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Predicting Financial distress of Pharmaceutical Companies in India using Altman Z Score Model

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Abstract:- The present paper aims to measure the financial distress of top five pharmaceutical companies operating in India using Altman's Z score model. This model is widely used throughout the world to identify financial distress in the company. The classical z score model is based on 5 ratios i.e. working capital to total asset ratio, retained earnings to total asset ratio, EBIT to total asset ratio, market value of equity to total liabilities and sales to total asset ratio. The study concluded that four companies fall in the Safe zone according to z score. These companies with average z score of last 5 years are Sun (9.09) pharma, Dr Reddy (7.61), Cipla (9.097) and Zydus (4.31). Thus, these companies are financially sound and may not face the problem of financial distress. Torrent pharma with average z score of 2.52 falls in Grey zone. Management needs to take immediate steps to improve the financial condition to avoid financial distress in the near future.

Keywords:- *Altman z score, Financial distress, Safe zone, Bankruptcy.*

I. INTRODUCTION

The financial stability of any company is the key for the long-term survival in the market. The capital structure of any company comprises a judicious mix of debt and equity. Debt is an important component which helps new companies to grow faster due to its tax benefit and availability of extra money to expand operations. But debt component also poses the financial threat due to fixed amount of Interest payable irrespective of the performance of the company. Therefore, debt element in the capital structure is one of the important reasons for corporate financial distress. Financially weak companies cannot survive and has to discontinue the operations thereby destroying the investors wealth. The situation where company is unable to carry on its operation due to its debt is called financial distress. Many large corporations such as Satyam, Lehman and brothers have faced the problem of financial distress and ultimately were thrown out of the market. Therefore, each organization needs to keep close eye on the financial stability of in the long run.

II. CONCEPT OF ALTMAN Z SCORE AND FINANCIAL DISTRESS

Altman model popularly known as Altman Z score is based on multivariate analysis which is used to predict the corporate bankruptcy. The model was developed in 1967 by New York University Professor Edward Altman and got published in 1968. The original model was updated by Altman few times in coming years. The Z score model is used to predict financial bankruptcy based on different profitability, leverage, solvency and turnover ratios. He had developed different models for different kinds of industries depending upon the type of market in which these companies are operating.

The first ever equation developed by him for financial sector like banks and insurance companies is given below:
$Z = 1.2\, Y1 + 1.4\, Y2 + 3.3\, Y3 + 0.6\, Y4 + 1.0\, Y5$ Where:
Y1= working capital to total asset ratio
Y2 = Retained earnings to total asset ratio
Y3= EBIT to total asset ratio
Y4= Market value of equity to total liabilities and
Y5= Sales to total asset ratio

The above four factor equation was modified to suit manufacturing companies as given below:
$Z = 6.56\, Y1 + 3.26\, Y2 + 6.72\, Y3 + 1.05\, Y4$

The summary of Altman's Z score is given below:

Z score	Status	Implication
Above 3	Safe Zone	Company will not fail
1.8- 2.99	Grey Zone	Company can avoid bankruptcy Through management decisions
Less than 1.8	Financial Distress	Company cannot avoid bankruptcy

The Z score obtained through the equation is used to predict the corporate insolvency. The score below 1.8 is means company is moving towards bankruptcy. Immediate actions and strict supervision is required on financial aspect of the company to avoid possible bankruptcy. Any score above 3 shows the good financial health of the company. It means the company may not go bankrupt in the near future. The z score can be used by the investor for selling or buying the stock of companies. Investors can exit the stock of the company whose z score falls below 1.8 and buy the stock of the company with z score of 3 or more. The Altman z score succeeded in predicting the global financial crisis of 2008. The median score of companies in a study conducted in 2007 was 1.81 which was very close to the threshold limit of 1.8 showing the sings of corporate failure. Therefore, the Altman Z score has proved its effectiveness in predicting financial distress of companies.

Financial distress prediction gained popularity after the work of Altman (1968). Literal meaning of financial distress is inability of anyone to generate enough revenue to pay off one's liabilities. Therefore, the corporate financial distress means inability of the company to meet its obligations. There are many causes like excessive investment in unviable projects, pricing decisions, financial decisions or even working capital decisions. Financial distress will lead to lower credit rating of the company stock and investor will also charge higher interest on the loan extended by them. The problem of financial distress should be addressed immediately otherwise it can turn into the problem of corporate bankruptcy. Financial distress is a warning signal to the corporate managers to be careful in the financial matters and take strong and urgent actions to tackle the issue.

III. REVIEW OF LITERATURE

Many studies have been conducted in India and abroad to measure the financial distress of the companies. All these studies have used different ratios like liquidity ratio, margin ratio, solvency ratios etc. and are mostly based on different variants of Altman z score model. The finding of some of the studies are discussed here:

Finch et. al (2008): The study tries to analyses the impact of good governance practices in avoiding the problem of financial distress. It was found that good governance practices like introducing higher number of independent directors than the inside director in the board, larger ownership stake of inside directors have positive impact in avoiding financial distress.

Elijelly (2004) conducted a study in the paper titled "Liquidity – profitability trade-off: An empirical investigation in an emerging market". The study was conducted on joint stock companies based in Saudi Arabia found negative relationship between liquidity levels and profitability of the firm.

Celli, M. (2015): The study is based on 102 industrial companies quoted on Italian stock exchange for the period of 1995-2013. Shares of 51 companies were delisted from the stock exchanges due to insolvency during that period. The study found that Altman Z score model was effective in predicting financial insolvency of the companies in Italian context.

BMB Akbar et. al; The study is based on sample of 7 pharmaceutical companies listed on Indonesian stock exchange. The study uses panel data regression in predicting the impact of financial distress of the company on stock returns. The study uses various ratios like quick ratio, cash ratio, activity ratio and profitability ratios in predicting financial distress. It was found that all the companies were facing decline in the value of these ratios over the years. The profitability ratios were falling in the grey area of z score. All these companies were having higher loan which kept on increasing over the years. The financial distress has negative impact on the performance of stock returns.

Bhunia A and Sarkar R: The study is based on 46 private sector pharmaceutical companies listed on recognised Indian stock exchange. Multiple discriminant analysis method is used with sixteen financial ratios including liquidity, solvency and profitability in analysing the financial distress of these companies. Seven ratios out of sixteen ratios were found to be significant in financial prediction power. The MDA model showed more than 85 percent of accuracy with five-year prior indication of actual financial failure. There is a strong relationship between selected financial ratios and company health and has strong ability in predicting the success and failure of the company in advance.

➢ *Statement of the Problem*

Financial distress is a horrifying event a corporation faces in its life. All the stakeholders investors, creditors, bankers, workers are concerned about the health of the company because of their vested interest. Thus, it is the responsibility of the management to take all necessary steps to prevent the problem of financial distress in any company.

➢ *Objectives of the study*

Following are the objectives of the study:

- To predict the financial distress of the of the selected pharmaceutical companies in India using Altman Z score model
- To compare the Z score of selected pharmaceutical companies in India

IV. RESEARCH DESIGN

➢ *Sample size and data*

The present study analyses the corporate financial distress of top five large cap pharmaceutical companies listed on BSE and operating in India for the period 2018-2023. These five companies constitute more than 75% of total pharmaceutical production in India. These companies are selected on the basis of their market capitalisation in the year 2023. Thus, health of these companies can depict the overall health of the pharmaceutical industry in India.

The present study is based on secondary data. The data of these pharma companies for 5 years viz 2018-2023 have been taken from CMIE prowess data, moneycontrol.com and published annual reports of these companies.

➢ *Selection of variables*

The Z score is based on five ratios accounting ratios. These ratios and their relationship with the financial position has been explained below:

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- Y1= Working Capital/Total Asset ratio (WC/TA*100) shows efficiency of the company in using its liquid assets or working capital. Working capital is difference of the current assets and current liabilities of the company. The working capital requirement differ across companies. The higher working capital ratio has positive impact on the z score.
- Y2= Retained Earnings to Total Asset ratio (RE/TA*100) shows the ability of the company in utilising the retained earning to finance its operations. Generally, large and stable companies have retained earnings at their disposal. The higher retained earing ratio has positive impact on the z score.
- Y3= EBIT to Total asset ratio (EBIT/TA*100) is a profitability ratio. The ratio shows the efficiency of the company in utilising the assets to create operating profit. EBIT stands for earning before interest, tax and dividend payments. It has positive impact on the z score.
- Y4= Market value of Equity to book value of Liabilities (MVE/L*100) ratio is opposite of debt-to-equity ratio. The ratio has negative impact on the z score.
- Y5= Sales to Total Asset ratio (S/TA) ratio shows the efficiency of the company in utilising the assets to create sales. The ratio has positive impact on the z score.

V. LIMITATIONS OF THE STUDY

The present study contributes immensely to the exiting literature of the corporate financial distress with special reference to the pharmaceutical industry in India. But the study analyses the financial distress of only five large cap companies operating in India for a period of 2018-2023. The finding of the present research may not be applicable to small and medium cap pharmaceutical companies in India. The time period could have been extended for better inferences. The study is limited to the companies operating in India.

VI. EMPIRICAL FINDING AND DISCUSSIONS

Present section deals with the Z score calculations of selected pharmaceutical companies using five financial ratios from financial year 2018-19 to 2022-23.

Table 1 Present section deals with the Z score calculations of selected pharmaceutical companies using five financial ratios from financial year 2018-19 to 2022-23.

Year / Company	**2018-19**	**2019-20**	**2020-21**	**2021-22**	**2022-23**	**Mean Z score**
Sun Pharma	4.855647	7.452575	9.27722	13.02	10.88437	9.097962
	Safe	Safe	Safe	Safe	Safe	Safe
Dr Reddy	5.579376	9.038364	7.74137	6.841471	8.89311	7.618738
	Safe	Safe	Safe	Safe	Safe	Safe
Cipla	4.855647	7.452575	9.27722	13.02	10.88437	9.097962
	Safe	Safe	Safe	Safe	Safe	Safe
Torrent	2.456586	2.548492	2.494459	2.594298	2.550022	2.528771
	Grey	Grey	Grey	Grey	Grey	Grey
Zydus	2.782501	3.67755	4.470805	4.323485	6.336888	4.318246
	Grey	Safe	Safe	Safe	Safe	Safe

Source: calculated on the basis of data taken from annual reports of these companies

The Z score of selected pharmaceutical companies is presented in the table above also shows the financial status of the company for that respective year. The Sun Pharma the biggest pharmaceutical company is above 3 score in all the years thereby given the status of Safe company. The mean z score of Sun Pharma is 9.097 which is more than three times of safety score. Thus, Sun pharma is financially strong as per z score calculations. Similarly, the mean z score of Dr. Reddy is more than two times of the benchmark z score of 3 therefore falling in the Safe category. Dr. Reddy also has more than benchmark score of 3 in all the years. Therefore, Dr. Reddy is also financially sound company in all the selected years. The Cipla pharmaceutical is also above the threshold limit of 3 in all the years with mean score of 9.09.

Torrent Pharma scores less than benchmark score in all selected years. The mean score of Torrent pharma is also 2.52 which falls in the category of Grey company. Therefore, the management of Torrent pharma need to take urgent and effective steps to prevent the companies slipping in the category of distress company. Investors also need to be alert and keep constant vigilance on the working and result of the management.

The Zydus pharma is also falling in the category of Safe companies in all years except the year 2019-19. The z score for the year 2018-19 is 2.78 which falls in the Grey zone. The mean score of Zydus pharma is 4.31 which is above the safe zone score. Therefore, Zydus pharma is also considered as financially strong company based on z score calculations.

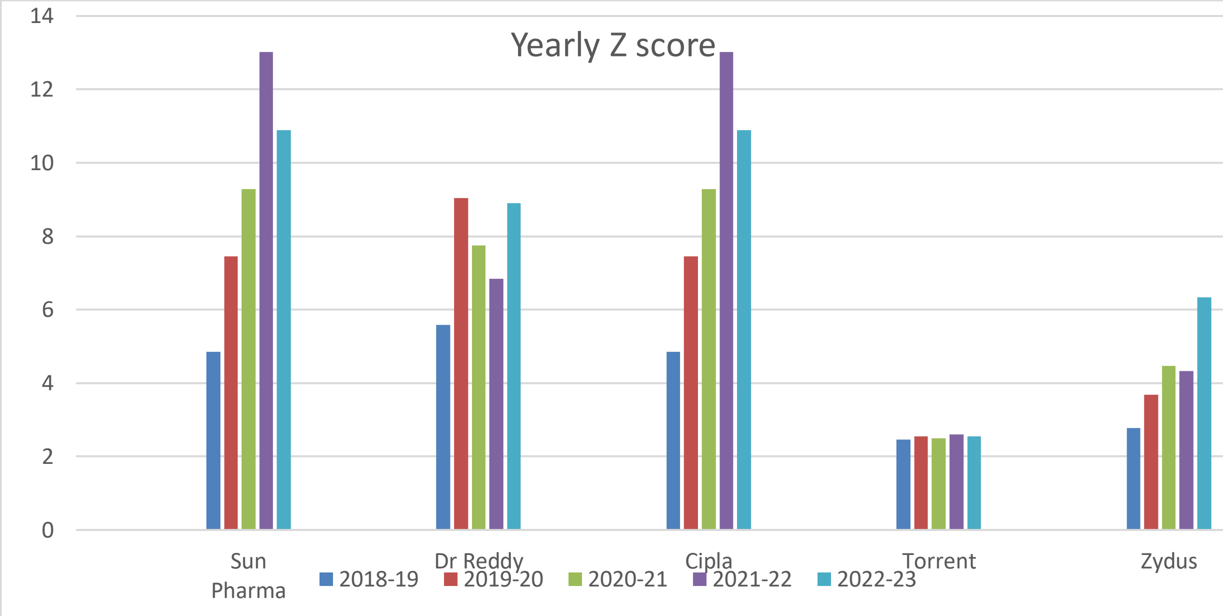

Fig 1 Graphical presentation of Z score of selected pharmaceutical companies in India.

The bar diagram shows the z score of selected pharmaceutical companies from 2018-19 to 2022-23. Sun pharma and Cipla have highest z scores in all the years followed by Dr Reddy and Zydus. The z score of Sun pharma and Cipla goes above 12 in year 2021-22. Torrent pharma has the lowest score and falls in the grey company zone. All the pharmaceutical companies scored above the safety zone of the Altman except Torrent pharma. It implies all the companies are financially strong and may not face the problem of insolvency in the near future. The Zydus pharma score just above the safety score of 3 in all selected years, therefore the management needs to be alert in managing the company. The z score of Torrent pharma falls in the grey area in all the selected years implying a serious issue with the financial health of the company. The management of the Torrent pharma needs to take immediate steps to avoid the insolvency problem.

VII. CONCLUSION

The present research gives an insight into the financial soundness of the pharmaceutical industry in India. The financial year 2019-20, 2020-21 and 2021-22 proved to be very profitable for the pharmaceutical companies due to higher demand of medical facilities in corona pandemic. The z score of companies like Sun pharma and Cipla reaches up to 9 in year 2019-20 and 13 in the year 2021-22. The overall z score analysis of the pharmaceutical companies in India reveals that the pharmaceutical industry in doing well and will not face problem of financial distress in the near future. Sun pharma, Dr. Reddy, Cipla and Zydus falls in the healthy zone in all years and mean z score is also more than 3. Torrent pharmaceutical company falls in Grey zone. It means if effective managerial decisions are not taken on priority, the company may face bankruptcy problem in near future.

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