

THE ANALYTICAL STUDY OF STEEL SECTOR USING ALTMAN'S Z-SCORE METHOD

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Abstract:-The share market is very volatile. The investors are always in a confusing state while analysing the company's performance. There are various models and techniques through the analysis of financial performance can be done. One of the model was developed by Mr. Altman for analysing the bankruptcy of the company. The aim of this research paper is to measure the risk (solvency) associated with companies in the steel sector through the detailed financial analysis of the company using Altman's Z score and retrospectively analyse event using Altman's Z score method. Reliability of the method will also be confirmed as part of the research.

Keywords: Altman's Z score, Solvency, Risk Analysis

Introduction

This research report is focussed on measurement of risk, specifically credit risk associated with a publically traded company using the corresponding Altman's Z- score. The paper will primarily focus on a specific industry/sector in Indian market focussing on analysis of the company financial statements, particularly Balance sheet and Income statement in order to derive the ratios that constitute the Altman's Z-Score. The Z-Score calculation is expected to provide a realistic view of the firm(s)/sectoral performance and the propensity for failure/bankruptcy. Such an analysis is important not only in terms of risk calculation, but also allows more rational investment decisions.

The Altman's Z-Score is a tool to measure of riskiness associated with a company, specifically the credit risk. It was proposed by Edward Altman in 1968, then an Assistant Professor of Finance at New York University. The Altman's Z-Score is a highly precise diagnostic tool consisting of a multivariate formula that is based on five financial ratios namely, liquidity, solvency, profitability, leverage and activity ratios. The Z-Score, which provides a single value derived from above 5 ratios measures the financial health of a company and predicts the probability of the company entering insolvency or bankruptcy. Since its introduction in 1968, the model has been constantly improved, with studies measuring reliability of Altman's Z-Score shown to be around 80-90%. Altman's model has provided a tool to investment managers and hedge funds in their investment strategies and management by measuring firm riskiness.

Altman derived the Z-Score model as following:

$$Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 1.0X_5$$

where,

- X_1 is the working capital / total assets.
Measures liquid assets of company in relation to its size.
- X_2 is the retained earnings / total assets.
Measures profitability that reflects the company's age and earning power.
- X_3 is the earnings before interest and taxes / total assets.
Measures the operating efficiency excluding tax and leveraging factors. It recognizes operating earnings as being very important to long-term viability.
- X_4 is the market value of equity / book value of total liabilities.
Adds market dimension that can show up security price fluctuation as a possible red flag.
- X_5 is the sales / total assets.
Standard measure for total asset turnover (varies greatly from industry to industry).

Zones of discrimination:

$Z > 2.99$ – “Safe” Zone

The company is considered ‘Safe’ based on the financial figures only

$1.81 < Z < 2.99$ – “Grey” Zone

There is a good chance of the company going bankrupt within the next 2 years of operations

$Z < 1.81$ – “Distress” Zone

The score indicates a high probability of distress within this time.

The Z-Score offers an excellent measure for evaluating the financial health of a firm—the lower the score the greater chance of failure. The score, which combines mutually exclusive ratios into a group, helps overcome the shortcomings of using individual financial ratio analysis, which often work in silos and may not always provide the correct picture. The advantage of Z-Score is that it provides a calculated measure based on experience, and not based on personal opinion. Thus, it provides a more

realistic and unbiased view of the health of the company. Almost all studies that measured the effectiveness of the model have shown that it enjoys an overall reliability of 70 to 80%.

However, neither the multiple Altman's Z-Score models nor other balance sheet-based models are recommended for use with financial companies. This is due to the inherent opacity of financial and banking companies' balance sheets and their frequent use of off-balance sheet items for accounting. There are market-based formulas that are used to predict the default of financial firms but these have been found to have limited predictive value because they rely solely on market data (fluctuations of share prices and options prices to imply fluctuations in asset values) to predict a market event (default), i.e., the decline in asset values below the value of a firm's liabilities.

Review of literature:

Since the introduction of Altman's Z score in 1968, innumerable studies have been carried out to understand its efficiency. Subsequently, numerous papers have been written by various authors highlighting the findings of these studies.

The widely popular Z-Score function used for analysing and predicting bankruptcies was first published in 1968 by Edward I. Altman (Altman, 1968). In Altman's study, the initial sample involved sixty-six corporations with thirty-three companies in each group in the time of 1946 to 1965. The Z-Score uses multiple inputs from corporate income statements and balance sheets to measure the financial status of a company.

In a study carried out studying the application of Altman's Z-Score model (Rao, Atmanthan, 2013), it has been found that Z-Score model is more appropriate for Indian manufacturing scenario compared to other models such as KMV Merton model due to latter's dependency on equity volatility.

Another study conducted (Chouhan, Chandra, Goswami, 2014) looked into financial health of Indian companies and found the Z-Score model to be applicable yet challenging.

A study (Sanesh, 2016) on 50 companies registered with NIFTY shows that Altman's Z-Score is not a prediction but an indication of likelihood of bankruptcy. Therefore, the paper concludes that even if the numbers look bleak, the management can adopt a turnaround strategy to improve the financial health. According to the paper, Z-Score is only a measure of how closely a firm resembles firms that have declared bankruptcy.

Methodology and Data:

For this paper, a desk research design will be utilised in order to analyse the financial health of company in specific sector (steel sector) of India. In such a methodology, research will make use of any/all published sources, such as financial statements, third party analyst reports, market statistics or comments and information about the issues in market. Sample for six financial years i.e. 2011-12, 2012-2013, 2013-2014, 2014-2015, 2015-2016, 2017-2018 have been used for the purpose of the current research work. Such a period will be sufficient for understanding the trends of the sector. All data collected are secondary in nature. Sources of data will include annual reports, analyst reports etc. and from financial data vendors such as Bloomberg.

Hypothesis of the research: The research is initiated with basic hypothesis that all the sample units of the steel sector are equally sound with respect to their financial health.

Altman's Z-Score							
Date	12/31/17	12/31/16	12/31/15	12/31/14	12/31/13	12/31/12	12/31/11
MANAKSIA STEEL	3.9407	4.7191	3.3867	3.9154	2.3849	2.1753	1.9449
JINDAL STEEL WORKS	1.4553	1.5856	2.1711	2.5726	1.9256	1.986	1.3873
TATA STEEL	1.585	1.1522	1.3457	1.7524	1.5429	1.8663	2.2392
JINDAL STEEL & POWER	0.8099	0.602	0.6906	0.9632	1.2417	1.9637	2.6223
SAIL	0.6805	0.6847	1.2271	1.4216	1.597	2.1105	2.67
STEEL EXCHANGE	0.6339	1.4557	1.1469	1.2623	1.0829		2.0036
BHUSHAN STEEL	-0.1542	-0.0873	0.4109	0.3792	0.784	0.9897	0.6692
VISA STEEL	-0.7412	-0.8042	-0.3918	0.0656	0.1383	0.0287	0.4434
ELECTROSTEEL STEELS	-0.7896	-0.2245	-0.3043	-0.0784	-0.2274	-0.0744	0.049
MONNET ISPAT	-0.9992	-0.4711	0.0299	0.322	0.4269	0.9296	1.4045

Source: Bloomberg L.P.

Table 1. Altman's Z-Score values of 10 Steel companies between 2011-17

Manaksia Steel reported the highest average ratio (3.21) followed by Jindal Steel Works with 1.87. Rest of the companies have Z-Scores in the Distress zone.

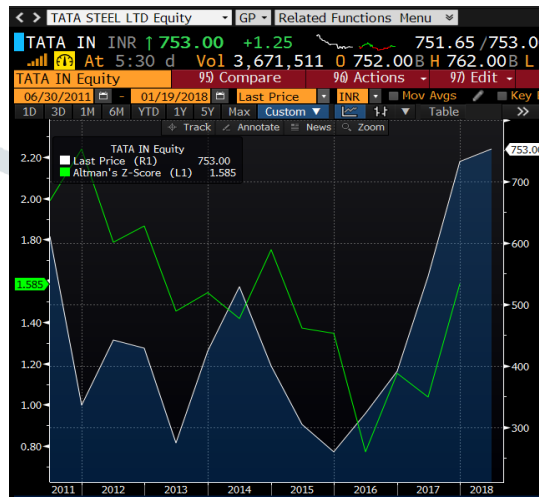
Analysis and Interpretation:

Company Analysis

During initial stage of analysis, two companies from the Indian Steel sector are selected with contrasting financial performances. On one hand, Tata Steel has performed reasonably well in spite of the headwinds faced by the sector as a whole during the period under investigation. On the other hand, Bhushan Steel had been reporting losses for consecutive financial years and has finally filed for bankruptcy

By comparing the Altman’s Z-score value to the firm’s share price performance we can get a fair idea of the accuracy of Altman’s Z-Score in predicting the financial health of the company. This will also provide an insight into whether the Z-Score can act as a leading indicator of financial performance.

Tata Steel

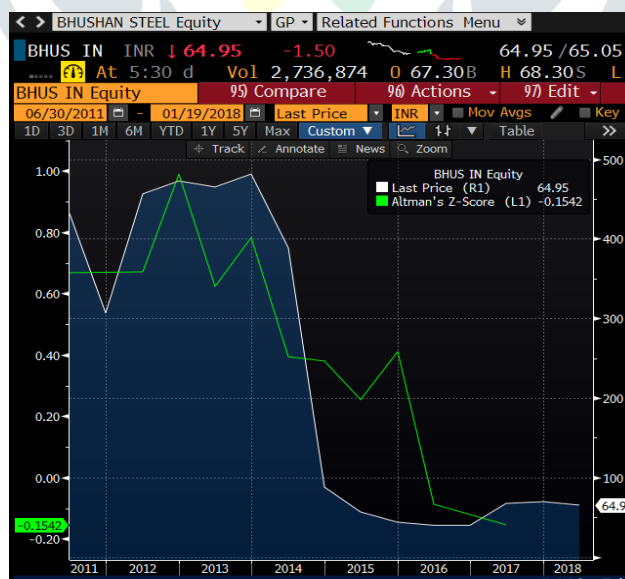


Source: Bloomberg L.P.

Figure 1. Share price v/s Altman’s Z-Score value for Tata Steel between 2011-2017

As can be seen from the graph, the share price movement closely follows the Altman’s Z-Score value movement. Additionally, it can be seen that, after the disappointing performance between 2012-2015, Tata Steel share price has risen in value along with the Z-Score value. This indicates that the company is on its way to improving its performance operationally and financially

Bhushan Steel



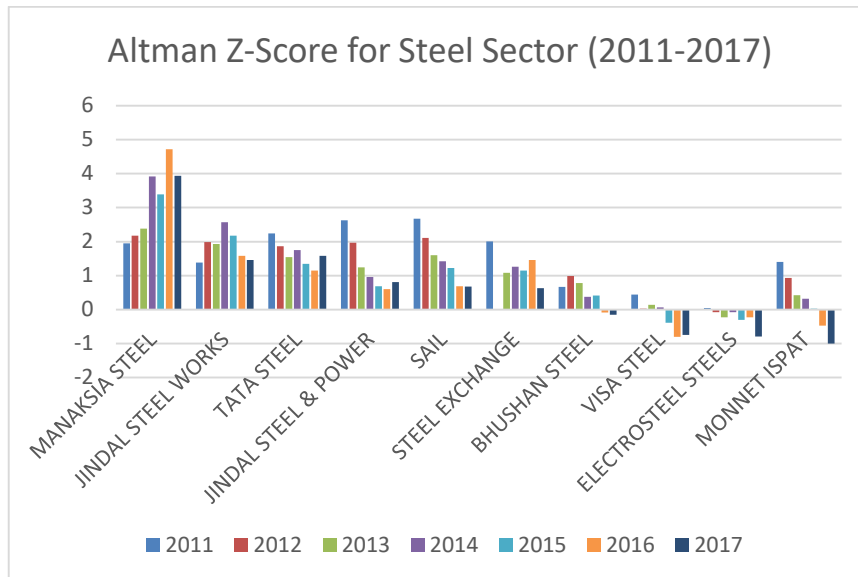
Source: Bloomberg L.P.

Figure 2. Share price v/s Altman’s Z-Score value for Bhushan Steel between 2011-2017

In case of Bhushan Steel, Altman’s Z-Score has given a reasonably advanced warning regarding its waning prospects. While the decline in Z-Score value has been comparatively more moderate, Bhushan Steel’s share prices have seen steep decline resulting from panic selling among investors.

Currently, Bhushan Steel is undergoing bankruptcy procedure through National Company Law Tribunal (NCLT). This decline and eventual demise of the company can be clearly seen in advance from the corresponding Altman’s Z-Score values.

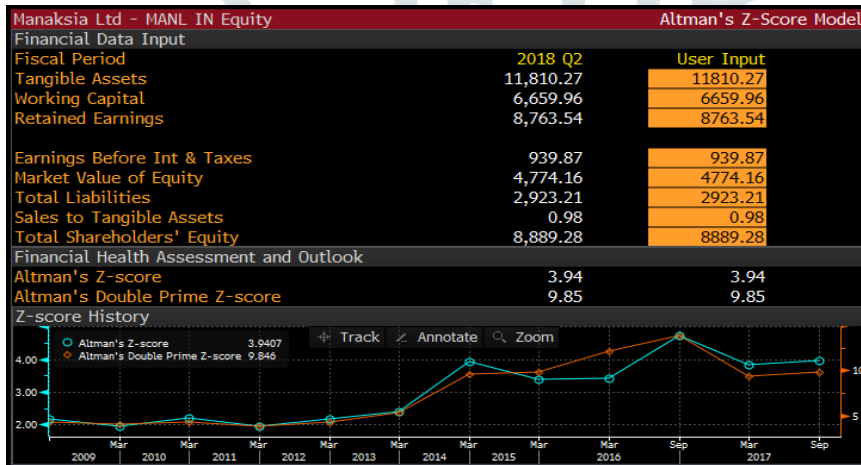
Sectoral Analysis:



Source: Calculated values from Bloomberg L.P.

Figure 3. Fluctuation in Altman’s Z-Score value for 10 Steel companies between 2011-2017

Manaksia Steel

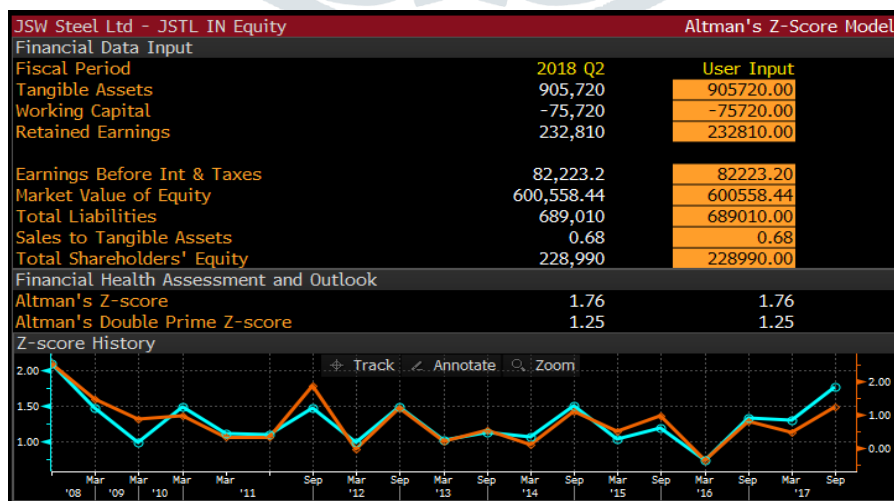


Source: Bloomberg L.P.

Figure 4. Altman’s Z-Score value and company snapshot for Manaksia Steel

Manaksia Steel has performed well and the current Z-Score value stands at 3.94 which is in Safe Zone. It has improved its Z-Score from around 2 to current level.

Jindal Steel Works

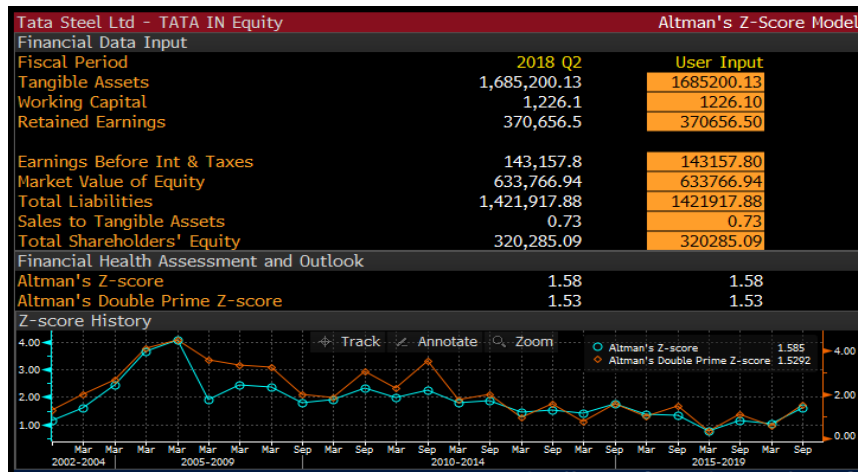


Source: Bloomberg L.P.

Figure 5. Altman’s Z-Score value and company snapshot for Jindal Steel Works

Jindal Steel Works with a Z-Score of 1.76 finds itself on the upper levels of Distress Zone. Looking at its performance over the period and the associated Z-Score values, it can be seen that despite the dip in the 2015-16 period, its prospects seem to be positive. Therefore, it is expected that the overall health will go up in coming years.

Tata Steel

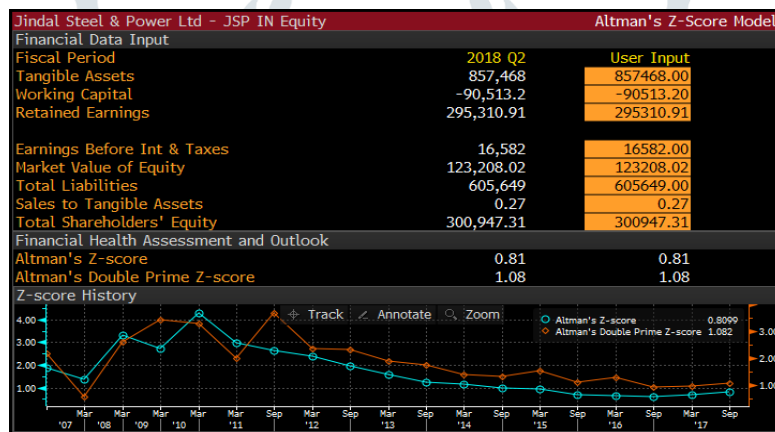


Source: Bloomberg L.P.

Figure 6. Altman's Z-Score value and company snapshot for Tata Steel

Tata Steel has been facing heavy headwind in global market especially in its European operations due to the high level of dumping carried out by Chinese manufacturers. This has resulted in plans to shut down its UK plant and subsequent PR disaster. As can be seen from graph, the downward trend mainly started around the Global Recession of 2008 and the general trend has been downward through the decade. However Since early 2017 it is showing signs of recovery. Currently, with a Z-Score of 1.58 Tata Steel is in the Distress Zone. Therefore, management needs to take urgent action as the risk of a failure is looming in the horizon.

Jindal Steel & Power

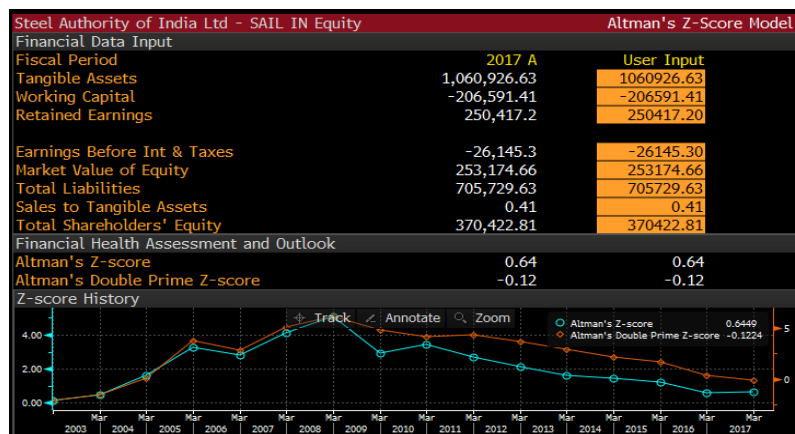


Source: Bloomberg L.P.

Figure 7. Altman's Z-Score value and company snapshot for Jindal Steel & Power

Jindal Steel & Power hit a high in mid-March of 2010 and since then the performance as well as the Altman's Score has continuously declined. The trend does not show any indication of reversal and with current Z-Score of only 0.81, the company is in Distress Zone.

SAIL

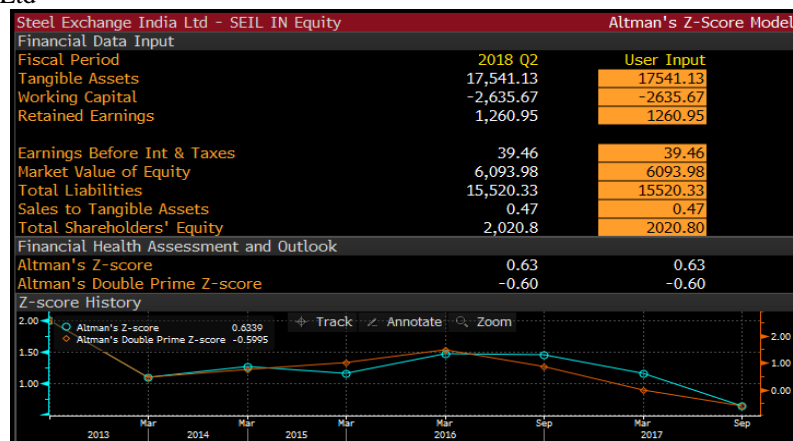


Source: Bloomberg L.P.

Figure 8. Altman's Z-Score value and company snapshot for SAIL

The State-owned SAIL has seen its financial health drop continuously since early 2008. The trend has shown no signs of reversal. However, since it is a government owned entity, it is not expected to go under. Currently it is in Distress Zone with a Z-Score of 0.64

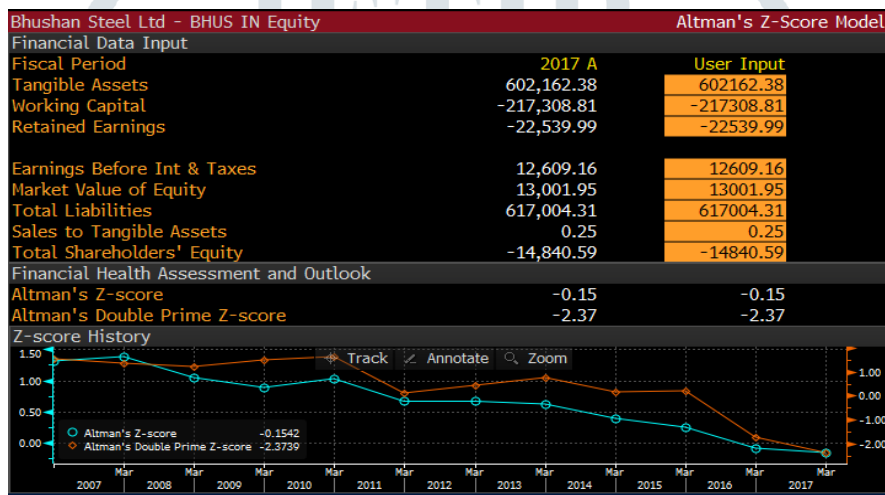
Steel Exchange Of India Ltd



Source: Bloomberg L.P.

Figure 9. Altman's Z-Score value and company snapshot for SEIL

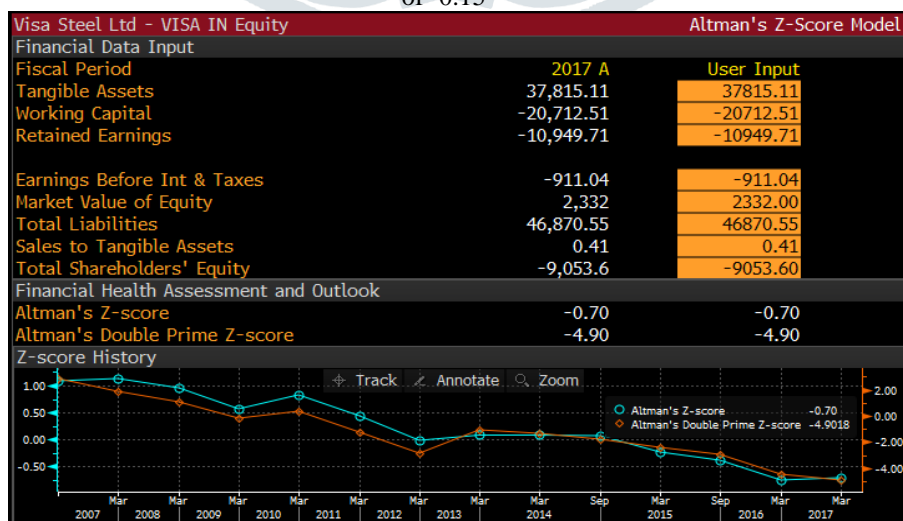
The Hyderabad based SEIL has shown declining trends through 2013-17 and the trend continues with current Z-Score at 0.63 Bhushan steel



Source: Bloomberg L.P.

Figure 10. Altman's Z-Score value and company snapshot for Bhushan Steel

Bhushan Steel is one of the steel companies which has filed for bankruptcy. This is clearly reflected by the Altman's Z-Score of -0.15

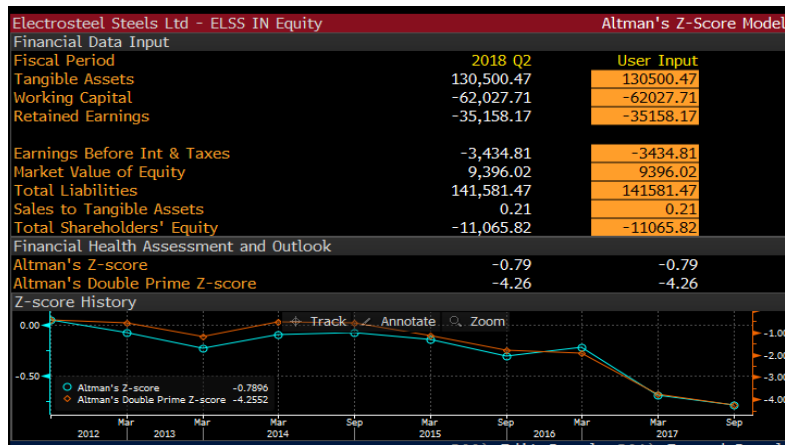


Source: Bloomberg L.P.

Figure 11. Altman's Z-Score value and company snapshot for Visa Steel

Visa Steel's Z-Score has continuously stayed at sub-zero levels and the trend has not reversed yet. Currently it is in distress zone with a Z-Score of -0.70

Electro steel Steels

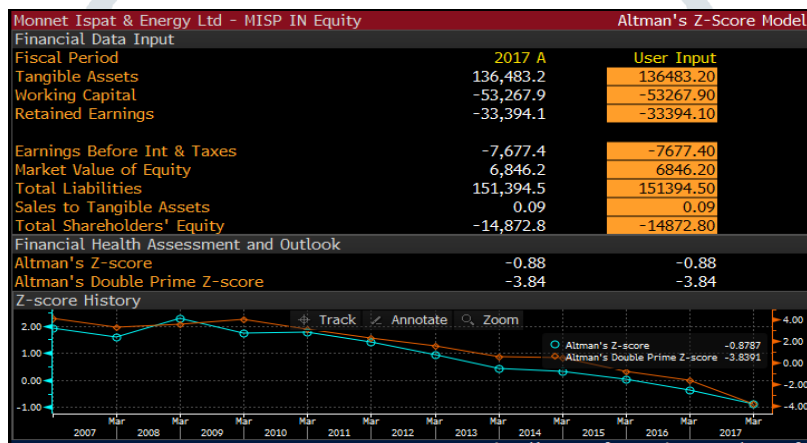


Source: Bloomberg L.P.

Figure 12. Altman's Z-Score value and company snapshot for Electrosteel Steels

Electrosteel has shown subzero performance levels in terms of Altman's Z-Score since 2012 and the trend has continued with current Z-Score at -0.79

Monnet Ispat



Source: Bloomberg L.P.

Figure 13. Altman's Z-Score value and company snapshot for Monnet Ispat

Monnet Ispat has also shown abysmally poor performance since the recession is in distress zone with Z-Score of -0.88

Summary of Findings:

The average Z-Score of Steel sector is 1.099402857 during the period of study (2011-17). It clearly indicates that Steel sector is facing difficulties due to internal and external factors. Thus the financial health of steel sector has deteriorated over the years.

From the average Z-Scores obtained, the financial health of each company can be predicted as below.

Company	Average Z-Score	Zone
MANAKSIA STEEL	3.21	Safe
JINDAL STEEL WORKS	1.87	Grey
TATA STEEL	1.64	Distress
JINDAL STEEL & POWER	1.27	Distress
SAIL	1.48	Distress
STEEL EXCHANGE	1.26	Distress
BHUSHAN STEEL	0.43	Distress
VISA STEEL	-0.18	Distress
ELECTROSTEEL STEELS	-0.24	Distress
MONNET ISPAT	0.23	Distress

Source: Calculated from Bloomberg L.P.

Table 2. Average Altman's Z-Score value for 10 steel companies and Zone positions

Thus, retrospective analysis of Bhushan Steel shows that, Altman's Z-Score successfully predicted its bankruptcy.

Scope for Further Research

The current research has been limited to just one sector by taking only 10 companies into consideration. This does not give a comprehensive picture of application of Altman's Z-Score method in Indian context. Additionally, the years under study (2011-17) has witnessed very lean period for the Steel sector and therefore, in order to achieve a more rounded look at the sector, a longer period needs to be considered.

A future study using a larger number of firms will be able to bring out much more interesting aspects of this particular bankruptcy prediction model and its use in the Indian scenario. Moreover, the study focussed more on the steel sector in India. A much more comprehensive study covering various sectors can be carried out in order to understand the real importance of the prediction model in an emerging economy like India with emphasis on services and analyse the sectoral behaviours.

Conclusions

Since the recession of 2008, Indian steel manufacturing industries have been in dire condition, and even the big players have not been able to reverse the negative slide. Therefore, the onus is on the industrial leaders as well as the government to shed the loss making entities and to consolidate the players in order to recapture the competitiveness in the global market in the face of increasing competition from other Asian players especially China. There are positives in the overall analysis and it is hoped that with right policy framework and quick and bold decision making, the sector can grow.

With tools such as bankruptcy prediction model using Altman's Z-Score, it becomes imperative on the part of management of industries as well as investment firms to maintain due diligence in all operations and decision making. Such advance notice providing tools cannot be relegated to theoretical sessions and need to be adopted industry wide.

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