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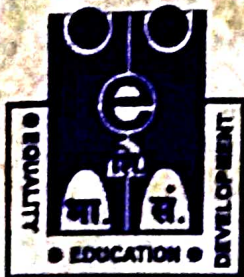
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Using the Altman Z Score Model to Forecast the Financial Distress of a Subset of NIFTY 50 Companies in light of SDG 8—Decent Work and Economic Growth

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Abstract:

A company's financial stability has a big impact on the growth of the country and for the benefits of the society. Financially sound companies keep the money of the stakeholders in safe position and utilized it for the benefit for the society and nation. The objective of this study is to measure the financial distress status of the selected NIFTY 50 companies of Indian Stock Market. Out of 50 companies of NIFTY 50, companies belong to other than finance industry are selected for the analysis. For the purpose of analysis researcher has used the financial statements of the companies so the secondary data has been used by the researcher for the period of 2022-23. This research paper is descriptive and analytical in nature. To measure the financial distress of the company Altman Z score model has been utilized by the researcher and found that out of 39 selected companies of NIFTY 50 there are 9 companies which belong to the bankruptcy status.

Keywords: Financial distress, NIFTY 50 Companies, Altman Z score

Introduction:

A company's financial stability has a big impact on how well its operations go. Financial instability threatens a company's capacity to survive at all and leads to its demise. The financial crisis of 2008 and the ensuing recession had a serious effect on the corporate sector. Despite an increase in debt, business profitability has sharply decreased. Corporate failure is a common problem in both emerging and developed economies. A corporation facing bankruptcy may be able to avoid the terrible effects of complete collapse by taking preventative measures. It is now even more important that the stakeholders assess the financial health of their organizations in light of the 2008 global financial crisis and the failure of major American and European organizations. Businesses need to be able to pay their debts in order to continue operating and expanding. The capacity to sell an asset for its fair market value in order to meet continuous cash flow requirements or unanticipated financial demands is referred to as liquidity. Liquidity risk refers to the threat that a corporation won't have the cash or liquid assets needed to cover its cash commitments.

Financial Distress:

When a company's commitments exceed its assets, it is in financial difficulty. Undercapitalization, a lack of sufficient cash on hand, poor resource usage, inadequate management of all activities, falling sales, and unfavorable market circumstances are frequently causes of financial hardship. When a company has financial difficulty, it has inadequate cash flow but is not insolvent despite having deadweight losses. A few of the disciplines and points of view that have been utilized to explore the many diverse facets of financial difficulty include political philosophy, legal theory, management, economics, accounting, and finance. Persistent losses cause liabilities to excessively climb and asset values to drop, which causes financial difficulty and collapse.

Literature Review:

(Toly A, 2019) Has conducted research on "The Effect of Financial Ratio (Altman Z-Score) on Financial Distress Prediction in Manufacturing Sector in Indonesia 2016-2018." This study aimed to clarify the potential for financial trouble in publicly traded industrial businesses in Indonesia. The manufacturing sector was picked since it was one that contributed significantly to the Indonesian economy as a whole. Altman Z-Score model served as the test instrument for bankruptcy forecasting. In Altman Z score model, there are four ratios to be used to get the value of Z score and researcher has calculated these for total 139 companies and

duration of the research was 2016 and 2017. Researcher has concluded that all the four ratio through which Altman Z Score is calculated had positive effect on the financial distress of the companies. (Panigrahi, 2019) Made the research on "Validity of Altman's "Z" Score Model in Predicting Financial Distress of Pharmaceutical Companies." Major objective of the study was to examine the financial health of the selected pharmaceutical companies with the help of Altman Z Score model. For the purpose of this study researcher has used the financial data of the companies for the last five years from 2012 to 2017 and researcher has found and concluded that the average Z score is 5.9 which indicated that the pharmaceutical industry was in safe zone.

(Ningsih S, 2018) Has conducted research on "Analysis Method of Altman Z Score Modifications to Predict Financial Distress on The Company Go Public Sub Sector of The Automotive and Components." The objective of the study was to examine the financial distress of the automotive public sector companies from 2012 to 2016 period. Sample size of the researcher was 64 companies and researcher has found that out of total 64 companies several found in financial distress which founded by the researcher by using the Altman Z Score model.

(Subagyo A, 2017) The aim of this study was to investigate the relationship between the five financial metrics in the Altman Z-score model. In this study, data analysis was carried out using a basic methodology known as simple regression multiple regression. The sample, which was selected at random for the calendar year 2014, might comprise up to 26 companies on the Stock Exchange's list. The research's conclusions led to the development of a model that takes into account two variables that have an impact on the ratio Altman Z score. The variable financial ratios Altman model Z score is not much impacted by using the first model, but it is by models with a bigger influence.

(Rulandari N, 2017) Has conducted research on "Financial Ratio (Altman Z score) with Statistic Modelling." The purpose of this study is to investigate how data and analytical conclusions from multiple regression and descriptive analysis are communicated. Researcher has selected the companies which are listed on the National Stock Exchange for the year 2014 and financial statements of the companies were analyzed to calculate the value of Z score.

(Edward A, 2017) Has made research on "Financial Distress Prediction in an International Context:

A Review and Empirical Analysis of Altman's Z-Score Model." Researcher has measured the performance of Z score for thirty-one European and 3 non-European countries. Researcher has selected samples of private companies which are non-financial in nature and researcher has concluded that Z score model perform in a good way as compare to other model of predicting the financial distress of the companies.

(MacCarthy, 2017) Researched on the topic of "Using Altman Z-score and Beneish M-score Models to Detect Financial Fraud and Corporate Failure: A Case Study of Enron Corporation." The purpose or the motive of the research was to decide whether the Altman Z score model and Beneish M model are able to predict the financial frauds and companies' failure of European Corporation and for this researcher has collected the data from US database for the time of 1996 to 2000. Researcher has concluded that with Altman Z score model stakeholders should use Beneish M model so that together both models can provide the accurate results of financial distress and rather than using the one model, two models can give accurate results.

(Thai S, 2014) Conducted a research on "A Revisited of Altman Z- Score Model for Companies Listed in Bursa Malaysia." The samples size of the research was 30 companies out of which 15 belong to financial distress and 15 non-financial distress and data for the five years have been analysed by the researcher and all five ratios of Altman Z score have been analysed and researcher has concluded that working capital to total assets ratio is the most important variable.

Research Problem:

It becomes easy to handle the financial distress if it is detected in an early stage so the steps, strategies can be identified to come out from the financial distress stage. If the company become bankrupted then the cost of this bankruptcy have to be bare by all the stakeholders of the company so earlier exposure or discovery of this stage is safe for all the stakeholders of the companies. If company cannot generate the enough cash flows to

repay their obligation then slowly they fill financial distress and to know the position of the company whether they are in safe position, near to distress zone this research has been carried out.

Research Objective:

The purpose of this research is to examine the financial distress status or the financial health of the selected companies with the help of Altman Z score Model.

Research Methodology:

The table below shows the research methodology used by the researcher. Table 1.1 Shows the Research Methodology used:

Particulars	Research Methodology used
Research Type	This study is descriptive and analytical in nature.
Sampling unit	Selected NIFTY 50 Companies
Sample Size	Researcher has selected 39 companies out of 50 companies of NIFTY 50.
Sample Selection	Out of 50 Companies of NIFTY 50, the companies other than finance sector have been selected.
Data Used	Secondary data has been used by researcher.
Source of Data	Financial Statements of the companies
Period of study	Financial data for the year 2022-23 has been used by the researcher.

Review of Altman Z score Model:

This Altman Z score model was originally developed by the Edward I Altman in the year 1968 and originally sample involved 66 corporations with 33 companies in every group for the time of 1946-1965. The secondary data like income statements and balance sheet of the companies were used and inputs that Altman utilized were 22 financial ratios out of which standard five ratios were identified and analysed which are as follows:

Ratios used in Z Score Analysis:

Table 1.2 Shows the formulas of Ratios to be used in Altman Z score Model

Sr. No.	Ratio	Formula
1.	Working Capital to Total Assets Ratio	$\frac{\text{Working Capital}}{\text{Total Assets}}$
2.	Retained Earnings to Total Assets Ratio	$\frac{\text{Retained Earnings}}{\text{Total Assets}}$
3.	EBIT to Total Assets Ratio	$\frac{\text{EBIT}}{\text{Total Assets}}$
4.	Market value of Equity to Total Liabilities Ratio	$\frac{\text{Market Value of Equity}}{\text{Total Liabilities}}$
5.	Sales to Total Assets Ratio	$\frac{\text{Sales}}{\text{Total Assets}}$

Importance and Interpretations of above Five Ratios:

R1: Working Capital to Total Assets Ratio:

It ascertains the net liquid assets of the companies or firms with reference to total capitalization of the companies or firms.

R2: Retained Earnings to Total Assets Ratio:

Retention is very much helpful for the company to expand the business of the company. In other terms this ratio helps to determine the leverage of a firm, like with the high retention ratio as compare to total assets are not required to finance their capital needs from debt.

R3: EBIT to Total Assets Ratio:

This ratio determines the actual productivity of the assets of the companies which is free from any tax or leverage factors.

R4: Market value of Equity to Total Liabilities Ratio:

This ratio determines the how much the company's assets would decline in value before the liabilities (current liabilities + non-current liabilities) surpass the assets and the firm turn out to be insolvent.

R5: Sales to Total Assets Ratio

This ratio defines the sales generating capacity of the assets of the company.

Table 1.3 Shows Ratios of Selected Companies of NIFY 50

Sr.	Name of the Company	R 1	R 2	R 3	R 4	R 5
1	Adani Enterprises Ltd.	0.059	0.213	0.051	0.323	1.23
2	Adani Port and Special Economic Zone Ltd.	0.026	0.348	0.008	0.044	0.056
3	Apollo Hospital	0.21	0.580	0.082	0.181	0.58
4	Asian Paints	0.356	0.665	0.213	0.545	1.26
5	Bajaj Auto Ltd.	0.166	0.826	0.157	0.235	1.038
6	Bharti Airtel Ltd.	-1.14	0.2672	-0.0078	0.028	0.247
7	Bharat Petroleum Corp. Ltd.	-1.119	0.315	0.079	0.0088	2.49
8	Britannia Industries Ltd.	-0.036	0.339	0.306	0.272	1.85
9	Cipla Ltd.	-0.36	0.876	0.105	0.340	0.54
10	Coal India Ltd	0.134	0.454	0.506	0.263	0.05
11	Divi's Laboratories Ltd.	0.535	0.874	0.276	6.77	0.74
12	Dr. Reddy's Laboratories Ltd.	0.502	0.745	0.090	0.139	0.62
13	Eicher Motors Ltd.	0.183	0.753	0.147	0.305	0.75
14	Grasim Industries Ltd.	0.040	0.772	0.047	0.097	0.36
15	HCL Technologies Ltd.	0.334	0.787	0.248	0.314	0.75
16	Hero MotoCorp Ltd.	0.232	0.723	0.149	0.111	1.33
17	Hindalco Industries Ltd.	0.106	0.546	0.086	0.028	0.72
18	Hindustan Unilever Ltd.	0.053	0.695	0.168	0.341	0.74
19	Infosys Ltd.	0.276	0.670	0.286	0.252	1.08
20	ITC Ltd.	0.545	0.783	0.264	0.361	0.77
21	JSW Steel Ltd.	0.008	0.388	0.156	0.022	0.8
22	Larsen & Toubro Ltd.	0.488	0.711	0.257	1.07	1.33
23	Mahindra & Mahindra Ltd.	0.105	0.568	0.095	0.066	0.91
24	Maruti Suzuki India Ltd.	-0.003	0.734	0.062	0.158	1.23
25	Nestle India Ltd.	0.045	0.263	0.370	0.350	1.97
26	NTPC Ltd.	-0.009	0.33	0.05	0.008	0.33
27	Oil And Natural Gas Corporation Ltd.	-0.002	0.684	0.121	0.022	0.34
28	Power Grid Corporation of India Ltd.	-0.04	0.279	0.066	0.010	0.16
29	Reliance Industries Ltd.	0.024	0.528	0.05	0.051	0.48
30	Sun Pharmaceutical	-0.009	0.59	0.052	0.179	-0.24

	Industries Ltd.					
31	Tata Consumer Products Ltd.	0.168	0.818	0.082	0.323	0.57
32	Tata Motors Ltd.	-0.177	0.300	-0.026	0.040	0.73
33	Tata Steel Ltd.	-0.1008	0.559	0.199	0.01	0.64
34	Tata Consultancy Services Ltd.	0.464	0.633	0.410	0.326	1.39
35	Tech Mahindra Ltd.	0.295	0.724	0.179	0.150	1.02
36	Titan	0.338	0.461	0.118	0.137	1.51
37	UltraTech Cement Ltd.	-0.002	0.606	0.087	0.077	8.76
38	UPL Ltd.	0.072	0.409	0.064	0.056	0.94
39	Wipro Ltd.	0.355	0.662	0.189	0.09	0.82

Source: www.moneycontrol.com

Calculation of Z score:

Formula to calculate the value of Z score is as follows:

$$Z = 1.2R_1 + 1.4R_2 + 3.3R_3 + 0.6R_4 + .999R_5$$

Measurement of Financial Health:

According to Altman following are the guidelines to be used to identify the firm as either financially sound or bankrupt.

Table 1.4 Shows the Guidelines of Z score Value

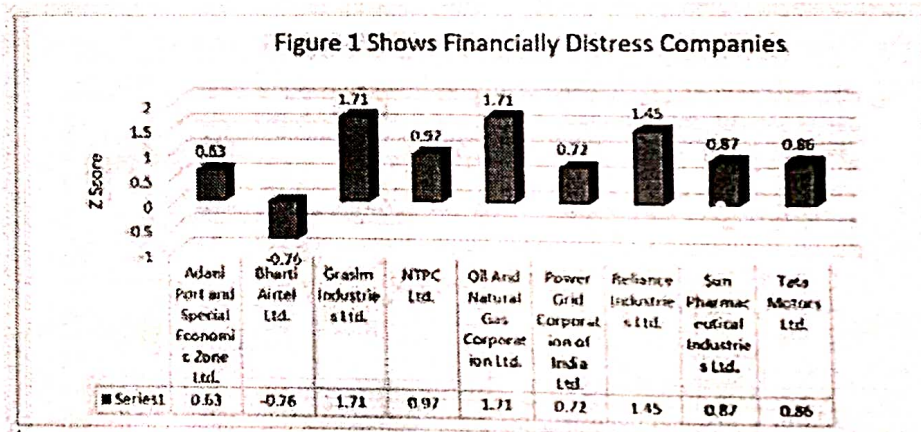
Situation	Z-Score	Zones	Result
1.	Below 1.8	Bankruptcy Zone	Failure is certain
2.	1.8 to 3	Healthy Zone	May or may not fail
3.	Above 3	Too Healthy	Will not fail

Table 1.4 Shows the Value of Z score and Interpretation of its score of Selected Companies of NIFTY 50:

Sr.	Name of the Company	Z Score	Interpretations
1	Adani Enterprises Ltd.	1.96	Healthy Zone
2	Adani Port and Special Economic Zone Ltd.	0.63	
3	Apollo Hospital	2.03	Healthy Zone
4	Asian Paints	3.65	Too Healthy
5	Bajaj Auto Ltd.	3.04	Too Healthy
6	Bharti Airtel Ltd.	-0.76	
7	Bharat Petroleum Corp. Ltd.	3.04	Too Healthy
8	Britannia Industries Ltd.	3.43	Too Healthy
9	Cipla Ltd.	1.88	Healthy Zone
10	Coal India Ltd	2.67	Healthy Zone
11	Divi's Laboratories Ltd.	7.57	Too Healthy
12	Dr. Reddy's Laboratories Ltd.	2.64	Healthy Zone
13	Eicher Motors Ltd.	2.69	Healthy Zone
14	Grasim Industries Ltd.	1.71	
15	HCL Technologies Ltd.	3.25	Too Healthy
16	Hero MotoCorp Ltd.	3.17	Too Healthy
17	Hindalco Industries Ltd.	1.91	Healthy Zone
18	Hindustan Unilever Ltd.	2.53	Healthy Zone
19	Infosys Ltd.	3.44	Too Healthy
20	ITC Ltd.	3.60	Too Healthy
21	JSW Steel Ltd.	1.87	Healthy Zone

22	Larsen & Toubro Ltd.	4.39	Too Healthy
23	Mahindra & Mahindra Ltd.	2.18	Healthy Zone
24	Maruti Suzuki India Ltd.	2.54	Healthy Zone
25	Nestle India Ltd.	3.81	Too Healthy
26	NTPC Ltd.	0.97	Bankruptcy Zone
27	Oil And Natural Gas Corporation Ltd.	1.71	Bankruptcy Zone
28	Power Grid Corporation of India Ltd.	0.72	Bankruptcy Zone
29	Reliance Industries Ltd.	1.45	Bankruptcy Zone
30	Sun Pharmaceutical Industries Ltd.	0.87	Bankruptcy Zone
31	Tata Consumer Products Ltd.	2.38	Healthy Zone
32	Tata Motors Ltd.	0.86	Bankruptcy Zone
33	Tata Steel Ltd.	1.97	Healthy Zone
34	Tata Consultancy Services Ltd.	4.36	Too Healthy
35	Tech Mahindra Ltd.	3.06	Too Healthy
36	Titan	3.01	Too Healthy
37	UltraTech Cement Ltd.	9.85	Too Healthy
38	UPL Ltd.	1.84	Healthy Zone
39	Wipro Ltd.	2.85	Healthy Zone

Analysis and Interpretation:



From the above analysis researcher concluded that out of selected 39 companies of NIFT 50, 15 companies belongs to "Too Healthy" Zone. Those companies belong to this zone have no worry about the bankruptcy and money of the stakeholders are safe.

Out of selected 39 companies of NIFTY 50, 15 companies belong to "Healthy Zone" which means these companies need to improve their financial health and if they improve their financial they will not fail but if they do not improve their financial condition then chances of bankruptcy can occur within two years.

Out of selected 39 companies of NIFTY 50, 15 companies belong to bankruptcy zone and the financial statements of the companies are not that much good. The companies which belong to this bankruptcy zone are shown on the figure 1

Limitations of the Study:

The main limitation of the study is this whole research work is based on the Altman Z score model and the financial distress status is solely based upon it so another model or tools can be more strengthen the concluding statements.

The data has been utilized by the researcher is purely secondary data so any discrepancy in data me lead to non-competency of the findings.

For the purpose of the research, researcher has analysed the data for the period of 2022-23 so time period can be a limitation of the study.

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