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Validity of Altman's Z Score Model in Determining Corporate Sickness Among Indian Companies

KEYWORDS: Altman's Z score, BIFR, corporate sickness, sick companies, non-sick companies

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ABSTRACT *The Indian Industry has witnessed a rapid growth in the post-independence era from around 3 percent during 1939-51 to 6.5 percent in 1951-65. The growth rate declined to 4 percent during 1965-80, but accelerated to 8 percent during 2000-2005 and further to 10 percent during 2005-2010. The share of the organized sector has accounted for 42 percent in manufacturing GDP in 1950-51, its share increased to 55 percent in 1979-80 and 70 percent in 2007-08 (Papola, 2012). Notwithstanding the rapid growth, quite a considerable number of companies were declared sick for various reasons in the recent decades. It is observed that that the incidence of corporate sickness has become common phenomenon from the fact that 5,689 companies having an accumulated losses to the tune of Rs.1,52,188.76 crores have been so far registered with BIFR as on 06.08.20101. This calls for distinguishing sick companies from non-sick ones. Several researches have employed Altman's model in determining how well Z score model could distinguish between bankrupt firms and non-bankrupt firms. This paper attempts to determine the extent to which Altman's Z-Score model well predicts corporate sickness among Indian companies. The study employs a sample of 30 companies declared sick by Board for Industrial and Financial Reconstruction (BIFR) and 30 non-sick companies in India during the period 2007 - 2011. The results of the study showed evidence that Altman's Z score model does not fully predict sickness among Indian companies. It is found that the percentage of sick companies correctly classified is maximum at 83.33% in the second year prior to sickness.*

INTRODUCTION

Industrial sickness is considered to be a significant issue as it has expensive consequences to the economy as a whole. The closure of sick industrial units render workers unemployed, associated business units losing their transactions, loss of revenues to the state and central governments in the form of taxes and excise duties. It contributes to high cost economy as resources gets locked up and the sick units remain an outstanding burden on the lending banks and financial institutions, thus affecting their business portfolio. It restricts the availability of such resources to other viable units. The closure of a sick unit leave investors dissatisfied, demoralizing the potential investors and demotivating the entrepreneurs who are planning to set up new industrial units. Datta, D K, 2012 explained the incidence of industrial sickness in India as alarming, as the total number of sick units in India was as high as 1,71,376 on 31.3.2003. The manpower involved in these sick units was as high as 24,73,229 on 31.12.2004, this number being higher than total industrial workforce in various developed countries, namely, Austria, Denmark, Australia, Switzerland, Sweden and New Zealand and in one underdeveloped country, namely, Srilanka.

The basic model used for predicting corporate sickness in any part of the world is Altman's (1968) Z-Score model. The model has been remarkably proved in various economies including U.S and some of the emerging markets (Altman, Hatsell and Peck, 1995). This paper tries to determine the validity of Altman's Model in predicting corporate sickness in India. According to the Sick Industrial Companies (Special Provisions) Repeal Act, 2003 passed by Indian parliament, sick industrial company means an industrial company which has at the end of any financial year accumulated losses exceeding 50 per cent of peak net worth during the last four years or has failed to repay installment of its debts or creditors in 3 consecutive quarters.

This study has become important in the light of increasing magnitude of industrial sickness in India in terms of numbers and outstanding bank credit involved.

RESEARCH OBJECTIVE

The objective of the study is to determine the extent to which Altman's model well predict industrial sickness among Indian companies.

RESEARCH METHODOLOGY

A purposive sampling has been employed to collect a sample of 30 sick and 30 non-sick companies from the official website of Board for Industrial and Financial Reconstruction (BIFR) – www.bifr.nic.in (referred on 14.06.2012). Each of the sick companies was paired with a non-sick company of same, or more or less of similar size in terms of market capitalization, belonging to the same industry type in the fiscal year of comparison. The financial data of selected companies for a period of 5 years from 2007 till 2011 was drawn from PROWESS Data Base maintained by Centre for Monitoring Indian Economy (CMIE).

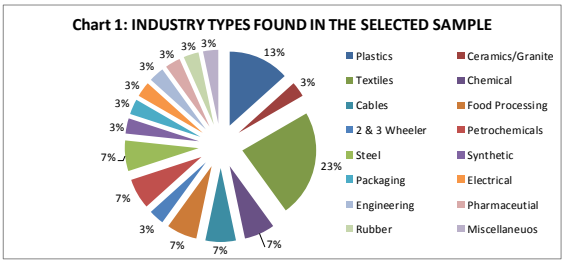

Chart 1 shows the composition of industries in the selected sample. The textile is the major industry forming 23% of the selected sample.

LITERATURE SURVEY

Several researchers have employed Altman's model to predict corporate failures. Gerantonis, N., Vergos, K., & Christopoulos, A. (2009) analyzed if Altman Z-Score model can predict correctly company failures for a period of up to three years prior to sickness. It was found that this model was useful in identifying financially troubled companies that may fail up to 2 years before bankruptcy as it matches both accounting data and market value. Chowdhury, A., & Barua, S. (2009) employed Z score model to predict risk of financial distress of Z category companies listed in Dhaka Stock Exchange (DSE). The Altman's Z score model was found to be not fully appli-

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cable for companies in Bangladesh, as the rules of accounting treatment, the rules of accounting information disclosure, and the governance structure in Bangladesh might not be corresponding with the companies considered by Altman (1968) in his model. Samarakoon, Lalith P. and Hasan, Tanweer (2003) examined 13 distressed matched with non-distressed firms in the same industry in Srilanka and of same size using Altman's Z-Score model (Z, Z', Z"). The study showed that these models have a remarkable degree of accuracy in predicting distress in smaller emerging markets. Grice, J., & Ingram, R. (2001) indicated in his study that those who employ Altman's Z-score model should re-estimate the model's coefficients rather than relying on those reported by Altman (1968).

Altman's Model

In the present study, Altman's model is tested for its validity in determining sickness prediction accuracy and misclassification errors using the selected sample of Indian companies.

The discriminant function of Altman (1993) is:

$$\mathbf{Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 1.0X_5}$$

where

X_1 = Working Capital / Total Assets (WC/TA)

X_2 = Retained Earnings / Total Assets(RE/TA)

X_3 = Earnings before Interest and Taxes / Total Assets (EBIT/TA)

X_4 =Market Value of Equity / Book Value of Total Liabilities (MVE/TL) and

X_5= Sales / Total Assets (S/TA)

The cut-off point was set at 2.675, but Altman advocates using the lower bound of the zone-of-ignorance (1.81) as a more realistic cut off Z-Score (Gerantonis, N., Vergos, K., & Christopoulos, A., 2009). In the present study, when Z score of a company fall below 1.81, then that company has a high probability of default and so such firms indicate distress. The companies with Z score greater than 1.81 have been considered to be safe. The validity of this model has been tested by examining the percentage of the companies that lie within the predictable range.

FINDINGS OF THE STUDY

The study reveals the extent to which Altman' model predict sickness in terms of percentage for four years prior to sickness. Also misclassification errors have been found out.

Table 1: Prediction accuracy and misclassification errors (Altman's Z Model)

Year	Sick Companies		Non-Sick Companies	
	Prediction accuracy	Type I error	Prediction accuracy	Type II error
2010	73.33%	26.67%	63.33%	36.67%
2009	83.33%	16.67%	66.67%	33.33%
2008	76.67%	23.33%	73.33%	26.67%
2007	66.67%	33.33%	76.67%	23.33%

Table 1 exhibits the percentage of sick companies classified as distress and percentage of non-sick companies classified as safe in the1st, 2nd, 3rd and 4th year prior to the year of sickness. In 2010, 73.3% of the companies have signaled sickness. The model shows that 83.33%, 76.67% and 66.67% of the companies have signaled in the 2nd, 3rd and 4th years prior to sickness respectively. The non-sick companies were classified correctly to a greater extent of 76.67% in 2007 than 63.33% in the 1st year and at 66.67% and 73.33% in 2nd and 3rd years respectively. The sick companies have been misclassified as non-sick at 26.67%, 16.67%, 23.33% and 33.33% in the 1st, 2nd, 3rd and 4th years. The misclassification of non-sick as sick companies exist at 36.67%, 33.33%, 26.67% and 23.33% in the 1st, 2nd, 3rd and 4th year prior to sickness.

CONCLUSION

The application of Altman's model to the selected sample of BIFR has thus declared that sick Indian companies and matching non-sick companies exhibit a moderate support to predict industrial sickness as the model predicts sickness well in the 2nd and then in the 3rd years than in the 1st year prior to sickness. Also Type I error is found to be low in the 2nd year and 3rd years than in the 1st year.

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