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Financial Distress Analysis to Predict Company Bankruptcy Using the Modified Altman Method

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Abstract: Financial distress is a condition where the company experiences a decline in its financial condition before bankruptcy. To avoid this condition, the company must pay attention to its financial condition both in terms of its balance sheet and income statement using financial statement analysis techniques, such as the Altman model. The purpose of this study is to analyze the occurrence of Financial Distress to predict company bankruptcy using the Modified Altman method using 3 classification categories namely safe, gray, and distress. A quantitative approach was used in this study with a total population of all companies listed on the JII and the sample selection using a purposive sampling technique so that a sample of 13 companies was obtained. Based on the Altman Z-score analysis, the results show that: 8 companies are consistently in the Safe category for 5 years with a cut-off value> 2.9. Then, if analyzed as a whole, the mean value obtained from all companies is 5.7688> 2.9. This value illustrates that on average all companies listed on the Jakarta Islamic Index in 2018-2022 are in the safe category.
Keywords: Altman; Financial Distress; Jakarta Islamic Index; Z-Score

INTRODUCTION

Economic conditions have changed quite significantly. This is mainly due to the Covid 19 pandemic and the Russia-Ukraine Invasion which has an impact on the economy in the world and Indonesia is one of them. Many companies were affected by these events and even suffered losses which led to financial distress (Fajarsari & Martini, 2022).

Financial distress is a stage where the company's financial condition decreases before reaching the bankruptcy stage (Isayas, 2021). Financial distress is closely related to liquidity. If a company experiences financial distress, the company will not be able to fulfill its obligations (Irfani, 2020). If this condition is ignored without proper handling, the company will certainly experience bankruptcy (Isdina, 2021). Some of the images that can be seen when a company experiences Financial Distress are experiencing a decrease in dividends, plant closures, losses, layoffs, and operating cash flow that cannot meet its obligations (Arifin, 2021).

Therefore, to avoid financial distress, the company can pay attention to its financial condition in terms of the balance sheet and income statement contained in the financial statements by using financial statement analysis techniques, such as the Altman Z-Score model (Oktaviani, 2020). This model or technique is a prediction model developed by Altman and from several previous studies, this model can be used to predict public companies with an accuracy rate of 82% - 95% (Idi & Borolla, 2021)

Several studies have conducted research related to financial distress using the Altman method such as Research conducted by Dian Pertiwi and Alvianita Gunawan Putri in 2021 with the title Financial Distress Prediction Analysis using the Altman Z-Score Model in Retail Companies in 2018-2020. This study uses the original Altman Z-Score model developed in 1968. The results of this study indicate that generally, these companies are in the "safe" zone for 2018 and 2019, except HERO which is in the "Grey" zone. Furthermore, in 2020, some companies are still in the "safe" zone, except for MIDI

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and RALS shifting to the "Grey" zone and even HERO shifting to the "distress" zone (Pertiwi & Putri, 2021).

In addition, there was another study conducted by Nina Rismawati, Umi Nadhiroh, and Heru Sutapa in 2022 with the title Financial Distress Analysis with the Altman Z-Score Approach in Transportation Sub-Sector Companies during the Covid-19 Pandemic. The results of this study indicate that 13 companies are experiencing financial distress, 5 companies are in a vulnerable condition or Grey area, and 5 companies are in a healthy condition (Pertiwi & Putri, 2021). The variables used greatly affect the calculation results of the Altman Z-Score analysis, especially if the company experiences capital deficiency, the possibility of financial distress in the company is also higher (Rismawati, Nadhiroh, & Sutapa, 2022).

This study was conducted to analyze the prediction of financial distress in companies listed on the Jakarta Islamic Index using the modified Altman Z-Score model. The results of this study are expected to be used by companies to anticipate financial distress to prepare strategies before financial distress occurs.

METHODS

The type of research in this study is descriptive quantitative where this research will see and describe data in the form of numbers objectively starting from the collection process to the interpretation of the results obtained (Kharisma, 2023). This research uses secondary data. The data needed in this study are the company's financial statements obtained through the Indonesia Stock Exchange website, namely www.idx.co.id (Hikmah & Afridola, 2019). The purpose of this study is to determine the company's financial condition using the Altman method in predicting the occurrence of financial distress in the company. (Hikmah & Afridola, 2019)

This study took a population of companies listed on the Jakarta Islamic Index whose samples were obtained using a purposive sampling technique with the following criteria: Listed on the Jakarta Islamic Index, Consistently listed on the Jakarta Islamic Index for 5 consecutive years, and Complete financial reports during the study period (5 years). Based on the above criteria, the number of samples in this study was 13 companies. The sample list can be seen in the table below:

Table 1. Sample of Research

No	Code	Company Name
1	ADRO	PT. Adaro Energy Tbk
2	AKRA	PT AKR Corporindo Tbk
3	ASII	PT Astra Internasional
4	ICBP	PT Indofood CBP Sukses Makmur Tbk
5	INCO	PT Vale Indonesia Tbk
6	INDF	PT Indofood Sukses Makmur Tbk
7	KLBF	PT Kalbe Farma Tbk
8	PTBA	PT Bukit Asam Tbk
9	SMGR	PT Semen Indonesia Tbk
10	TLKM	PT Telkom Indonesia Tbk
11	UNTR	PT United Tractors Tbk
12	UNVR	Unilever Indonesia
13	WIKA	PT Wijaya Karya Tbk

Source: Data that has been processed by the author (2023)

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The Altman method has evolved. Altman made several modifications to the formula used to predict financial distress (Kristiani, Putriana, & Fahruddin, 2022). This is because, over time, companies continue to develop. The modified Z-Score formula is considered the most flexible because it can be used to analyze various types of companies and is suitable for developing countries such as Indonesia (Cipta, 2021).

In the modified model, Altman eliminates the 5th ratio because it is a ratio that is quite varied in each company with different asset sizes (Ambarsari, 2020). The ratios used in the modified model that we will use in this study are Working Capital to Total Assets (X1), Retained Earning to Total Assets (X2), Earnings Before Interest and Taxes to Total Assets (X3), Book Value of Equity to Total Liabilities (X4) (Adnyana & Firdaus, 2020).

The steps taken in analyzing data using the Altman Z-Score method are as follows:

Table 2. Steps Taken in Analyzing Data

No.	Steps	Subtest
1.	Calculating Financial Ratios (Altman., 1968)	Working capital Total Assets Retained Earnings EBIT Market Value of Equity Total Liabilities
2.	Calculate the Z-Score Value (Altman, 2019)	**Z-Score = 6,56 X1 +3,26 X2 + 6,72 X3 + 1,05 X4** X1 = Working Capital to total assets X2 = Retained Earnings to total asset X3 = EBIT to total asset X4 = Book Value of equity to total liabilities
3.	Analyzing zona area	Distress If the Z value < 1.10, it is a bankrupt company. In this condition, the company is experiencing financial distress and is at high risk of bankruptcy. (Cipta, 2021) If the value of 1.10 < Z < 2.60, it includes a Grey area (it cannot be determined whether the company is healthy or experiencing bankruptcy). In this condition, the company is experiencing financial distress but can still be handled with proper management handling. If the handling is late and inappropriate, the company can experience bankruptcy. (Fitri, 2020). Safe if the Z value> 2.60 (non-distress area) then it includes companies that are not bankrupt (Wahab, 2019). The company is in a healthy condition and there is very little chance of bankruptcy (Sari, Hasbiyadi, & Arif, 2020)

Source: Steps taken in analyzing data by the Author (2023)

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RESULTS AND DISCUSSION

Table 3. Value Calculation X1, X2, X3, dan X4

Code	Year	X1	X2	X3	X4
ADRO	2022	-0,1490	0,3216	0,0419	0,7936
	2021	-0,0927	0,0844	0,2489	0,2702
	2020	0,0919	0,0373	0,0903	1,4651
	2019	0,1215	0,0675	0,1336	1,2318
	2018	0,1110	0,0155	0,0321	1,5969
AKRA	2022	0,1677	0,3343	0,1564	0,9374
	2021	0,1155	0,3196	0,0975	0,9254
	2020	0,1573	0,3707	0,1096	0,1197
	2019	0,0964	0,2988	0,0000	0,8875
	2018	0,1607	0,3032	0,0779	0,9912
ASII	2022	0,1466	0,4381	0,1695	1,4372
	2021	0,1537	0,4447	0,1389	1,4213
	2020	0,1377	0,4395	0,1140	1,3692
	2019	0,0826	0,3979	0,1427	1,1305
	2018	0,0497	0,3693	0,1472	1,0235
ICBP	2022	0,1824	0,2539	0,1890	0,9937
	2021	0,1279	0,2293	0,1719	0,8710
	2020	0,1114	0,2174	0,1662	0,9445
	2019	0,2601	0,4766	0,3721	2,2155
	2018	0,2003	0,4361	0,3569	1,9474
INCO	2022	0,3068	0,7205	0,1180	7,7629
	2021	0,2659	0,7128	0,1035	6,7672
	2020	0,2312	0,6821	0,0537	6,8657
	2019	0,2032	0,6749	0,0529	6,9100
	2018	0,2068	0,6548	0,0472	5,9102
INDF	2022	0,1338	0,2281	0,1882	1,0784
	2021	0,0768	0,2064	0,1811	0,9425
	2020	0,3369	0,1900	0,8630	0,9421
	2019	0,2518	0,2771	0,8519	1,2906

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	2018	0,0214	0,2402	0,2093	1,0706
KLBF	2022	0,4507	0,7410	0,4296	4,2957
	2021	0,4035	0,7195	0,4396	4,8323
	2020	0,4386	0,7367	0,4540	4,2619
	2019	0,4266	0,7468	0,5054	4,6937
	2018	0,4607	0,7644	0,5427	5,3634
PTBA	2022	0,33313	0,30476	0,4359	1,7585
	2021	0,33273	0,26041	0,4188	2,0432
	2020	0,18672	0,07441	0,1898	2,3799
	2019	0,26778	0,12747	0,2916	2,4003
	2018	0,28146	0,17955	0,2294	2,0586
SMGR	2022	0,1710	0,4100	0,1287	1,4198
	2021	0,0190	0,4020	0,1434	1,1553
	2020	0,0520	0,4074	0,1489	0,8787
	2019	0,0553	0,3699	0,1593	0,7717
	2018	0,1525	0,5543	0,1823	1,7772
TLKM	2022	-0,0557	0,3508	0,1320	1,1852
	2021	-0,0283	0,3219	0,1575	1,1028
	2020	-0,0914	0,3205	0,1570	1,0482
	2019	-0,0752	0,3442	0,1713	1,1898
	2018	-0,0145	0,3669	0,1765	1,3196
UNTR	2022	0,2626	0,5063	0,2474	1,5872
	2021	0,2675	0,5018	0,1747	1,7420
	2020	0,1961	0,1392	0,1323	1,5796
	2019	0,1370	0,1847	0,1863	0,9782
	2018	0,0590	0,3468	0,1815	0,9632
UNVR	2022	-0,2661	1,7898	1,0407	0,2791
	2021	-0,2518	0,2167	1,0292	0,2904
	2020	-0,2205	0,3424	1,0936	0,3165
	2019	-0,2196	0,2467	1,0668	0,3437
	2018	-0,1058	0,3695	1,0547	0,8134
WIKA	2022	0,0466	0,0007	0,0293	0,3038
	2021	0,0031	0,0017	0,0244	0,3356

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2020	0,0559	0,0012	0,0223	0,3237
2019	0,1929	0,0279	0,0560	0,4479
2018	0,2583	0,0221	0,0608	0,4097

Source*:* Data that has been processed by the author (2023)

From the table 3 above, it can be seen that the values of X1, X2, X3, and X4 of the 13 Issuers were used as research samples for 5 years, namely 2018, 2019, 2020, 2021, and 2022. The results of these calculations will be the basis for calculating the Z-Score value according to the Altman method. Below are the results of the Z-Score calculation that has been done by the author:

Table 4. Value of Z-Score

Code	Year	Z-Score	Area
ADRO	2022	1,18613	Grey
	2021	1,62370	Grey
	2020	2,87054	Safe
	2019	3,20907	Safe
	2018	2,67154	Grey
AKRA	2022	4,22585	Safe
	2021	3,42717	Safe
	2020	3,10347	Safe
	2019	2,53899	Grey
	2018	3,60806	Safe
ASII	2022	5,03933	Safe
	2021	4,88487	Safe
	2020	4,53995	Safe
	2019	3,98594	Safe
	2018	3,59466	Safe
ICBP	2022	4,33824	Safe
	2021	3,65700	Safe
	2020	3,54891	Grey
	2019	8,08701	Safe
	2018	7,17948	Safe
INCO	2022	13,30637	Safe
	2021	11,86994	Safe
	2020	11,31092	Safe
	2019	11,14509	Safe
	2018	10,01501	Safe
INDF	2022	4,01949	Safe
	2021	3,38410	Safe

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	2020	9,61862	Safe
	2019	9,63608	Safe
	2018	3,45499	Safe
KLBF	2022	12,77037	Safe
	2021	13,02122	Safe
	2020	12,80617	Safe
	2019	13,55868	Safe
	2018	14,79290	Safe
PTBA	2022	7,95453	Safe
	2021	7,99194	Safe
	2020	5,24193	Safe
	2019	6,65241	Safe
	2018	6,13495	Safe
SMGR	2022	4,81446	Safe
	2021	3,61201	Safe
	2020	3,59319	Safe
	2019	3,44997	Safe
	2018	5,89998	Safe
TLKM	2022	2,91033	Safe
	2021	3,08072	Safe
	2020	2,60061	Grey
	2019	3,02951	Safe
	2018	3,67298	Safe
UNTR	2022	6,70295	Safe
	2021	6,39423	Safe
	2020	4,28903	Safe
	2019	3,78124	Safe
	2018	3,74947	Safe
UNVR	2022	11,37645	Safe
	2021	6,27590	Safe
	2020	7,35090	Safe
	2019	6,89333	Safe
	2018	8,45233	Safe
WIKA	2022	0,82456	Distress
	2021	0,54256	Distress
	2020	0,86149	Distress
	2019	2,20406	Grey
	2018	2,60648	Grey

Source: Data that has been processed by the author (2023)

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Based on the table above, it can be seen that in 2018, the majority of JII companies were in the healthy category. There are 11 of the 13 companies that are in the safe category, namely: AKRA (3,60806), ASII (3,59466), ICBP (7,17948), INCO (10,01501), INDF (3,45499), KLBF (14,79290), PTBA (6,13495), SMGR (5,89998), TLKM (3,67298), UNTR (3,74947), UNVR (8,45233) and there are only 2 companies in the gray category, namely ADRO (2,67154) and Wika (2,60648).

In 2019, almost all companies fell into the safe category. Only AKRA Company is in the gray category with a Z-Score value of 2.53899. In this condition (gray), it is hoped that management will be careful and conduct a thorough evaluation so that the Company does not experience sluggishness until it reaches the distress stage.

In 2020 there was a decrease in conditions, namely 10 companies in the safe category, 2 companies in the gray category, and 1 company in the distress category. Companies that fall into the safe category are ADRO (2,87054), AKRA (3,10347), ASII (4,53995), INCO (11,31092), INDF (9,61862), KLBF (12,80617), PTBA (5,24193), SMGR (3,59319), UNTR (4,28903), dan UNVR (7,35090). Then continued with companies that fall into the gray category, namely ICBP (3.54891) and TLKM (2.60061). Furthermore, the company that is in the most unsafe or distressed position is the WIKA Company with a Z-Score value of 0.86149.

In 2021, there are 11 companies in the safe category, namely: AKRA (3,42717), ASII (4,88487), ICBP (3,65700), INCO (11,86994), INDF (3,38410), KLBF (13,02122), PTBA (7,99194), SMGR (3,61201), TLKM (3,08072), UNTR (6,39423), UNVR (6,27590). Then, there is 1 company in the ADRO category with a Z-Score value of 1.62370. Finally, there is 1 company that is in the worst condition, namely the distress zone, namely the WIKA Company with a Z-Score value of 0.54256.

In 2022, the number of companies in the safe category is the same as the previous year, namely 11 companies, the list of companies is still the same, namely: AKRA (4,22585). ASII (5,03933), ICBP (4,33824), INCO (13,30637), INDF (4,01949), KLBF (12,77037), PTBA (7,95453), SMGR (4,81446), TLKM (2,91033), UNTR (6,70295), UNVR (11,37645). ADRO is still in a gray condition with a Z-Score value of 1.18613. In the distress position, there is WIKA with a Z-Score value of 0.82456.

When viewed as a whole, the majority of JII companies have a healthy condition. This is evidenced by the Z-Score value of several companies that have been consistent for 5 years above the Safe cut which is > 2.9. These companies are ASII, INCO, INDF, KLBF, PTBA, SMGR, UNTR, and UNVR.

The minimum value in the Altman Z-Score model was obtained by the WIKA company in 2021, which amounted to 0.54256. This minimum value explains that according to this model the company at that time was the most distressed company during the 5-year research period.

The Altman Z-Score model achieved a maximum value of 14.79290. This maximum value was obtained by the company PT KLBF in 2018. This maximum value explains that at that time the company was categorized as the safest company from financial distress conditions compared to other companies sampled in the study.

The mean value obtained by the Altman Z-Score model is 5.76884. This value illustrates that the average of all companies listed in the Jakarta Islamic Index in 2018-2022 that are sampled is in the safe area category.

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CONCLUSION

The majority of JII companies have a healthy condition. This is evidenced by the Z-Score value of several companies that are consistent for 5 years above the Safe cut which is> 2.9. These companies are ASII, INCO, INDF, KLBF, PTBA, SMGR, UNTR, and UNVR. The mean value obtained by the Altman Z-Score model is 5.76884. This value illustrates that the average of all companies listed on the Jakarta Islamic Index in 2018-2022 that are sampled is in the safe area category.

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