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INTRODUCTION

REVIEW OF LITERATURE

NEED/IMPORTANCE OF THE STUDY

STATEMENT OF THE PROBLEM

OBJECTIVES

HYPOTHESES

RESEARCH METHODOLOGY

RESULTS & DISCUSSION

FINDINGS

RECOMMENDATIONS/SUGGESTIONS

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SCOPE FOR FURTHER RESEARCH

ACKNOWLEDGMENTS

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APPENDIX/ANNEXURE

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CONTRIBUTIONS TO BOOKS

- Sharma T., Kwatra, G. (2008) Effectiveness of Social Advertising: A Study of Selected Campaigns, Corporate Social Responsibility, Edited by David Crowther & Nicholas Capaldi, Ashgate Research Companion to Corporate Social Responsibility, Chapter 15, pp 287-303.

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- Schemenner, R.W., Huber, J.C. and Cook, R.L. (1987), "Geographic Differences and the Location of New Manufacturing Facilities," Journal of Urban Economics, Vol. 21, No. 1, pp. 83-104.

CONFERENCE PAPERS

- Garg, Sambhav (2011): "Business Ethics" Paper presented at the Annual International Conference for the All India Management Association, New Delhi, India, 19–22 June.

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- Garg, Bhavet (2011): Towards a New Natural Gas Policy, Political Weekly, Viewed on January 01, 2012 http://epw.in/user/viewabstract.jsp

FINANCIAL DISTRESS PREDICTION OF PHARMACEUTICAL INDUSTRY THROUGH Z-SCORE MODEL

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ABSTRACT

Bankruptcy prediction is of immense importance to the ever dynamic business environment for an investment decision by investors. The present study is under taken to analyze level of financial distress of selected companies of pharmaceutical industry (n=5) through Altman's Z score model for a period of 11 years i.e. 2001-02 to 2011-12. The Z score model indicate that Ranbaxy Lab Ltd. is in the threshold of bankruptcy and Glaxo SmithKline Pharmaceuticals Ltd is financially healthy and rest three companies is in the grey zone which necessitates more focus on improvement of their financial performance mostly total asset utilization and more sales revenue creation in future. A paired sample t-test analysis among financially distressed company and non-distressed companies reveal that there is a significant difference between mean of all variables used in Altman's Z Score model over the period of study at 5% significance level.

KEYWORDS

Bankruptcy, Financial distress, Altman's Z Score model, Paired sample t-test.

INTRODUCTION

Investment is a commitment of financial resources with the expectation for some positive rate of return. Professional investment decision ensures safety and liquidity and high rate of return from the investment. Financial analysis requires both internal and external comparison of financial and non-financial information to measure financial and operational efficiency as well as to determine the strengths and weaknesses of the organization. Kahl (2002) has argued that investment decisions are affected by the degree of uncertainty on a firm's performance. Thus any prudent investor would require an array of tools to predict the volatility of a company's performance.

One of the best-known models for predicting corporate financial distress is the Altman's Z score model (Altman, 1968, 1983, 1993). The application of this model is important to predict future corporate distress and bankruptcies particularly in Indian market in the aftermath of Asian crisis.

REVIEW OF LITERATURE

Review of literature of this study largely consists of research based on the published work available in India as well as abroad. Altman (1968) in his work studied the financial position within the help of multiple discriminant analysis (MDA) through which discriminant coefficients were determined. The model was formulated to determine the bankruptcy of any company. In his work he determined that, for manufacturing companies, if the Z score is less than 1.8, the company becomes bankrupt but if the score is more than 2.99, the company if financially sound. The companies with Z score between 1.8 to 2.99 are in a grey zone in which the financial distress may or may not be impending. For private non-manufacturing firms, a score of 2.6 or higher indicates good financial health, score of less than 1.1 indicates bankruptcy but score within 1.1 to 2.6 indicates grey zone for possibility of bankruptcy. The model crafted by him was 95% accurate. Johan(2006) used Z score analysis to measure the financial performance of small business firm in Kenya and predicted the distress level of Kenyian firms during cyclical period. Krishna(2005) using Altman's Z score model measured the financial distress of IDBI and predicted that company is not in the healthy zone and likely to be insolvent in the near future. Lalith P. Samarakoon (1999) has analyzed 13 companies of Sri Lanka which were delisted due to liquidation, litigation or loss as well as those with a negative. The result revealed that, Altman's Z score model has a remarkable degree of accuracy in predicting distress. The overall success of prediction was 81%. Nilanjana Kumari (2013) has studied the financial health of MMTC through Z-score model for five years i.e. from 2007-12. The study revealed MMTC has a Z score of 4.24 to 6.30 during the period of study indicating a good financial health. Ben Mcvclure (2004) through his work has advised the investors to check the Z-score of companies from time to time to avoid bankruptcy condition. Selvam (2004) made a study to predict the financial health and viability of Indian Cement Ltd. He concluded that the cement company was in a verge of collapse. Another study by Bhatt (2012) have investigated the ability of three versions of the Z Score models for distress prediction. The study was conducted to predict four selected companies of different industries. The result proved that the model have remarkable degree of accuracy in distress prediction.

AN OVERVIEW TO INDIAN PHARMACEUTICAL INDUSTRY

The Indian pharmaceutical market is valued at 72069 crore INR in 2013 as against 65654 crore INR in 2012. It has experienced a slowdown with its growth going down to 9.8% in 2013 from 16.6% in 2012. There has been a slowdown in the growth of the top Indian as well as multinational companies (MNCs). In 2012, the top five MNCs had grown at the rate of 16% which dropped down to 7% in 2013.

The implementation of the National Pharmaceutical Pricing Policy 2012 by the government of India has resulted in margins erosion from 20% and 10% to 16% and 8% for retailers and stockists respectively. This decrease in the stockist margins led to a significant uncertainty among many stockists regarding the feasibility of staying in business due to lower profitability. In addition to the growth challenges, the pharmaceutical industry is currently grappling with a number of issues like delays in clinical trial approvals, the new pharmaceutical pricing policy, a uniform code for sales and marketing practices and compulsory licensing, etc. The industry is also facing stricter regulations on manufacturing and quality practices in the domestic as well as the international markets.

OBJECTIVES OF THE STUDY

The main objective of the study was to

1) To predict the level of financial distress of selected five Indian pharmaceutical companies by applying Altman's Z-Score model.
2) To compare between means of two samples (distressed and non-distressed companies) for each financial ratios used in Z score model through paired sample t-test.

METHODOLOGY OF THE STUDY

The data used for the study are secondary data collected from annual reports of the selected companies. The period of study is 11 years i.e.2002-2012. Ratios have been computed from secondary data to analyze in a suitable form through Altman's Z score model. Paired t- test is used to analyze the significant difference between means of distressed and non-distressed companies. Total five pharmaceutical companies are taken for the study i.e. CIPLA Ltd, Dr. Reddy's Lab. Ltd, Glaxo SmithKline Pharmaceuticals Ltd, Ranbaxy Lab. Ltd, and Sun Pharmaceuticals Industries Ltd.

Z-SCORE MODEL

Z score model was developed by Edward I. Altman(1968), professor of Finance, Stern School of Business, New York University to predict likelihood to bankruptcy of the company. Employing multiple discriminant analysis (MDA), Altman evaluated 22 different financial ratios of 66 manufacturing companies in USA. The research concluded that the financial distress of the company can be predicted with only five financial ratios, weighted by established coefficients in a linear multivariate model.

$Z = 0.012 X1 + 0.014 X2 + 0.033 X3 + 0.006 X4 + 0.999 X5$

Where:

X1= Working capital/ total assets.

X2= Retained Earnings /Total Assets.

X3=Earnings before interest and taxes/total assets.

X4= Market Value of equity/ book value of total liabilities.

X5= Sales/ total assets.

The computed Z score is compared with a pre-determined cut-off score to evaluate the level of distress of the companies i.e. likelihood of a company to become bankrupt.

Zones of discrimination

$Z > 2.99$ - Safety zone

$1.80 < Z < 2.99$ - Grey zone

$Z < 1.80$ - Distress zone

Z score offers an excellent measure for evaluating the financial health of the firm. The model uses financial ratios of the company which are mutually exclusive in nature. Z score provides an calculated measure on the basis of past financial data indicating level of difficulty in maintaining the operations of the company. The empirical studies carried out by Altman 2003 using financial ratios predicted 94% correctly for one year before bankruptcy occurred and 72% two years before occurrence of bankruptcy. The importance of the Z score model has been highlighted by number of studies. In a study, Pongsatat, Ramage and Lawrence (2004) found the predicting ability of Z score model of 90.48% for year one for large asset sized companies and 100% accuracy rate for succeeding two years. For small asset bankrupt firms, for year one was 94.87% . Odipo & Sitati (2011) opined that the model is a powerful technique for diagnosing the financial performance of company and forecasts the company entering bankruptcy with in next two years. In all these studies, Z score was found to be a accurate

ANALYSIS AND FINDINGS

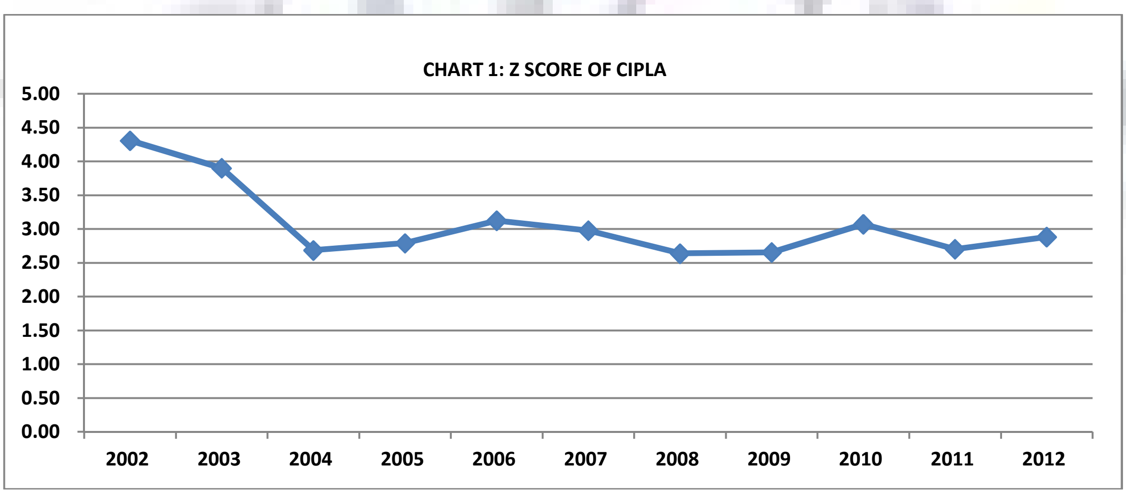
The analysis and interpretation part of the study is carried out on five selected pharmaceutical companies (Cipla, Dr. Reddy's lab, GSK, Ranbaxy Lab, Sun pharma) using Altman's Z score model. Year wise Z scores are calculated separately for all companies for 11 years i.e. 2001-02 to 2011-12 and by using paired t-test, each variables of Z score model are analyzed for significant difference between the means of distressed company and non-distressed companies.

1. CIPLA LTD.

TABLE 1: Z SCORE OF CIPLA

year	X1	X2	X3	X4	X5	Z SCORE
2002	54.00	86.14	32.10	12.66	1.32	4.31
2003	56.88	82.73	25.59	6.29	1.18	3.90
2004	34.08	54.23	18.20	1.48	0.83	2.61
2005	37.25	57.10	19.67	11.13	0.83	2.79
2006	43.82	60.90	22.48	14.46	0.92	3.13
2007	42.90	69.80	18.31	17.25	0.78	2.98
2008	43.54	62.80	14.62	9.37	0.70	2.64
2009	45.23	62.93	13.52	7.96	0.74	2.66
2010	42.91	78.68	18.12	21.42	0.73	3.07
2011	34.87	76.38	13.63	2.92	0.75	2.70
2012	40.25	82.16	13.80	2.63	0.78	2.88

Source : computed.



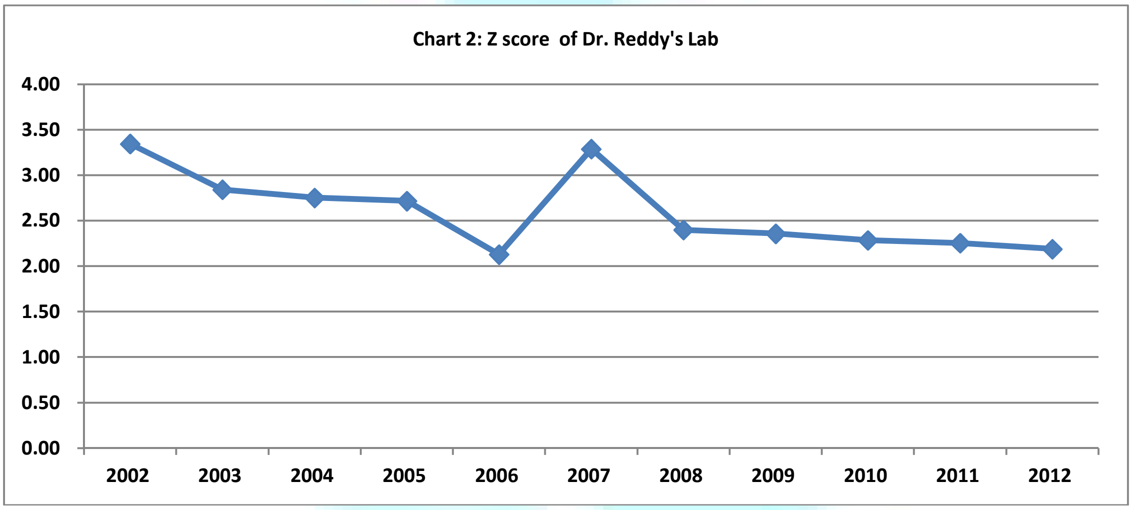
From table 1, z score of Cipla Ltd for 2002, 2003, 2006 and 2010 are above 2.99 and for rest years of study, it is in grey zone of 1.8 to 2.99. For the last two years z score is also in the grey zone where the company may or may not fall into the financial distress. X5 (sales/ total assets) of Cipla during the period of study are in a decreasing trend which reveals that Cipla's total assets turnover is not adequate. Last two year's data of X4 (=Market Value of equity/ book value of total liabilities) indicate that there is a significant drop in the market price of share in comparison to total liabilities which has decreased z score from healthy zone to grey zone. Performance of the company in maintaining liquidity, retained earnings and EBIT is satisfactory.

2. DR. REDDY'S LAB

TABLE 2: Z SCORE OF DR. REDDY'S LAB.

year	X1	X2	X3	X4	X5	Z SCORE
2002	12.00	84.89	28.15	32.59	0.89	3.35
2003	12.97	83.85	20.44	19.97	0.72	2.84
2004	38.93	80.45	12.15	14.99	0.67	2.75
2005	49.38	72.46	15.79	6.78	0.55	2.72
2006	45.27	57.77	6.85	5.47	0.52	2.13
2007	53.99	78.03	24.85	8.41	0.68	3.29
2008	35.82	77.10	9.53	6.17	0.54	2.40
2009	37.14	72.14	10.17	1.42	0.56	2.36
2010	23.50	70.74	13.16	8.33	0.53	2.29
2011	30.68	64.08	11.36	9.24	0.56	2.26
2012	18.00	64.15	12.18	5.79	0.64	2.19

Source : computed.



The data in Table 2 reveals that, Z scores varied between 3.35(2002) to 2.13 (2006) across the years of study. From 2007 onwards, there is a decreasing trend of z score from 3.29 to 2.19 indicating increasing pressure of financial non-performance in the company though it is in the grey zone from 2008-12. There is a significant drop in liquidity from X1=30.68(2011) to X1=18.00 (2012). The retained earnings and liquidity to total assets of the company are found to be satisfactory over the period of study. EBIT results are average due to poor sales performance during the period of study. Company's X5 (total sales/total assets) has varied from 0.89(2002) to 0.52(2006) revealing that total sales revenue is not high in comparison to total assets. The company is facing problem of poor sales in comparison to total assets employed. From 2008 onwards, company's Z scores are in grey zone.

3. GLAXO SMITHKLINE

TABLE 3: Z SCORES OF GSK

year	X1	X2	X3	X4	X5	Z SCORE
2002	44.02	82.14	31.94	9.11	1.87	4.66
2003	18.82	84.67	40.63	7.12	1.70	4.49
2004	1.07	59.88	29.92	11.19	0.98	2.88
2005	-5.75	57.53	31.83	11.03	0.99	2.84
2006	3.30	62.85	31.48	21.51	0.88	2.97
2007	3.98	63.68	30.50	14.71	0.79	2.82
2008	29.25	64.08	29.91	12.10	0.73	3.04
2009	57.41	67.95	30.78	13.07	0.76	3.49
2010	57.55	66.34	31.17	17.68	0.76	3.51
2011	51.91	60.34	30.30	15.81	0.77	3.33
2012	57.50	62.31	27.40	22.00	0.84	3.44

Source : computed.

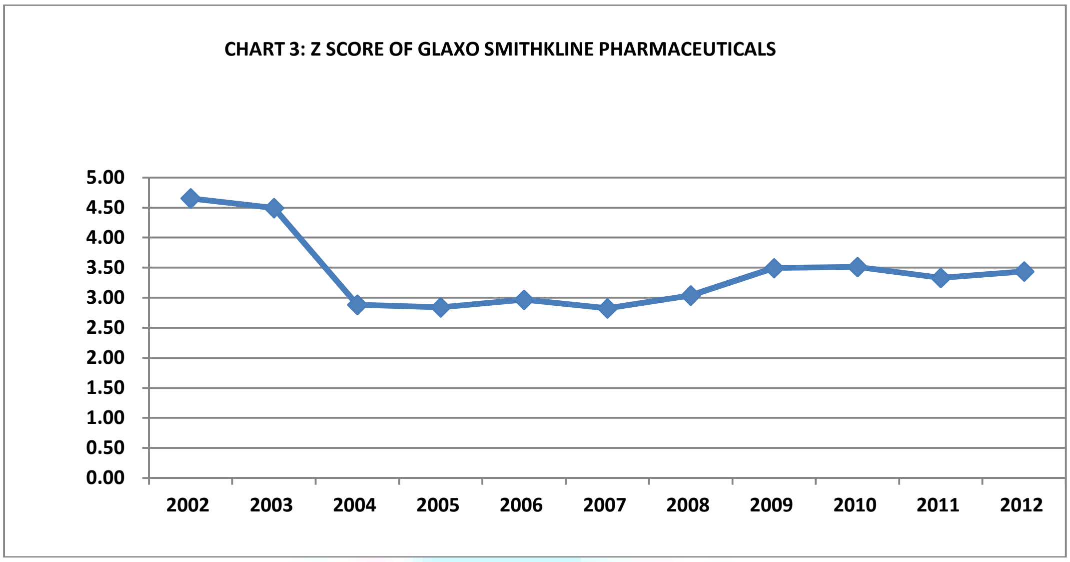


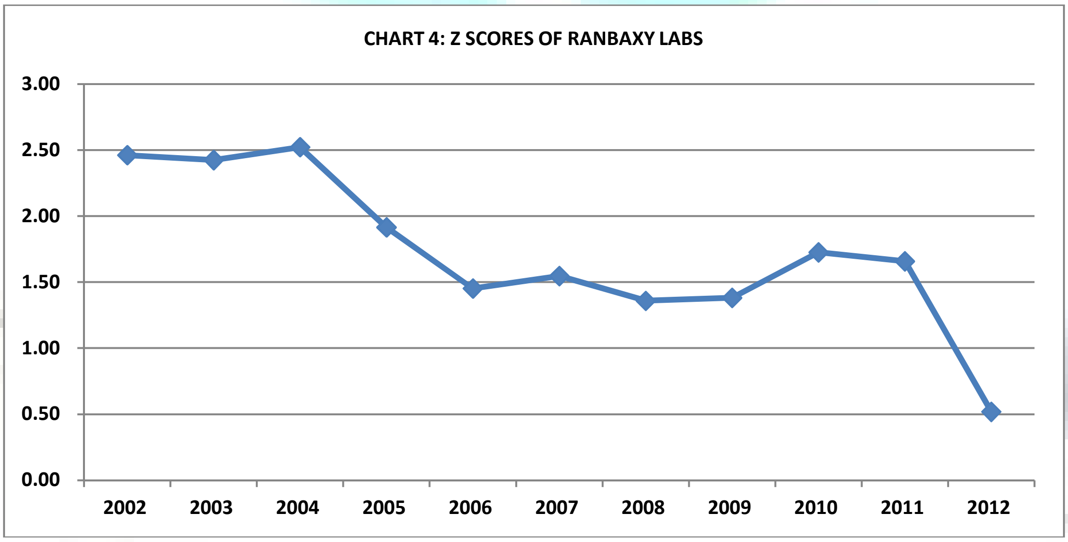
Table 3 reveals that Z scores varied between 2.82 (2007) to 4.66 (2002) during the years of study. Most of the years the company has stayed in very healthy zone of financial performance. During early four years i.e. 2004 to 2007, Z scores were upper levels of grey zone (Z<2.99), which may be due to insufficient liquidity. After 2007, the company has a very good financial health which is reflected by its Z scores (>2.99). Company's retained earnings were high which a good sign of healthy financial performance. GSK's X3 (EBIT/TA) is satisfactory over the years of study. The company is financially sound and there is no chance of bankruptcy in near future.

4. RANBAXY LAB

TABLE 4: Z SCORES OF RANBAXY LAB

year	X1	X2	X3	X4	X5	Z SCORE
2002	34.49	60.86	0.52	20.08	1.06	2.46
2003	37.56	59.76	0.84	10.28	1.05	2.43
2004	23.48	56.21	15.22	8.87	0.90	2.52
2005	24.10	47.00	4.08	10.81	0.77	1.92
2006	17.99	31.23	6.40	3.24	0.57	1.45
2007	19.98	29.89	9.85	2.34	0.55	1.55
2008	7.36	28.88	14.04	2.23	0.39	1.36
2009	11.20	34.38	9.74	0.94	0.44	1.38
2010	27.68	38.36	12.22	2.38	0.44	1.73
2011	5.26	24.65	21.29	1.34	0.54	1.66
2012	(8.67)	13.18	(1.27)	1.80	0.47	0.52

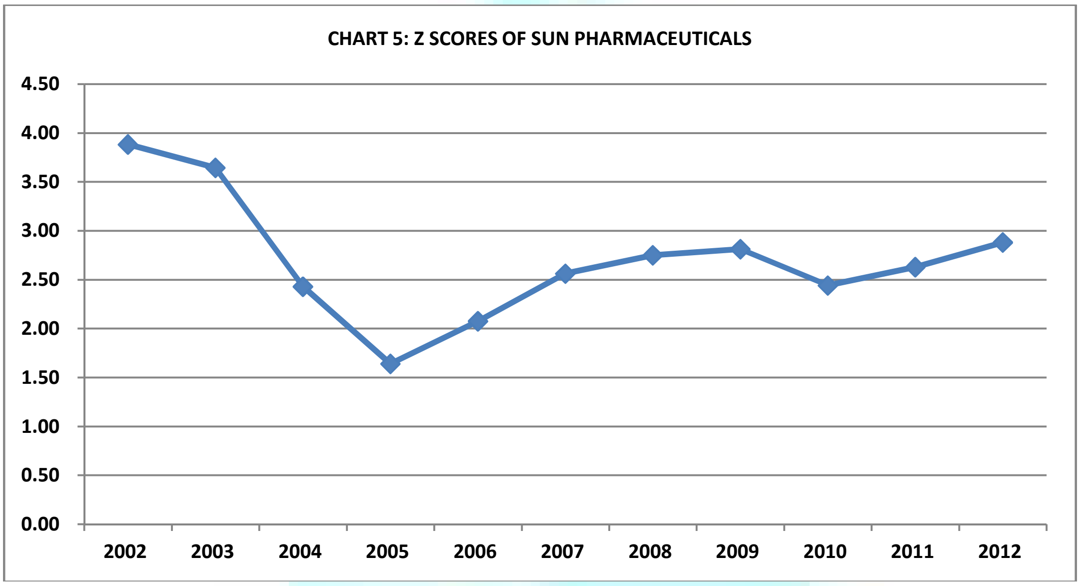
Source : computed.



Calculated Altman's Z-scores in table 4 varies between 2.46 (2002) to 0.52 (2012). And it is in a decreasing trend across the period of study. From 2002 to 2005, the z score value were in grey zone but after 2006 onwards, the Z score values were below 1.8. Hence the company is in bankruptcy zone. During 2012, company has negative current asst and negative EBIT indicating that the company has severe liquidity problem which has led the company to the bankruptcy position. The total asset turnover of the company is also decreasing continuously. The poor z score of the company can be attributed to declining total asset turnover, , declining market value of shares, inadequate proportion of EBIT to total assets and insufficient liquid assets (negative working capital) during the period of study. It can be predicted from the declining z scores that the company in going to be bankrupt in near future.

5. SUN PHARMACEUTICALS

TABLE 5: Z SCORES OF SUN PHARMACEUTICALS						
year	X1	X2	X3	X4	X5	Z SCORE
2002	36.53	77.46	29.67	32.34	1.19	3.88
2003	40.43	75.25	30.01	14.70	1.03	3.65
2004	20.50	55.68	20.52	11.51	0.66	2.43
2005	47.51	31.34	6.93	4.21	0.38	1.64
2006	54.63	40.65	13.56	7.67	0.36	2.08
2007	50.39	63.36	16.57	16.02	0.43	2.56
2008	33.56	75.83	19.44	34.46	0.44	2.75
2009	29.36	81.32	20.87	30.98	0.45	2.81
2010	15.13	86.80	14.67	47.06	0.28	2.44
2011	29.39	86.46	19.12	31.06	0.25	2.63
2012	34.42	85.43	21.62	21.79	0.43	2.88
Source : computed.						



From table 5, the analysis reveals that z scores varied between 3.88 (2002) to 1.64 (2005). For 2002 and 2003 the company was in safety zone (Z>2.99) and since 2004 onwards, the company is in grey zone (Z<2.99) except in 2005, where the company has entered in bankruptcy zone.(Z<1.8). Since 2006 onwards the company has recovered from the bankruptcy zone and maintained financial performance in grey zone. The poor Z score level is due to more proportionate assets in comparison to its sales during periods of study. The financial performance of the company is satisfactory except poor total asset turnover.

TABLE 6: PAIRED COMPARISON OF MEANS OF VARIABLES OF ALTMAN'S Z SCORE MODEL OF RAXBAXY WITH OTHER FOUR COMPANIES				
	Distressed company (Ranbaxy Labs)	Nondistressed company (rest all companies)	t	p
X1	35.10	18.22	3.492	.006
X2	69.79	38.58	6.273	.000
X3	21.22	8.45	4.213	.002
X4	14.71	5.85	4.265	.002
X5	0.76	0.65	3.035	.013
Source: computed				
$t_{(10,5\%)}$ =1.812 Level of significance: 5%				

In Table 6, the difference between mean of variables of distressed company (Ranbaxy) and rest all other companies (Cipla,Dr. Reddy,GSK,Sun pharma) over the years of study were calculated using paired t-test at 5% significance level. The test reveals that the mean difference of all variables is found to be significant. For all the variables, the p values are below 2%. The overall result gives convincing evidence that the specified variables are able to discriminate between the distressed and non distressed companies during the period of study.

SUGGESTIONS

- A company with strong financial health will always have good financial ratios and a Altman's Z score above 2.99. In case of CIPLA, it has Z score is in grey zone for four years from last five years. The company should improve its sales revenue .which will improve its EBIT in future to improve its z score. Cipla should also take care to improve its market price of share to increase its Z score.
- Latest Z scores of |Dr. Reddy's Lab is in grey zone which is a point of cocern for the company. The company must focus on poor sale performance which has dipped its EBIT/sales to 12.18% in 2011 to avoid further slipping deep into grey zone.
- GSK has very strong financial health and there is no chance of financial distress on coming future. However in 2004-07 ,WC/TA was very poor which improved significantly in succeeding years. Thus the company should take focus for a consistent WC policy.
- GSK has very strong financial health and there is no chance of financial distress on coming future. However in 2004-07 ,WC/TA was very poor which improved significantly in succeeding years. Thus the company should take focus for a consistent WC policy.
- Z score analysis of sun pharmaceuticals reveals that it is slightly in grey zone in last nine years of study where it may or may not fall into financial distress. Looking into different variable of study, company's sales performance is not good. The company must focus more on improving its sales results which will lift its z score.
- The overall analysis of selected pharmaceutical companies reveals that, total sales performance is not satisfactory in comparison to huge employed assets. All the company's under study have poor total assets turn over (X5=sales/TA). Hence they should improve sales conditions through new drugs development.

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