

Financial Distress Analysis In Detecting Bankruptcy Levels In Manufacturing Companies

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Abstract

This study aims to determine the prediction of the bankruptcy of manufacturing companies listed on the BEI. The methodology used is the Altman method, the Springate method and the Zmijewski method for the 2015-2019 period. The type of data used is quantitative data. The data analysis technique used is the formula of the Altman method, the Springate method and the Zmijewski method. The results of this study show that in the 2015 and 2019 Altman method there are eight or all companies that are predicted to be in the bankrupt category. Meanwhile from 2016 to 2018 there are only six companies that are included in the bankrupt category and two other companies are categorized in the gray zone. In the Springate method from 2015 to 2019, there are eight or all companies predicted to have the potential to go bankrupt. In the zmijewski method from 2015 to 2017 there were five companies that were in the bankrupt category while in 2018 to 2019 there were only two companies that were included in the bankrupt category. In addition, based on the different results through the one-way ANOVA test, a significant value < 0.05 was obtained, which means that there was a significant difference between the methods tested.

Keywords: bankruptcy prediction, altman method, springate method, zmijewski method, one way anova test

1. Introduction

financial difficulties distress) even bankruptcy or insolvency. There are several indicators that can be known and must be paid attention to by the company's internal parties, namely the decline in sales volume, as well as the decline in the company's ability to make profits and its dependence on debt is very large. (Fitriyanti, 2015) . If the financial difficulties cannot be corrected by the company concerned, then over time the company will experience bankruptcy.

Financial distress in a company includes an initial period of decline in performance to its lowest point, then a recovery stage if the company can improve its performance, but if performance gets worse, it is very likely that the company will experience bankruptcy (Kristanti, 2019). One indicator that a company is experiencing *financial distress* is a decline in profits from year to year.

Table 1. Manufacturing company profits 2015 -20 19 (in Rupiah)

Year	Sector Type	Company Code	Profit and loss)	Percentage Increase / (Decrease)
2015	Basic Industry and Chemistry	KIAS	(174,815,895,877)	(140)%
		ETWA	(224 . 231 . 055 . 302)	37%
		Indonesian	(155,746,630,931)	(6)%



		Embassy	
		JKSW	(23.192.914.5491) (139)%
2016	Food and Drink	ALTO	(24 , 345 , 726 , 797) (60)%
	Various Industries	ARGO	(8,335,226,000) (71)%
		HDTX	(355 659 019 000) (70)%
		MYTX	(263,871,000,000) (35)%
	Basic Industry and Chemistry	KIAS	(168.791.156.106) 4%
		ETWA	(72,586,362,581) 69%
		Indonesian Embassy	(102,760,678,878) 85%
		JKSW	(1,207,036,075) 92%
	Food and Drink	ALTO	(26,500,565,763.) (8)%
	Various Industries	ARGO	(23,531,220,000) (65)%
HDTX		(221,500,546,000) 61%	
MYTX		(245,716,000,000) 7%	
2017	Basic Industry and Chemistry	KIAS	(95,433,945,482) 77%
		ETWA	(127 520 669 008) (43)%
		Indonesian Embassy	(125,704,262,232) (18)%
		JKSW	(3 925 258 889) (69)%
	Food and Drink	ALTO	(62,849,581,665) (58)%
	Various Industries	ARGO	(10,781,108,000) 78%
		HDTX	(847 049 209 000) (74)%
MYTX		(286 485 000 000) (14)%	
2018	Basic Industry and Chemistry	KIAS	(94,086,692,401) 1%
		ETWA	(138 704 828 271) (89)%



2019		Indonesian Embassy	(124,767,897,543)	1%
		JKSW	(48 , 588 , 147 , 020)	(88)%
	Food and Drink	ALTO	(62,849,581,665)	47%
	Various Industries	ARGO	(4,790,107,000)	96%
		HDTX	(229 988 885 000)	73%
		MYTX	(170 , 235 ,000,000)	41%
	Basic Industry and Chemistry	KIAS	(303,804,185,996)	(68)%
		ETWA	(8 9,485,479,839)	35%
		Indonesian Embassy	(36,043,580,231)	71%
		JKSW	(1 , 391 , 297 , 992)	71%
	Food and Drink	ALTO	(33 . 021 . 220 . 862)	98%
	Various Industries	ARGO	(3,764,333,000)	21%
		HDTX	(65 ,673,323,000)	71%
		MYTX	(241 027 000 000)	(42)%

Source: Indonesian Stock Exchange 2015-2019

Seen from table 1, the eight manufacturing companies experienced losses for 5 consecutive years. In 2015 PT Keramika Indonesia Association Tbk (KIAS) experienced a decrease in profits of 140%, then in 2016 to 2018 it experienced an increase in profits but remained at a loss and in 2019 again experienced a decrease in profits of 68%. At PT Eterindo Wahanatama Tbk (ETWA) in 2016 there was an increase in profits, but in 2017-2018 there was another decline in profits, then in 2019 there was an increase in profits but still at a loss. PT Kertas Basuki Rahmat Indonesia Tbk (KBRI) experienced a decline in profits in 2015 and 2017, then in 2016 to 2019 it experienced an increase in profits but was still at a loss. In 2015 PT Jakarta Kyoei Steel Works Tbk (JKSW) experienced a decline in profits of 139%, then in 2016 there was an increase in profits, but in 2017 to 2018 there was another decline in profits and in 2019 there was an increase in profits but still made a loss. PT Tri Banyan Tirta Tbk (ALTO) experienced a decline in profits from 2015 to 2017, then experienced an increase in profits from 2018 to 2019 but was still at a loss. PT Argo Pantes Tbk (ARGO) experienced a decline in profits from 2015 to 2016, but from 2017 to 2019 it experienced an increase in profits. PT Panasia Indo Resources Tbk (HDTX) experienced a decline in profits in 2015 and 2017, then in 2016-2019 it experienced an increase in profits but remained at a loss. PT Asia Pacific Investama Tbk (MYTX) experienced a decline in profits in 2015, then in 2016 and 2018 there was an increase in profits, but in 2019 there was another decline in profits so it

remained at a loss.

The problems described above experienced by the five manufacturing companies indicate that the companies have experienced financial difficulties over the last five years. Therefore, this writing was carried out to find out whether the financial difficulties experienced by the company were still safe or serious and how big the potential for bankruptcy was.

2. Method

The data source used is secondary data obtained from the financial reports of manufacturing companies listed on the Indonesia Stock Exchange for the period 2015 - 2019. The objects used in this research are manufacturing companies listed on the Indonesia Stock Exchange for 2015-2019. Manufacturing companies were chosen as research objects because manufacturing companies are considered to represent industrial conditions in Indonesia which have a larger data population compared to other companies. The research data was taken from the Indonesian Stock Exchange which can be accessed via www.idx.co.id

A different test was carried out to determine the comparison of the Altman, Springate, and Zmijewski methods in predicting bankruptcy. This difference test is carried out using the one way ANOVA test, where this test is a type of average difference test which tests whether there is an average difference between two or more groups. If the significant value is > 0.05 then there is no difference between the several methods tested. Conversely, if the significant value is < 0.05 then there are differences between several methods tested.

3. Results and Discussions

A different test was carried out to determine the comparison of the Altman, Springate, and Zmijewski methods in predicting bankruptcy. This difference test is carried out using the one way ANOVA test, where this test is a type of average difference test which tests whether there is an average difference between two or more groups.

Table 2. One way anova test

Descriptives

Bankruptcy Prediction Value

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Altman	40	1.6310	2.40568	.38037	-2.4004	-.8616	-6.68	2.84
Springate	40	-.6487	.56164	.08880	-.8284	-.4691	-2.12	.56

Multiple Comparisons

Dependent Variable: Bankruptcy Prediction Value

Tukey HSD

(i) Bankruptcy Prediction Method	(J) Bankruptcy Prediction Method	Mean Difference (IJ)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Altman	Springate	-.98225	.75462	,397	-2.7736	.8091
	Zmijewski	-4.26850 *	.75462	,000	-6.0599	-2.4771
Springate	Altman	.98225	.75462	,397	-.8091	2.7736
	Zmijewski	-3.28625 *	.75462	,000	-5.0776	-1.4949
Zmijewski	Altman	4.26850 *	.75462	,000	2.4771	6.0599
	Springate	3.28625 *	.75462	,000	1.4949	5.0776

*. The mean difference is significant at the 0.05 level.

Bankruptcy Prediction Value

Tukey HSD ^a

Bankruptcy Prediction Method	N	Subset for alpha = 0.05	
		1	2
Altman	40	-1.6310	
Springate	40	-.6487	
Zmijewski	40		2.6375
Sig.		,397	1,000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 40,000.



Based on the table above, the mean or average bankruptcy prediction value using the Altman method, Springate method and Zmijewski method is -1.63, -0.65 and 2.64 respectively. In the anova output, a sig value of 0.000 (<0.05) was obtained. The Altman and Springate methods have a sig value of 0.39 (>0.05), the Altman and Zmijewski methods have a sig value of 0.00 (<0.05), the Springate and Altman methods have a sig value of 0.39 (>0.05), the Springate and Zmijewski methods have a sig value of 0.00 (<0.05), the Zmijewski and Altman methods have a sig value of 0.00 (<0.05), the Zmijewski and Springate methods have a sig value of 0, 00 (<0.05).

4.2 Discussion

4.2.1 Discussion of Predictions Bankruptcy Rate According to the Altman Method

Companies that are categorized as having the potential to go bankrupt are in line with the results of calculations on financial ratio indicators in the Altman method. On the *Working Capital to Total Assets* (WCTA) ratio (X_1) the company has a low and partly negative value. If the value of net working capital is negative, then it is likely that the company will experience financial difficulties, especially in covering its short-term obligations (Idi, 2021). The company's *Retained Earnings to Total Assets* (RETA) (X_2) ratio has a negative value, which means the possibility of the company experiencing *financial distress*, where the higher the resulting ratio, the lower the possibility of *financial distress* (Idi, 2021). The company's *Earning Before Interest and Taxes to Total Assets* (EBITTA) (X_3) ratio has a negative value, where the lower the EBITTA ratio value indicates the lower productivity of assets in generating profits, conversely the greater the value of this ratio, the more effective the management of all assets owned. company (Idi, 2021). In the ratio *Book Value of Equity to Book Value of Total Debt* (BVEBVT) (X_4) the company has a total liability value greater than the total value of equity, thus indicating that the company has not been able to fulfill its obligations from the total equity value. On the *Total Sales To Total Assets* (STTA) ratio (X_5) the company did not experience an increase in sales compared to its total assets, this can be seen from the greater asset value compared to its sales value. Therefore, it can indicate that the company is less effective in using assets to increase sales.

4.2.2 Discussion of Predictions Bankruptcy Rate According to the Springate Method

Companies that are categorized as potentially bankrupt are based on the calculation of the financial ratio indicators used. The ratio of *working capital to total assets* of the company has a low value and is partly negative. If the value of net working capital is negative, then it is likely that the company will experience financial difficulties, especially in covering its short-term obligations (Idi, 2021). The ratio of *earnings before interest and taxes (ebit)* to the company's total assets has a negative value, where the lower the value of this ratio indicates the low productivity of assets in generating profits, the greater the value of this ratio, the more effective the management of all assets owned by the company (Sanjaya, 2018). The ratio of *earnings before interest and taxes (ebit)* to total current liabilities of the company gets a negative value, which can indicate that all companies are unable to fulfill their current obligations, which can result in the company experiencing financial difficulties. In the ratio of *total sales to total assets*, the company does not appear to have experienced an increase in sales compared to its total assets, this can be seen from the greater value of assets compared to the value of sales. Apart from that, companies that are categorized as safe have a fairly large value in the ratio of *working capital to total assets* of 3.34, where if net working capital is positive, then the prediction is that the company will face financial difficulties. very rare or minor occurrence.



4.2.3 Discussion of Predictions Bankruptcy Rate According to the Zmijewski Method

Companies that are categorized as having the potential to go bankrupt can be seen from the value of each financial ratio indicator, where the company's *net income to total assets* (x_1) ratio has a low value and is mostly negative, this value indicates that the company is unable to generate profits consistently. continuously, if this condition is not corrected, the company will be threatened with financial difficulties that will lead to bankruptcy. Apart from that, the ratio of *total liabilities to total assets* (x_2) the company also has a low asset value compared to its total liabilities. The company's *current assets to current liabilities/current ratio* (x_3) also has a low value.

4.2.4 Discussion of Bankruptcy Rate Prediction Between the Altman, Springate, and Zmijewski Methods

Based on the results of different tests using one way ANOVA, *the mean* or average bankruptcy prediction value using the Altman method, Springate method and Zmijewski method respectively is -1.63, -0.65 and 2.64, which means it can be concluded that the average The highest bankruptcy prediction value is found in the Zmijewski method. In the ANOVA output, a sig value of 0.000 (<0.05) is obtained, which means there is a significant difference between the three bankruptcy prediction methods. Between the Altman and Springate methods, the sig value is 0.39 (>0.05), which means that there is no significant difference between the two methods, but between the Altman and Zmijewski methods, the sig value is 0.00 (<0.05), which means means there is a significant difference. Likewise, the Springate and Altman methods have a sig value of 0.39 (>0.05) which means there is no difference between the two methods, then the Springate and Zmijewski methods have a sig value of 0.00 (<0.05) which means there are differences between the two methods. The difference is that the Zmijewski and Altman methods have a sig value of 0.00 (<0.05) which means there is a difference between the two methods, the Zmijewski and Springate methods also have a sig value of 0.00 (<0.05) which means they have the difference between the two methods.

4. Conclusion

Based on the results of the analysis and discussion that has been carried out, the following conclusions can be drawn:

1. *financial distress* analysis using the Altman (Z-score) method in manufacturing companies listed on the Indonesia Stock Exchange In 2015 and 2019 there were eight or all companies that fell into the bankruptcy category . In 2016 to 2018 there were seven companies in the bankruptcy category and one company in the gray category.
2. *financial distress* analysis using the springate (S -score) method in manufacturing companies listed on the Indonesia Stock Exchange From 2015 to 2019 all companies were included in the bankruptcy category.
3. *financial distress* analysis using the Zmijewski (X -score) method for manufacturing companies listed on the Indonesia Stock Exchange From 2015 to 2017 there were five companies in the bankruptcy category and three companies in the safe category . Meanwhile, in 2018 and 2019 there were six companies in the bankruptcy category and two companies in the safe category.
4. Based on the test results of differences in bankruptcy prediction results using one way anova The three *financial distress* analysis methods obtained a significant value of <0.05



between the *Altman* method (*Z-Score*), the *Springate* method and the *Zmijewski* method (*S- Score*), which means there are differences between the methods tested.

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