

APPLICATION OF BANKRUPTCY PREDICTION MODELS FOR REAL ESTATE COMPANIES LISTED ON THE INDONESIA STOCK EXCHANGE (IDX)

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Abstract

A company that is built not only could make a profit, but also definitely has the risk of bankruptcy. This research aims to measure and analyze the potential for bankruptcy from the analysis of several methods compared to the reality in the field. The sample used in this study were several real estate companies in Indonesia which were listed on the Indonesia Stock Exchange from 2017 to 2019. The methods used in predicting company bankruptcy in the property sector are the Altman Z-score, Altman Revised Z-score, and Springate methods. Based on the research results, companies that tend to be at risk of bankruptcy according to the three models are APLN, CTRA, DART, EMDE, PPRO, and SMRA with Altman Z-score < 1.8, Altman Revised Z'-score < 1.23, and Springate S-score < 0.862.

Keywords: alman z-score; bankruptcy; property; springate; zmijewski

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Introduction

According to the (Pitaya, 2015), the number of companies in the property and real estate sector listed on the Indonesia Stock Exchange as of the end of 2012 was 64 companies. including banking companies listed on the Indonesia Stock Exchange for the period 2005 to 2007 (Putri & Sampurno, 2012). The property industry sector is a sector that is very sensitive to changes that occur in macroeconomic conditions (Kumalasari, & Vita, 2010).

In addition to the financial sector, the property industry is also a sector that has the largest multiplier effect with industries in other sectors. To analyze the company's performance, financial ratios can be used (Astuti, Sumarni, & Saraswati, 2017). The development of the property sector will be able to affect other industries, such as the material industry, logistics industry, service industry, financial industry, and banking through mortgages. (Ismoyo, 2011) who concludes that DER has a positive effect on stock returns.

However, in the past few years, the property industry sector has shown stagnant growth. In 2019, the growth of the property industry sector was below 5%, while the national economic growth was at 5.02%. In 2020, the Covid-19 pandemic brought the

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property industry sector growth lower than the previous year. This is a signal for property companies to restructure their business strategy and analysis to avoid the risk of bankruptcy.

Several previous studies have predicted the potential bankruptcy of companies listed on the Indonesia Stock Exchange. (Sembiring, 2015) in research on manufacturing companies listed on the Indonesia Stock Exchange concluded that 27% of the companies studied have the potential to go bankrupt using the Springate model, while the results using the Altman Z-score and Zmijewski predict even greater results. The study also concluded a significant difference between the results of the three models where the conclusions of the Altman Z-score and Springate models were significantly different from those of the Zmijewski model, whereas there was no significant difference between the Z-score model and the springate model. While the research conducted (Arum, K., Surwanti, A., & Si, 2018), there are two financial ratios that are most dominant and have a significant effect on the bankruptcy of a company, namely QR (Quick Ratio) and ROE (Return on Equity). The results of the same study were also concluded by researchers from Jordan (Al-Khatib & Al-Horani, 2012). By using discriminant analysis and logistic regression analysis, the results showed that the ROE ratio played a major role in influencing the bankruptcy of a company. Meanwhile, (Bunyaminu & Issah, 2012) in a study conducted in England in the 2000 s.d. 2010 shows that the bankruptcy of a company is closely related to the ROA (Return on Asset) ratio.

A. Financial Distress

Financial distress is one of the early indicators of a company's bankruptcy. Financial performance that is increasingly moving downward is a financial distress condition. The decline in financial conditions can be seen from the company's financial statement data. Financial distress can be defined if the company's net income is negative for several years (Whitaker, 1999). (Foster, 1986) defined financial distress as a financial condition with severe liquidity problems that cannot be resolved without re-scaling of an entity or company.

From the above explanation, it can be concluded that financial distress is a situation in which the company is unable to pay its current obligations from its operating cash flows. This condition is closely related to bankruptcy. Bankruptcy is defined as financial failure and economic failure (Adnan & Kumiasih, 2000).

B. Bankruptcy

(Platt & Platt, 2002) explained that the bankruptcy or liquidation of a company is caused by a decline in financial conditions. Bankruptcy is a condition in which a company fails to manage operations so that it affects the profit deficit. Bankruptcy is also referred to as company liquidation or insolvency. (Paddock, 1980) defined two meanings in bankruptcy in terms of economic failure and financial failure.

Economic failure in the company happened when the company was unable to meet its own obligations and needs. This occurs when the company's revenue is less than the capital used. In addition, another condition that causes economic failure is

when the amount of liabilities to be paid by the company is greater than the cash flow owned by the company. In addition, there is also the term financial failure (insolvency). Insolvency is divided into two, namely technical insolvency and insolvency in the definition of bankruptcy. The definition of technical insolvency is that a company is declared bankrupt when the company cannot pay its obligations when due. Meanwhile, insolvency in the definition of bankruptcy is a company that is declared bankrupt when the net worth is negative in the conventional balance sheet or the value of the expected cash flows is less than the liabilities.

C. Factors Causing Bankruptcy

(Glueck & Jauch, 1999) outlined that there are 3 factors that cause company bankruptcy, including the following:

1. General Factors

What is meant by general factors is company bankruptcy caused by macro factors currently occurring in a country or region. Bankruptcy due to general factors was more due to 4 sectors. The first sector is the economic sector such as inflation, interest rates, monetary policy, and currency valuation. The second sector is the social sector, such as a lifestyle that affects supply and demand and conditions of social stability in a region. The third sector is the technology sector. The implementation of information technology is an expensive investment that demands precise calculations from a company. The fourth sector is the government sector, such as lifting subsidies and increasing export-import tariffs.

2. External Factors of the Company

Conditions outside the company that can cause a company's bankruptcy are called external factors. This factor consists of 3 sectors, including the customer sector, the supplier sector, and the competitor sector. In the customer sector, companies that are unable to identify customer needs will close their business faster due to decreased sales. In the supplier sector, companies must be able to work together with material suppliers to get material prices within the range of economics of scale. Meanwhile, in the competing sector, a company has the potential to go bankrupt if it does not understand the game theory used to win the competition.

3. Internal Factors of the Company

The bankruptcy factor that comes from internal companies is a factor caused by mismanagement in determining policies within the company. Harnanto (1984) explained that there were 3 dominant internal factors of the company that cause bankruptcy, namely credit given to customers that are too large, inefficient management, and frauds such as abuse of authority.

D. Company's Bankruptcy Prediction

The efforts of researchers in predicting a company's bankruptcy have been carried out for a long time. Many studies had proposed models for predicting potential bankruptcies and had been tested for decades and in several countries.

Beaver (1966) is the first researcher conducted a study on bankruptcy. The study that Beaver had conducted was using 29 financial ratios in the last 5 years before the bankruptcy. In his research, Beaver categorized the ratio groups into 6 groups and made a univariate analysis by linking each ratio to determine the best ratio as a predictor of bankruptcy. The sample in this research was 79 companies. From a total of 6 ratio groups, Beaver's research shows that the ratio of cash flow to total liabilities is the most appropriate ratio to predict bankruptcy.

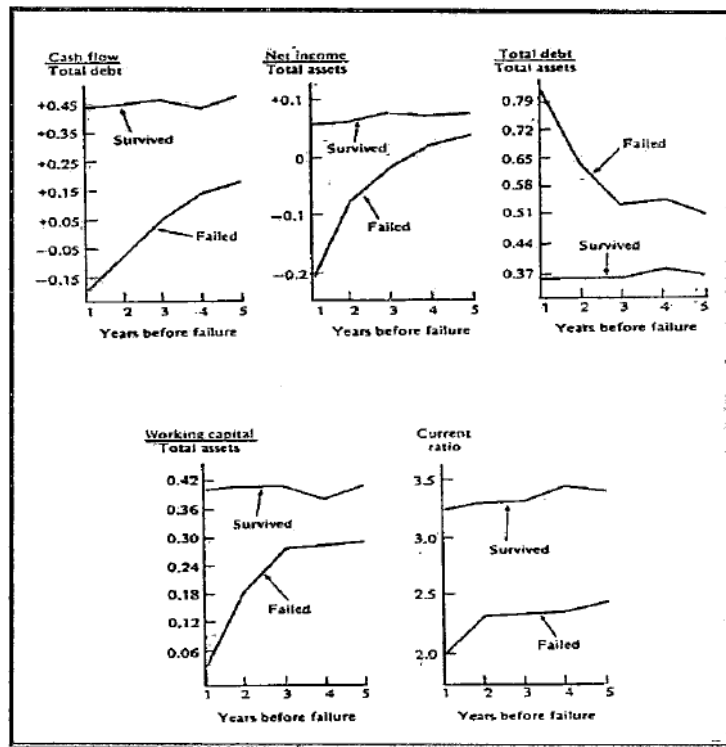


Figure 1
Ratios to predict company's bankruptcy

E. Altman Model

The z-score model is a model created by Edward I. Altman. Altman (1968) used multiple discriminant analysis, which is a statistical technique to identify several variables that have a significant effect on an event. The discriminant analysis which is carried out is motivated by the limitations of the ratio analysis which is tested separately. As a follow-up study on the limitations of ratio analysis, it is necessary to make calculations that combine various ratios to become an accurate prediction model.

The discriminant analysis research that was conducted produced a z-score model to predict bankruptcy. This model is a linear model with weighting of several financial ratios. By calculating the model, the value "z" is obtained which indicates the health condition of the company's financial performance. The "z" value is often

used as a model in several studies in predicting the state of the company in the future.

In developing this model, Altman took 33 companies that went bankrupt from 1960 to 1965 and 33 companies that remained in the manufacturing sector that listed on stock exchange. In compiling a combination of these financial ratios, Altman found as many as 22 possible financial ratios and grouped them into 5 categories, namely liquidity, profitability, leverage, solvency, and performance. The 5 categories are combined to get the right prediction model. During its development, Altman continues to test this model and develop it so that it can be used in sector companies other than manufacturing. Here is the development of the Altman model:

a) First Altman Model Z-score

From the results of research on financial ratios in several manufacturing companies, Altman produced the first bankruptcy prediction model. The equation of the first Altman model is as follows:

$$Z = 1,2X1 + 1,4X2 + 3,3X3 + 0,6X4 + 0,999X5$$

With the following information

Table 1
Proxy, Variable, and Measurement used in Altman Model

Proxy	Variable	Measurement
X1	Ratio of Working Capital to Total Assets	WC / TA
X2	Ratio of Retained Earnings to Total Assets	RE / TA
X3	Ratio of Earning Before Interest and Tax to Total Assets	EBIT/ TA
X4	Ratio of Market Value of Equity to the Book Value of Debt	MVE/ BVD
X5	Ratio of Sales to Total Assets	Sales/ TA

The Z score is an overall index from multiple discriminant analysis which is divided into 3 categories (Altman, 1968).

- $Z < 1.8$ then includes companies that are likely (high probability) to bankrupt
- $1.8 < Z < 2.99$ then it is a grey area (it cannot be determined whether the bankruptcy is likely or not)
- $Z > 2.99$ then including companies that are less likely to go bankrupt

b) Altman Revised Model Z'-score

The use of Altman's (1968) model with discriminant analysis calculations is able to produce the right model to predict the bankruptcy of public manufacturing companies. Furthermore, Altman developed a model that could be applied to manufacturing companies in the private sector (Altman, 1983). The revised Altman model changes in one of the variables used. Because private companies do not have a market price on their equity, the X4 proxy in the numerator section

which was originally market value of equity was changed to book value of equity (Abdulkareem, 2015).

$$Z' = 0,717X1 + 0,847X2 + 3,108X3 + 0,42X4 + 0,988X5$$

With the following information

Table 2
Proxy, Variable, and Measurement used in Altman Revised Model

Proxy	Variable	Measurement
X1	Ratio of Working Capital to Total Assets	WC / TA
X2	Ratio of Retained Earnings to Total Assets	RE / TA
X3	Ratio of Earning Before Interest and Tax to Total Assets	EBIT/ TA
X4	Ratio of Book Value of Equity to the Book Value of Debt	BVE/ BVD
X5	Ratio of Sales to Total Assets	Sales/ TA

With the revised model of the calculation, Altman (1983) classified potential bankruptcies with the following value ranges:

- $Z' < 1.23$, it includes companies that are likely (high probability) to go bankrupt
- $1.23 < Z' < 2.9$ then it is included in the grey area (cannot be determined whether the bankruptcy tendency or not)
- $Z' > 2.9$, it includes companies that are less likely to go bankrupt

c) Altman Modified Model Z'' -score

At that time, Altman (1968) and modified Altman (1983) models focused on corporate research in the manufacturing sector, both public and private. Furthermore, predictors that can predict the bankruptcy of companies operating in sectors other than manufacturing are needed (Fifriani & Wahyu Santosa, 2020). Companies other than manufacturing, such as banks or bond issuing companies, have different asset ratios so that adjustments are needed (Ramadhani & Lukviarman, 2009). The equation for the modified model Z'' -score is as follows (Altman, 2000).

$$Z'' = 6,56X1 + 3,26X2 + 6,72X3 + 1,05X4$$

With the following information

Table 3
Proxy, Variable, and Measurement used in Altman Z'' Model

Proxy	Variable	Measurement
X1	Ratio of working capital to total assets	WC/ TA
X2	Rasio of retained earning to total assets	RE/ TA
X3	Ratio of Earning Before Interest and Tax to Total Assets	EBIT/ TA
X4	Ratio of Book Value of Equity to Book Value of Debt	BVE/ BVD

The classification of the modified Altman model is as follows:

- $Z < 1.1$, it includes companies that are likely (high probability) to go bankrupt
- $1.1 < Z < 2.6$ then it is a grey area (cannot be determined whether the tendency of bankruptcy is large or not)
- $Z > 2.6$, it includes companies that are less likely to go bankrupt

d) Springate Model

According to Peter & Yoseph (2011), the Springate model was developed by Gorgon L.V. Springate in 1978. Springate (1978) conducted a study using the same multiple discriminant analysis as Altman's (1968) research. In his research, Springate (1978) used 40 samples of manufacturing companies in Canada and collected 19 financial ratios for analysis of bankruptcy predictions. From 19 financial ratios, he found 4 main financial ratios that can be used as predictors of corporate bankruptcy. Ghodrati (2012) in her research states that the accuracy rate of the Springate model reaches 92%. The next Springate model is better known as the S-score with the following calculations:

$$S = 1,03Y1 + 3,072Y2 + 0,66Y3 + 0,4Y4$$

With the following information

Table 4
Proxy, Variable, and Measurement used in Springate Model

Proxy	Variable	Measurement
Y1	Ratio of Working Capital to Total Assets	WC/ TA
Y2	Ratio of Earning Before Interest and Tax to total assets	EBIT/ TA
Y3	Ratio of Earning Before Tax to Current Liabilities	EBT/ CL
Y4	Ratio of Sales to Total Assets	Sales/ TA

The S score is an overall index from multiple discriminant analysis which is divided into 2 categories, namely:

- $S < 0.862$, then it is a company that is likely to bankrupt
- $S > 0.862$, it is a healthy company

e) Zmijewski Model

Zmijweski's (1984) used random sampling techniques in making a model for predicting a company's bankruptcy. According to him, the side matched-pair sampling technique used by the previous models is considered to lead to bias. Zmijweski (1984) argued that population and sample determination to determine the frequency of bankruptcies must be determined at the outset. The frequency of bankruptcy was defined as the number of samples that went bankrupt divided by the total number of samples. In his research, Zmijewski used logit regression and took a sample of 840 companies. A total of 40 companies out of the

population went bankrupt, while another 800 did not. A study conducted by Avenhuis (2013) in the Netherlands stated that the accuracy rate of the Zmijewski model is 99.4% for detecting companies that are not bankrupt. The resulting model is as follows:

$$X = -4,3 - 4,5X_1 + 5,7X_2 - 0,004X_3$$

With the following information

Table 5
Proxy, Variable, and Measurement used in Zmijewski Model

Proxy	Variable	Measurement
X1	Ratio of Net Profit to Total Assets	$\frac{\text{Net Profit}}{\text{Total Assets}}$
X2	Ratio of Total Debt to Total Assets	$\frac{\text{Total Debt}}{\text{Total Assets}}$
X3	Liquidity Ratio	$\frac{\text{Current Assets}}{\text{Current Liabilities}}$

Zmijewski's model rating categories are as follows:

- $X < 0$ is a healthy company. The smaller the X value (negative value), the healthier the company's finances.
- $X = 0$ then it is a grey zone.
- $X > 0$ is a bankrupt company. The greater the value of X (positive value, the stronger the company is to go bankrupt).

Method

This research is a comparative descriptive type, which compares the results obtained from the calculation of several bankruptcy prediction models, namely Altman Z-score, Altman revised Z'-score, and Springate. This research is also a descriptive quantitative type, namely by collecting several numerical data (quantifying) and conducting variable analysis to determine the results (Apuke, 2017). Interpretation of numerical data on research results can provide an overview of the actual situation at the company.

The population in this study were all companies in the property or real estate sector listed on IDX during the period 2017 until 2020. Companies that are the samples in this study are companies that have the following criteria:

- Property companies that listed on IDX.
- Have financial reports as of December 31 for the period 2017 until 2019;
- Experienced a decrease in ROE for the last 3 years, namely the period 2017 until 2020

Financial report data from companies are obtained from the respective company's annual reports and publications on the official IDX website (www.idx.co.id).

Results and Discussion

Based on the initial screening, from 2017 to 2019, there were 17 companies that experienced a decline in return on equity for 3 consecutive years. The complete data is in the following table:

Table 6
Value and Comparison of ROE

NO	STOCK CODE	VALUE OF ROE				COMPARISON OF ROE		
		ROE 2017	ROE 2018	ROE 2019	ROE 2020	2018 to 2017	2019 to 2018	2020 to 2019
1	APLN	16,37	5,45	0,68	-5,2	Smaller	Smaller	Smaller
2	ASRI	16,16	9,24	2,73	-13,8	Smaller	Smaller	Smaller
3	BAPA	11,00	4,42	3,25	-2,62	Smaller	Smaller	Smaller
4	BKSL	4,71	0,56	0,33	-4,13	Smaller	Smaller	Smaller
5	CTRA	6,59	5,48	3,22	1,84	Smaller	Smaller	Smaller
6	DART	0,85	0,59	-1,3	-13	Smaller	Smaller	Smaller
7	EMDE	13,50	0,8	0,74	-9,5	Smaller	Smaller	Smaller
8	GWSA	2,82	1,97	1,45	1,29	Smaller	Smaller	Smaller
9	JRPT	18,69	14,76	13,9	12,2	Smaller	Smaller	Smaller
10	MKPI	26,22	21,06	10,6	4,79	Smaller	Smaller	Smaller
11	MTLA	18,37	13,5	9,34	6,4	Smaller	Smaller	Smaller
12	OMRE	-1,65	-1,9	-2,53	-5,07	Smaller	Smaller	Smaller
13	PPRO	9,19	7,81	4,72	2,25	Smaller	Smaller	Smaller
14	RBMS	8,24	0,97	-2,77	-7,31	Smaller	Smaller	Smaller
15	RDTX	12,02	11,82	9,63	9,14	Smaller	Smaller	Smaller
16	SMRA	6,37	6,01	4,54	-0,176	Smaller	Smaller	Smaller
17	TARA	0,12	0,07	0,05	-1,22	Smaller	Smaller	Smaller

From the 17 property companies that experienced a decline in ROE value for 3 consecutive years, there were 3 companies that did not have complete financial reports for 3 consecutive years, namely PT Alam Sutera Realty Tbk. (ASRI), PT Sentul City Tbk. (BKSL), and PT Sitara Propertindo Tbk (TARA). Therefore, these 3 companies were removed from the list of research objects.

Table 7
Value and Comparison of ROE

COMPANY'S CODE	YEAR	RESULTS OF BANKRUPTCY PREDICTION MODEL			PROBABILITY OF BANKRUPTCY'S OPINION		
		Z	Z'	S	Z	Z'	S
APLN	2017	1,058513254	1,027577299	0,628482471	high	high	high
	2018	0,67476865	0,742062696	0,203358098	high	high	high
	2019	0,774267916	0,804621716	0,291022994	high	high	high
BAPA	2017	2,102794378	1,964787863	0,967393354	grey area	grey area	health
	2018	2,694881758	2,526942494	0,761833676	grey area	grey area	high
	2019	5,611363364	8,790756937	1,683243291	low	low	health
CTRA	2017	1,683727545	1,060125393	0,582919164	high	high	high

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	2018	1,607704971	1,135104907	0,659133152	high	high	high
	2019	1,642540527	1,162023313	0,672009316	high	high	high
DART	2017	0,617669284	0,831931408	0,09221781	high	high	high
	2018	0,462615298	0,683108722	0,01746889	high	high	high
	2019	0,2923281	0,498034956	-0,02719990	high	high	high
EMDE	2017	2,901416738	2,32448092	2,041892535	grey area	grey area	health
	2018	1,359185168	0,899737427	0,605403788	high	high	high
	2019	1,232941913	0,801225251	0,50352961	high	high	high
GWSA	2017	2,670269157	6,18809347	1,362458143	grey area	low	health
	2018	2,483269986	5,713198285	1,173235381	grey area	low	health
	2019	2,536357187	5,887220565	0,362217159	grey area	low	high
JRPT	2017	3,560957612	1,831377206	0,784952913	low	grey area	high
	2018	2,928888087	1,744639438	0,656402529	grey area	grey area	high
	2019	2,670191694	1,835333447	0,633919087	grey area	grey area	high
MKPI	2017	11,1564266	2,406879965	1,400755866	low	grey area	health
	2018	9,18294483	2,713674779	1,452565634	low	grey area	health
	2019	6,844161943	2,492738516	0,793960293	low	grey area	high
MTLA	2017	2,586129081	1,884643461	1,178315061	grey area	grey area	health
	2018	2,808003805	2,027208562	1,176883094	grey area	grey area	health
	2019	2,710095414	1,814695267	0,974878888	grey area	grey area	health
OMRE	2017	4,994813226	7,951463973	-0,37754135	low	low	high
	2018	5,761335852	4,724699573	0,487212648	low	low	high
	2019	3,297202483	4,164258596	-0,27426327	low	low	high
PPRO	2017	1,760556966	0,908730208	0,611226894	high	high	high
	2018	0,756654883	0,770798701	0,52102999	high	high	high
	2019	0,853886261	0,664244911	0,44414607	high	high	high
RBMS	2017	0,600121869	1,005382887	0,499915443	high	high	high
	2018	0,979548036	1,368910956	0,363846622	high	grey area	high
	2019	0,655280682	1,388631643	0,342733219	high	grey area	high
RDTX	2017	6,185594802	5,144348199	1,93767538	low	low	health
	2018	6,043128699	5,862871963	2,00140541	low	low	health
	2019	4,998575566	5,09182106	1,668603406	low	low	health
SMRA	2017	1,567526726	1,006790194	0,516767799	high	high	high
	2018	1,449656128	1,013651702	0,535950362	high	high	high
	2019	1,481291649	0,9740831	0,454392625	high	high	high

Based on the bankruptcy prediction calculations from several models, as many as 6 companies that have a great potential for bankruptcy according to the 3 bankruptcy prediction models. Meanwhile, 2 companies were categorized as healthy companies. The other 6 companies received different opinions among the 3 bankruptcy prediction models.

From the results of the bankruptcy opinion, 6 companies that have the potential for bankruptcy will be discussed in the following discussion:

a) PT Agung Podomoro Land Tbk (APLN)

The data processed of APLN has contain as follow:

Table 8
Finance Ratios of APLN

YEAR	WCTA	RETA	EBITTA	MVEBVD
2017	0,076858	0,2009182	0,0905296	0,2351544
2018	0,014762	0,1965268	0,0333631	0,1693926
2019	0,110705	0,1943846	0,0351118	0,2061745

The data shows that there is a fluctuation in the value of the Working Capital to Total Assets (WCTA), but the value is always positive. It shows that the company's liquidity maintained properly so that it can run with good short-term liabilities (Van Horne & Wachovics, 2012). The ratio of Retained Earnings to Total Assets (RETA) in the above calculation shows a decline in the ramps for three years so that the profitability performance of the company is in a declining condition.

The next ratio is EBITTA (EBIT to Total Assets), which explains that during 2017 to 2019, it always shows a positive number. This indicates that the company can still get operating profit but in a small number. Meanwhile, the value of MVEBVD (Market Value of Equity to Book Value of Debt) fluctuated with a small value which indicates that the company is declining based on the investor insight.

b) PT Ciputra Development Tbk (CTRA)

The data processed of CTRA has contain as follow:

Table 9 Finance Ratios of CTRA

YEAR	WCTA	RETA	EBITTA	MVEBVD
2017	0,2305864	0,1620227	0,0507359	1,3475263
2018	0,237893	0,180041	0,06269	1,0624088
2019	0,2714935	0,1974061	0,0604302	1,0470998

Based on the data above, the WCTA value is in a positive number and tends to increase. This indicates that the liquidity of the company is still in good condition. The company's RETA is also in an increasing condition indicating that internal funding is strong from its equity. Furthermore, EBITTA, which is the company's ability to generate operating profit, tends to increase, but still at a small value. Meanwhile, MVEBVD has decreased in value in the capital market.

c) **PT Duta Anggada Realty Tbk (DART)**

The data processed of DART has contain as follow:

Table 10
Finance Ratios of DART

YEAR	WCTA	RETA	EBITTA	MVEBVD
2017	-0,0485677	0,2404461	0,01936	0,3431403
2018	-0,0715099	0,2233889	0,0128001	0,2321105
2019	-0,1709557	0,1862815	0,0019633	0,2748633

The value of WCTA at PT Duta Anggada Realty Tbk is negative and decreasing, which indicates that the company's liquidity is in an unhealthy condition. The RETA value that decreased from 2017 to 2019 also indicates that the profitability of the company is decreasing. The EBITTA value shown in the data table is also at a small value so that the company's ability to create operating profit is still weak. Meanwhile, MVEBVD is still experiencing a downward trend, which illustrates the company's falling market value.

d) **PT Megapolitan Development Tbk (EMDE)**

The data processed of EMDE has contain as follow:

Table 11
Finance Ratios of EMDE

YEAR	WCTA	RETA	EBITTA	MVEBVD
2017	0,4433505	0,1724065	0,4328446	0,8052191
2018	0,4696695	0,162009	0,0183198	0,6585798
2019	0,5283961	0,1434103	-0,0037564	0,5470532

EMDE recorded an increase in the value of WCTA from 2017 to 2019 and was positive, indicating that the company's liquidity was in good condition. Meanwhile, the RETA of EMDE has decreased in a row which indicates the profitability of the company is decreasing. In addition, the company's EBITTA has decreased, even reaching a minus number in 2019. This shows that the efficiency of the company in creating operating profit is decreasing. In addition, the decreasing MVEBVD also indicates that the company is in an unattractive condition in the eyes of investors.

e) **PT PP Properti Tbk (PPRO)**

The data processed of PPRO has contain as follow:

Table 12
Finance Ratios of PPRO

YEAR	WCTA	RETA	EBITTA	MVEBVD
2017	0,2954753	0,0872681	0,0424967	1,5419277
2018	0,2869716	0,0897356	0,0342462	0,0263069
2019	0,2827066	0,0881762	0,0222283	0,3115946

Based on the data above, the PPRO value is in a positive number and tends to decrease. This indicates that the liquidity of the company is not going to be good. Meanwhile, RETA tends to be stagnant, which means that the profitability of companies in PPRO is stagnant. EBITTA for 3 consecutive years has sloped downwards, which indicates that the company's ability to generate operating profit is getting weaker. Meanwhile, MVEBVD tends to fluctuate, which means that the company value is attractive to investors.

f) Summarecon Agung Tbk (SMRA)

The data processed of SMRA has contain as follow:

Table 13
Finance Ratios of SMRA

YEAR	WCTA	RETA	EBITTA	MVEBVD
2017	0,1344245	0,2327785	0,0618926	1,0243516
2018	0,1406568	0,2333277	0,0668713	0,8156427
2019	0,0872859	0,2414081	0,0650064	0,96722

The data shows that WCTA at SMRA decreased in 2019 which shows that the liquidity of the company tends to decrease which has an impact on the ability of the company to handle short-term liabilities. Meanwhile, the RETA of the company is in a decreasing condition, which indicates that the profitability of the company is also decreasing. Meanwhile, EBITTA is at a stagnant level, which means that there is no change in the value of the company's operating profit, while MVEBVD tends to fluctuate, which means that the company's market value in the capital market is also fluctuating.

Conclusion

From a combination of several test models using the Altman Z-score, Altman Revised Z-score, and Springate, there are 6 companies that fall into the high probability category to achieve bankruptcy. However, each of the predictors of bankruptcy has different results.

In the Altman z-score model, there are 7 companies that have z-score <1.8, so that 7 companies are predicted to experience financial distress in the future. Meanwhile, in the Altman Revised model, there are 6 companies that have a z-score <1.23, which have a high risk of bankruptcy. The Springate model predicts that more companies are predicted to go bankrupt. In the calculation of the Springate model, there are 11 companies with an S-score value <0.862, so that 11 companies are predicted to experience financial distress.

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