



Management

PREDICTING BANKRUPTCY OF SELECTED FIRMS BY APPLYING ALTMAN'S Z-SCORE MODEL



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ABSTRACT

Predication of Bankruptcy is critical task. Early stage of identification of likelihood of solvency may avoid evils in the near future & may shelter the firm from Bankruptcy situation. Bankruptcy of organizations can be predicated by using Altman's Z-Score Model. This study tries to apply the model to understand the likelihood of Bankruptcy of selected firms for past 5 years from 2011 to 2015 which are listed in BSE & NSE. Companies are selected from manufacturing & non-manufacturing sector. The study reveals that none of the companies completely belongs to Safe Zone except for few years. Most of the firms are in Distress Zone which clearly indicates that these firms may go Bankrupt in near future.

Keywords:

Bankruptcy; Altman's Z-Score Model.

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1. INTRODUCTION

Most of the organizations exist with an objective of profit maximization. To achieve profit maximization objective, firm needs strong internal & external support. The failure of internal support system such as effective utilization of funds, labor, material etc & external support system such as economic, political & socio-cultural conditions results in Bankruptcy of the organization.

Bankruptcy is a situation where the firm's total liabilities exceed total assets. The real net worth of the firm is, therefore negative. This leads to reduced sales, increased cost & losses, ineffective competition etc. Ultimately firm will be under distress stage. Under such situations it becomes difficult for investors & lenders to analyze the financial performance of the organization.

Several bankruptcy models for example, logit analysis, recursive partitioning algorithm and neural networks are available but still Altman's model is considered to be superior and pervasively applied by researchers all over the world in the present days.

Altman's Z-Score Model is the output of a credit-strength test that predicts company's likelihood of bankruptcy.

2. OBJECTIVES OF THE STUDY

This study intends to estimate likelihood of Bankruptcy of selected firms by applying Altman's Z-Score Model

3. ALTMAN'S Z-SCORE MODEL

Edward Altman Finance Professor of the Leonard N. Stern School of Business of New York University has developed the Financial Model in 1967 to predict the likelihood of bankruptcy of the company which is named as Altman's Z-Score Model. Later, in 2012 he released an updated version called the Altman's Z-Score plus Model that can be used to evaluate both manufacturing & non-manufacturing firms & public & private companies in both U.S & non-U.S companies. The investors can use this model to determine whether to buy or sell a particular stock if they are concerned about the financial strength of the organization. The Altman Z-score Plus can be used to evaluate corporate credit risk.

Altman added a statistical technique called multivariate analysis to the mix of traditional ratio-analysis techniques, and this allowed him to consider not only the effects of several ratios on the "predictiveness" of his bankruptcy model, but to consider how those ratios affected each other's usefulness in the model. The model formed by Altman for predicting a company's financial health is as follows;

3.1. THE ORIGINAL Z-SCORE FORMULA OR FOR MANUFACTURING FIRMS

X1 = Working Capital / Total Assets
 X2 = Retained Earnings / Total Assets
 X3 = Earnings Before Interest and Taxes / Total Assets
 X4 = Market Value of Equity / Total Liabilities
 X5 = Sales / Total Assets

Z score bankruptcy model:

$$Z = 1.2X1 + 1.4X2 + 3.3X3 + 0.6X4 + .999X5$$

Zones of Discrimination:

Z > 2.99 - "Safe" Zone
 1.81 < Z < 2.99 - "Gray" Zone
 Z < 1.81 - "Distress" Zone

3.2.Z-SCORE FORMULA FOR NON-MANUFACTURING FIRMS

$X1 = (\text{Current Assets} - \text{Current Liabilities}) / \text{Total Assets}$

$X2 = \text{Retained Earnings} / \text{Total Assets}$

$X3 = \text{Earnings Before Interest and Taxes} / \text{Total Assets}$

$X4 = \text{Book Value of Equity} / \text{Total Liabilities}$

Z-Score bankruptcy model:

$$Z = 6.56X1 + 3.26X2 + 6.72X3 + 1.05X4[4]$$

Zones of discriminations:

$Z > 2.6$ -“Safe” Zone

$1.1 < Z < 2.6$ -“Grey” Zone

$Z < 1.1$ -“Distress” Zone

4. METHODOLOGY**4.1.DATA COLLECTION & RESEARCH SAMPLE**

The study depends on the secondary source & annual reports (financial statements) are collected from the websites of respective organizations. The time frame of data being collected is set for past 5 years i.e. from 2011 to 2015. Study covers the sample size of 6 companies which listed in Indian stock exchanges off which 3 are from manufacturing sector & other 3 are from non-manufacturing sector. In each sector, the companies are selected based on the high profits, high loss & average profit/loss earned by them in each year. And it also considers the assets & liabilities of companies while selecting the sample

And collected data is analyzed by using Excel.

Below shown are the companies which are selected for the study for the period of 5 years.

4.2.MANUFACTURING COMPANIES

- ACC Cement Ltd (Generated Profits in all 5 years)
- Hindustan Machine Tools Ltd (HMT) (Incurred Losses in all 5 years)
- Adani Enterprise Ltd (Generated Profits in few years & Losses in few years)

4.3.SERVICES COMPANIES

- Axis bank (Generated Profits in all 5 years)
- Mahanagar Telephone Nigam Limited (MTNL) (Incurred Losses in all 5 years)
- SKS Micro Finance (Generated Profits in few years & Losses in few years)

5. DATA ANALYSIS & FINDINGS**5.1.MANUFACTURING COMPANIES****ACC Cement Ltd:**

Particulars	2015	2014	2013	2012	2011
X1	-0.03587	-0.01191	0.074433	0.138207	-0.00671
X2	0.806455	0.791518	0.781788	0.738638	1.192753
X3	0.189518	0.250383	0.294491	0.450312	0.771077
X4	0	0	0	0	0
X5	0.892294	0.92473	0.920491	0.951262	1.146959
Z	1.852398	1.954719	2.071203	2.278419	3.104074

Hindustan Machine Tools (HMT) Ltd:

Particulars	2015	2014	2013	2012	2011
X1	-3.63141	-2.93987	-3.34716	-2.56472	-2.06386
X2	-11.696	-10.103	-10.2659	-8.57175	-3.4474
X3	-1.44315	-1.5761	-0.69532	-0.567	-0.29829
X4	0	0	0	0	0
X5	0.446564	0.423785	0.600446	0.670434	0.014094
Z	-16.324	-14.1952	-13.7079	-11.033	-5.79546

Adani Enterprise Ltd:

Particulars	2015	2014	2013	2012	2011
X1	-0.09308	-0.09959	-0.06371	-0.04662	0.004293
X2	0.119686	0.115422	0.096546	0.083018	0.105249
X3	0.24078	0.193635	0.121696	0.126106	0.063122
X4	0	0	4.7E-09	5.66E-09	9.36E-07
X5	0.493031	0.465202	0.414727	0.367531	0.038188
Z	0.760421	0.674671	0.569258	0.530039	0.210853

5.2.SERVICES COMPANIES**Axis Bank Ltd:**

Particulars	2015	2014	2013	2012	2011
X1	-3.84451	-4.08709	-4.23529	1.098543	-5.46788
X2	0.187384	0.175404	0.149501	0.130204	0.249668
X3	0.162278	0.16488	0.150451	0.147624	1.856489
X4	0.04192	0.049423	0.055473	0.04217	0.001776
Z	-3.45293	-3.69739	-3.87987	1.418542	-3.35994

Mahanagar Telephone Nigam Limited (MTNL):

Particulars	2015	2014	2013	2012	2011
X1	-1.93168	-1.65366	-1.64614	-1.03816	-1.51541
X2	0.082051	0.433434	-0.50804	0.146239	0.714674
X3	-0.4576	-0.47844	-1.10981	-0.8227	-0.67947
X4	0.054759	0.060507	0.046588	0.055719	0.024103
Z	-2.25248	-1.63816	-3.21739	-1.65891	-1.4561

SKS Micro Finance:

Particulars	2015	2014	2013	2012	2011
X1	2.739209	2.319327	2.239516	2.709557	3.398973
X2	-0.70373	-1.40006	-1.64992	-1.84382	1.287141
X3	0.27674	0.187833	-0.75214	-5.1037	-0.26545
X4	0.585215	0.845358	0.812239	1.130092	0.017553
Z	2.897433	1.952462	0.649693	-3.10787	4.438216

Z Value & Firm's Classification:

Company	Year	Z Value	Zone
ACC Cement Ltd	2015	1.852398	Gray
	2014	1.954719	Gray
	2013	2.071203	Gray
	2012	2.278419	Gray
	2011	3.104074	Safe
HMT	2015	-16.324	Distress
	2014	-14.1952	Distress
	2013	-13.7079	Distress
	2012	-11.033	Distress
	2011	-5.79546	Distress
Adani Enterprise Ltd	2015	0.760421	Distress
	2014	0.674671	Distress
	2013	0.569258	Distress
	2012	0.530039	Distress
	2011	0.210853	Distress
Axis bank Ltd	2015	-3.45293	Distress
	2014	-3.69739	Distress
	2013	-3.87987	Distress
	2012	1.418542	Gray
	2011	-3.35994	Distress
MTNL	2015	-2.25248	Distress
	2014	-1.63816	Distress
	2013	-3.21739	Distress

	2012	-1.65891	Distress
	2011	-1.4561	Distress
SKS Micro Finance	2015	2.897433	Safe
	2014	1.952462	Gray
	2013	0.649693	Distress
	2012	-3.10787	Distress
	2011	4.438216	Safe

6. INTERPRETATION

The above table shows that from the selected sample of 6 companies 3 companies are in Distress Zone namely HMT, Adani Enterprise & MTNL. This means that the financial performances of these companies are pathetic & are likely to experience Bankrupt. These firms are not eligible to borrow the funds from banks & financial institutes & even the investors will be not interested to invest as they doesn't have any hopes to recover especially HMT & MTNL who's Z Values are in highly negative terms. Adani Enterprise may recover over a long period of time with effective management of financial & other resources.

Z Value of Axis Bank also falls under Distress Zone except for the year 2012. This indicates the poor financial performance of the bank. Under this case the firm has generated good amount of profits in all the 5 years but their current liabilities are in excess to current assets which indicates banks are not in a position to meet its short term obligations. Management has to take caution so that they shouldn't lose potential investors & can continue to survive in the market.

SKS Micro Finance shows mixed zones of Z Value. In the initial time frame of selected period the firm was performing badly but in later years it has showed improvements & reached safe zone.

Among the selected sample only ACC is performing consistently which is in Gray Zone.

7. CONCLUSION

This study investigated the applicability of the Altman's bankruptcy model to examine the financial soundness of the firms belonging to the manufacturing & non-manufacturing firms. The study covers the 6 companies & 5 years of time frame from 2011-2016. According to findings unfortunately, none of the companies completely belongs to Safe Zone except for few years. Most of the firms are in Distress Zone which clearly indicates that these firms may go Bankrupt in near future. It's up to top level management to design effective strategies for better control & management of resources. This may result in win-win situation for both management & investors.

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