

Analysis of Financial Annual Reports for Bankruptcy Predictions Using Altman Z-Score Method

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ABSTRACT

The study focused on comparisons to investigate a company's financial health situation in diagnosing early bankruptcy of tobacco-producing companies using the Altman Z-Score formula. The bankruptcy risk predictions were analyzed from 2013 to 2018 on the Indonesia Stock Exchange website. The investigative data obtained at the www.idx.co.id website address used annual financial statement data from three tobacco companies in Indonesia for six consecutive years. Research illustrates that from 2013 to 2018, tobacco-producing companies are in the healthy and low-risk category. The total variable is the key to changing its health condition if it changes its value. Therefore, the results of this study can analyze the company, especially financial statements, for information on fulfilling its obligations to investors and creditors and managing assets to increase sales in generate profits.

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1. Introduction

Everyone wants a healthy life free from disease. With the increase of a healthy body and mind, the welfare of life can increase. Maintaining and managing a healthy body is not as difficult as one might think, one of which is adopting a healthy lifestyle. A healthy lifestyle is a long-term commitment to maintaining bodily functions to impact health positively. One effort can be made to stop using tobacco products in everyday life. By doing this, eating quality of life can also positively impact the environment.

Along with the increase in a healthy lifestyle, trading companies will have changes, either decreasing or increasing. In this case, it is a tobacco company in Indonesia. Tobacco is the primary raw material for the tobacco products, such as kretek cigarettes, cigars, sliced tobacco, and tobacco leaves. Moreover, the announcement from the Indonesian Doctors Association (Ikatan Dokter Indonesia/IDI) states tobacco contains hazardous materials that are harmful to the body where the harmful compounds contained in cigarettes include: toxic gas carbon monoxide, which has no taste and no smell; nicotine which has opiate effects including pleasant and calming effects; hydrogen cyanide harms the brain, heart, blood vessels, and lungs; Benzene is a residue from burning cigarettes. In addition, it reduces the number of red blood cells and damages the bone marrow, thereby increasing the risk of anemia and bleeding and damaging white blood cells, lowering the immune system, and increasing the risk of leukemia and others [1]. Generally, the Indonesian tobacco industry is faced with a dilemmatic situation. Based on the impact

of material hazards of tobacco, the problems on public health and the environment as a controversial negative of the national economy, the side of the situation in a company can result in unhealthy finances for tobacco companies [2].

The company has functioned in a volatile environment. Not all companies can survive for a long time since the company inception. For example, the purchase decision of a product is now changed to the transaction on social media [3]. Contrary to this, some companies can last for a long time. The company conducts its activities to generate profits and wealth to carry out operations and business continuity—finance stability and controlling assets to carry out all conditioning. Consequently, companies must remain healthy in their financial statement to survive during competition [4].

A company is not built to go bankrupt but to get the maximum profit, and we need a tool that can be used as a premature warning system. One way to predict bankruptcy is using discriminant analysis, popularized by Altman. For example, the financial condition of companies listed on the Indonesia Stock Exchange (IDX) is data secondary to the annual financing statement. The data during a specific period of utility prediction indicated bankruptcy with the analysis function of a method of the Altman Model (Z-Score) and Zavgren Model (Logit), as well as to determine whether there are significant differences between the two valuation models [5]–[7].

Bankruptcy is fundamental to compromises in companies' financial routines and activities. The company describes default if its cumulative liabilities surpass its cumulative assets. Therefore, the company's financial condition can measure its ability to maintain its operations. Thus, companies need to analyze and evaluate the company's financial statements [8].

Financial ratio analysis is a choice to experiment with whether the economic report presented by financial accounting helps classify or predict asset values in the industry market. The category of corporation healthiness is fundamental for organizations to improve efficiency in managing companies forced to make earnings can increase, which can sidestep the potentiality of bankruptcy (liquidation) in the company.

Retail trading corporations' Liquidation changes can be detected and measured through financial audits by analyzing the Jakarta Stock Exchange (JSX). In addition, the analysis of the financial information is an essential instrument in the company's economic condition. Therefore, the study of the financial statement does achieve in connection with adopting the company's strategy implemented. One method that can be used is the Altman Z-score model, which helps predict company finances [9]. The Altman Z-score calculation model is used because, based on several previous studies, this model is a calculation with a high level of accuracy. Therefore, the Altman Z-score method can use as a reliable calculation instrument based on these studies

The function of the financial reports is an instrument to study the financials, which analyze and describe a statement about the economic situation, performance, and cash flows to use as a basis for making financial findings [10], [11]. Financial Statements are reports of a company's financial data in an accounting interval representing the company's performance.

The primary objective of financial statements is to present financial data that includes transformations in the elements of financial statements that are addressed to other parties to assess the company's financial performance in profits to the company's management. The information users will get to predict, balance, and evaluate the financial result of the economic decisions. Information about the economic effects that arise earlier is beneficial for users to forecast, balance, and assess finances.

2.2. Bankruptcy

Bankruptcy prediction is significant for every company. For example, a bankruptcy prediction is made to anticipate the bankruptcy of the company [12], [13] and according to the Big Indonesian Dictionary (KBBI), taken from the word bankruptcy, regarding (state) bankruptcy of the company because it is unable to pay its debts and so on. Meanwhile, the Constitutional Court Decision Number 18/PUU-VI/2008, page 27, states that the company went bankrupt not because of the workers' fault, and the number of bankruptcies in Indonesia is two factors, namely external factors beyond the authority of the entrepreneur and mismanagement.

According to Hanafi [14], stated a company could be said to be bankrupt if the company experiences mild difficulties (such as liquidity problems) and more severe difficulties, namely solvency (debt is more incredible than assets).

Based on several expert opinions, it can be concluded that bankruptcy is a situation where the establishment does not make extend healthy (financially) to fulfill its responsibilities in fulfilling its duties and resulting in a decrease in revenue.

2. Research Method

The research method is shown in Figure 1 as the author's stages of getting the research results. The figure describes the scenes from the beginning to the final result to be achieved in the analysis of tobacco companies by applying the Altman method to get the Z-Score value. The Z-Score value is used as a corporation's financial health parameter.

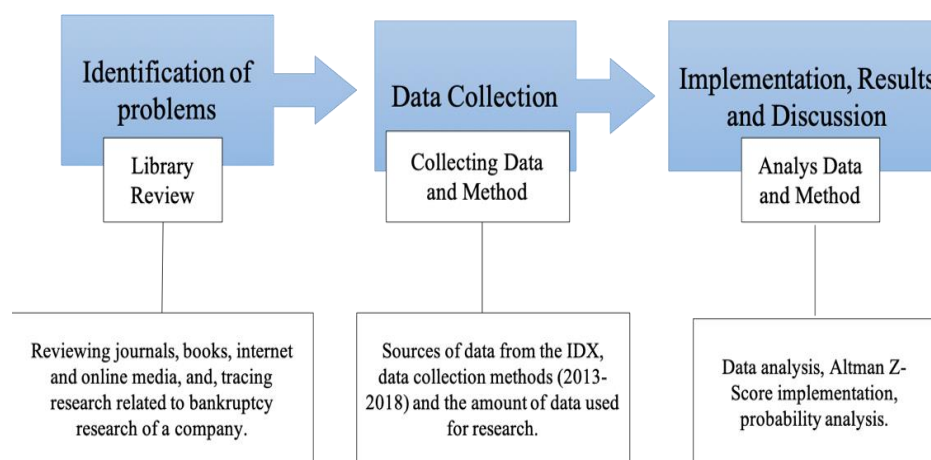


Figure 1. Research Method

The achieve that final result, several processes will be carried out. First, collect data from tobacco-producing companies' financial statements: the first tobacco company was founded 108 years ago with the name traded as HMSP or PT. Hanjaya Mandala Sampoerna, TBK., the second tobacco company, launched 91 years ago, with the name traded as RMBS or PT. Bentoel Internasional Investama, TBK., and the last tobacco company founded 63 years ago in Kediri with a name traded as GGRM or PT. Gudang Garam, TBK.

Before detection of bankruptcy can be done well when an entrepreneur implements integrity and competence in organizational systems, accounting reporting systems, capital structure use systems, and business resilience systems against fraud [15]–[17]. According to Jauch and Glueck reveal, the factors that can superintend bankruptcy in the company are [18]:

(a). Common Factors

1. Economic factors originate from signs of inflation and deflation in rates of assets and services, financial policies, business rates and devaluation or revaluation with foreign currencies, and balance of payments, surplus or deficit concerning foreign trade.
2. Social factors, which are very influential, are variations in people's lifestyles that affect the demand for products, services, or employees. For example, the different social factors are riots or confusion in society.
3. Swelling occurs if the management does not plan to use information technology, the system does not integrate, and the user managers are less professional.
4. Government factors, the government's policy of eliminating subsidies to companies and industries, changeable tariffs on exports and imports of goods, new law policies for funding or industry, Etc.

(b). External Factors

1. The client factor, where companies evade losing consumers, must identify the nature of consumers and create opportunities to get new customers, avoid declining sales results, and prevent consumers from turning to competitors.
2. The supplier/creditor factor, where the strength lies in providing loans and determining the repayment period depending on the creditor's trust in a company's liquidity.
3. Competitor factors, which are things that must consider because they involve differences in service delivery to consumers.

(c). Internal factors

1. Much credit is provided to clients, causing arrears in payments continuously, finally being incapable of paying.
2. Inefficient management.
3. Abuse of authorization and trickery, often carried out by employees, even topmost managers, are detrimental, especially to company finances.

(d). Altman Z-Score

Using Altman Z-Score, data analysis of company bankruptcy is a statistical technique to predict company bankruptcy. The Altman method was developed by an American researcher named Edward I. Altman in the mid-1960s, using financial ratios. Dr. Mamduh M. Hanafi [14] explained that in 1983 and 1984, the bankruptcy prediction model was developed again by Altman for several countries. This research found a new Z value for publicly traded companies, and it turns out that the Altman Z-Score method has a truth grade of up to 95%. Bayesian Bland Altman analysis for predictive [19]–[21], and the Altman method is an analysis of the potential for bankruptcy [22], [23]. For example, with the following discriminant equations [4], [14], [18], [24]–[26]:

$$Z_{score} = (1.2 \times X_1) + (1.4 \times X_2) + (3.3 \times X_3) + (0.6 \times X_4) + (1.0 \times X_5) \quad (1)$$

Where variable X of an index of i is:

1. Variable X_1 , namely this ratio, shows the company's ability to generate net working capital from its total assets. Net working capital is obtained by deducting existing investments from existing liabilities.

$$X_1 = \frac{\text{Net working Capital}}{\text{Total Assets}} \quad (2)$$

2. Variable X_2 is a ratio that indicates the company's ability to generate retained earnings from the company's total assets. As a result, retained revenues exist in profits that do not distribute to stockholders.

$$X_2 = \frac{\text{Retained Earnings}}{\text{Total Assets}} \quad (3)$$

3. Variable X_3 is a ratio that indicates the company's ability to make a profit from the company's assets before the payment of interest and taxes.

$$X_3 = \frac{\text{Earnings Before Interest and Tax}}{\text{Total Assets}} \quad (4)$$

4. Variable X_4 is a ratio that indicates the company's ability to meet the obligations of capital market value (common shares). The market value of the capital itself is obtained by multiplying the number of common shares outstanding by the market price per common share. The book value of the debt is obtained by summing current liabilities with long-term obligations.

$$X_4 = \frac{\text{Market Value of Equity}}{\text{Book Value of Debt}} \quad (5)$$

5. Variable X_5 indicates the company generates sufficient business volumes compared to investments in total assets. This ratio reflects management's efficiency in using the company's overall assets to generate sales and profit.

$$X_5 = \frac{\text{Sales}}{\text{Total Assets}} \quad (6)$$

The

- a) The Z-score is shown in equation The status of the company is the bankrupt category.

$$Z_{\text{score}} \leq 1.81 \quad (7)$$

- b) The Z-score is shown in equation The status of the company is categorized as prone to bankruptcy.

$$1.81 < Z_{\text{score}} < 2.9 \quad (8)$$

- c) The Z-score is shown in equation The status of the company is in the healthy category.

$$Z_{\text{score}} \geq 2.9 \quad (9)$$

3. Results and Analysis

The data collected in our research are secondary data accepted directly from the Jakarta Stock Exchange (JSX) homepage on link address www.idx.co.id in the company tobacco does collect financial statements during 2013 - 2018 in Indonesia. This study uses the Time Series method in data collection. Therefore, data were collected according to the time sequence in a specific time sequence for PT. Gudang Garam TBK., the data reference from [27]–[32], PT. Hanjaya Mandala Sampoerna TBK., the data reference from [33]–[38], and PT. Bentoel Internasional Investama TBK., the data reference from [39]–[44].

TABLE 1
THE PREDICTED STATUS AND Z-SCORE RESULTS (FROM 2013 TO 2018)

Tobacco Company	Z - score values						Status
	2013	2014	2015	2016	2017	2018	
PT. Hanjaya Mandala Sampoerna Tbk	4.88948936	4.74654690	4.38913400	4.36409304	4.39128606	4.33181773	Healthy
PT. Bentoel Internasional Investama Tbk	2.67453657	2.20184264	2.33947676	4.59856956	3.90002402	3.27719611	Healthy
PT. Gudang Garam Tbk	1.87748438	1.92008418	1.98781902	2.13648388	2.19138050	2.33003199	Low risk

The results in table 1 show the implementation of the Altman Z-Score bankruptcy prediction model at PT. Hanjaya Mandala Sampoerna, TBK. from HMSP Group, PT. Bentoel Internasional Investama, TBK. from Bentoel Group, and PT. Gudang Garam, TBK. from GGRM Group.

PT. Hanjaya Mandala Sampoerna TBK. is a company with a very healthy financial condition, evidenced by a stable Z-score above 2.9 for six consecutive years. PT. Bentoel Internasional Investama

TBK. is healthy, but the trend to low risk of bankruptcy. It can be seen a significant increase in 2016 due to the payment of the short-term debt of 3062,44%. However, in 2017 again experienced, a decrease in the value of Net Working Capital by 17.72%. It happened again in 2018 by 21.43%, followed by a decline in share prices of 35.58%. Despite the decrease, PT Bentoel Internasional Investama TBK. is still healthy. PT. Gudang Garam TBK. is the only company in a vulnerable condition where the company, for six years, has a Z-score between 1.8 and below 2.9. However, there is an increase every year.

The result of tests carried out using the Altman Z-score method, and it can be concluded that the first company tobacco of PT. Hanjaya Mandala Sampoerna TBK. and the second company tobacco of PT. Bentoel Internasional Investama TBK. is in a healthy financial position based on the financial statements from 2013 to 2018. For six consecutive years, PT. Bentoel Internasional Investama TBK. did not experience a significant increase or decrease. Therefore, it can be estimated that in 2019 there will likely not be bankruptcy or a substantial decline in financial conditions. And the last position of the company tobacco in analysis our research is PT. Gudang Garam TBK. in a vulnerable condition. However, PT. Gudang Garam TBK experienced a steady increase every year. If PT. Gudang Garam TBK. can maintain its expansion and can be estimated to get out of the vulnerable situation.

There are seven variables used in the analysis of financial statements. Probability analysis is tested to see which variable has the most significant impact on changes in the z-score. The variables of total assets, networking capital, earnings before interest and tax, sales, and the book value of debt will experience a reduction and increase in value of 1,000,000 from the initial value. Retaining earnings have decreased and added value by 10,000. The market value of equity has decreased and increased by 10,000.

Tables 2, 3, and 4 show changes in each variable value in the three tobacco companies from Indonesia. The test results of changes in the value of the variables as a feature to analysis are the following: Total Assets, Earning Before Interest and Tax, Sales, Book Value of Debt, Retained Earnings, and Market Value of Equity.

Table 2 shows the possible changes that occurred at PT. Hanjaya Mandala Sampoerna TBK. Total Assets and Net Working Capital can be the leading causes of a decrease or increase in the value of Z. In the experiment analyses for PT. Hanjaya Mandala Sampoerna TBK. of prediction of bankruptcy, changes in the form of a reduction in numbers on the total variable assets of 1,000,000, where the average change in the subtraction in total assets is 0.262950366. In addition, the standard of the difference in the addition in total assets is 0.109382282. Meanwhile, the Net Working Capital variable experienced a decrease in the initial z-score value against the final z-score value in 2016, so the average difference in the Net Working Capital variable for subtraction is 0.033239322, and addition 0.028947699.

TABLE 2
THE VARIABLE VALUE OF PT. HANJAYA MANDALA SAMPOERNA TBK.

Variable	Subtraction	Addition
Total Assets	0.262950366	0.109382282
Net Working Capital	0.033239322	0.028947699
Earning Before Interest and Tax	0.163987212	0.203200771
Sales	0.092185855	0.275002129
Book Value of Debt	0.155894557	0.211293427
Retained Earnings	0.183206200	0.183981784
Market Value of Equity	0.183459037	0.184504531

(Source: processing of data of the result in our research)

Table 3 shows the possible changes that occur in PT. Bentoel Internasional Investama TBK. Total Assets can be the leading cause of a decrease or increase in the value of Z. In the experiment using an annual financial report, the PT. Bentoel International Invertama TBK., changes in the form of a reduction in numbers on the total assets of 1,000,000, where the average change in the subtraction in total assets is 0.170793751. In addition, the standard of the difference in the addition in total assets is 0.145344870.

TABLE 3
THE VARIABLE VALUE OF PT. BENTOEL INTERNASIONAL INVESTAMA TBK.

Variable	Subtraction	Addition
Total Assets	0.170793751	0.145344870

Net Working Capital	0.096889700	0.096889700
Earning Before Interest and Tax	0.266446674	0.266446675
Sales	0.080108345	0.080108346
Book Value of Debt	0.224636479	0.154578569
Retained Earnings	0.000112151	0.000112152
Market Value of Equity	0.000716731	0.000716732

(Source: processing of data of the result in our research)

Table 4 shows the possible changes that occurred at PT. Gudang Garam TBK. Total Assets can be the leading cause of a decrease or increase in the value of Z. In the experiment using an annual financial report, the PT. Gudang Garam TBK., changes in the form of a reduction in numbers on the total assets of 1,000,000, where the average change in the subtraction in total assets is 0.034137155. In addition, the standard of the difference in the addition in total assets is 0.033036175.

TABLE 4
THE VARIABLE VALUE OF PT. GUDANG GARAM TBK.

Variable	Subtraction	Addition
Total Assets	0.034137155	0.033036175
Net Working Capital	0.019591187	0.019591186
Earning Before Interest and Tax	0.053875763	0.053875763
Sales	0.016325989	0.016325989
Book Value of Debt	0.000118108	0.000109217
Retained Earnings	0.000228564	0.000228564
Market Value of Equity	0.000235377	0.000235378

(Source: processing of data of the result in our research)

4. Conclusions

On the outcomes of our research, the Altman Z-score method can use as a measuring tool to assess the company's financial condition. Altman offers a consistent measurement of methodology research across all business activities and a completely open level of calculation transparency. Our study finds an effect based on testing when there is a change in the variable's value, so we suggest that the variable that has the most significant influence in decreasing and increasing the Z-score value is Total Assets. Unfortunately, the company experiences an unstable Total Assets condition so that it can experience a considerable risk of bankruptcy, and it is not easy to maintain its financial situation.

Sustainability research on predicting the imaginable bankruptcy of tobacco establishments documented on the Indonesia Stock Exchange (IDX) is recommended. Further research using Springate (S-Score) analysis to determine which financial ratios have the most influence in predicting the potential for corporate bankruptcy.

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