



APPLYING ALTMAN'S Z SCORE MODEL FOR FINANCIAL HEALTH CHECKUP

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ABSTRACT

Industrial sickness is an umbrella term applied to various things associated with industry that make people ill and cause them to miss work. The solutions will have to be tailored to the specific industry, and only in that way can any real effect be made on improving the health and productivity of the industrial workforce. The sick industrial companies (Special provisions) Act, 1985, as amended in 1993 defines sick Industrial company as an industrial company (being a company registered for not less than five Years) which has at the end of any financial year accumulated losses equal to or exceeding its entire net worth. The study involves five phases. In the first phase it gives the conceptual details about management of sick units, in the second phase a trend analysis of number of sick units was done. Third and fourth phase talks about the revival plans and government assistance given to sick units. Fifth phase involves determination of a publicly traded manufacturing company's likelihood of bankruptcy with the help of Altman's Z-score analysis, taking Parry's Sugar Industries Ltd as a case.

1. INTRODUCTION

Industrial sickness is defined in India as "an industrial company, which has, at the end of any financial year, accumulated losses equal to or exceeding, its entire net worth and has also suffered cash losses in such financial year and the financial year immediately preceding such financial year.

The Reserve Bank of India defined a sick unit as "One which has incurred cash losses for one year and, in the judgment of the financing bank, is likely to incur cash losses for the current as well as following year and/or there is an imbalance in the unit's financial structure, that is current ratio is less than 1:1 and debt/equity ratio (total outside liabilities as a ratio of net worth) is worsening".

Causes of sickness

A firm remains healthy if it (1) operates in a reasonably favorable environment and (2) has a fairly efficient management. When these conditions are not satisfied, the firm is likely to become sick. Hence sickness may be caused by:

1. Unfavorable external environment

The firm may be affected by one or more of the following external factors over which it may hardly have any control on the following external factors:

- Shortage of key inputs like power and basic raw materials.
- Changes in government policies with respect to excise duties, customs duties, export duties, reservation etc.
- Development of new technology.
- Sudden decline in orders from government.
- Shifts in consumer preferences.

2. Managerial deficiencies

Managerial can be deficiencies in many ways. An attempt has been made below to classify managerial deficiencies function wise. These shortcomings, singly or in combinations, can induce sickness.

➤ Production:

- Improper location
- Wrong technology
- Uneconomic plant size
- Inadequate emphasis on research and development
- Weak production and quality control
- Poor maintenance & quality control.

➤ Marketing:

- Inaccurate demand projection
- Improper product mix
- Wrong product positioning
- Irrational price structure



- Inadequate sales promotion
- High distribution costs
- Poor customer services
- **Finance:**
 - Wrong capital structure
 - Bad investment decisions
 - Weak budgetary control
 - Absence of responsibility accounting
 - Inadequate management information system
 - Poor management of receivables
 - Bad cash planning and control
 - Strained relationship with suppliers of capital
 - Improper tax planning.
- **Personnel:**
 - Ineffective leadership
 - Bad labor relationship
 - Inadequate human resource
 - Over staffing
 - Weak employee commitment
 - Irrational compensation structure
 - Poor organization decision
 - Insufficient training

Symptoms of sickness

Sickness does not occur overnight, but develops gradually over time. A firm which is becoming sick shows symptoms which indicate that trouble lies ahead of it. Some of the common symptoms are:

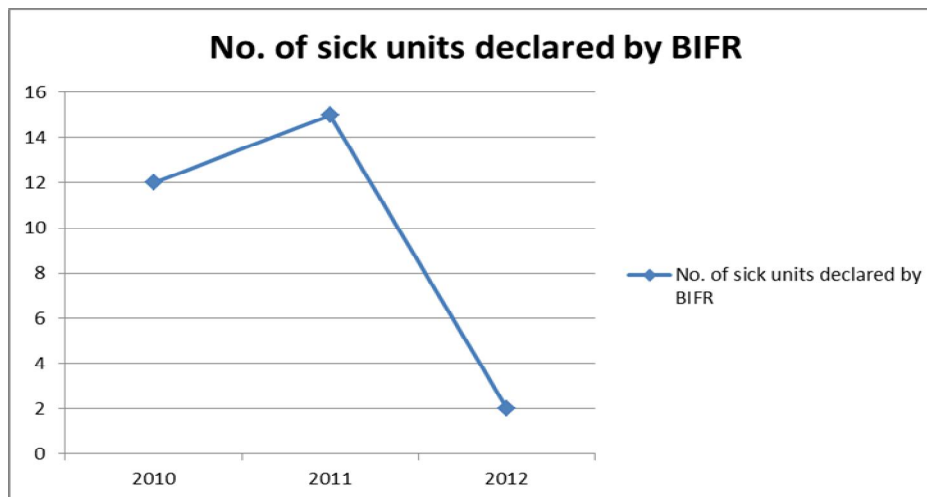
- ❖ Delay or default in payment to suppliers
- ❖ Irregularity in the bank account
- ❖ Delay or default in payment to banks and financial institutions
- ❖ Non-submission of information to banks and financial institutions
- ❖ Frequent distribution to banks and financial institutions for additional credit
- ❖ Decline in capacity utilization
- ❖ Poor maintenance of plant and machines
- ❖ Low turnover of assets
- ❖ Accumulation of inventories
- ❖ Inability to take trade discount
- ❖ Excessive turnover of personnel
- ❖ Extension of accounting period
- ❖ Resort to 'creative accounting' which seeks to present a better financial picture than what it really is
- ❖ Decline in the price of equity shares and debentures.

TREND ANALYSIS OF NUMBER OF UNITS DECLARED SICK BY BIFR IN INDIA FROM 2010-2012

TABLE SHOWING THE NUMBER OF SICK UNITS IN 2010, 2011 & 2012

Year	2010	2011	2012
No. of sick units declared by BIFR	12	15	2

GRAPH REPRESENTING NUMBER OF SICK UNITS IN 2010, 2011 & 2012



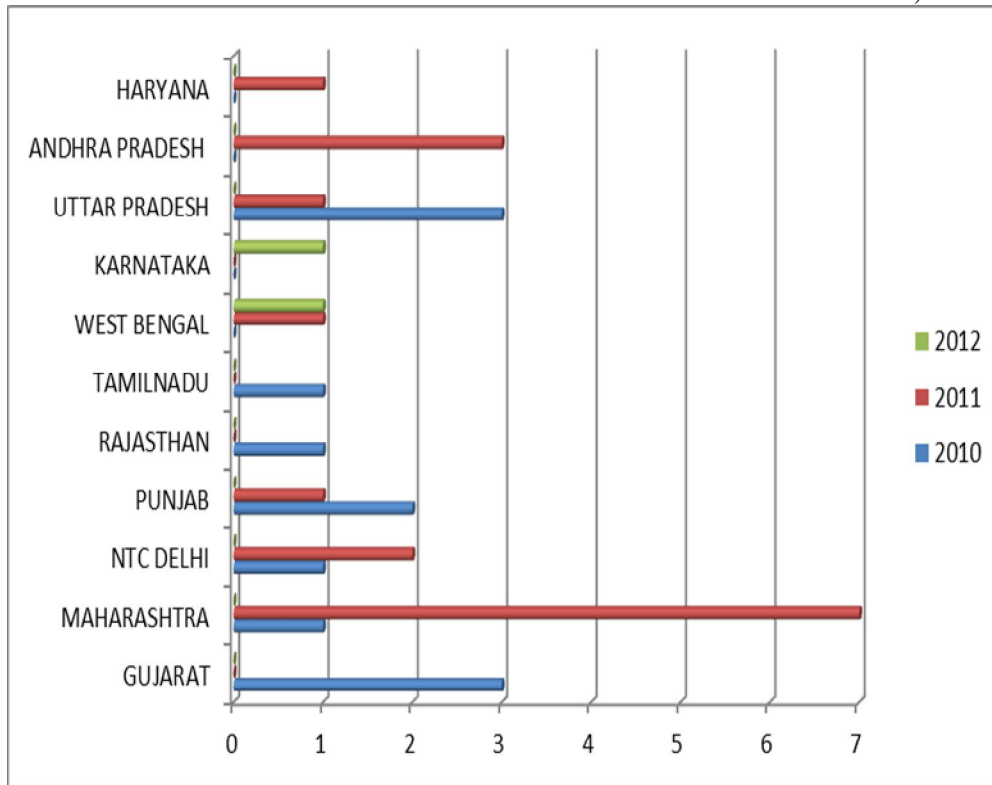
INTERPRETATION

The no. of sick units declared in 2010 was 12 and later in 2011 it was increased to 15 and in 2012, there was a drastic reduction which resulted in 2.

TABLE SHOWING STATE WISE NUMBER OF UNITS DECLARED SICK IN 2010, 2011 & 2012

YEAR	2010	2011	2012
STATES			
GUJARAT	3	0	0
MAHARASHTRA	1	7	0
NCT DELHI	1	2	0
PUNJAB	2	1	0
RAJASTHAN	1	0	0
TAMILNADU	1	0	0
WEST BENGAL	0	1	1
KARNATAKA	0	0	1
UTTAR PRADESH	3	1	0
ANDHRA PRADESH	0	3	0
HARYANA	0	1	0

GRAPH REPRESENTING STATE WISE NUMBER OF UNITS DECLARED SICK IN 2010, 2011 & 2012



MEASURES TAKEN TO REVIVE SICK UNITS

Steps taken by banks

- Giving adequate working capital when there is a shortage
- Recovery of interest reduced rate
- Defining the special cell in the RBI
- Arrange the special committee of state level in the local branch for link between the financial institution & government agency

Policy framework of the Government

- SWOT analysis of industry
- Liberalization of sick industries

Concessions by the Government

- Giving high facilities to large industries to take over the small sector for revival
- High liberalization in terms of financial rather than intervention
- Introduce the scheme for sick industry

Committees by RBI

- The Hasib Committee
- The Kohli Working Group, 2002
- Internal Group to Strengthen Credit Flow to SME Sector, Appointed by the RBI, 2005
- The State Level Inter-Institutional Committee (SLIIC)

EXAMPLES OF SICK UNITS REVIVED BY GOVERNMENT

Sl. No	Name of the company	Declared sick	Revival measure
1	Bengal Chemicals & Pharmaceuticals	The company was formally declared sick by the Board for Industrial and Financial Reconstruction (BIFR) on the 14th January, 1993	A revival package was approved by the BIFR on the 4th April, 1995
2.	Fertilizer Corporation India Limited (FCIL)	The Corporation was declared sick in November, 1992 by the Board for Industrial and Financial Reconstruction (BIFR).	ECOS on 24.8.2009 selected a suitable Revival Model.
3.	Hindustan Fertilizer Corporation Limited (HFCL)	The Company was referred to BIFR in the year 1992	An Empowered Committee of Secretaries was constituted with the mandate to evaluate all financial options for revival of the closed units of FCIL/HFCL and to make suitable recommendations for consideration of the Government.
4.	NEPA Ltd	The Company is a sick unit and under Board for Industrial and Financial Reconstruction (BIFR) since May, 1998	On 23 August 2007, Cabinet approved revival of Nepa through a Joint Venture Partner in private sector by disinvestment of Government of India equity
5.	Scooters India Limited (SIL)	Declared as sick company on 11 August 1992 by BIFR.	Revival scheme for SIL was sanctioned on 9 September 1996

PREDICTION OF SICKNESS

Though symptoms of sickness can be observed from the leading indicators, such indicators may only suggest that the unit is a potentially sick unit. However, it is not easy to arrive at a definite conclusion about the impending sickness on the basis of the leading indicators of sickness. Considerable research work has been done to identify other measurable parameters that can be used for predicting sickness. The research, in general has been done by two different methods of analysis. They are,

Univariate Analysis

Univariate analysis aims to predict sickness on the basis of a single financial ratio. Though many financial ratios were used by analysts for predicting sickness, there was no consensus as to what the most appropriate ratio is for the prediction of sickness. Such a situation prevailed till William H. Beaver published his study on univariate analysis in the year 1966. Beaver examined the predicative power of 30 different financial ratios by choosing a sample of 79 firms that had become sick and 79 firms that were healthy for the same period of time. The sample was so chosen that for each failed (sick) firm, a healthy firm operating in the same industry and having comparative size was included in the sample set. For both the set of samples of 79 firms each, Beaver examined the behavior of 30 different financial ratios during the period of 5 years prior to the failure. The main finding of Beaver was that the ratio that is most useful in predicting impending sickness is the 'ratio of cash flow to total debt', since this ratio showed the minimum error in his prediction.

Multivariate analysis, on the other hand, aims to predict industrial sickness by studying the combined influence of several financial ratios.

Altman. E.I. presented his model of multivariate analysis for predicting industrial sickness in the year 1966. In his model, Altman combined several financial ratios into a single index. He named this index as 'Z-score'. His analysis was based on a statistical procedure known as 'multiple discriminate analysis' (MDA). Altman studied a sample of 33 bankrupt firms along with a paired sample of 33 non-bankrupt firms. He examined 22 financial ratios to identify their combined influence on sickness and selected five ratios, which in his opinion jointly possess the maximum power to predict bankruptcy.

Altman derived a discriminant function ('Z') that contains five financial ratios. The discriminant function derived by Altman is as under:

$$Z = 1.20T1 + 1.40T2 + 3.30T3 + 0.60T4 + 0.999T5$$

Where,

Z = discriminant score

T1 = (working capital) / (total assets)

T2 = (retained earnings) / (total assets)

T3 = (earnings before interest and tax) / (total assets)

T4 = (market value of equity) / (book value of total debt)

T5 = (sales) / (total assets)

The Interpretation of Altman Z-Score

- **Z-SCORE ABOVE 3.0** –The company is considered ‘Safe’ based on the financial figures only.
- **Z-SCORE BETWEEN 2.7 and 2.99** – ‘On Alert’. This zone is an area where one should ‘Exercise Caution’.
- **Z-SCORE BETWEEN 1.8 and 2.7** – Good chance of the company going bankrupt within 2 years of operations from the date of financial figures given.
- **Z-SCORE BELOW 1.80** - Probability of Financial Catastrophe is Very High.

CASE STUDY:

Parrys Sugar Industries Limited (PSIL)

Parrys Sugar Industries Limited engages in the production and sale of sugar and associated products in India. The company uses its by-products to generate power; and produce bio-fertilizers and industrial alcohols, including ethanol, extra neutral alcohol, and rectified spirit. It was formerly known as GMR Industries Limited and changed its name to Parrys Sugar Industries Limited on November 15, 2010. The company is headquartered in Bangalore, India

CALCULATION OF ALTMANS Z SCORE FOR PARRYS SUGAR INDUSTRIES LIMITED

IN LAKHS

PARTICULARS	2009	2010	2011	2012	2013
T1=WORKING CAPITAL/ TOTAL ASSETS	5883.15/ 66486.7 = 0.088	10535.9/ 69511.55 = 0.1515	17599.98/ 73629.46 = 0.239	7817.16/ 86,872.12 = 0.089	316.362/ 30,891.68 = 0.010
T2=RETAINED EARNINGS/ TOTAL ASSETS	9,310.37/ 486.7 = 0.14	3,467.28/ 69511.55 = 0.049	2,166.97/ 73629.46 = 0.029	(6,637.46)/ 86,872.12 = (0.076)	(2,213.17)/ 30,891.68 = (0.072)
T3=EBIT/ TOTAL ASSETS	1279.89/ 66486.7 = 0.019	(1773.75)/ 69511.55 = (0.026)	(2630.38)/ 73629.46 = (0.036)	(2,012.93)/ 86,872.12 = (0.023)	(1,293.27)/ 30,891.68 = (0.042)
T4=MARKET VALUE OF EQUITY / BOOK VALUE OF DEBT	12718/ 43,423.68 0.293	6,874.96/ 53,372.97 = 0.129	13,074.65/ 61,800.48 = 0.212	6770.22/ 41,922.51 = 0.161	1538.91/ 9,705.08 = 0.159
T5 = SALES /TOTAL ASSETS	12684.33/ 6486.7 =0.191	19,764.49/ 69511.55 = 0.284	41,381.30/ 73629.46 =0.562	46,739.09/ 86,872.12 = 0.538	10,073.46/ 30,891.68 = 0.326
Z	0.7309	0.697	0.897	0.5585	0.1936

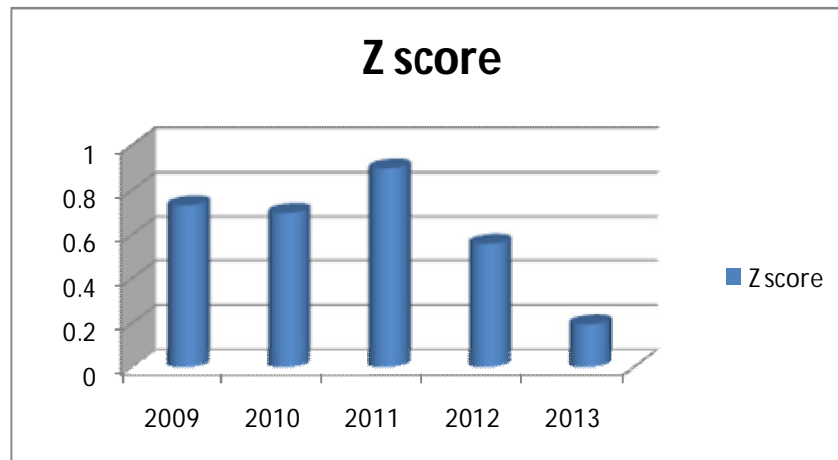
TABLE SHOWING Z SCORE CALCULATION

PARTICULARS	2009	2010	2011	2012	2013
Z – VALUE	0.7309	0.697	0.897	0.5585	0.1936

ANALYSIS

- Z score for the company is fluctuating year by year.
- In the year 2009, Z score is 0.7309.
- In the year 2010, the company has seen a dip in the Z score with the value 0.697.
- In the year 2011 it has increased to 0.897.
- In the year 2012, it has again decreased to 0.5585.
- In the year 2013, there is a substantial fall in Z score value resulting in 0.1936.

GRAPH SHOWING Z SCORE CALCULATION



Z score is below 1.80 which indicates “**Distress Zone**”. The score indicates a high probability of distress within this time period. Therefore Probability of Financial Catastrophe is Very High.

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