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Prediction of financial distress using the altman z-score method: It's impact on stock prices of companies in the properties and real estate subsector

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ABSTRACT

This research seeks to asses the precence of Prediction Financial Distress using the Altman Zscore Method: it's Effect on Stock Prices of Companies in the Properties and Real Estate Subsector Listed on the Indonesia Stock Exchange for the Period 2015-2023. The research method used is quantitative Associative. The data analysis technique used is descriptive statistics and simple and multiple linear analysis using SPSS ver.23. The test results show that all companies in 2015-2019 were in a safe condition but financially vulnerable since 2020-2023 have been in the gray zone even though they are not yet in the acute distress category. The variables Net Working Capital to Total Assets (WCTA), Retained Earning to Total Assets (RETA), Earning Before Interest and Tax to Total Assets (EBITA), Market Value Of Equity to Book Value Of Debt (MVEBVL) and Sales to Total Assets (STA) together do not have a significant effect on stock prices with a significance value of 0.970409 greater than 0.05.

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1. INTRODUCTION

Properties and real estate companies play an important role in the growth and progress of a country's economy, including in developing countries. The properties and real estate sector has a significant impact on the progress of the national economy because it is able to attract and encourage economic development in other sectors. Not only that, the properties and real estate sector also has a major influence on the development of financial products, which is one of the important points in economic dynamics. The properties and real estate industries are two different things. While often mentioned together, property and real estate are distinct concepts—property is a subset of the real estate industry that primarily involves legal aspects such as ownership and leasing arrangements (Kamila et al., 2023).

Increased sales lead to increased revenue for the company. The property and real estate business is also supported by regional development and microeconomic growth. The competition that occurs in property companies is very high, as a result companies are required to have high competitiveness in order to survive in the global economy. Quoted from (Veganzones & Severin in the journal Treasury, State Finance and Public Policy, Dwitya Estu Nurpramana et al. 2022). Companies need to maintain the performance of their respective companies. Especially financial performance to avoid being entangled in excessive debt which can cause an increase in interest

expenses. If the company has large enough costs so that it is unable to pay its debts on time, the company is at high risk of bankruptcy. The bankruptcy of a company can be reviewed and assessed based on its financial statements.

Furthermore, the property and real estate sector is known to have a highly cyclical nature, which tends to grow rapidly when economic conditions improve and contract when there is an economic slowdown. This fluctuation makes the property sector a sector that is difficult to predict consistently.

One interesting phenomenon that is the background of this research is the large number of property advertisements scattered along the road. This phenomenon reflects the high marketing activity and product offerings in this sector. Methodologically, the number of property advertisements on the road can be used as a quantitative indicator of real estate sector activity, because the increasing number of advertisements tends to reflect the company's efforts to sell its assets, indicating an increase in supply, and the dynamics of competition in the market. However, the use of this indicator must be carried out systematically, with an adequate quantitative approach such as calculating the number of advertisements periodically, categorizing locations, and validating real transaction data so that it can be used as a valid and representative indicator in scientific studies.

The large number of advertisements in public spaces is also a sign that companies are competing to offer their products. However, massive advertising does not always indicate sales success. If sales are not optimal while marketing expenses increase, then this condition can actually be a sign of financial pressure for the company.

Researchers also noted that in the financial report, there were significant fluctuations in annual income which were likely caused by the company's inability to manage assets efficiently, weak business strategies, and minimal innovation. In addition, the emergence of many new property companies has tightened competition which has an impact on reducing the market share for each company.

In a theoretical context, this phenomenon can be explained through the Industry Life Cycle Theory. According to Miles dan McCue (1982), Wheaton (1999), Grant (2016), every industry experiences four phases of development, namely: introduction, growth, maturity, and decline. The property sector often experiences the greatest pressure in the maturity and decline phase, where competition increases, prices tend to stagnate or decline, and demand becomes more satisfying. In this phase, companies face difficulties in maintaining profit margins and liquidity, making them vulnerable to financial pressure.

Financial distress can start from difficulty in paying short-term obligations that have matured as an indication of the mildest financial distress, to a declaration of bankruptcy which is the most severe financial distress condition (Wahyuni Amelia, 2023). Financial distress conditions can occur if a company experiences negative net income for three years and has not paid dividends for more than one year (Darsono and Ashari, 2005:101).

According to Brigham and Gapenski (1996:891) in Amaniyah (2023), financial distress occurs when a debtor cannot meet the schedule for paying its debts to creditors when they are due or the company's cash flow projections show that the company will soon experience difficulties in terms of liquidity.

Based on the explanations of the experts above, it can be concluded that financial distress is a condition where a company experiences financial difficulties and is threatened with bankruptcy or experiences a decline in financial conditions before bankruptcy or liquidation o ccurs. However, there is often a common mistake that equates financial distress with bankruptcy. In fact, this is not true, financial distress is the cause of a company's bankruptcy, but it does not mean that all companies experiencing financial distress will go bankrupt.

According to Hutauruk, et.al (2021), Krishnatama et al (2019b), Jariah et al (2021), Syahyunan (2013) the Z-Score analysis was first proposed by Edward I Altman in 1968 as a result of his research. Bankruptcy is a situation where a company cannot fulfill its obligations. This condition does not just appear, but usually has early indications that can be detected through in-depth analysis of financial

statements with certain methods. Financial ratios can be an indication of the potential for company bankruptcy. The first version of the original ZScore can be seen in the formula below.

$Z = 1.2X_1 + 1.4X_2 + 3.3\ X_3 + 0.6X_4 + 1.0X_5$

Description:

X_1 = Working capital / Total asset

X_2 = Retained Earning / Total asset

X_3 = EBIT / Total asset

X_4 = Market Value of Equity / Book Value of Debt

X_5 = Sales / Total Asset

Explanation:

1) If the Z- Score value > 2.99 then it is a company that is not bankrupt.

2) If the Z- Score value is 1.81 – 2.99 then it is a gray area company.

3) If the Z- Score value < 1.81 then it is a bankrupt company.

Meanwhile, according to Darmadji and Fakhrudin (2012:102), Endri et al (2022) stock prices are prices that occur on the stock exchange at a certain time. Stock prices can change up or down in a very fast time. Stock prices can change in minutes and can even change in seconds. This is possible because of the demand and supply between stock buyers and stock sellers.

2. RESEARCH METHOD

This research was conducted using an associative descriptive method using a quantitative approach. namely the results of the research which are then processed and analyzed to draw conclusions, meaning that the research conducted is a study that emphasizes its analysis on numeric data (numbers). By using this research method, a significant relationship will be known between the variables studied, thus producing conclusions that will clarify the picture of the object being studied, then interpreted based on related theories.

Explaining research chronological, including research design, research procedure (in the form of algorithms, Pseudocode or other), how to test and data acquisition (Wijnen et al., 2017)(Calero et al., 2013). The description of the course of research should be supported references, so the explanation can be accepted scientifically (Morita & Seiford, 1999)(Land et al., 1994).

The focus of the research object is companies operating in the properties and real estate subsector listed on the Indonesia Stock Exchange (IDX) in the period 2015-2023. The population for the study was 85 properties and real estate companies listed on the Indonesia Stock Exchange. However, from the 85 companies based on the research sample criteria, four companies were obtained to be used as samples. Sampling in this study used Non Probability Sampling, which is sampling that does not provide equal opportunities for each member of the population to be selected as a sample (Sugiyono, 2017:84). The sampling technique uses purposive sampling. The purposive sampling technique is sampling based on certain criteria or considerations in order to obtain samples that are relevant and in accordance with the objectives of the study. The criteria include companies in the properties and real estate subsector that have won the BCI Asia Award more than 6 times in the last 8 years and use Rupiah currency in their financial reports.

This research employs two categories of variabels, namely independent variables and dependent variables. The independent variabels utilized in this research consist of X_1: working capital divided by total assets, X_2: Retained earnings divided by total assets, X_3: Earnings before interest and taxes divided by total assets, X_4: Book value of equity divided by book value of total liabilities, and X_5: Sales to total assets. In contrast, the dependent variable examined in this research is the stock price.

According to Sugiyono (2014:243) in quantitative research, data analysis is an activity after data from all respondents or other data sources are collected. The data analysis technique used in this study is quantitative analysis, where in analyzing the collected data, a hypothesis test needs to be carried out. To support the analysis and hypothesis testing, the right application to use is with the help of the E-views 12 and Microsoft Excel 2019 programs.

3. RESULTS AND DISCUSSIONS

The following is Financial Distress data using the Altman Z-Score model on stock prices in this study:

Table 1 Financial Distress Model Altman Z-Score on Stock Prices in Properties and Real Estate Companies

Firm	Year	X1	X2	X3	X4	X5	Stock Price (IDR)
	2015	0.35143384	0.11013936	0.25225243	0.30080439	0.28298262	334
	2016	0.32441402	0.1148016	0.15897361	0.14383931	0.24359755	210
	2017	0.35457032	0.00441949	0.15857454	0.12237522	0.21567641	210
	2018	0.34436591	0.12562984	0.11301245	0.08680884	0.15514797	152
APLN	2019	0.3392479	0.12344665	0.07335338	0.0687341	0.12818269	177
	2020	0.30538449	0.01330999	0.03680413	0.06587052	0.11163837	188
	2021	0.33039791	0.01120608	0.02477025	0.05577039	0.04090141	122
	2022	0.32912663	0.02725802	0.02224426	0.05360791	0.07814962	118
	2023	0.32912663	0.02725802	0.02224426	0.05360791	0.07814962	138
	2015	0.35143384	0.11013936	0.25225243	0.30080439	0.28298262	1451
	2016	0.32441402	0.1148016	0.15897361	0.14383931	0.24359755	1335
	2017	0.35457032	0.00441949	0.15857454	0.12237522	0.21567641	1185
	2018	0.34436591	0.12562984	0.11301245	0.08680884	0.15514797	1010
CTRA	2019	0.3392479	0.12344665	0.07335338	0.0687341	0.12818269	1040
	2020	0.30538449	0.01330999	0.03680413	0.06587052	0.11163837	985
	2021	0.33039791	0.01120608	0.02477025	0.05577039	0.04090141	970
	2022	0.32912663	0.02725802	0.02224426	0.05360791	0.07814962	940
	2023	0.32912663	0.02725802	0.02224426	0.05360791	0.07814962	1170
	2015	0.35143384	0.11013936	0.25225243	0.30080439	0.28298262	1451
	2016	0.32441402	0.1148016	0.15897361	0.14383931	0.24359755	1335
	2017	0.35457032	0.00441949	0.15857454	0.12237522	0.21567641	1185
	2018	0.34436591	0.12562984	0.11301245	0.08680884	0.15514797	1010
PPRO	2019	0.3392479	0.12344665	0.07335338	0.0687341	0.12818269	1040
	2020	0.30538449	0.01330999	0.03680413	0.06587052	0.11163837	985
	2021	0.33039791	0.01120608	0.02477025	0.05577039	0.04090141	970
	2022	0.32912663	0.02725802	0.02224426	0.05360791	0.07814962	940
	2023	0.32912663	0.02725802	0.02224426	0.05360791	0.07814962	1170
	2015	0.35143384	0.11013936	0.25225243	0.30080439	0.28298262	1451
	2016	0.32441402	0.1148016	0.15897361	0.14383931	0.24359755	1335
	2017	0.35457032	0.00441949	0.15857454	0.12237522	0.21567641	1185
	2018	0.34436591	0.12562984	0.11301245	0.08680884	0.15514797	1010
SMRA	2019	0.3392479	0.12344665	0.07335338	0.0687341	0.12818269	1040
	2020	0.30538449	0.01330999	0.03680413	0.06587052	0.11163837	985
	2021	0.33039791	0.01120608	0.02477025	0.05577039	0.04090141	970
	2022	0.32912663	0.02725802	0.02224426	0.05360791	0.07814962	940
	2023	0.32912663	0.02725802	0.02224426	0.05360791	0.07814962	1170

Source: Annual Financial Report at BEI (Data processed, 2024)

Based on the calculation results of the table above, it is stated that the stock prices in each company fluctuate every year. From the data of the four companies, the stock price value shows that the company is in the Distress Zone. This is due to several factors such as a significant decrease in the amount of equity, a decrease in the value of income and an increase in the amount of financial burdens that must be paid. The lowest stock price in APLN is 188 which occurred in 2022, but the stock price increased or its highest value occurred in 2015, which was 334. The lowest stock price in CTRA is 940 in 2022 and its highest value occurred in 2015 at 1335. The lowest stock price for PPRO occurred in 2022 at 940 and the highest value was 1452 in 2015. And for SMRA the lowest value was in 2022 at 940 while the highest value occurred in 2015 at 1451. These values indicate that the companies APLN, CTRA, PPRO, and SMRA are in the Distress Zone. It can be concluded that of the four existing companies, the lowest APLN stock price value is 118 in 2022 and the highest value is in the SMRA company in 2015 at 1451.

By using cutoff values of 2.99 and 1.81, it can be concluded that if the Z value obtained is more than 2.99, it means that the company can be estimated to be able to avoid financial distress in the future. If the Z value is in the range of 1.81 to 2.99, it means that the company is in the gray area

or shows financial challenges but has not reached the distress zone. However, if the Z value <1.81, it means that the company is estimated to experience financial distress. The following are the results of the Z-Score calculation:

Table 2 Bankruptcy Calculation Results Model Altman Z-Score

Years	APLN	CTRA	PPRO	SMRA	Interpretation
2015	4.68	4.68	4.68	4.68	Safe Zone
2016	3.72	3.72	3.72	3.72	Safe Zone
2017	3.53	3.53	3.53	3.53	Safe Zone
2018	3.52	3.52	3.52	3.52	Safe Zone
2019	3.19	3.19	3.19	3.19	Safe Zone
2020	2.36	2.36	2.36	2.36	Grey Zone
2021	2.43	2.43	2.43	2.43	Grey Zone
2022	2.45	2.45	2.45	2.45	Grey Zone
2023	2.45	2.45	2.45	2.45	Grey Zone

Source: Annual Financial Report at BEI (Data processed, 2024)

Hypothesis testing

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	0.173568	Prob. F(5,30)	0.9704
Obs*R-squared	1.012129	Prob. Chi-Square(5)	0.9616
Scaled explained SS	0.483829	Prob. Chi-Square(5)	0.9927

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 12/19/24 Time: 12:46
Sample: 1 36
Included observations: 36

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-243019.1	1864688.	-0.130327	0.8972
X1	946747.8	5291726.	0.178911	0.8592
X2	5397.278	843430.3	0.006399	0.9949
X3	-1413608.	4910341.	-0.287884	0.7754
X4	662200.1	1831144.	0.361632	0.7202
X5	1092144.	3066271.	0.356180	0.7242

R-squared	0.028115	Mean dependent var	170253.2
Adjusted R-squared	-0.133866	S.D. dependent var	202598.7
S.E. of regression	215733.5	Akaike info criterion	27.55249
Sum squared resid	1.40E+12	Schwarz criterion	27.81641
Log likelihood	-489.9448	Hannan-Quinn criter.	27.64460
F-statistic	0.173568	Durbin-Watson stat	0.275580
Prob(F-statistic)	0.970409		

Figure 1. The Influence of WCTA, RETA, EBITA, MVEBVL and STA Variables on Stock Prices
Source: Eviews 12 Output (Processed data, 2024)

Based on the table above, which presents a significance of 0.05 (0.970409 > 0.05), it can be seen that simultaneously the variables Net Working Capital to Total Assets (WCTA), Retained Earning to Total Assets (RETA), Earning Before Interest and Tax to Total Assets (EBITA), Market Value Of Equity to Book Value Of Debt (MVEBVL) And Sales to Total Assets (STA) simultaneously do not have a s ignificant effect on stock prices. The results are supported by the F-count value of the variables Net Working Capital to Total Assets (WCTA), Retained Earning to Total Assets (RETA), Earning Before Interest and Tax to Total Assets (EBITA), Market Value Of Equity to Book Value Of Debt (MVEBVL) and Sales to Total Assets (STA) on stock prices simultaneously of 0.970409 greater than 0.05 and the F-table value of 3.327654499 (28.75739> 3.327654499) with df1 = 3 - 1 = 2 and df2 = 32 - 3 = 29 with a significance of 5% meaning Ho3 is rejected and Ha3 is accepted. In conclusion, the variables Net Working Capital to Total Assets (WCTA), Retained Earning to Total Assets (RETA), Earning Before Interest and Tax to Total Assets (EBITA), Market Value Of Equity to Book Value Of Debt (MVEBVL) and Sales to Total Assets (STA) together do not exert a significant influence on stock prices.

4. CONCLUSION

Based on the results of the data analysis and discussion that have been presented, it can be concluded that from the two variables used in this study, the following conclusions can be drawn: a) All sample companies in 2015–2019 were in the safe zone according to the Altman Z-Score model, which indicates that the company's financial performance was still relatively good. Cash flow and operating profit in that period were considered stable, so the risk of financial distress was very small. However, in the 2020–2023 period, all companies moved to the gray zone, indicating the emergence of early signals of financial stress, most likely influenced by economic pressures due to the COVID-19 pandemic, the slowdown in the property sector, and financing challenges; b) Altman Z-Score component variables consisting of Net Working Capital to Total Assets (WCTA), Retained Earnings to Total Assets (RETA), Earnings Before Interest and Tax to Total Assets (EBITA), Market Value of Equity to Book Value of Debt (MVEBVD), and Sales to Total Assets (STA), together do not have a significant effect on stock prices, as indicated by a significance value of 0.970409 which is far above the significance limit of 0.05. This shows that stock price movements are not solely influenced by the company's internal conditions as measured by the financial distress indicator, but are very likely influenced by other factors outside the company's financial performance itself.

Thus, these results open up opportunities for the development of more comprehensive further research. One important direction is to include external variables originating from the macroeconomic environment such as interest rates, inflation, exchange rates, GDP growth, and market sentiment. These variables greatly influence investor perceptions, the company's financing structure, and return expectations, which ultimately have a direct impact on the company's stock price.

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