EVALUATING FINANCIAL EFFICIENCY OF SELECTED REFINERIES COMPANIES OF INDIA THROUGH ALTMAN Z-SCORE MODEL

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Abstract

The main problem that has concerned entrepreneurs, researchers and government for years is the prediction of bankruptcy in companies. Now a days most companies are facing bankruptcy due to many micro and macro factors which is affecting our economy. Prediction of bankruptcy is a wide area of accounting research. For predicting bankruptcy many models have been developed by researchers. But in present paper a well - known model Z-Score is used. In the present paper, Altman's Z-Score model has been used on five Refineries companies which are selected randomly based on Convenience Sampling. For the study only manufacturing firms has been considered and non-manufacturing firms have been excluded.

Keywords: *Bankruptcy, Altman's Z-Score model, Prediction, Economic Analysis, Gross Domestic Product.*

INTRODUCTION

Every firm can be bifurcated into two categories i.e. profit making firm or non-profit making firm. The 1st category is set up to earn profit while 2nd is set up to fulfil objectives other than earning profit.

If the value of firm's assets is less than the value of its liabilities then a firm is said to be legally insolvent. A firm can file a bankruptcy petition if it is not able to pay its debts. There are many models available to check the bankruptcy of firms such as logit analysis, recursive portioning, algorithm and neutral networks, but almost all the available models , Altman's Z-Score model is most efficient and effective.

OBJECTIVES OF THE STUDY

The main aim of the study is to predict the bankruptcy of selected Refineries firms by using Altman's Z-Score model.

SIGNIFICANCE OF THE STUDY

India is considered as a Refinery hub and is planning to increase refining capacity to 400 MMTPA by 2025. The present capacity of refining is 249 MMTPA which consists of 23 refineries, out of which 18 falls under public sector, 3 under private sector and 2 under joint venture.

In the present research public sector companies has been considered and Altman's Z-Score model has been applied to check bankruptcy of selected companies which will be useful to lenders and other party to see whether their money is safe or not.

LITERATURE REVIEW

(Elia , Toras, Sawaya , & Balouza, 2021) The main aim of the paper is to know the financial distress in the Lebanese Alpha banks during 2009-18 using Altman Z-Score model. Altman Z-Score was calculated by the researcher for non-manufacturing companies. By using Eviews software the researcher studied descriptive analysis of variables (X_1, X_2, X_3, X_4, & Z), Pearson Correlation Matrix was used to study impact of independent variable on dependent variable. Four independent variables were used for the study. The result shown a strong positive correlation between X_1 & Z and a weak negative correlation between X_2 & Z and a weak positive correlation between X_4 & Z. Ten Alpha banks have a cut off of 1.1 which shows distressed over period 2009-18.

RESEARCH METHODOLOGY

Selection of Sample: On the basis of Convenience Sampling the researcher has selected randomly five Refineries companies as follows:
1. Indian Oil Corporation Ltd.
2. Bharat Petroleum Corporation Ltd.
3. Hindustan Petroleum Corporation Ltd.
4. Manglore Refinery & Petrochemicals Ltd.
5. Chennai Petroleum Corporation Ltd.

Source of Data: The study is purely based on the secondary data for which the data was collected from the annual reports of selected Refineries companies and other related websites.

Period of the Study: The present study was conducted for five years i.e. from 2015-16 to 2019-20.

Altman's Z-Score Model: Altman Z-Score model predicts a numerical measurement which indicates the chances of business becoming bankrupt in coming years. The model was formed by American Finance Prof. Edward Altman in 1968.

Z-Score Formula for Manufacturing Firms:
X_1 = Working Capital / Total Assets
X_2 = Retained Earnings / Total Assets
X_3 = Earnings before Interest & Tax / Total Assets
X_4 = Market value of equity / Total Liabilities
X_5 = Sales / Total Assets
Z-Score bankruptcy model:
$Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 1.0X_5$
Zones of discrimination:
Z > 2.99 to 4 - Safe Zone
1.81 < Z < 2.99 - Grey Zone
Z < 1.81 - Distress Zone

DATA ANALYSIS & FINDINGS

1. Indian Oil Corporation Ltd:

Particulars	2016	2017	2018	2019	2020
X_1	-0.14	-011	-0.06	-0.0001	0.02
X_2	0.09	0.13	0.13	0.09	0.01
X_3	0.15	0.20	0.22	0.15	0.01
X_4	0.0041	0.0019	0.0010	0.0010	0.0010
X_5	2.66	2.40	2.56	2.75	2.35
Z-Score	**3.12**	**3.11**	**3.40**	**3.37**	**2.42**

2. Bharat Petroleum Corporation Ltd:

Particulars	2016	2017	2018	2019	2020
X_1	-0.20	-0.14	-0.11	-0.09	-0.16
X_2	0.18	0.16	0.14	0.11	0.04
X_3	0.27	0.23	0.21	0.18	0.07
X_4	0.0092	0.0040	0.0030	0.0029	0.0024
X_5	4.63	3.99	4.15	4.65	3.98
Z-Score	**5.54**	**4.81**	**4.91**	**5.29**	**4.08**

3. Hindustan Petroleum Corporation Ltd:

Particulars	2016	2017	2018	2019	2020
X_1	-0.43	-0.30	-0.22	-0.17	-0.16
X_2	0.12	0.17	0.15	0.11	0.04
X_3	0.21	0.25	0.23	0.19	0.04
X_4	0.0165	0.0053	0.0036	0.0035	0.0028
X_5	5.79	4.99	5.04	5.16	3.99
Z-Score	**6.14**	**5.70**	**5.75**	**5.74**	**3.99**

4.   Manglore Refinery & Petrochemicals Ltd:

Particulars	2016	2017	2018	2019	2020
X_1	-0.24	0.06	-0.03	0.12	0.03
X_2	0.09	0.22	0.14	0.02	-0.15
X_3	0.13	0.36	0.24	0.06	-0.18
X_4	0.0028	0.0034	0.0040	0.0033	0.0024
X_5	2.99	2.59	3.10	3.30	2.80
Z-Score	**3.26**	**4.16**	**4.05**	**3.67**	**2.03**

5.   Chennai Petroleum Corporation Ltd:

Particulars	2016	2017	2018	2019	2020
X_1	0.16	0.24	-0.09	0.15	0.12
X_2	0.11	0.12	0.14	-0.02	-0.21
X_3	0.16	0.19	0.26	0.01	-0.26
X_4	0.0200	0.0253	0.0384	0.0231	0.0081
X_5	3.73	3.14	4.82	4.29	3.76
Z-Score	**4.62**	**4.24**	**5.79**	**4.49**	**2.76**

Z VALUE & FIRM'S CLASSIFICATION:

Company	Year	Z Value	Zone
1. IOC	2016	3.12	Safe
	2017	3.11	Safe
	2018	3.40	Safe
	2019	3.37	Safe
	2020	2.42	Grey
2. BPCL	2016	5.54	Safe
	2017	4.81	Safe
	2018	4.91	Safe
	2019	5.29	Safe
	2020	4.08	Safe
3. HPCL	2016	6.14	Safe
	2017	5.70	Safe
	2018	5.75	Safe
	2019	5.74	Safe
	2020	3.99	Safe
4. MRPL	2016	3.26	Safe
	2017	4.16	Safe
	2018	4.05	Safe
	2019	3.67	Safe
	2020	2.03	Grey
5. CPL	2016	4.62	Safe
	2017	4.24	Safe
	2018	5.79	Safe
	2019	4.49	Safe
	2020	2.76	Grey

INTERPRETATION

The above table shows that from the selected sample of five companies three companies namely Indian Oil Corporation Ltd., Manglore Refinery & Petrochemicals Ltd., & Chennai Petroleum Corporation Ltd. are in Grey

zone in the last year. This means that the financial performance of these three companies is consistent in last year.

Overall all the five selected companies are in safe zone and has good performance, so investors may not face any problem in receiving return from their money.

CONCLUSION

This study examined the usefulness of Altman's bankruptcy model to examine the financial soundness of firm belonging to manufacturing sector. The study considers five companies and five years i.e. from 2015-16 to 2019-20. According to the findings none of the companies falls into distress zone, so it can be concluded that Refineries sector is performing best in the economy as it contributes largely to India's GDP.

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