countries, including developing countries such as Indonesia. This happen because U.S. market is one of the larger Indonesian products export destination. Therefore, it is greatly affects the economic condition in Indonesia. One of the most influential impacts of the global economic crisis that occurred in the United States is an increasing of rupiah depreciated against the U.S. dollar, the Jakarta Composite Index (JCI) which is decaying, and of course Indonesian exports are hampered and impeded due to reduced demand from American market itself. Besides closing for a few days as well as the suspension of stock trading in Indonesian Stock Exchange (BEI) is one of the most noticeable impact, and the first time in history, which of course can reflect on just how big the impact of the global nature of this problem.

The capital market is one of the tools for economic growth in a country. Because the capital market is a means of capital formation and accumulation of long-term funds are directed to increase community participation in the mobilization of funds to support national development financing. In addition, the stock market is also a representation to assess the condition of the company in a country, because almost all industries in a country represented by the capital markets.

Consider with the financial hardship, only a few of Indonesian company that are predicted to deal with this problem. If financial difficulties were simply considered trivial by the management company and not addressed quickly through remedial action, then it is possible that companies will be ruined and went bankrupt in the years going forward. If a company goes bankrupt, it will be a lot of loss, especially for the parties that are interested in the company. In this case the external parties such as investors and creditors would be harmed. Investors will be harmed because it is been instilled in the company and the creditors will lose money because it has already been providing loans that ultimately cannot be repaid. Consider with that situation, investors and creditors need a tool that can be used to detect and predict the potential (indication) bankruptcy of the company. Thus, the tool can be use as an early warning for the possibility of the financial difficulties that will be faced even bankruptcy of the company. On management side, it is very useful in anticipatory action through corrective measures at the company.

Financial statement analysis is a widely used ratio analysis. Financial statement analysis focuses on just one aspect of the finance. It results in weakness of the financial statement analysis. Therefore it requires analysis tool to combine various financial aspects; the tool is an analysis of bankruptcy. The ability to predict bankruptcy is critical for many users of financial statements. Those users include banks, investors, credit rating agencies, underwriters, auditors, regulators as well as the management of the company itself (Gross and Souleles, 2002:322; Lifschutz, 2010:134; Lizal, 2002:3).

Analysis tool that was frequently used in bankruptcy prediction are Altman Z-Score models and Springate models. Altman developed a z-score model using ratios as its foundation. With the help of the Z- Score model, Altman could predict financial efficiency with accuracy was 95% for the data one year before bankruptcy and for the data two years before bankruptcy 72% (Altman, 1968:590-598). Springate models (1978) by Gordon L.V. Springate a Canadian scientist on the basis of Altman developed own coefficient with using analysis multi diskriminan, with using the 40 company as sample. By Springate analysis the accuracy ratio of the coefficient is 92.5% (Haseley, 2012:5).

Some of the research studies have used the bankruptcy prediction models are as follows: Imanzadeh et al. (2011) studied of the application of springate and zmijewski bankruptcy prediction models in firms accepted in Tehran Stock Exchange. Aghajani and Jouzbarkand (2012) also studied the creation of bankruptcy prediction model using springate and SAF models, and the result was similar as that obtained by Imanzadeh et al., that Springate and Zmijewski models can be use to predict financial ratios in company bankruptcy. Anjum (2012) studied business bankruptcy prediction models: a significant study of the Altman's Z-score model with the result that Altman's Z score Model can be applied to modern economy to predict distress and bankruptcy one, two & three years in advance.

Gudang Garam with a market share of almost 30 percent is a leading producer of kretek, the clove cigarette, and one of the major consumer brand recognised throughout the archipelago. Under reference GGRM on the Indonesian Stock Exchange (IDX), the company's shares were traded in a range from Rp 46,400 to Rp 64,250 per share during 2012. There were no changes to the issued and paid up capital of the company in 2012 and a dividend of Rp.1,000 per share was distributed from 2011 earnings, as approved at the Annual General Meeting of Shareholders.

Research Objective

The objective of this research is to find out the result of PT. Gudang Garam Tbk period 2008 - 2012 using the method of Altman Z-Score and Springate.

THEORETICAL FRAMEWORK

Bankruptcy Prediction

Bankruptcy is a situation when a company or a natural person's financial positions low and weak. Where the company or other entity that cannot repay the debts it owes to creditors (Aghajani and Jouzbarkand, 2012:6). According to Khalid et al. (2008:119), bankruptcy as a failure that occurs in a company that is defined in some understanding, as follows: (1) economic distressed means that the company loses money or earnings are not able to cover its own costs, this means that the level of earnings is less than the cost of capital or the present value of cash flows is less than the obligation; and (2) financial distressed has meaning in the sense of lack of funding, both in terms of cash or funds in the sense of working capital.

Previous Research

Aghajani and Jouzbarkand (2012) analyzed and compared the ability of "Springate and SAF" models are calculated using the ratio of cash flow recording and the findings cannot argue with the first and second hypothesis (one or two years before the activity stops), but the third hypothesis can be rejected. Anjum (2012) found that Altman's Z-score can predict accurately the level of corporate bankruptcy and can be used in the future to any economic circumstances. Diakomihalis (2012) applied Altman model to evaluate the prediction accuracy of the company's bankruptcy and the hotel was falling in - distress zone. Imanzadeh et al. (2011) showed that there were significant differences between the two models in predicting bankruptcy. In addition, more conservative Springate models in bankruptcy prediction model Zmijewski.

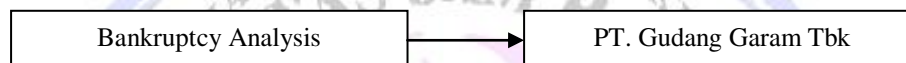


Figure 1 Conceptual Framework

RESEARCH METHOD

Type of Research

This research uses a descriptive study in order to ascertain and be able to describe the characteristics of the variables of interest in a situation. Descriptive studies are also undertaken to understand the characteristics of organizations that follow certain common practices. The goal of a descriptive study, therefore, is to offer to the researcher a profile or to describe relevant aspects of the phenomenon of interest from individual, organization, industry-oriented, or other perspective (Sekaran and Bougie, 2009:105).

Place and Time of Research

The study was conducted in Manado during June to July 2013.

Population and Sample

Population is the entire group of people, events, or things that the researcher desire to investigate (Sekaran and Bougie, 2009:262). Population of this research is a manufacturing company engaged in the industrial sector of the consumer goods with sub-sector of cigarettes and listing on the Indonesian Stock Exchange.

The sample of this research is financial report from 2008 until 2012. The sampling technique used in this study is purposive sampling. Purposive sampling is sampling design in which the required information is gathered from special or specific target (Sekaran and Bougie, 2009:276).

Data Collection Method

This research using a secondary data is that have already been gathered by researchers, data published in statistical and other journals and information available from any published or unpublished source available either within or outside the organization, all of which might be useful to researcher (Sekaran and Bougie, 2009:184). Secondary data from this research which is a company financial report, theoritical review and documentation data gathering method from library and internet.

Operational Definition of Research Variables

Bankruptcy is a situation when a company or a natural person's financial positions low and weak. Where the company or other entity that cannot repay the debts it owes to creditors (Aghajani and Jouzbarkand, 2012:6).

Data Analysis Method

Altman Z-Score Model Bankruptcy Analysis

Altman (1968) was the first to use multi-variable models to predict bankruptcy. Altman found five types of financial ratios that can be combined to see the difference between a company that went bankrupt and not bankrupt. Altman stated that if the company has a bankruptcy index of 2.99 or above, the company does not include companies that were categorized will be bankrupt. While the bankruptcy of a company that has an index of 1.81 or below then the company went bankrupt category. Altman Z-Score is determined by using the following formula:

$$\text{ZScore} = 0.012 X_1 + 0.014 X_2 + 0.033 X_3 + 0.006 X_4 + 0.999 X_5.$$

Where:

- X_1 = Working Capital to Total Assets
- X_2 = Retained Earnings to Total Assets
- X_3 = Earnings Before Interest and Taxes to Total Assets
- X_4 = Market Value Equity to Book Value of Total Debt
- X_5 = Sales to Total Assets

Springate Model Bankruptcy Analysis

This model was developed in 1978 by LV Gorgon Springate. The Springate model is a model that uses multiple discriminant ratio analysis (MDA). In the MDA method takes more than one financial ratios relating to the company's bankruptcy to form a good model (Haseley, 2012:5). Springate models formulated as follows:

$$S = 1,03X_1 + 3,07X_2 + 0,66X_3 + 0,4X_4$$

Where:

- X_1 = Working capital / total asset
- X_2 = Net profit before interest and taxes / total asset
- X_3 = Net profit before taxes / current liability
- X_4 = Sales / total asset

RESULT AND DISCUSSION

Result

The results of this study are detailed explanations concerning the calculation of PT Gudang Garam period 2008-2012 were examined by bankruptcy Altman Z-score models.

Table 1. Result Analysis of Bankruptcy using Altman's Z-score Models

Years	X1	X2	X3	X4	X5	Z-score
2008	0.388	0.594	0.131	1.814	1.256	3.204
2009	0.426	0.634	0.191	2.068	1.210	3.512
2010	0.469	0.656	0.190	2.262	1.226	3.656
2011	0.431	0.598	0.169	1.688	1.071	3.118
2012	0.396	0.600	0.107	1.756	0.874	2.734

Source: Data Processed, 2013

Table 1 shows that the value of Z-score in PT. Gudang Garam Tbk. for the period of 2008-2011 concluded that the company is in a position of the healthy company because of the Z-score for that years is above the score of 2.99. While for 2012 the company is in a position of grey area or bankruptcy-prone position because of the Z-score that year between 1.81 and 2.99 are classified as a company in the gray area. The value of Z-Score reached a peak in 2010 with Z-score is 3.656.

The results of this study are detailed explanations concerning the calculation of the company PT Gudang Garam period 2008-2012 were examined by bankruptcy Z-score Springate models:

Table 2. Result Analysis of Bankruptcy using Springate Models

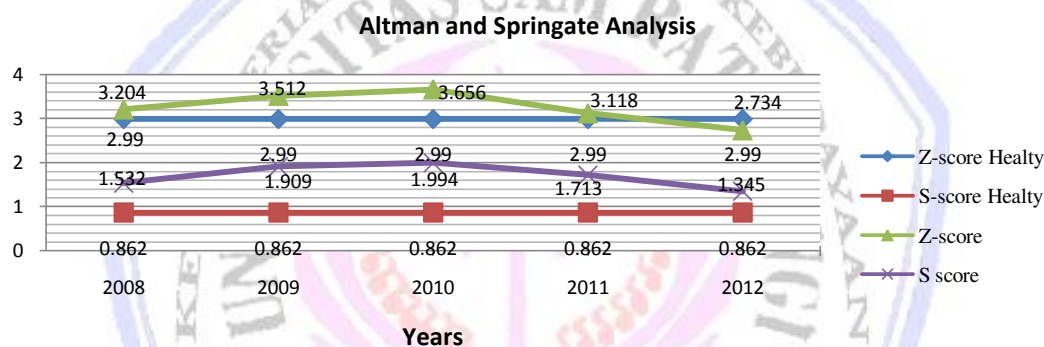
Years	X1	X2	X3	X4	S-score
2008	0.388	0.131	0.346	1.256	1.532
2009	0.426	0.191	0.606	1.210	1.909
2010	0.469	0.190	0.663	1.226	1.994
2011	0.431	0.169	0.488	1.071	1.713
2012	0.396	0.107	0.393	0.874	1.345

Source: Data Processed 2013

Table 2 shows that the value of S-score in PT. Gudang Garam Tbk. for the period 2008-2012 the company is classified as the company that is not potentially bankrupt because the value of the S-score for that years is above the score 0.862. The value of S-Score reached a peak in 2010 with S-score is 1.994.

Discussion

Analysis by using Altman models, the criteria used to predict corporate bankruptcy with this model is, companies with Z score > 2.99 were classified as healthy companies, while companies with Z score < 1.81 were classified as potentially bankrupt the company. Furthermore, scores between 1.81 and 2.99 are classified as a company in the gray area. On the other hand with using the analysis of Springate models that has a standard for the company with S score > 0.862 were classified as healthy companies, while companies with S score < 0.862 classified as potentially bankrupt the company.

**Figure 1. Altman and Springate Analysis**

Source: Data Processed 2013

Figure 1 shows in 2008, by using Altman analysis models the Z-score obtained is 3.204 in the position of healthy company and is not bankruptcy. When using the analysis of Springate models the value of the S-score obtained is 1.532 which means it is in the category of healthy companies and is not bankruptcy too. By using two models of the bankruptcy analysis, it can be seen that the condition of the company is in a healthy condition.

Figure 1 shows in 2009, by using Altman analysis models the Z-score obtained is 3.512 which means in the position of healthy company and is not bankruptcy. When using the analysis of Springate models the value of the S-score obtained is 1.909 which means it is in the category of healthy companies and is not bankruptcy. By using two models of the bankruptcy analysis, it can be seen that the condition of the company is in a healthy condition.

Figure 1 shows in 2010, by using the Altman analysis models the Z-score obtained is 3.656 which means it is in the category of healthy companies and away from bankruptcy. When using the analysis Springate models the value of the S-score obtained is 1.994 which means it is in the category of healthy companies. By using two models of the bankruptcy analysis, it can be seen that the condition of the company is in a healthy condition.

Figure 1 shows in 2011, by using Altman analysis models the Z-score obtained is 3.118 which means it is in the category of healthy companies. In contrary the Z-score in this year has decreased compared to the previous year. While using the analysis of Springate models the value of the S-score obtained is 1.731 which means it is in the category of healthy companies, but the value of the S-score this year has decreased compared to the previous year. Therefore the value of the analysis Springate models still in the position of a healthy company even though there is a decreasing in the value of the S-score. By using two models of the bankruptcy analysis, it can be seen that the condition of the company is in a healthy condition.

Figure 1 shows in 2012, by using Altman analysis models the Z-score obtained is 2.734 which can be categorized in the gray area or bankruptcy-prone. While using the analysis of Springate models the value of the S-score obtained is 1.345 which means it is in the category of healthy companies and is not bankruptcy, but value of the S-score decreased again this year compared with to the previous year which decreased. By using two models of the bankruptcy analysis it can be seen that there are a contradiction of those two models result. Altman model analysis shows that the company is in the gray area or bankruptcy-prone position. On the other hand, the Springate model analysis showed that the company conditions is in a healthy level.

CONCLUSION AND RECOMMENDATION

Conclusion

The conclusions are: (1) Bankruptcy analysis using the Altman Z-score model of the PT. Gudang Garam Tbk. for the period 2008-2011 concluded that the company is in a healthy position. While in 2012 are classified as a company in the gray area position. This is consistent with the declining value of X1, X3 and X5 in which there was an increasing in retained earnings to total assets (X2); and (2) Bankruptcy analysis using the Springate models of PT. Gudang Garam Tbk. for the period 2008-2012 the company is classified as the company that is not potentially bankrupt. Based on the analysis results by using the Altman Z-score and Springate models, it can be seen that the liquidity and inefficient management extremely affect to financial performance of the company.

Recommendation

From the results of this research proved that methods of Altman Z-Score and Springate models can predict bankruptcy at PT. Gudang Garam Tbk. Therefore, the recommendation for this company are as follows: (1) Perform a good asset management, such as cash management, inventory and accounts receivable to get a good result as well as to manage the risks; (2) The operating costs of the company must be use more efficiently and the spending not more than the revenue generated by the company; (3) Company need to pay attention to the liquidity, because if the liquidity increase then a lot of idle cash funds from an operational perspective will result to the inefficient use of funds. If the liquidity decrease, will cause the company existence in the eyes of hard parties decline, especially for those who interest to invest in the company; and (4) The other researcher may use different models to predict the bankruptcy, that will be use as a comparison in predicting bankruptcy.

REFERENCES

- Aghajani, V. and Jouzbarkand, M. 2012. The Creation of Bankruptcy Prediction Model Using Springate and SAF Model. *Journal of Accounting Research*, 6 – 8
- Altman, E. I. 1968. Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy. *The Journal of Finance* Vol. XXIII No. 4, 590-598.
- Anjum, S. 2012. Business Bankruptcy Prediction Model - A Significant Study of Altman's Z-Score Model. *Asian Journal of Management Research*, 213 – 216.
- Bank Indonesia, 2011. Annual Financial Statements Bank Indonesia 2011. Jakarta. Retrieved (May, 20th 2013) from http://www.bi.go.id/web/en/Publikasi/Laporan+Tahunan/Laporan+Tahunan+BI/lktbi_2011.htm
- Diakomihalis, M. 2012. The Accuracy of Alman's Model in Predicting Hotel Bankruptcy. *International Journal of Accounting and Financial Reporting* Vol. 2, No. 2, 99 – 101.
- Gross, B. and Souleles, N. 2002. An Empirical Analysis of Personal Bankruptcy and Delinquency. *The Review of Financial Studies* Spring Vol. 15, No. 1, 320 – 325.
- Haseley, M. 2012. An Analysis of the efficacy of the Altman and Springate Bankruptcy Models in Companies Listed on the Stock Exchange of Thailand (2006-2012). Paper presented to fulfillment of the requirements for the Degree of Master of Business Administration, 1 – 10.
- Imanzadeh, P., Jouri, M. and Sepehri, P. 2011. A Study of the Application of Springate and Zmijewski Bankruptcy Prediction Model in Firms Accepted in Theran Stock Exchange. *Australian Journal of Basic and Applied Sciences* 5(11): 1546-1550, 1548.

- Indonesia Stock Exchange, 2013. Performance Profile of PT. Gudang Garam Tbk. Retrieved (July, 03rd 2013) from <http://www.idx.co.id/Portals/0/StaticData/ListedCompanies/PerformanceSummary/GGRM.pdf>
- Keown, A., Martin, J., Petty, J and Scott, D. 2005. Fiancial Management 10th Edition. New Jersey: Pearson.]
- Khalid, Rawi, A., Kiani, R. and Vedd, R. 2008. The use of Altman Equation for Bankruptcy Prediction in an Industrial Firm. *International Business & Economics Research Journal* Vol. 7, No. 7, 115 – 116.
- Lifschutz, S. 2010. Predicting Bankruptcy - Evidance from Istraël (Altman's Model). *International Journal of Business and Management* Vol. 5, No. 4, 134 – 136.
- Lizal, L. 2002. Determinants of Financial Distress: What Drives Bankruptcy in a Transition Economy? The Czech Republic Case. William Davidson Working Paper No. 451, 2 – 7.
- PT. Gudang Garam Tbk., 2013. Annual Financial Report PT. Gudang Garam Tbk. Retrieved (July, 1st 2013) from http://www.gudanggaramtbk.com/investor/laporan_keuangan
- Sekaran, U. and Bougie R. 2010. Research Methods for Business 5th Edition. Cornwall, Wiley.

