

Analysis of Financial Health of Select Pharmaceutical Companies using Z Score Model

¹B. Praveen Kumara, ²Dr. M. Thyagarajan

¹Ph.D Research Scholar, Dr. S.N.S Rajalakshmi College of Arts & Science, Coimbatore – 6, Tamil Nadu

²Associate Professor, Dr. S.N.S Rajalakshmi College of Arts & Science, Coimbatore – 6, Tamil Nadu

Abstract : A company face financial distress when its operational cash flows become insufficient to meet day to day obligations of the business. Early identification of financial distress can reduce the risk of financial bankruptcy. Analysis of financial statements gives a true picture to investors, creditors etc. The stakeholders of the firm are interested in knowing about the firm financial condition and wealth of the firm. The present study is under taken to evaluate financial health of six Indian pharmaceutical companies i.e. Cadila Healthcare Ltd, Cipla Ltd Ltd, Dr. Reddy's Laboratories Ltd, Lupin Ltd, Piramal Enterprises Ltd and Sun Pharmaceutical Industries Ltd. Altman Z score model has been applied over a period of 5 years from 2013-14 to 2017-18.. The study reveals that, the overall financial health of Pharmaceutical industry is in healthy zone. Cadila Healthcare Ltd., Cipla Ltd., Dr. Reddy's Laboratories Ltd and Lupin Ltd are in healthy zone. Piramal Enterprises Ltd and Sun Pharmaceutical Industries are in bankruptcy zone.

IndexTerms - Financial distress, Bankruptcy, Stakeholders, Financial Health

I. INTRODUCTION

Being the world's third-largest industry by volume and thirteenth largest in terms of value, Indian Pharmaceutical industry is likely to become leader in manufacturing soon. In past 30 years Indian pharmaceutical industry has emerged as one of the major leader in drug production from almost nothing. Earlier multinational companies used to import drugs either in fully formulated or bulk form. The credit for this steep curve in development can be given to the twin benefit, firstly the increase in domestic consumption capacity of India and secondly to the various export opportunities available in India. It is one of the major contributors to Indian economy with a growth percentage of 7-8%. The Indian pharma industry has been growing at a compounded annual growth rate (CAGR) of more than 15% over the last five years and has significant growth opportunities. However, for the industry to sustain this robust growth rate till 2020, companies will have to rethink their business strategy. They will have to adopt new business models and think of innovative ideas to service their evolving customers faster and better.

Pharmaceutical Sector - World Scenario

The world market is dominated by countries like USA, EU and Japan and the contribution of emerging countries is expected to be more in coming years. According to IMS health report, it is projected that, US will contribute to about 41 percent of total sales of medicine in the world by 2020, followed by EU5 and China which are projected to spend about 13 percent and 11 percent respectively. Brazil, Russia and India put together contribute about 6 percent of global consumption of the medicine.

Indian Pharmaceutical Industry (IPI)

The IPI is a highly fragmented sector, with about 20,000 registered units with severe price competition and government price control. There are approximately 250 large units and about 8000 small scale units which form the core of this industry in India (including 5 Central Public Units). The countries production cost is the lowest in the world. According to IBEF, the cost of production in India is approximately 60 per cent lower compared to US and almost half when compared to Europe.

India is the largest provider of generic drugs globally. Indian pharmaceutical sector industry supplies over 50 per cent of global demand for various vaccines, 40 per cent of generic demand in the US and 25 per cent of all medicine in UK. India enjoys an important position in the global pharmaceuticals sector. The country's pharmaceutical industry is expected to expand at a CAGR of 22.4 per cent over 2015–20 to reach US\$ 55 billion. It is expected to grow to US\$100 billion by 2025.

II. LITERATURE REVIEW

There were researchers like McDonald and Morris (1985) who argued that it is not possible to predict bankruptcy as it occurs due to some unanticipated events. However, there are many researchers like Altman (1968); Kida 1998; Shirata (1998); Shumway (2001) etc. who supported that bankruptcy can be predicted by developing a model.

In 1968, Edward Altman used multiple discriminant analysis (MDA) to build a bankruptcy prediction model. Altman made use of five ratios to develop a Z Score which helped in the prediction of the financial health of a company. Altman found that his five ratios outperformed Beaver's (1966) cash flow to total debt ratio. His study was based on 60 firms in general.

Chowdhury & Barua (2009) examined the financial aspects of Z-category companies' shares by using Z-score analysis and established the outcome that 90% of the companies under study were facing financial problem.

Nanayakkara & Azeez (2012) predicted the corporate financial distress in Sri Lanka. The main purpose of the study was to develop a better financial distress prediction model for Sri Lankan companies using the Z-score model. Multivariate Discriminate Analysis (MDA) was used as the analytical technique and simultaneous estimation method has used to enter the variables in the analysis. The study has examined four accounting ratios for 134 companies from 2002 to 2011. The study has found that the derived model which consists of four accounting ratios is capable of predicting financial distress of quoted public companies in Sri Lanka with 76.9% accurate one year prior to distress. Further, the model has the financial distress predicting ability of 74.6% and 67.2% two years and three years prior to distress respectively. This model can be used to assist investors, creditors, managers, auditors and regulatory bodies in Sri Lanka to predict the financial distress.

Chouhan et al (2014) analysed and re-examined the Altman Z-score by calculating various ratios of Z score on a sample of 10 companies from BSE 30 companies for a period of 5 years each. They aimed to identify the change in time series data correspond to Z score for each companies. Thus concluding that Altman Z score could be used to measure credit worthiness of companies.

III. STATEMENT OF THE PROBLEM

Financially strong company indicates operational efficiency, managerial efficiency, optimum capital structure and best management practices. Analysis of financial statements using ratios have been found very useful in prediction financial distress. Timely intervention through sound financial strategies can turnaround companies with potential distress. Altman Z score is such a tool which predicts potential bankruptcy of companies. It is a financial tool through which the company's financial performance can be studied, particularly about the liquidity position of companies. It can also be called as predictor of financial distress. In this background, the present study is mainly concentrated on the phenomenon of bankruptcy prediction of selected pharmaceutical companies in India using Altman Z- score model.

IV. OBJECTIVES OF THE STUDY

1. To study the financial health of selected pharmaceutical companies in India.
2. To predict the possible financial distress of selected pharma companies using Altman Z score model.

V. RESEARCH METHODOLOGY

5.1 Source of Data

The study is mainly based on secondary data. The required data for the study is collected and compiled from "PROWESS" database of Centre for Monitoring Indian Economy (CMIE) which is a reliable and empowered corporate database. In addition to this, supportive data is collected from books, journals, annual reports and various news-papers.

5.2 Period of the Study

The study has been undertaken for the period of five financial years from 2013-2014 to 2017-2018.

5.3 Sample Design

In order to study the financial health of pharmaceutical industry in India, six pharmaceutical companies listed in both BSE and NSE and also having Market Capitalisation of more than Rs.10,000 crores are selected by non-random sampling method. They are namely Cadila Healthcare Ltd, Cipla Ltd Ltd, Dr. Reddy's Laboratories Ltd, Lupin Ltd, Piramal Enterprises Ltd and Sun Pharmaceutical Industries Ltd.

5.4 Techniques of Analysis

To predict the financial health of selected sample pharmaceutical units in India, Altman Z score is applied by considering liquidity, solvency, profitability and financial efficiency.

5.4.1 Altman Z Score

The Altman Z score was initially published in the year 1968 by Professor Edward Altman, which tries to measure a company's financial health. At original research which is piloted by Edward Altman, he chose 66 corporations which is listed in stock exchange (half of those corporations is doing well and half of corporations went bankrupt). Altman then observed several similar financial ratios based on data retrieved from annual financial reports. After linearly combining these ratios, Altman arrived at an empirical equation (called the Z-Score) that predicted the risk of corporate failure within two years with an accuracy of 72%, and false-positives at 6%.

The Altman Z score is an empirical model that predicts the probability of corporate insolvency. It is a tool which helps to predict the company's financial performance with respect to the liquidity of the company. Many of the individual accounting ratios used frequently to predict the financial performance of an enterprise may only provide warnings. Further single ratio does not convey much of the sense. There is no internationally accepted standard for financial ratios against which the results can be compared. Therefore, Edward I. Altman combined a number of accounting ratios (liquidity, leverage, activity and profitability) to form an index of the profitability, which was effective indicator of corporate performance in predicting bankruptcy.

The data collected for the study were first analysed with the help of five accounting ratios. These different ratios are combined into a single measure called Z Score with the help of Multiple Discriminant Analysis (MDA). "Z" is the overall index and the variables 'X1' to 'X5' are computed as absolute percentage values while 'X5' is computed number of times. The formula for The Z score is arrived using the following formula:

$$Z = .012X_1 + .014X_2 + .033X_3 + .006X_4 + .999X_5$$

The variables used for the Z score are the following ratios:

- X₁ – Ratio of Working Capital to Total Assets
- X₂ - Ratio of Retained Earnings to Total Assets
- X₃ – Ratio of Earnings Before Interest and Taxes (EBIT) to Total Assets
- X₄ – Ratio of Market value of equity to Book value of debt
- X₅ – Ratio of Sales to Total assets

5.5 Significance of the variables

X₁ is a liquidity ratio which is used to measure the net liquid asset of a concern in relation to its total assets (overall capitalisation). Working Capital = Current Assets – Current Liabilities. This ratio is ideal amongst the liquidity ratios to measure the liquidity of a concern.

X₂ is an indicator of the extent to which the Company relies on debt. The more the company is funding its assets by borrowings, the chances of bankruptcy increases in the event of failure to meet its debt obligation.

X₃ is a measure of firm's productivity which is crucial for the long-term survival of the company. The ultimate existence of an enterprise is based on earning power. It measures the true productivity of a firm's resources (without taking into consideration leverage or tax factors).

X₄ incorporates the effects of fall in the market value of a Company's shares prior to the value of assets becoming lower than the value of liabilities resulting in bankruptcy of the Company. It is a reciprocal of Debt Equity ratio. While Debt includes both Long Term liabilities as well as Current Liabilities, Equity is measure of market value of all shares of the Firm.

X₅ measures the Assets turnover of the concern. ie, the revenue generating ability of a Company's assets. The ratio is widely used for dealing in Competitive scenario.

5.6 Altman Guidelines

- If the Z score is below 1.8, the unit failure is certain and it is considered to be in bankruptcy zone.
- If an unit has a "Z" Score between 1.8 and 3, then its financial viability is considered to be healthy. The failure in this situation is uncertain to predict.
- If "Z" Score is of 3 and above, then the unit is in too healthy zone and its financial health is very much viable.

VI. DATA ANALYSIS AND INTERPRETATION

**Table 1 Ratio of Working Capital to Total Assets (X₁)
(in Percentage)**

S.No	Name of the Company	2014	2015	2016	2017	2018	Average
1	Cadila Healthcare Ltd	27.55	24.95	34.76	26.05	33.08	29.28
2	Cipla Ltd.	31.73	32.84	34.19	30.84	34.07	32.73
3	Dr. Reddy Labs	48.88	44.76	39.19	39.21	37.29	41.87
4	Lupin Ltd.	49.28	34.17	45.45	32.28	37.49	39.73
5	Piramal enterprises	16.14	27.61	25.90	14.57	23.04	21.45
6	Sun Pharmaceuticals Industries Ltd	10.73	-6.89	1.64	5.25	10.40	4.23

Source: Data compiled and calculated from the database of CMIE

Table 1 reveals that the average ratio of Working Capital to Total Assets of the selected Pharmaceutical Companies from the year 2014-2018. The average Working Capital is recorded highest in Dr. Reddy's Laboratories Ltd., (41.87 %) followed by Lupin (39.73 %) and Cipla Ltd(32.73 %) which indicates adequate liquid assets to meet short term obligations. Sun Pharmaceuticals Industries Ltd., indicating a very low average Working Capital of 4.23 percentage which indicates that the company may have serious financial trouble. Further, during the year 2015 the Working Capital to Total Assets ratio was negative (-6.89) which indicates it has negative cash flow (i.e., its current assets are less than its current liabilities).

Table 2 Ratio of Retained Earnings to Total Assets (X₂)

(in Percentage)

S.No	Name of the Company	2014	2015	2016	2017	2018	Average
1	Cadila Healthcare Ltd.	17.92	21.96	27.87	7.04	10.49	17.06
2	Cipla Ltd.	12.66	9.47	11.15	7.43	10.28	10.20
3	Dr. Reddy's Laboratories Ltd.	16.12	12.21	9.22	9.92	3.94	10.28
4	Lupin Ltd.	32.65	26.44	23.02	20.44	8.51	22.21
5	Piramal Enterprises Ltd.	-2.48	2.44	4.32	3.50	1.56	1.87
6	Sun Pharmaceuticals Industries Ltd.	-28.81	-5.23	-3.95	-0.09	-1.86	-7.99

Source: Data compiled and calculated from the database of CMIE

Table 2 shows that the average ratio of Retained Earnings to Total Assets of the selected Pharmaceutical Companies from 2014-2018. The average Retained Earnings to Total Assets is recorded highest in Lupin (22.21 %) followed by Cadila Healthcare Ltd., (17.06 %) and Dr. Reddy's Laboratories Ltd. (10.28 %) which signifies that these companies are accumulating Assets through Retained Earnings. The average Retained Earnings to Total Assets recorded negative in Sun Pharma Industries Ltd., (-7.99) which indicates the company is funding assets through Debt or Borrowings instead of through Retained Earnings which increases the risk of bankruptcy in the event of failure of the company to meet its debt obligations.

Table 3 Ratio of Earnings Before Interest and Taxes to Total Assets (X₃)

(in Percentage)

S.No	Name of the Company	2014	2015	2016	2017	2018	Average
1	Cadila Healthcare Ltd.	19.60	26.04	34.61	6.95	15.01	20.44
2	Cipla Ltd.	17.74	13.44	14.42	9.34	14.00	13.79
3	Dr. Reddy's Laboratories Ltd.	21.12	15.44	13.61	11.48	5.28	13.38
4	Lupin Ltd.	44.39	35.48	31.45	27.38	11.57	30.05
5	Piramal Enterprises Ltd.	2.84	4.29	7.38	9.46	5.23	5.84
6	Sun Pharmaceuticals Industries Ltd.	0.95	-3.57	-1.72	0.80	3.08	-0.09

Source: Data compiled and calculated from the database of CMIE

Table 3 portrays the average ratio of Earnings Before Interest and Taxes to Total Assets of the selected Pharmaceutical Companies from 2014-18. This ratio is recorded highest in Lupin (30.05 %) followed by Cadila Healthcare Ltd., (20.44 %) and Cipla Ltd (13.79). Sun Pharmaceuticals Industries Ltd., recorded a negative ratio of -0.09 per cent which indicates the inefficiency of productivity of assets employed.

Table 4 Ratio of Market Value of Equity to Book Value of Debt (X₄)

(in Percentage)

S.No	Name of the Company	2014	2015	2016	2017	2018	Average
1	Cadila Healthcare Ltd.	2.03	1.77	1.40	1.09	0.98	1.45
2	Cipla Ltd.	1.46	1.29	1.22	1.23	1.13	1.27
3	Dr. Reddy's Laboratories Ltd.	0.71	0.62	0.58	0.59	0.58	0.62
4	Lupin Ltd.	1.26	0.99	0.73	0.59	0.57	0.83
5	Piramal Enterprises Ltd.	0.23	0.23	0.14	0.16	0.11	0.17
6	Sun Pharmaceuticals Industries Ltd.	2.11	0.73	0.89	0.93	0.90	1.11

Source: Data compiled and calculated from the database of CMIE

Table 4 represents the ratio of Market Value of Equity to Book Value of Debt of the selected Pharmaceutical Companies for the period 2014-2018. Cadila Healthcare Ltd., recorded (1.45 %) the highest followed by Cipla Ltd., (1.27 %) and Sun Pharmaceuticals Industries Ltd., (1.11 %). Piramal Enterprises Ltd., (0.17 %) recorded the lowest ratio of Market Value of Equity

to Book Value of Debt when compared to all other sample units which indicates the Company uses higher debt capital. The company will be forced to sell off its assets or declare bankruptcy in the event of inability to service its own debt. .

Table 5 Ratio of Sales to Total Assets

(in times)

S.No	Name of the Company	2014	2015	2016	2017	2018	Average
1	Cadila Healthcare Ltd.	0.80	0.93	0.98	0.35	0.56	0.72
2	Cipla Ltd.	0.86	0.82	0.92	0.84	0.80	0.85
3	Dr. Reddy's Laboratories Ltd.	0.82	0.73	0.70	0.70	0.65	0.72
4	Lupin Ltd.	1.27	1.09	0.92	0.83	0.64	0.95
5	Piramal Enterprises Ltd.	0.13	0.16	0.14	0.17	0.10	0.14
6	Sun Pharmaceuticals Industries Ltd	0.30	0.29	0.29	0.30	0.30	0.29

Source: Data compiled and calculated from the database of CMIE

In Table 5, the ratio of Sales to Total Assets of the selected Pharmaceutical Companies for the period 2014-2018 is represented in Table 5. Lupin (0.95) has recorded the highest ratio of Sales to Total Assets for the said period closely followed by Cipla Ltd (0.85) and Cadila Healthcare Ltd (0.72) and Dr. Reddy's Laboratories Ltd (0.72). Piramal Enterprises Ltd has recorded the lowest (0.14 times) among the selected Pharmaceutical Companies for the said period indicating less efficiency of Management in using its Assets efficiently to generate sales.

Table 6 Altman Z - Score Analysis

S. No	Name of the Company	X ₁	X ₂	X ₃	X ₄	X ₅	Z - Score
1	Cadila Healthcare Ltd.	0.35	0.24	0.67	0.01	0.72	2.00
2	Cipla Ltd.	0.39	0.14	0.46	0.01	0.85	1.85
3	Dr. Reddy's Laboratories Ltd.	0.50	0.14	0.44	0.00	0.72	1.81
4	Lupin Ltd.	0.48	0.31	0.99	0.00	0.95	2.73
5	Piramal Enterprises Ltd.	0.26	0.03	0.19	0.00	0.14	0.62
6	Sun Pharmaceuticals industries Ltd.	0.05	-0.11	0.00	0.01	0.29	0.24

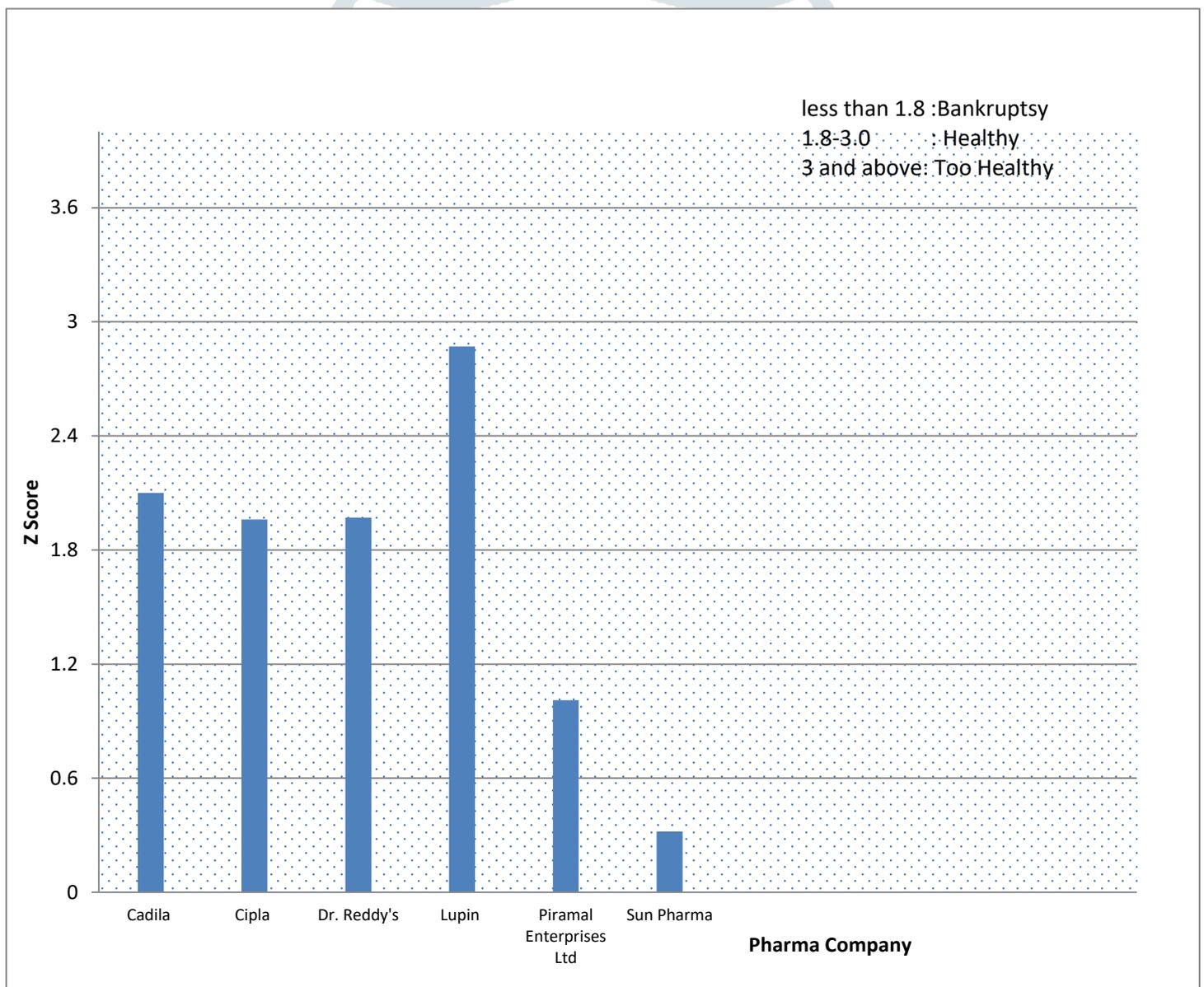
Source: Data compiled and calculated from the database of CMIE

Table 6 shows that the financial health of selected pharmaceutical companies for the study. The results reveals that in none of the selected companies, the Z-score is greater than 3. It clearly indicates that none of the company is in "too healthy Zone". Z-score value of Cadila Healthcare Ltd., Cipla Ltd., Dr. Reddy's Laboratories Ltd and Lupin Ltd are between 1.80 and 3. Therefore, they are in Healthy Zone. The Z- score values of Piramal Enterprises Ltd and Sun Pharmaceutical Industries Ltd are found below 1.80, which indicates that the company is in Bankruptcy Zone.

S. No	Name of the Company	Z - Score	Financial Health
1	Cadila Healthcare Ltd	2.00	Healthy Zone
2	Cipla Ltd.	1.85	Healthy Zone
3	Dr. Reddy's Laboratories Ltd	1.81	Healthy Zone
4	Lupin Ltd	2.73	Healthy Zone
5	Piramal Enterprises Ltd	0.62	Bankruptcy Zone
6	Sun Pharmaceutical Industries Ltd	0.24	Bankruptcy Zone

Table 7 Financial Health of the selected sample Pharma companies

Chart representing the analysis of Z score of selected Pharmaceutical companies



CONCLUSION

Corporate distress is a major concern in developing countries. An attempt has been made in the present study to bring an insight into the analysis of financial health of selected pharmaceutical companies in India. The study concludes that the overall financial health of Pharmaceutical industry is in healthy zone. Because from the selected six companies, four companies (Cadila Healthcare Ltd., Cipla Ltd., Dr. Reddy's Laboratories Ltd and Lupin Ltd) are in healthy zone. The other two companies (Piramal Enterprises Ltd and Sun Pharmaceutical Industries) are in bankruptcy zone.

REFERENCES

1. Altman, E.I 1968. Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy. The Journal of Finance, September, pp 589-609.
2. Chouhan, V., Chandra, B., & Goswami, S. (2014). Predicting financial stability of select BSE companies revisiting Altman Z score. International Letters of Social and Humanistic Sciences, 26, pp 92-105. doi:10.18052/www.scipress.com/ILSHS.26.92
3. Chowdhury, A., & Barua, S. (2009). Rationalities of Z-category shares in Dhaka stock exchange: are they in financial distress risk? BRAC University Journal, VI (1), 45-58.
4. Kida, C.Y. (1998). Financial ratios as predictors of bankruptcy in japan: an empirical research. Journal of Finance, 123: 589-609.
5. McDonald, B., & Morris, M. (1985). The functional specification of financial ratios: an empirical examination. Accounting and Business Research, 15(59), 223.
6. Nanayakara, K.G.M. & Azeez, A.A. (2012) Predicting Corporate Financial Distress in Sri Lanka.
7. Shirata, C. Y. (1998). Financial ratios as predictors of bankruptcy in japan: an empirical research. Tsukuba College of Technology Japan, 1-17.
8. Shumway, T. (2001). Forecasting bankruptcy more accurately: A simple hazard model. Journal of Business, 74(1): 101-124.
9. www.ibef.org
10. www.nanabhoyms.com
11. www.moneycontrol.com

