Research Article

The Influence of Bankruptcy Prediction Using the Altman Z Score Modified Approach to Stock Prices (Survey of Private Companies in the General Banking Sector in the Indonesia Stock Exchange in 2015 - 2018)

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Abstract:This research was conducted with the aim to determine the effect of the Altman Z Score and the variables in it namely Working Capital to Total Assets, Retained Earnings to Total Assets, Earnings Before Interest and Tax and Market Value Equity to Book Value of Debt on stock prices in private sector companies general banking listed on the Indonesia Stock Exchange in 2015 - 2018. Factors tested in this study are the Altman Z Score and the variables in it namely the Working Capital to Total Assets ratio, Retained Earnings to Total Assets, Earnings Before Interest and Tax, and Market Value Equity to Book Value of Debt as the independent variable and stock price as the dependent variable. This research method is descriptive and verification. The population in this study is private sector banking sector private companies listed on the Indonesia Stock Exchange in 2015 - 2018, amounting to 45.

Keywords: Altman Z Score, Earnings Before Interest and Tax to Total Assets Ratio, Market Value Equity to Book Value of Debt Ratio, Retained Earnings to Total Assets Ratio, Stock Price, Working Capital to Total Assets Ratio**.**

1. Introduction

Bankruptcy analysis methods from the financial sector have been developed and used by various countries, including Altman Z Score method, Grover G Score, Springate S Score, and also Zmijewski X Score. Z-Score analysis method was first founded by Edward I Altman in 1968 on research conducted in the United States, specifically for manufacturing companies that go public. In 1995 Altman re-modified his model so that it could be applied to all types of companies and now days the Z-Score method is easier to use and able to obtain prediction accuracy of up to 95% (Fitria Wulandari, Burhanudin, and Rochmi Widayanti, 2016).

The Z-Score is a bankruptcy analysis model provided to companies by using the calculation of financial ratios. This Altman model uses five financial ratios obtained from selecting 7 financial ratios. Variables or financial data that used in the analysis of the Altman Z Score model have several changes from the first Altman model in 1968 and the 1993 Revision Altman. Over time, the Altman method has been adjusted to various types of industry, so that this method can be used in various types of companies. Altman's method was modified again in 1995 which eliminated the fifth variable, known as Sales to Total Asset ratio, because this ratio was very different in various industries and asset sizes. After that, the ratio can be used with flexibility for industrial, manufacturing and non-manufacturing companies with 4 ratios, working capital to total assets ratio, retained earnings to total assets ratio, earning before interest and tax to total asset and market value of equity to book value of debt (Choiruddin SE, M.Si, 2016; Garcia & Esquivel, 2019).

At 2019 will be the year of banking consolidation in Indonesia. The Financial Services Authority Indonesia said there were at least 3 banks that would merge in 2019. These banks include PT Bank Tabungan Pensiunan Nasional merged with PT Bank Sumitomo Mitsui Indonesia, then PT Bank Danamon Indonesia with Bank Tokyo Mitshubishi UFJ, together with PT Bank Nusa Parahyangan. The planned merger between PT Bank Dinar Indonesia and PT Bank Oke Indonesia is expecting to be realized in 2019. Bank BCA has stated to Financial Services Authority Indonesia that will make acquisitions in small banks and PT. Permata Bank is under the spotlight of foreign parties (Laurensius Marshall Sautlan Sitanggang, 2018).

There are an estimated eight banks that recorded a loss. Most of them are banks with a core capital fund less than one trillion, namely the book banking group 1. Many low-level banks have underperformed (including banking groups 1 and 2) and shareholders prefer to have their banks taken over by investors rather than strengthening their bank capital. Apart from the eight banks whose profits were minus, there were fifty-five other banks whose profits were predicted to be positive but in fact fell down. The causes, among others, decreased credit performance and increased operating costs. Low quality credit increased from 12.05% percent in 2018 to 13.54%

in September 2019. In 2020, the economic condition is predicted to be not much different from 2019, where the economic conditions are uncertain. The government is targeting economic growth of 5.30% by 2020, but many independent institutions such as the Infobank Research Bureau predict that Indonesia's gross domestic product growth this year is only 4.90% (Karnoto Mohamad, Info Bank, January 2020).

2. Literature review

Bankruptcy can be caused by a few factors, including internal and external conditions of the company. Internal company conditions can be triggered by errors in determining policies and strategies, lack of control and supervision and prediction errors. The company's external factors occur beyond management's control, such as the high level of industrial competition, economic and political stability, government policies, the global crisis, high levels of inflation and other conditions that management cannot predict. Financial difficulties indicate company's financial condition is in an unhealthy state which can lead to company bankruptcy. The health of a company will reflect the company's performance to run their business, distribution of assets, coefficient of users of assets, results of operations or income that has been achieved and the potential for bankruptcy to be funded. The risk of bankruptcy for a company can be seen through financial company reports, with analyzing the financial statements issued by the company concerned(Novien Rialdy, 2018).

Almant Z-Score Model

Altman Z Score is a score determined from the standard calculation of financial ratio times where the ratio detects the company's financial condition related to liquidity, profitability and company activities. Altman's Z Score still has a tendency to have good accuracy in predicting bankruptcy even when it is used by companies in developing countries such as Indonesia (Nur Anissa, 2016: 210).

The classification of the results of the calculation is included in the cut off point determined by Altman, namely:

1. Z value <1.10 categorized as distress zone. The company experienced financial difficulties and the risk of company bankruptcy was high.
2. Value 1.10 <Z <2.60 categorized as gray area. The conditions of the company experiencing financial problems that must be handled immediately with the right management to prevent bankruptcy. The company management can immediately take action to immediately solve the problems experienced by the company.
3. Z value> 2.60 categorized in safe zone. The company zone is in a very healthy state so the possibility of bankruptcy is very unlikely.(Vina Novi Arsita and Rivai Abdullah, 2018)

Working Capital to Total Asset Ratio (WCTA)

WCTA ratio, is a part of the liquidity ratio, provides additional information about the company's liquidation and this ratio also indicate the percentage of the company's total assets that are used as the company's net capital. A high ratio value indicates a strong liquidation condition. Working capital is obtained from difference between company current assets and current liquidity.

Ratio of Retained Earning to Total Asset (RETA)

RETA rasio is a the part of profitability ratio and the account that informs the total income or loss from investments made by the company.

Ratio of Earnings Before Interest and Tax to Total Asset (EBITTA)

EBITTA ratio is a part of profitability ratios, reflect how company has effectiveness and efficiency in management of all investments that made by company. The higher the ratio means more effective and efficient management of all assets that owned by company to generate company profit before interest and also taxes.

Market Value Equity to Book Value of Debt Ratio (MVEBVD)

The MVEBVD ratio is a ratio that includes the solvency ratio, used to measure which company's assets are financed from company’s debt. Means how much is the debt expenses that the company compared to its assets and then is used to measure the company's ability to pay all liabilities, short and long term when the company is being liquidated (Vina Novi Arsita and Rivai Abdullah, 2018)

Stock Price

Shares are proof of ownership of the assets of a company that issues shares. The share price is mean the value from a share that reflects the company’s wealth that issues its shares, where changes or fluctuations are largely determined by the forces of supply and demand that occur on the stock exchange. When many investors want to buy or hold shares, then price will increase. Conversely, more investors want to sell or release shares, the price

will drag down. Every investor who invests in stocks will monitor the latest developments in the condition of the issuer where they invest money and observe the movement of shares in the stock exchange (Sulia: 2017: 130).

3. Research method

The research object is the financial ratios in private companies in the banking sector listed on the Indonesia Stock Exchange, which is represented by the liquidity ratio, namely the working capital to total assets ratio, the profitability ratio, namely the retained earnings per total assets ratio and the earnings before interest and tax to total assets, and the solvency ratio, namely the ratio of market value equity to book value of debt. The population in this research are private banking sector companies listed on the Indonesia Stock Exchange.

The research methodology used explanatory research method. Some of the criteria that must be met in selecting sample of this study as follows:

1. Private companies in general banking sector category Book 1 and Book 2 which are listed on the IDX and not delisted in the 2015-2018 period.
2. Private banking sector companies that present consecutive audited financial reports for the period 2015-2018 are listed on the IDX.
3. Private companies in the banking sector that provide complete financial report data concerning the variables to be studied. The usefulness of this research expected to provide more benefits in company.

Based on the criteria that have been mentioned, the researchers obtained a sample size from 12 companies registered in Indonesia Stock Exchange during the 2015-2018 observation year, so that the number of observations was 48.

The independent variables in this study are as follows :

1. Liquidity : WCTA $= \frac{\text{Working Capital}}{\text{Total Assets}}$
2. Profitability : RETA $= \frac{\text{Retained Earning}}{\text{Total Assets}}$
3. Profitability : EBITTA $= \frac{\text{Earnings Before Interest and Tax}}{\text{Total Assets}}$
4. Solvency : MVEBVD $= \frac{\text{Market Value Equity}}{\text{Book Value of Debt}}$
5. Z Score = 6.56 (X1) + 3.26 (X2) + 6.72 (X3) + 1.05 (X4)

Where:
Z "= bank bankruptcy (financial distress)
X1 = WCTA
X2 = RETA
X3 = EBITTA
X4 = MVEBVD

The data in this research that involves the time dimension of time series. Analysis using the regression method is the reference for this study in analyzing the data. The stages of data analysis include descriptive statistics such as average, mean, maximum, minimum, kurtosis and skewness, then Linear Regression Analysis Test and Multiple Linear Regression Analysis Test, determination coefficient test (R2), classic assumption tests (normality test, multicollinearity test, heteroscedasticity test, and autocorrelation test), F test, and t test. The multiple linear regression equation with 4 variables can be stated in the following formula:

$$Y = \alpha + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + \mu$$

where :

Y	:	Stock Price
α	:	constant
β1,2,3	:	regression coefficient
X1	:	WCTA
X2	:	RETA
X3	:	EBITTA
X4	:	MVEBVD
μ	:	standard error

4. Result and discussion

Descriptive Statistics

Descriptive statistics are descriptions of data seen from the average, maximum, minimum values for each research variables.

1. WCTA

The average value of the Working Capital to Total Assets of the 12 companies listed on BEI (Indonesia Stock Exchange) for the period 2015-2018 is 0,13035. The highest value reached 0,374 owned by PT Bank Ina Perdana, Tbk (BINA) in 2017. While the lowest value was 0,050 owned by PT BankArtha Graha International,Tbk (INPC) in 2018.

2. RETA

The average value of the Retained earnings to Total Assets of the 12 companies listed on BEI (Indonesia Stock Exchange) for the period 2015-2018 is 0,03931. The highest value reached 0,095 owned by PT Bank Woori Saudara Indonesia 1906,Tbk(SDRA) in 2018. While the lowest value was -0,004 owned by PT Bank Agris,Tbk (AGRS) in 2018.

3. EBITTA

The average value of the Earning Before Interest and Taxes to Total Assets of the 12 companies listed on BEI (Indonesia Stock Exchange) for the period 2015-2018 is 0,00831. The highest value reached 0,025 owned by PT Bank Woori Saudara Indonesia 1906,Tbk (SDRA) in 2018. While the lowest value was -0,007 owned by PT Bank Agris,Tbk (AGRS) in2018.

4. MVEBVD

The average value of the Market Value of Equity to Book Value of Debt of the 12 companies listed on BEI (Indonesia Stock Exchange) for the period 2015-2018 is 0,00831. The highest value reached 0,26838 owned by PT Bank Ina Perdana, Tbk(BINA) in 2017. While the lowest value was 0,038 owned by PT Bank Artha Graha International, Tbk (INPC) and PT Bank Victoria International, Tbk (BVIC)in 2015-2016 and PT Bank Victoria International,Tbk (BVIC) in2015.

5. Altman Z Score

The average value of the Altman Z Score of the 12 companies listed on BEI (Indonesia Stock Exchange) for the period 2015-2018 is 1,32096. The highest value reached 4,061 owned by PT Bank Ina Perdana, Tbk (BINA) in 2017. While the lowest value was 0,533 owned by PT Bank Artha Graha International, Tbk (INPC) in 2018.

6. Stock Price

The average value of the Stock Price of the 12 companies listed on BEI (Indonesia Stock Exchange) for the period 2015-2018 is 390,65. The highest value reached 1.150 owned by PT Bank Woori Saudara Indonesia 1906, Tbk (SDRA) in 2016. While the lowest value was 62 owned by PT Bank Artha Graha International, Tbk (INPC) in 2018.

Classical Assumption Test

The results test show that the residual variables are normally distributed, no strong correlation between independent variables in this study, the data used has homogeneous variance, and the data tested does not have autocorrelation problems, either positive autocorrelation or negative autocorrelation.

Simultaneous Test (f-test)

Result of the F test is known that the value obtained is 44,024 > 2,630 (F-table), which means the regression model can be accepted. This shows that simultaneously liquidity proxied by the working capital to total assets ratio, retained earnings to total assets ratio, earnings before interest and tax to total asset and market value of equity to book value of debt have a significant effect on the stock price in companies registered in Indonesia Stock Exchange for 2015 - 2018.

Simple Regression Analysis

Simple regression equation is obtained:

$$\mathbf{Y = 5{,}229 + 1{,}587X}$$

The determination produces an R Square value of 0.614 and this shows that Altman Z Score contributed to the stock price for companies listed Indonesia Stock Exchange for the period 2015 - 2018 amounting to 61,4%, while the remaining 38,6% others are contributions from other variables not studied

Multiple Linear Regression Analysis

Multiple regression equation is obtained:

$$\mathbf{Y = 3{,}914 + 1{,}009X1 + 9{,}937X2 + 26{,}605X3 + 4{,}384X4}$$

The determination show an R Square value of 0.614 and this shows that WCTA ratio, RETA ratio, EBITTA ratio and MVEBVD ratio contributed simultanous to the stock price for companies listed on BEI (Indonesia Stock Exchange) for the period 2015 - 2018 amounting to 82,6%, while the remaining 17,4% others are contributions from other variables not studied

Partial Test (t-test)

Tabel T-test

Variable	t-value	Sig.
WCTA	**0,748**	**0,459**
RETA	**2,557**	**0,015**
EBITTA	**2,042**	**0,048**
MVEBVD	**8,826**	**0,000**
Altman Z Score	**7,783**	**0,000**

This table give information about the results of partial hypothesis testing. The table interpretation above is as follows:

1. Partially, the WCTA ratio has not dominant effect on stock price of private companies in the banking sector listed in Indonesia Stock Exchange 2015-2018.
2. Partially, the RETA ratio has dominant effect on stock price of private companies in the banking sector listed in Indonesia Stock Exchange 2015-2018.
3. Partially, the EBITTA ratio has dominant effect on stock price of private companies in the banking sector listed in Indonesia Stock Exchange 2015-2018.
4. Partially, the MVEBVD ratio has dominant effect on stock price of private companies in the banking sector listed in Indonesia Stock Exchange 2015-2018.
5. Partially, the Altman Z Score ratio has dominant effect on stock price of private companies in the banking sector listed in Indonesia Stock Exchange 2015-2018.

5. Discussion

Study hypothesis testing indicate that WCTA has no effect on stock price. This means that investors consider that when the WCTA ratio increases, it means that the company has not good used of its working capital so that it will reduce the level of demand for shares (Andromeda Ardian and Moh Khoiruddin, 2014). Research that shows differences with existing theories is because investors in the object under study show that the decrease and increase in the ratio of WCTA does not show an effect on the demand for share prices. Investors are more interested in other variables such as earnings, retained earnings and stock market value which shows the effect on stock prices in the research conducted.

The results of hypothesis testing indicate that RETA has a good effect on stock price. Retained earnings are used to refinance company activities which will be adjusted to the dividend policy of the company so that the company is able to increase its capability by generating profit which means that the ratio of RETA has an influence on stock prices (Andromeda Ardian and Moh Khoiruddin, 2014).

The results of hypothesis testing indicate that EBITTA has a good effect on stock price. The ratio of EBITTA measures the productivity assets that company had, without the influence of the tax rate or the interest rate. The greater the income obtained, the greater the level of productivity of the company so that it can increase investors' profits, which means that the ratio of EBITTA has an influence on stock prices.

The results of hypothesis testing indicate that MVEBVD has a good effect on stock price. The MVEBVD ratio is a ratio that measures how far the market value from company's equity will decline before liabilities exceed assets. The market value of equity is a combination of the market value of ordinary shares and preferred stock. The lower the solvency level of the company, the greater the level of company productivity, which makes the stock returns given to investors bigger, which will further increase the stock price.

The results of hypothesis testing indicate that Altman Z Score has a good effect on stock price. Bankruptcy analysis can indirectly affect the stock price which gives investors an idea of the prospects for the company that is given the investment. The prospect of a profitable company will avoid selling shares, whereas the less favorable

prospect tends to sell shares so that the analysis is not directly related to share prices related to investment decision making from investors (Augustpaosa Nariman, 2016).

6. Conclusion

6.1 Conclusion

Research conducted on the effect of bankruptcy prediction of private banking sector companies utilize the Altman Z Score Modification model approach to stock prices in private companies in the general banking sector in the Indonesia Stock Exchange in 2015-2018, the authors draw the following conclusions:

1. WCTA ratio has no effect on the stock price of private companies in the banking sector in the Indonesia Stock Exchange 2015-2018.
2. The RETA ratio has a positive effect on the stock price of private companies in the banking sector in the Indonesia Stock Exchange 2015-2018.
3. The ratio of EBITTA has a positive effect on the stock price of private companies in the banking sector in the Indonesia Stock Exchange 2015-2018.
4. The ratio of MVEBVD has a positive effect on the stock price of private companies in the banking sector in the Indonesia Stock Exchange in 2015-2018.
5. The ratio of WCTA, RETA, EBITTA, and MVEBVD has a simultaneous positive effect on the stock price of private companies in the banking sector in the Indonesia Stock Exchange 2015-2018.
6. Analysis of bankruptcy prediction with the Altman Z-Score Modification has a positive effect the stock price of private companies in the banking sector on the Indonesia Stock Exchange 2015-2018.

Implications for companies and investors:

1. The company needs to conduct an analysis of the potential bankruptcy prediction of its company as input for the company's performance on various aspects of the company, one of which is the company's stock price.
2. Companies in the general banking sector, especially those in the bank book category one and two, must further strengthen their financial ratios, such as RETA ratio, EBITTA ratio, and MVEBVD which shows an effect on the demand for stock prices by investors.
3. Altman Z Score analysis can be a track for investors to make considerations before investing in a company in an effort to prevent failure in investment that results in losses for investors.

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