Altman Z-Score Models and *Financial Distress*

Yudhi Prasetiyo[1]*, Etik Ipda Riyani[2] , Yeni Widiastuti[3] , Putri Agustina[4]

{yudhiprasetiyo@ecampus.ut.ac.id}

Universitas Terbuka, South Tangerang, Indonesia[123]
Student Accounting Study Program, Universitas Terbuka, South Tangerang, Indonesia[4]

Abstract. Indonesian economic predictions for 2023 by economists make the public reaction tighter in preparing for a global recession. Given these problems, the purpose of this paper is to see financial predictions within the company to face these challenges. The method uses descriptive exploratory analysis using a purposive sampling technique with a sample of industrial companies on the Indonesia Stock Exchange in 2018-2021. The results of the study show that in various companies in the industrial sector on the Indonesia Stock Exchange for the 2018-2021 period, in 2018 there were 12 company category dangerous zones, 5 gray zones, and 4 safe zones, then in 2019 at 9 dangerous zones, 8 gray zones, and 4 safe zones, in 2020 12 company dangerous zones, 5 company gray zones, and 4 safe zones, and 2021 11 dangerous zones, 6 gray zones and 4 safety zones

Keywords: Altman Z Score, Financial Distress, Various Industrial Companies, Indonesia Stock Exchange.

1. Introduction

Over the past three years, the world has experienced an extraordinary event, namely the Covid-19 pandemic which has harmed many sectors, especially in finance and the economy. also has a significant effect on the company's contribution and turnover in carrying out its business and operations. Every entity in Indonesia certainly has different factors in predicting its future finances, According to Onur & Yelkenci (2015), Although there are many external aspects that are difficult to analyze due to measurement issues, one alternative to assist the industry in planning future operations is to carry out a financial analysis based on financial information and financial comparisons that are reported by the company.

Financial Distress or financial distress refers to a situation when cash flow is insufficient to compensate for ongoing loans. Industries that are declared to be facing a financial emergency or collapse can affect the stability of all capital markets or can even cause investor anxiety and economic loss so that the damage to the needs of shareholders, creditors, investors, and industry employees can be felt significantly (2). If there is a proper form of financial crisis warning to be carried out by the industry concerned, to prevent the formation of financial difficulties, for the company's management, settlement can be carried out earlier to avoid the occurrence of financial difficulties which can lead to bankruptcy of the entity. For investors, a form of warning of financial difficulties can be done by strengthening the capital market by distributing collateral to investors by investing in various industries separately. Therefore, this form of warning detects and understands problems from the listed industry in order to avoid significant losses from capital owners (Cheng, 2018).

At this time in Indonesia, many industries are facing financial difficulties so many

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companies are experiencing warnings of impending bankruptcy. The main causes of its occurrence include competition in similar industries on a large scale, causing the movement of product and service competition to become increasingly stringent, it is also caused by the amount of debt that is larger than the total assets owned by the company (2). The following is a multi-industrial sub-sector company listed on the Indonesia Stock Exchange (IDX) with a period of three years, an overview of the conditions for obtaining profits generated in the income statement.

Table 1.1 Percentage of Profit/Loss of Multi-Industry Sub-Sector Companies in Indonesia

No	Company Name	Profit Growth Percentage		
		2018-2019	2019-2020	2020-2021
1	Astra International Tbk	9,08	5,76	8,99
2	Astra Otoparts Tbk	5,60	-4,36	7,05
3	Garuda Metalindo Tbk	8,99	-40,44	37,24
4	Goodyear Indonesia Tbk	-4,20	-17,67	7,37
5	Gajah Tunggal Tbk	6,06	7,87	1,06
6	Indomobil Sukses Internasional Tbk	9,75	-89,90	-49,83
7	Indospring Tbk	4,65	-2,06	16,21
8	Multi Prima Sejahtera Tbk	14,44	3,15	-14,03
9	Multistrada Arah Sarana Tbk	140,57	-64,76	581,70
10	Prima Alloy Steel Universal Tbk	-488,51	-134,51	-23,92
11	Selamat Sempurna Tbk	11,98	7,61	10,82
12	Argo Pantes Tbk	2,23	1,79	0,38
13	Trisula Textile Industries Tbk	17,77	-26,94	2,42
14	Eratex Djaja Tbk	5,94	-16,04	17,14
15	Ever Shine Textile Industry Tbk	4,07	0,84	-2,39
16	Indorama Synthetics Tbk	12,75	1,23	27,69
17	Asia Pacific Fibers Tbk	0,54	0,97	-0,09
18	Ricky Putra Globalindo Tbk	13,96	-543,97	144,20
19	Sunson Textile Manufacturer Tbk	10,02	8,64	-46,95
20	Buana Artha Anugerah Tbk.	19,48	36,70	39,91
21	Tifico Fiber Indonesia Tbk	477,67	39,36	114,52
22	Trisula International Tbk	-4,75	-17,71	4,43
23	Mega Perintis Tbk	36,35	-42,87	24,20
24	Primarindo Asia Infrastructure Tbk	-1,50	13,43	7,95
25	Jembo Cable Company Tbk	40,49	-5,64	-14,94
26	KMI Wire and Cable Tbk	23,80	-4,08	5,68
27	Kabelindo Murni Tbk	16,51	-2,33	-10,72
28	Supreme Cable Manufacturing &	14,71	7,63	6,23

No	Company Name	Profit Growth Percentage		
		2018-2019	2019-2020	2020-2021
	Commerce Tbk			
29	Voksel Electric Tbk	27,25	0,26	-43,97

Source: Data processed by the author, 2023

It can be seen from table above that there are several companies that have suffered significant losses, such as PT Astra Otoparts Tbk, PT Garuda Metalindo Tbk, PT Goodyear Indonesia Tbk, PT Indomobil Sukses Internasional Tbk, PT Indospring Tbk, PT Multi Prima Sejahtera Tbk, PT Multistrada Arah Sarana Tbk, PT Trisula Textile Industries Tbk, PT Eratex Djaja Tbk, PT Ricky Putra Globalindo Tbk, PT Sunson Textile Manufacturer Tbk, PT Trisula International Tbk, PT Mega Perintis Tbk, PT Jembo Cable Company Tbk, PT KMI Wire and Cable Tbk, PT Kabelindo Murni Tbk, and PT Voksel Electric Tbk who experienced a very significant loss or decrease in profits which could have made the company not in a good condition. According to Tuvadaratragool (2013), This matter has an unfavorable effect on stakeholders, for example employees, creditors, shareholders, communities, and authorities, because it can cause very dangerous things from their capital, as well as incidents that result in the bankruptcy of entities. Analysts love to measure and find it difficult to calculate in the ordinary way. The potential threat from this kind of action lies in various aspects such as poor asset quality and weak investment (5).

Based on existing phenomena, the purpose of this research is to enrich literacy for stakeholders and the public to be able to see situations and conditions when they want to make an investment in a wide range of ways to see whether the financial health of a company is a condition and comparison in making investment decisions. the right decision to invest.

2 Literature Review

Financial distress What is happening in the industry is not a disaster for the industry. Because financial distress can also be intended as an early warning system for an industry in trouble, such as an industry with large debts that will face financial distress earlier than an industry that does not have too much debt. (6). According to Rodoni, A., & Ali (2014), financial distress as a decrease in the industrial situation from the previous situation. Depreciation in the industrial situation fell due to econic distress, shrinking industry operating income. Operating income is defined as net sales, less cost of goods sold, less marketing, ordinary and administrative fees before a downturn and before gains and losses in asset sales. Meanwhile in his opinion Santosa et al., (2020), Financial distress is a situation in which the existing industry cash flow is unable to fulfill short-term roles consisting of short-term loan payments that are due, and loans to third parties that are past due and obligations given to employees (Wruck, 1990).

According to the opinion expressed by Wati et al., (2022), philosophy that explains the bond between the agent and the principal where one or more people are entrusted with the responsibility to carry out a service at the behest of the principal. Agents who have more data about the industry are asked to be more transparent about industry management (11). The agent has more data regarding the actual situation in the industry compared to the principal. This results in a comparison of needs which results in the inefficiency of the data obtained (12).

Meanwhile according to Yunia (2018), company owners can expect profits from the entity to provide returns to owners. The principal can calculate the agent's ability to source resources in obtaining profits to be distributed according to the scale of shares in the form of dividends to be distributed (Islamy et al., 2021). In this case agency theory is also defined as a cost, as is the case with the opinion expressed by Sutra & Mais (2019), agency cost as the amount of payment paid by the principal to supervise the agent. It is almost impossible for a company to have an empty agency cost chart on the chart, guaranteeing that administrators will get the maximum decision from the shareholders' perspective because there is a large ratio of needs between them. Monitoring costs are costs that are intended to monitor the behavior of the agent, whether the agent has played a role according to the principal's needs by carefully notifying all activities that have been assigned to the manager of the organization.

According to the theory presented by Brigham, E., & Houston (2015), Signaling Theory is a philosophy that explains an action taken by industrial management to provide information to investors or creditors about conditions that are currently being experienced by an industry. According to Firmansyah (2017), In this philosophy it is argued that signal theory is used to explain that financial information is used as a positive sign (good news) or as a sign of bad news (bad news) to its users. Signal theory is also a sign that can be used by the industry (agen), principal or others to reduce data asymmetry by producing quality financial information. Financial information is a method of analysis and evaluation that can help explain the mission an industry has achieved. Financial information is very important for every industry, because it can be used to identify the ability and financial condition of the industry so that it can predict the potential for a company crisis that will result in bankruptcy in the future (15). According to the opinion expressed by Restianti, T., & Agustina (2018) the assumption of signaling theory as a sign can help gaps in data on industry (agent), owner (principal) and other external parties by providing industry financial or non-financial information that can have good and relevant implications. A healthy industry will be oriented to disclosure when compared to an industry that is currently facing a financial distress situation (19).

According to Platt (2006), Giving a statement that financial distress is defined as a step to reduce the financial situation that existed before the formation of bankruptcy or liquidation. Financial distress can be predicted to originate from the inability of the industry or the unavailability of a budget to pay off obligations that are due (21). According to the opinion expressed by Khaliq et.al., (2014) describes financial distress as a situation where the company is unable or encounters difficulty in fulfilling its obligations to creditors. The opportunity for financial distress to form increases when the fixed costs of operating large industries, liquid assets, or income is very sensitive to economic recession. This situation will force the industry to generate large profits so that management is forced to make loans to other parties. According to the opinion expressed by Baimwera, B., & Muriuki (2014) Describes financial distress as the industry may not be able to fulfill its obligations when they are due. In times of financial difficulties, the inability of the industry to fulfill its role indicates that the industry lacks working capital or working capital.

Based on the interpretation of the study above, it can be interpreted that financial distress is a condition in which the industry faces financial difficulties which are signaled by the cash flow obtained by the industry that is not sufficient to meet the needs of the company in the near or distant term and the industry's management funds must make an agreement to design repeat activities and activities so that they can be controlled and measured for the finances they have. Financial distress can also cause industry to face failure and be forced to take action to ensure cash flow.

Based on Fachrudin (2008), in the book presented there are several meanings of

financial distress for each type, including the following

1. Economic Failure
   Declining economic conditions are situations where industry income is insufficient to cover the full costs of the required costs, including the cost of capital. In this situation, the industry can continue its operations if creditors are willing to accept a rate of return that is at the market base.
2. Business Failure
   Business failure is a situation where a business that ends operations with an alibi faces a loss. so, they can't continue their activities.
3. Bankruptcy Technical
   The industrial situation can be said to be in a technical condition of bankruptcy if an industry cannot fulfill its current obligations when they fall due. For example, the inability to pay off debt technically proves that the industry is facing a temporary lack of liquidity, which may mean that in the future the industry will be able to pay off the debt and the interest. However, if the bankruptcy technique is an early sign of economic defeat, this could be a sign of an early station towards bankruptcy.
4. Law Bankruptcy
   The field of business can be said to have suffered legal damage if the industry notifies events and demands legally with applicable law.
5. Bankruptcy
   Bankruptcy occurred before the legal bankruptcy where an industry has a novel debt number that exceeds the current asset market value. This condition can be considered more serious when compared to technical insolvency, because in general it is a sign of economic failure, which clearly aims at dissolving the business sector. An industry that is currently facing a situation like this does not need to be involved in the pressure for legal bankruptcy.

Related to financial distress research has also been carried out in several countries in the world such as EI (1968) which predicts financial distress with financial ratios. Then the research conducted by Rezende et.al., (2017), who conducted research on the topic of financial distress by adding macroeconomic factors to the predictive model for companies in Brazil. Then also research conducted in Sweden by Quarcoo (2014) with 227 samples of companies in the service industry and retail sectors in predicting their financial distress situation. Verma, (2023) also predicts financial distress in textile companies in India. Then in Indonesia there is also research conducted by one of them (8) who took a sample of retail companies on the IDX in predicting financial distress.

3. Methodology

Research conducted in this study is by means of qualitative methods. With the scope of the research population being conducted on companies that are listed on the Indonesia Stock Exchange for the 2018-2021 period. The sample companies in this research are companies with the Various Industries sector which are registered and listed on the Indonesia Stock Exchange for the 2018-2021 period, for the selection of the sample used is Purposive Sampling, with the following sample selection criteria.

Table 1.2 Sample of Various Industrial Sector Companies on the IDX for the 2018-2021

period

No	Explanation	Amount
1	Companies in the various industrial sectors listed on the IDX for the 2018-2021 period.	53
2	Companies that are inconsistent in publishing audited financial statements and incomplete financial data.	(19)
3	Companies that do not use Rupiah as the main currency in financial statements.	(13)
	Number of Samples	21

Source: Data processed by the author, 2023

In this research the data used is the acquisition of secondary data obtained on the Indonesia Stock Exchange which has been published and audited by an independent auditor. The total sample obtained is 21 companies, so if you add them up during 2018-2021, there are 84 samples that will be examined in this research. The data collection technique used is documentation from the company's financial statements that have been audited and published on the Indonesia Stock Exchange. The analytical method used is descriptive analysis to be able to explain the phenomenon, the formulation of the problem and the purpose of this research. The variable used in this study is research that is independent variable. According to Sugiyono (2019), the independent variable is a stand-alone variable, and in this research the independent variable is financial distress with an indicator calculated using the Altman Z Score.

In 1995, Altman conducted back research regarding the ability to destroy companies, not only the manufacturing industry, whether they went public or did not go public (Ade, 2021). Based on the opinions and discussions submitted by Rudianto (2013), The formula for identifying the final Z-Score is a method that is estimated to be very flexible because it can be used for various types of aspects of industrial business and is suitable for use in developing countries such as Indonesia, so this model is known as the Altmanz Modification finding, and the formula is often used as a financial interpretation analysis. distress for various types of existing industries.

Altman Z Score = 6,56Y1 + 3,26Y2 + 6,72Y3 + 1,05Y4

Explain:
Y1 = Net Working Capital to Total Assets (WCTA)
Y2 = Retained Earnings to Total Assets
Y3 = Earning Before Interest and Taxes to Total Assets
Y4 = Market Value Equity to Book Value Total Debt
Altman Z Score = Overall Index

The calculation value using the Altman Z-Score formula will get a score that differs from one company to another or in one sector. This score is compared with this assessment standard to assess the viability of the company as follows:
- If the value of $Z < 1.1$ is included in the dangerous zone.
- If the value is $1.1 < Z < 2.99$ it is included in the gray zone.
- If the value of $Z > 2.6$ is included in the safe.

4. Results and Discussion

Based on calculations using the Altman Z Score analysis with the 3rd modification method, the results of the tests carried out on the Various Industry sector companies listed on the Indonesia Stock Exchange for the 2018-2021 period are as follows which are presented in the table.

Table 1.3 Z Score Prediction of Various Industry Sectors in 2018-2021

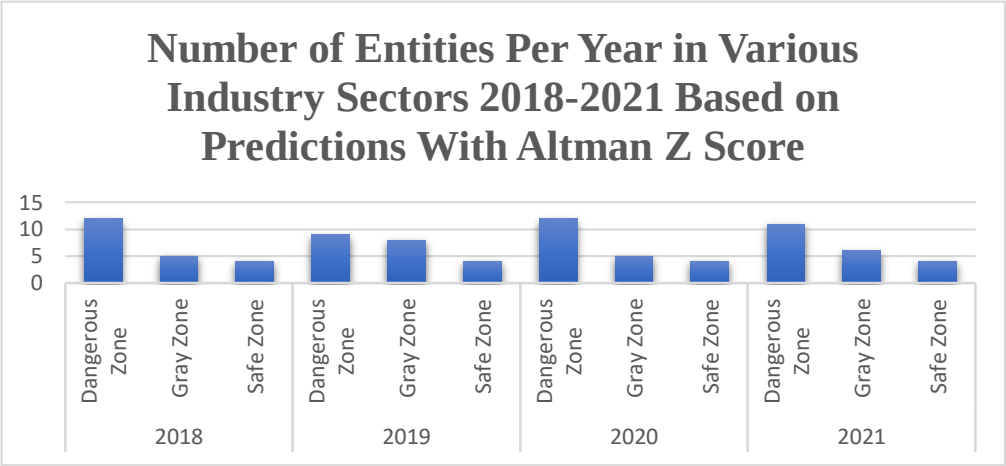
No	Company Name	Year	Altman Z Score	Zone
1	Astra International Tbk	2018	-0,35	Dangerous
		2019	-0,27	Dangerous
		2020	-0,17	Dangerous
		2021	0,09	Dangerous
2	Astra Otoparts Tbk	2018	1,78	Gray
		2019	1,87	Gray
		2020	1,30	Gray
		2021	1,49	Gray
3	Trisula Textile Industries Tbk	2018	1,26	Gray
		2019	1,34	Gray
		2020	0,15	Dangerous
		2021	0,93	Dangerous
4	Primarindo Asia Infrastructure Tbk	2018	-13,98	Dangerous
		2019	-5,38	Dangerous
		2020	-8,60	Dangerous
		2021	-9,36	Dangerous
5	Garuda Metalindo Tbk.	2018	-0,59	Dangerous
		2019	-0,36	Dangerous
		2020	-1,06	Dangerous
		2021	-0,23	Dangerous
6	Gajah Tunggal Tbk	2018	-1,47	Dangerous
		2019	-1,05	Dangerous
		2020	-0,66	Dangerous
		2021	-0,65	Dangerous
7	Indomobil Sukses Internasional Tbk	2018	-3,34	Dangerous
		2019	-3,93	Dangerous
		2020	-3,83	Dangerous

No	Company Name	Year	Altman Z Score	Zone
		2021	-3,80	Dangerous
8	Indospring Tbk	2018	2,49	Gray
		2019	2,10	Gray
		2020	1,77	Gray
		2021	2,52	Gray
9	Jembo Cable Company Tbk	2018	0,03	Dangerous
		2019	1,38	Gray
		2020	1,46	Gray
		2021	0,86	Dangerous
10	KMI Wire and Cable Tbk	2018	3,40	Safe
		2019	4,69	Safe
		2020	3,31	Safe
		2021	4,80	Safe
11	Kabelindo Murni Tbk	2018	0,91	Dangerous
		2019	1,20	Gray
		2020	1,58	Gray
		2021	0,75	Gray
12	Multi Prima Sejahtera Tbk	2018	6,92	Safe
		2019	6,55	Safe
		2020	5,68	Safe
		2021	6,47	Safe
13	Prima Alloy Steel Universal Tbk	2018	-2,09	Dangerous
		2019	-2,61	Dangerous
		2020	-2,87	Dangerous
		2021	-3,05	Dangerous
14	Ricky Putra Globalindo Tbk	2018	-0,06	Dangerous
		2019	-0,01	Dangerous
		2020	-1,11	Dangerous
		2021	-1,11	Dangerous
15	Supreme Cable Manufacturing & Commerce Tbk	2018	3,70	Safe
		2019	4,02	Safe
		2020	7,15	Safe
		2021	9,63	Safe
16	Selamat Sempurna Tbk	2018	6,24	Safe

No	Company Name	Year	Altman Z Score	Zone
17	Sunson Textile Manufacturer Tbk	2019	6,11	Safe
		2020	4,92	Safe
		2021	5,24	Safe
18	Buana Artha Anugerah Tbk.	2018	-1,09	Dangerous
		2019	-1,52	Dangerous
		2020	-1,53	Dangerous
		2021	1,44	Gray
19	Trisula International Tbk	2018	0,24	Dangerous
		2019	2,05	Gray
		2020	1,66	Gray
		2021	0,32	Dangerous
20	Voksel Electric Tbk	2018	1,68	Gray
		2019	1,30	Gray
		2020	1,01	Dangerous
		2021	1,57	Dangerous
21	Mega Perintis Tbk.	2018	0,68	Dangerous
		2019	0,27	Dangerous
		2020	0,39	Dangerous
		2021	-1,16	Dangerous
		2018	2,30	Dangerous
		2019	2,41	Dangerous
		2020	-0,36	Dangerous
		2021	1,22	Gray

Source: Data processed by the author, 2023

Based on the table above it can be seen that as a whole it shows a value in the dangerous zone but there are also several companies that are still in the gray zone category or are still in an unstable condition and there are even companies that are in the safe category, if it is known that financial distress with Altman Z Score method is a way of calculating to see the financial condition of an entity. Based on previous studies, the results obtained in the research are a special reference for investors and potential investors in including their investment capital, so that they are not wrong in choosing issuers in making investments. because with the company experiencing something that is limited in terms of finances it will have an impact on the company's operations and going concern for the future. Below is the result of the summary graph in table 1.3 in predicting financial distress using the Altman Z Score method.



Picture 1.1 Graph of Number of Entities per Year Based on Predictions Altman Z Score

Based on the graph above, the results of the summary of tests on various industrial companies listed on the Indonesia Stock Exchange, when viewed carefully in 2018, companies in the dangerous zone category show a total of 14 companies, then companies with gray and safe zones each show grades 5 and 4 companies. Then in 2019 the results in graph 1.1 can be seen again showing companies in the dangerous zone category decreased to 9 companies, then gray zone companies to 8 companies, and companies with safe zones to 4 companies. The results for 2020 can be seen in summary that companies with a dangerous zone are 12 companies, then a gray zone is 5 companies, and a safe zone is 4 companies. In 2021 the results show for companies showing a decline again to 11 companies, then companies with a gray zone of 6 companies and companies with a safe zone of 4 companies. If you look at the graph for four years, companies in the dangerous zone category still experience fluctuating conditions, companies in the gray zone also experience up and down movements from year to year, and companies in the safe zone only experience stable conditions so that there is no there is a significant increase in changes for companies in the Safe category.

5. Conclusion

In this study it can be concluded that in various industrial sector companies listed on the Indonesia Stock Exchange for the 2018-2021 period in 2018 for companies in the dangerous zone category is 12, the gray zone is 5, the safe zone is 4, then in 2019 the danger zone by 9, the gray zone is 8 and safe zone is 4, in 2020 the danger zone is 12 companies, the gray zone is 5 companies and the safe zone is 4, and in 2021 the hazard zone is 11, the gray zone is 6 and a safe zone of 4. If seen in terms of the implications of the test results, it gives an affirmation that companies with consistency every year generate good profits will get a safe zone condition in terms of their finances, but if the company generates profits that are only stagnant not increasing will not cause changes towards a safe zone can even enter into a dangerous category such as a company that experiences losses every year in its business activities and operations. Therefore, management as the person in charge of the company must continue to be able to control business

operations intently and strictly so that the company can continue to grow, and the sustainability of its business continuity is maintained.

This research and research still have many shortcomings and limitations so that it still needs more extensive development in studies to determine with certainty whether a company can be predicted well for its financial position and smooth running of its business, further testing is needed intensively, because this research is a prediction which are still minimal, it is necessary to carry out explorative research with various kinds of testing.

For further research, it can be used with a wider sample such as using manufacturing to see in a larger scope for companies it can be predicted going concern with its financial conditions, then researchers can add and use other model methods to predict financial distress so that the results are more varied. and can be compared to find broader and more complex results.

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