



## **Analysis Z-score to Predict Bankruptcy in Banks Listed in Indonesia Stock Exchange**

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### **ABSTRACT**

This study aimed to test the predictions of bankruptcy in the banking companies listed in the Indonesia Stock Exchange using the Altman Z-score to see how big the bankruptcy prediction during period of 2011-2013 in the banking industry. Calculating each bank's bankruptcy prediction on each 29 banks institution. The data used in this study is the annual financial statements that are Exchange Indonesia. The analysis technique used is a bankruptcy prediction model Altman Z-score. By using the formula  $Z\text{-score} = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6 + 1.0X_4X_5$ . The criteria for assessing a Z-score  $> 2.99$  categorized as a very healthy company.  $1.81 < Z\text{-score} < 2.99$  are in the gray area so the chances saved and the possibility of bankruptcy the same amount depends on the discretion of the management company's decision as a decision maker.  $Z\text{-score} < 1.81$  categorized as a company that has enormous financial difficulties and are at high risk so that the possibility of the collapse of very large. During the period show that the research data of 29 banks that go public are still some who are in a state of bankruptcy. In 2011, there were 13 banks that are in a healthy condition is indicated by the results of the Z-score were above 2.99, and the 14 banks that are in a state of bankruptcy, and two banks that are in Grey area. Whereas in 2012 there were 10 banks in good health, 14 banks were in a state of bankruptcy, and 5 banks in conditions of gray area. In 2013 increased at a healthy bank that there are 11 banks, in conditions of gray area 4 and in a state of bankruptcy remains the same in each year i.e. 14 banks.

**Keywords:** Altman Z-score, Bankruptcy, Stock Exchange

**JEL Classifications:** G1, G3, G33

### **1. INTRODUCTION**

During the recent period of economic and business world is growing rapidly. The Company has developed into increasingly large and complex. It is not in spite of the higher and sophistication of technology and sound management in the company itself. Companies generally is an organization founded by individuals or institutions with the main aim to maximize profits, besides that there are also other purposes not less important is that it can continue to survive in the competition, develop, and may implement other social functions in the community.

Along with the global business competition intensifies, companies not only aim for profit optimally, but also aims for survival, the ability of management to manage closely related to the

company's survival. Auditors may provide an opinion going concern for measuring the company's survival. Companies must prepare financial statements that will be audited. Auditors have an obligation to disclose the problems regarding the viability (going concern) client company if there is a very strong indication of the bankruptcy of the company.

The economy is growing and developing with various financial institutions. One of the financial institutions that seem to play a major role in the economy is a financial institution, which is usually called the bank. The bank is a financial institution that is a place for companies, government agencies and private sector, and individuals keep their funds. Through lending activities and a variety of services provided, the bank serving the financing needs as well as the launch mechanism payment systems for all sectors of the economy (Ibrah, 2012).

Banking plays an important role in public life. Banking is a company in activities directly related to the community. Banking activities are so influenced by the trust of customers or the general public. If the bank's organizational turmoil fluctuations will display a strong reaction from the public.

Banking industry in Indonesia is growing, but we can not deny that in recent years many of the problems in this industry that have sprung up. The number of problem banks that have sprung ultimately resulted in the weakening of the rupiah against the dollar at the time. Although some analysts say that the financial crisis is always preceded by fluctuations and macroeconomic instability that led to the depreciation of the domestic currency significantly and create a high level of interest and inflation that led to the banking crisis, some other analysts argue that macroeconomic instability is precisely due to the weakness of the banking system (Wahyu, 2013).

As quoted in (jakartakompas.com, Tuesday 3 May 2011) strategy of Indonesia noted, in the quarter of 2011 occurred several cases of bank fraud in various banking industry. Jos Luhukay, Indonesia strategic banking analyst, said the mode of banking crime is not just a matter of fraud (fraud), but a lack of oversight of internal control of the bank's human resources is also a point gap banking crime. "Internal control becomes a major problem banks. Bank Indonesia must set the standard operating procedure of," said Jos Luhukay, Monday (05/02/2011).

Jakarta-Council of Representatives of the Republic of Indonesia revealed that there are several cases involving the banking industry. This was revealed from the results of a closed meeting between Indonesia Central Bank (BI) to the commissioner XI Parliament. Among them, the Parliament requested that BI push PT Bank Mega Tbk return the money amounting Rp 111 billion to Elnusa. Bank Mega with Elnusa and local governments Coal was still unfinished. There Rp 111 billion to Bank Mega Elnusa demands, and there is Rp 60 billion county government demands Coal into mega bank. The case of mega bank itself until now has not been resolved. Although mega banks proved to be refund Elnusa, but until now it has not done the return activity as well. Moreover Elnusa has done legal action lawsuit (www.infobanknews.com 24 June 2014).

Bankruptcy is an essential issue to watch out by the company. Because if the company is exposed to financial difficulties (financial distress), then the company actually failed attempt. Therefore, the company must perform various analyzes as early as possible, especially the analysis of the arise of the company's bankruptcy. By doing the analysis is very useful for companies to anticipate which can avoid or reduce the risk of bankruptcy.

Model Altman Z-score is a multivariate analysis model which serves to predict corporate bankruptcy with the level of precision and accuracy that is relatively reliable. This study aims to improve the company's financial performance as well as bankruptcy prediction based on the results of discriminant analysis using a model of Altman. Discriminant analysis was conducted to predict the bankruptcy of a company by analyzing the financial

statements of a company 2-5 years before the company went bankrupt predicted.

## 2. LITERATURE REVIEW

### 2.1. Banking

Banks are very large role in promoting economic growth of a country. All business sectors both sectors of industry, commerce, agriculture, plantation, services, housing, and others desperately need a bank as a partner in developing a business. According to the law No. 10 of 1998 on banking, is the banks are business entities that raise funds from the public in the form of savings and channel them to the public in the form of credit and/or other forms in order to improve the living standards of the people.

The bank is a financial institution whose main function is to collect funds to the community, and also provide services in the form of banking services. Bank has three main functions, namely activities in funding to third parties, the activity of the distribution of funds to those in need of funds, and the activity of the bank in providing services to the public. Of the three functions, the bank can develop in a wide range of bank products, namely products of banks associated with fund raising, fund distribution, and services.

### 2.2. Model Altman Z-score

Financial ratios are one of the information that can be used as a tool for predicting the performance of the company, including information about potential bankruptcy prediction useful for many people, especially on the part of creditors and investors. In 1968, Altman Edward; I provide a formula that serves to predict the potential bankruptcy of a company. Altman through experiments by taking a sample of companies that have undergone bankruptcy that certain financial ratios have "predictive power" than others in predicting financial difficulties (financial distress) and bankruptcy. Altman has found five financial ratios which can be used to detect the bankruptcy of the company, known as Z-score.

In his research Altman (2000), Altman used a sample of 33 pairs of company bankrupt and not bankrupt the exact formulation of the model and is able to identify 90% of bankruptcy cases in 1 year before the bankruptcy occurred. In the process of determining the Altman Z-score uses statistical techniques by using multiple discriminant analysis (MDA). MDA can be used to determine the variables that differentiate the group identifier existing population, can also be used as a grouping criteria. MDA generally is  $Z = V_1(X_1) + V_2(X_2) + \dots + V_n(X_n)$  where  $V_1$  and  $V_2$  are parameters (weights) while  $X_1, X_2, \dots, X_n$  the financial ratios that contribute to predictive models.

By basing the financial ratios of the Z-score model Altman successfully used to classify companies into groups that have a high probability of bankruptcy or a group of companies that are likely to experience bankrupt low Z-score model Altman allows to predict bankruptcy for up to 2 years before the bankruptcy occurred.

The downside of this model is no definite time frame when the bankruptcy will happen after the results are known Z scores lower

than the standard set. This model also can not be used because sometimes there are absolutely different results if we use different objects. Nevertheless, the use Altman method can be used by companies to undertake preventive measures (early warning) when indicated already in a state into bankruptcy.

The Altman Z-score formula (original) are as follows:

$$Z\text{-score} = 0.012X_1 + 0.014X_2 + 0.033X_3 + 0.006X_4 + 0.999X_5$$

Description:

$X_1$  = Working capital/total assets

This ratio indicates the company's ability to generate net working capital of the whole of its total assets. Working capital is the difference between current assets and current liabilities.

$X_2$  = Retained earnings/total assets

This ratio indicates the company's ability to generate retained earnings of the total assets of the company. This parameter is useful to measure whether the cumulative profit is able to compensate for the total assets of the company.

$X_3$  = Earnings before interest and taxes/total assets

This ratio indicates the company's ability to generate profits from the assets of the company, before interest payments and taxes.

$X_4$  = Market value of equity/book value of total debt

This ratio indicates the company's ability to meet the obligations of the market value of equity (common stock). The value of equity market itself is obtained by multiplying the number of outstanding common shares at the market price per share of common stock. The book value of debt is obtained by summing current liabilities with long-term liabilities.

$X_5$  = Sales/total assets

This ratio is also called asset turnover and are usually used to measure the efficiency of the overall management of the use of corporate assets to generate sales and profit.

Classification of a healthy company and bankruptcy are based on the value of Z obtained, namely:

- Z-score for values less than or equal to 1.81 means that the company is experiencing financial difficulties and high risk.
- Z-score for values between 1.81 to 2.67, the company is considered to be in the gray area (gray area). In this condition, the company experienced financial problems that must be dealt with the handling of proper management. If it's too late and improper handling, the company may face bankruptcy. So in this gray area there is a possibility the company went bankrupt and some are not depends on how the company's management can take immediate action to immediately tackle the problems experienced by the company.
- For the Z-score values >2.67, providing an assessment that the company is in a very healthy state so that the probability of bankruptcy is very little going on.

### 3. RESEARCH METHODOLOGY

#### 3.1. Population and Sample

Population is a group of elements that is complete, which is usually a person, object, transaction, or event where we are keen to learn or become the object of research (Kuncoro, 2009. p. 118). The population in this study are all banking companies listed in the Indonesia Stock Exchange during the period of 2011.2012 and 2013 as many as 94 companies.

The sample is a subset of the population unit (Kuncoro, 2009. p. 118). Meanwhile, according to Sugiyono (2008. p. 116) states that the sample is a fraction of the number and characteristics possessed by the population. The method used in the selection of the object in this research is purposive sampling. According Sugiyono (2008. p. 124), purposive sampling method, sampling on the basis of the characteristics and suitability of certain criteria. The criteria are as follows:

1. The banking company listed on the stock exchange and not out (delisting) of the stock exchange during the study period (2011.2012 and 2013).
2. Companies that publishes financial reports during the study period of 2011, 2012 and 2013.
3. Still in operation until 2014.

Based on these criteria, found a sample of 29 banking companies in the Indonesia Stock Exchange. For more details, number of samples can be seen in Table 1.

#### 3.2. Types and Sources of Data

Data used in this research is quantitative data in the form of numbers, can be measured, and the calculation and need to be interpreted in advance in order to become an information.

The data used in this research is secondary data is data that is published or used by organizations that are not processing.

#### 3.3. Data Collection Technique

In this research, data collection techniques used is a method of documentation to record and track corporate data contained on the Indonesia Stock Exchange in the form of the financial report the balance sheet and profit and loss in 2011-2013.

## 4. RESULTS

#### 4.1. Z-score Analysis for Banks Listed on the Stock Exchange

Results of the analysis of Z-score calculation on the banks listed on the stock exchange can be seen in the Table 2.

Bank listed on the stock exchange in 2011 there were 14 banks will be bankrupt, 2 is expressed in the position of the gray area, and 13 otherwise healthy. 14 banks are expected to bankruptcy have in common in low income before tax in the company, the company's retained earnings, and the difference between the capital and the value of liabilities is small. Low retained earnings of a company indicates that the company is not able to regulate

**Table 1: Samples**

Company name	Abbreviation
Bank Capital	BACA
Bank Ekonomi Raharja	BAEK
Bank Central Asia	BBCA
Bank Bukopin	BBKP
Bank Negara Indonesia	BBNI
Bank Nusantara Parahyangan	BBNP
Bank Rakyat Indonesia	BBRI
Bank Tabungan Negara	BBTN
Bank Mutiara	BCIC
Bank Danamon	BDMN
Bank Pundi	BEKS
BPD Jawa Barat dan Banten	BJBR
Bank QNB Indonesia	BKSW
Bank Mandiri	BMRI
Bank Bumi Artha	BNBA
Bank CIMB Niaga	BNGA
Bank Internasional Indonesia	BNII
Bank Permata	BNLI
Bank Sinarmas	BSIM
Bank Tabungan Pensiunan	BTPN
Bank Victoria Internasional	BVIC
Bank Artha Graha	INPC
Bank Mayapada	MAYA
Bank windu Ketjana	MCOR
Bank Mega	MEGA
Bank OCBC NISP	NISP
Bank Pan Indonesia	PNPB
Bank himpunan Saudara	SDRA
Bank ICB Bumi Putera	BABP

**Table 2: Analysis of Z-score**

Company name	2011	2012	2013
Bank Capital Indonesia Tbk	4.089	1.188	1.699
Bank Ekonomi Raharja Tbk	0.248	0.282	0.261
Bank Central Asia Tbk	5.49	5.566	5.537
Bank Bukopin Tbk	5.774	2.703	4.856
Bank Negara Indonesia Tbk	7.137	5.679	5.411
Bank Nusantara Parahyangan Tbk	76.292	61.122	81.981
Bank Rakyat Indonesia Tbk	10.646	8.289	8.197
Bank Tabungan Negara Tbk	4.026	3.647	2.351
Bank Mutiara Tbk	2.758	2.356	2.272
Bank Danamon Tbk	4.869	4.631	2.336
Bank Pundi Tbk	3.034	2.327	1.729
BPD Jawa Barat dan Banten Tbk	9.725	3.495	3.396
Bank QNB Indonesia Tbk	10.148	2.216	0.411
Bank Mandiri Tbk	11.449	7.132	6.569
Bank Bumi Arta Tbk	1.311	1.549	0.958
Bank CIMB Niaga Tbk	0.783	0.420	0.378
Bank Internasional Indonesia Tbk	1.289	0.789	2.263
Bank Permata Tbk	0.479	0.378	0.289
Bank Sinarmar Tbk	1.424	1.310	1.288
Bank Tabungan Pensiunan Tbk	1.729	1.450	7.625
Bank Victoria Internasional Tbk	2.061	1.024	0.778
Bank Artha Graha Tbk	0.911	1.616	1.021
Bank Mayapada Tbk	0.467	2.111	4.096
Bank windu ketjana Tbk	1.406	1.276	1.034
Bank Mega Tbk	0.250	0.281	0.267
Bank OCBC NISP Tbk	1.533	0.271	0.295
Bank Pan Indonesia Tbk	0.960	0.885	1.335
Bank Himpunan Saudara Tbk	7.574	15.981	5.753
Bank ICB Bumi putera Tbk	0.966	7.297	5.539

Source: Data processed in 2015

their profits, so it can not cover the company's expense. Bank stated in the gray area there are 2 bank, almost the same as the bank will go bankrupt, only the value of retained earnings and profit before taxes are not so low.

There are 13 banks which are otherwise healthy, factors that can lead to 13 banks to a bank that has a Z-score is higher than the other is the value of capital which is not so far from liability. Thus, it can be concluded the smaller the difference between the capital and the value of liabilities, it can be said that small banks have an obligation, so the possibility of a small bankrupt. There are other factors that influence the high value of Z-score in 2011 that is, the working capital obtained from the calculation of current assets-current liabilities. The smaller the liabilities held the higher working capital. Working capital is a fundamental calculation, in this calculation of working capital divided by total assets. So, if liabilities held small, it can increase the value of the Z-score of a company.

Another factor affecting the high value of Z-score of a company is the high profits of a company, because the greater the profit owned by the company can be said companies benefit.

In 2012 explained that there are 14 banks that are in a condition to be bankrupt, there are five that are in the gray area, and there are 10 banks that are in a healthy condition. On Bank Capital Indonesia Tbk in 2011 are in a healthy condition, while in 2012 in a state of bankruptcy, because in 2012 the market value of equity in Bank Capital Indonesia Tbk has decreased significantly. While the Bank ICB Bumiputera Tbk experienced

the opposite in 2011 went bankrupt in 2012, while in good health, it is marked by increasing the value of the market value of equity.

In 2013 there were 14 banks that are in a state of bankruptcy, 4 in the gray area and the condition of 11 banks that are in a healthy condition. At Pundi Bank and QNB Bank Indonesia has decreased in each year. And the savings bank, and Bank ICB Mayapada Bank Bumi good son increased from year to year.

The fifth variable used to calculate the value of Z-score of a banking company that is ( $X_1$ ) 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 of equity to book value of total liabilities, ( $X_5$ ) sales to total assets (Sofyan, 2009. p. 353). Among the variables that each other has a mutual relationship that affects the value of the working capital of the shows the productivity of the company's assets are able to generate an operating profit as expected large banking companies. With the increase in operating profit, the company will attract investors to invest their shares in the company so that the company's retained earnings will increase. Increased retained earnings and working capital being owned company will encourage increased total sales of banking companies. *Vice versa*, if the working capital of the company is getting smaller, the company will earn a small profit too. If the company experienced anything like this will encourage the occurrence of financial difficulties and if this situation continues, the company will be bankrupt.

**Table 3: Measurement results of Z-score banking in the year 2011-2013**

Years	Healthy	Gray area	Bankrupt
2011	13	2	14
2012	10	5	14
2013	11	4	14

Source: Data processed in 2015

In the Table 3 can be seen that the prediction of bankruptcy in the banking company is not so improved in each year, predictions of bankruptcy among banks from the year 2011-2013 there is no decrease is still the same every year. As well as a healthy banking conditions actually experienced ups and downs in each year, and the gray area also fluctuate each year.

## 5. CONCLUSION

Altman Z-score model is able to predict the state of the banking companies on the stock exchanges in Indonesia. In 2011 there were 13 banks that are in a healthy condition is indicated by the results of the Z-score were above 2.99, and the 14 banks that are in a state of bankruptcy, and two banks that are in Grey area. Whereas in 2012 there were 10 banks in good health, 14 banks were in a state of bankruptcy, and 5 banks in conditions of gray area. And in 2013 there were 11 banks that are in good condition, 4 banks in the gray area and 14 banks in a state of bankruptcy.

The chances of bankruptcy would be even greater if the management company did not immediately take action evaluation

of the company's financial condition. In addition, the performance improvement is required every bank that went bankrupt less likely.

Expected studies can then use the models of other bankruptcy prediction. To be used as a comparison in predicting bankruptcy. And research could be in other companies listed on the stock exchange.

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