THE RELEVANCE OF ALTMAN Z-SCORE ANALYSIS

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ABSTRACT

Information about the future and survival of - a company and a 'prime industry' for the development of the nation is of utmost importance to investors and the government. This paper analyses the viability and accuracy of the tool "Z-Score Analysis" for the Indian Steel sector by using various ratios to know about each aspect of the companies of this sector. The tool has first been applied to Indian companies that have collapsed or have been takeover in the past to determine its accuracy and then has been applied to some of the most prominent companies in large, medium as well as small market capitalization areas to determine the health of the industry. Previous studies in this field are not of much importance as there has been a tremendous change in the industry with many takeovers and shutdowns. Hence it's of utmost importance to determine the health of the industry in the current state.

Keywords: Z score, Company, Steel Sector

I.   INTRODUCTION

One of the primary objectives of any business is survival. Only if there is survival will there be existence, subsequent growth and eventual profits. In the constantly dynamic business world, the only way to stay relevant and survive is by constantly updating. Therefore it is essential for every business to accumulate information relevant to the survival of the business. Bankruptcy prediction models have been a method for formal analysis since 1932 which ranged from the Fitzpatrick study to William Beaver's t-tests to Edward I Altman's Z score which was designed in 1968.In India, Steel Industry is known to be the sector with high risk of bankruptcy.In the present world of cut throat competition there are numerous reasons as to why manufacturing industries like steel fail and therefore efficient tools and models to predict bankruptcy in advance would help the industries, creditors and the public in general to avoid the ill effects of a company going dry or bankrupt. The Altman's Z score model is one of the most popular and most widely used bankruptcy prediction model for manufacturing companies, wherein he used multivariate analysis using various ratios to predict bankruptcy in advance. The relevance of Altman's Z score model **has not been** put

to the test by studies in the past on the Indian steel sector by applying it to companies that have gone through tough times or bankruptcy proceeding in the past and hence it is the need of the hour to study if the model works accurately for various divisions of the Indian steel sector.

II.   REVIEW OF LITERATURE

(Bussiness Line Bureau, 2018)As per the article, the steel industry is the biggest defaulter under insolvency and bankruptcy code of India with 45 defaulting companies with a total default of 57000 crores. Other sectors include non-electric goods, textiles, trading corporates, chemical as well as textiles. Steel industry has 39 companies under corporate insolvency resolution process, insolvency has been approved in case of 2 companies and the case has been resolved for 3 companies.

(Agarwa & Taffler, 2006) In their paper concluded that accounting based models of bankruptcy prediction are superior when compared to market based models based on the following facts: These models reply on balance sheets which in itself is more reliable to market data. Further, the double entry system minimizes the ability of window dressing. Loan givers are bound to rely on accounting numbers and this would mostly be accounted under accounting models.

(Rotblut, 2016) Edward Altman in his interview speaks about the growth of his model from being applicable only to the manufacturing sector in the past to newer versions of the model which can be used for any industry at present, which is the same as the older formula but with different weights assigned to each formula. He also speaks about how the Z-score should be interpreted by considering its value for over a period rather than only a single year.

(Chatterjee, 2018)The article talks about the growth of the steel industry in the current scenario after facing lot of difficulties and slow growth, which has had a favorable impact on the Indian steel industry. India's GDP has improved to 7.4% in 2018 as compared to 6.7% in the previous year 2017. This mostly benefited real estate, consumer goods, construction industry and automobile industry. Housing and construction industry consumes maximum amount of steel which has boosted the per capital income and social sector. With the various schemes under 'make-in-India', the steel industry will be in a position to grow and will be able to meet the supply requirements of steel in the country. The steel industry is facing immense threat from the import, even then the Indian steel industry is highly investing in modernization and expansion of the existing units to build a most cost effective and environmental friendly industry.

(Sivakumar, 2013) In his paper has analyzed the financial ratios of various trends and types of expenditure. He indicates that the higher expenditure on production reduces the profitability of the steel industry. Therefore, the steel sector shall make an attempt to reduce its production expenditure. Which will enhance the profitability of the steel sector. He suggests that there is a high demand of steel in global level, therefore

it is essential to increase the production level which can only be attained through increasing the level of investment in the steel sector and the government should provide tax exemption and tax holidays to the new infant sector. These measures will help the steel sector to increase its level of production.

III.   RESERACH DESIGN

STATEMENT OF PROBLEM :

There is always a dilemma in the minds of analysts and investors as to whether a model formulated in a foreign country would hold the same significance and accuracy in the Indian context as well. Thus this paper studies the relevance of the model for the Indian industry and gives a conclusion as to whether the analysis is viable in the Indian industry. Also, steel industry is one of the primary industries susceptible to bankruptcy along with other capital expenditure reliant industries such as infrastructure. This study aims to find out the current health of the steel industry at a time when the industry faces an uncertainty due to the events of growing number of acquisitions and bankruptcy proceedings.

SOURCES OF DATA:

This study is based on secondary data. The study takes into consideration one company which shut down due to bankruptcy and four bleeding companies which have been or in the process of being taken over, to judge the ability of the z score analysis to predict bankruptcy. The data will be accumulated from the balance sheets, P&L A/c and annual reports of the respective companies. Other documents such as director's report, articles and documents from websites have also been referred, to find the reasons for the companies being taken over and get relevant information on the appeals being made to NCLT to commence insolvency on the respective companies.

DATA ANALYSIS AND TOOLS:

ALTMAN'S Z- SCORE ANALYSIS

The Altman's Z score model is one of the most popular and most widely used bankruptcy prediction model. Altman used the multivariate analysis wherein he used various ratios such as working capital to total assets, retained earnings to total assets to conclude about the creditworthiness and predict the distress of the business. The formula for Z score analysis is as follows:

Z score=1.2A+1.4B+3.3C+0.6D+1.0E

Where

A=working capital to total assets

B=retained earnings to total assets

C=Earnings before interest and taxes to total assets

D=market value of equity to total liabilities

E=sales to total assets

1) Working capital to total assets ratio measures the current available working capital in relation to the total assets of the firm. It shows short term credibility of the business

2) Retained earnings to total assets ratio shows the company's dependence on debt for funding of capital. If the ratio is more, the dependency on borrowings is more and vice versa.

3) Market value of equity to total liabilities measures how much the market value will decrease prior to the liabilities becoming more than assets. In the case of private companies, the book value of the equity will be taken for this purpose.

4) Sales to total assets which shows the efficiency of the company inn using its assets.

The various thresholds followed in the industry are as follows:

Score above 2.99   - Safe

Score below 2.99 and above 1.80   - Grey zone

Score below 1.80   - Distress zone

EXPECTED OUTCOMES

This study aims to conclude with the following outcomes:

1. Numerical inference for the accuracy and relevance for Z-score analysis in the Indian steel sector

2. A measure into the health of the steel industry in the current market

3. The fate of certain bleeding companies as specified with regards to bankruptcy through prediction using the Altman's Z-score analysis

4. The beneficiary of this study will be the prospective investors and traders who would understand the stand of the steel industry in the market.

5. The accuracy of Altman Z score analysis when using it to already bankrupt companies.

LIMITATIONS

Although the aim of the study is to provide completely accurate information to the readers, the study has some inherent as well as external information:

1. Since the study uses multivariate analysis, which involves the use of various ratios,   there may be a certain amount of deviation due to rounding off   .

2. The Z Score analysis provides accurate data only if the data input is reliable. Any manipulation of data prior input is not accounted for under this analysis

3. The management of a company might at any point of time implement remedial measures and take effective decisions to overturn the fate of the company.

4. From a company's financials, it may look likely that bankruptcy looms, but the management may well succeed in improving matters.

IV. Data Analysis and Interpretation

Method :

The study is done by evaluating the Z-Score for companies that have gone bankrupt or have been taken over by other companies in the past or recently to determine the viability and accuracy of Z-Score in the context of the Indian Steel Sector. The companies chosen include – Essar Steel that started bleeding and got delisted from the Indian markets. It also includes other companies such as Electro steel, Bhusan steel, Facor steel, Uttam Value. These companies have gone through rough times in the past and have appeals filed against them in the past for commencing of the insolvency and bankruptcy proceedings. Most of these companies are on the verge of being taken over or have already been taken over. After finding the accuracy of viability and accuracy of Z-Score, two companies from each segment of market capitalization have been selected to predict its health and to determine the health of the industry in general.

Z-Score for industries which have failed in the past :

RATIO	2014		2015		2016		2017	
	Essar steel	Electrosteel	Essar steel	Electro steel	Essar steel	Electro steel	Essar steel	Electro steel
WORKING CAPITAL/TOTAL ASSETS	-0.07826	-0.51331	-0.11513	-0.12222	0.056985	-0.23548	-0.50664	-0.41803
RETAINED EARNINGS/TOTAL ASSETS	-0.07084	-0.06377	-0.08054	-0.10129	-0.15278	-0.12354	-0.23716	-0.23168
EBIT/TOTAL ASSETS	0.024769	0.104628	0.068884	0.014843	-0.04086	-0.00725	-0.02361	-0.00874
MARKET VALUE OF EQUITY/TOTAL LIABILITIES	0.061146	0.104628	0.056873	0.065626	0.054465	0.075898	0.050166	0.058756
SALES/TOTAL ASSETS	0.240522	0.046281	0.223863	0.148329	0.225276	0.205194	0.360325	0.20633
Z SCORE	0.16586	-0.692776	0.234393	-0.0517791	-0.02239	-0.2287143	0.234393	-0.6132612

From the above table we can infer that Essar steel is in a state of distress and is exhibiting a negative trend of Z-Score right from the past four years. Electro steel too had been showing a greater negative Z-Score than Essar Steel. Therefore we can infer that Z-Score predicted this correctly and both these companies had insolvency and bankruptcy proceeding on 02/08/17 and 21/7/17 respectively.

Uttam Value and Facor

RATIO	2015		2016		2017		2018	
	Uttam value	Facor	Uttam value	Facor	Uttam value	Facor	Uttam value	Facor
WORKING CAPITAL/TOTAL ASSETS	-0.27729	0.020215	-0.46369	-0.06117	-0.27411	-0.58485	-0.62677	-0.52692
RETAINED EARNINGS/TOTAL ASSETS	-0.35838	-0.39337	-0.20863	-0.56408	-0.36078	-1.24898	-0.53841	-1.69749
EBIT/TOTAL ASSETS	0.046638	-0.1628	-0.06201	-0.14869	-0.06482	-0.06616	-0.06583	-0.16777
MARKET VALUE OF EQUITY/TOTAL LIABILITIES	0.134215	0.151137	0.112814	0.075442	0.100881	0.10795	0.029234	0.0597
SALES/TOTAL ASSETS	0.989446	2.056835	0.883234	0.492382	0.909261	0.417689	0.763072	0.024769
Z SCORE	1.389403	1.083814	0.897799	-0.81615	0.921878	-2.18625	0.05749	-3.50183

It is generally believed that slightly lesser than 1.8 is a grey area but, in the case of Uttam value this score started deteriorating year on year right from 2016. From the above table we can infer that the accuracy of Z-Score increases in the immediate preceding years before the company would become bankrupt.

BHUSHAN STEEL

RATIO	2015	2016	2017	2018
WORKING CAPITAL/TOTAL ASSETS	-0.0080	-0.2860	-0.3596	-1.460
RETAINED EARNINGS/TOTAL ASSETS	-0.0235	-0.0694	-0.1268	-0.815
EBIT/TOTAL ASSETS	0.0234	0.0068	0.0215	-0.531
MARKET VALUE OF EQUITY/TOTAL LIABILITIES	0.0322	0.0228	0.0219	0.014
SALES/TOTAL ASSETS	0.2012	0.1966	0.2267	0.427
Z SCORE	0.2553	-0.2076	-0.2982	-4.209

In the case of Bhusan steel, it has been one of the most prominent cases of insolvency in the recent past and Z-Score has been successful in predicting it.

Z-Score for companies in the present :

COMPANIES	Z -score			
	2015	2016	2017	2018
LARGE CAPITAL				
SAIL	1.168402	0.582592	0.693591	1.087768
TATA STEEL	1.41995	1.233279	1.239686	1.661223
MID CAPITAL				
HISAR METAL	2.84424	2.622519	2.583692	2.955026
TECHNOCRAFT	3.273266	2.372801	3.345527	2.877532
SMALL CAPITAL				
LLOYD	0.85162	0.711688	2.509255	0.672979

KAMADHENU	4.6964806	4.16865696	4.21746736	5.27076602

From the above calculations, we can deduce that the most prominent company of the Indian steel sector is going through tough times with low working capital although their losses have been consistently been reducing. The Z- score for SAIL and Tata Steel aren't completely favorable towards them, with mid and small cap companies enjoying a good run.

V.   FINDINGS AND SUGGESTIONS

From the above study conducted to determine the health of the steel industry in India by selecting the most prominent companies as per their market capitalization, it's evident that the companies with a large market capitalization are more prone to uncertainty, while small and medium cap companies are showing better results. The above results are a result of well established companies striving to improve production by investing in capital assets to increase their production, but end up facing dull demand and imports at competitive prices. Firms could try to reduce their overheads and increase production thereby coming up with competitive prices to match the global industry standards. This accompanied by increased import duties would help the domestic sector grow and remain competitive.

VI. CONCLUSION

The above analysis indicates the perilous position of the steel industry currently in India. With major companies (small and especially big) facing cash crunch and subsequent insolvency. Excessive imports, outdated technology as well as high capital expenditure might be the main culprits. The study also shows a lack of working capital for a number of companies. Steel industry is also the industry with the highest number of defaulters in the insolvency code. The health of the industry in general is very poor. The research also proves Altman Z score to be a very competitive tool to measure the distress and future bankruptcy of a company.

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