

## EVALUATION OF FINANCIAL DISTRESS IN METAL AND MINING INDUSTRY USING GROVER MODEL

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### **ABSTRACT**

Investment is one of important coin of economy. To make investment, financial performance of the company should be known. Financial performance of the company can be easily evaluated by profitability ratio, Liquidity ratio, activity ratio and soon. Financial distress model is framed based on financial ratios. This study aim to analyse the financial performance of selected metal and mining industry listed in national stock exchange. Data are collected for period of 5 years. Grover model is used for analysing the financial distress of the companies.

***Keyword: Grover model, financial distress, Metal, Bankruptcy.***

### **INTRODUCTION:**

Bankruptcy is the legal proceeding involving a person or business that is unable to repay outstanding debts. Long back, about 200years ago Thiruvallur had contributed Thirukkural. Thirukkural, is a collection of couplets on ethics, politics, love and economic matters. His 385 Kural states,

*“EYATRALUM EETALUM KAATHALUM KATHA VAZHUGUTHALUM VALLADHU ARASU.”*

This means ‘Producing, saving, protecting, regulating and equitably sharing is the way to powerful governance.’ Due to lack of proper planning and governance it paves the way for bankruptcy in many industries.

There are many companies listed in National Stock Exchange .Each company is categorised sector wise. Among all Metal and mining industry plays an important role in infrastructure development and economy. Metal and Mining Industry holds a fair advantage in cost of

production and conversion costs in steel and alumina in India. “India is the 3<sup>rd</sup> largest producer of coal. India ranks 4<sup>th</sup> in terms of iron ore production globally. India became the world, second largest crude steel producer in 2018 with output 106.5 million tonnes.” (IBEF - INDIAN AUTOMOBILE INDUSTRY REPORT (OCTOBER 2019)).

Even though the Metal and mining industry holds a good market size, it is essential to analysis the financial performance of this sector. Since many financial changes like demonetization, GST and many taken place. The Indian economy is facing major Challenges. Therefore this study aims at analysing the financial performance by bankruptcy model.

Prediction of Bankruptcy is of increasing importance to corporate governance (Fich & Slezak, 2008). Bankruptcy arises when the amount of organization debt is higher than its value of existing assets (Gitman, 1996). The high production costs, financial activities weakness, ineffective sales activities, managerial failures or mixture of these reasons can be a warning for a company for bankruptcy (Shankar, 2013).

Over the last two decades investment in stocks are increasing. Stock market plays the vital role in uplifting the economy of the country. The introduction of demonetization, GST and many other financial changes affects the stock market. Therefore for the stakeholders as well as for the society the prediction of financial distress is of greater importance.

The bankruptcy prediction models have been used to analyse the financial performance of the industries. There are five model constructed to study the bankruptcy. Altman, Springate, Ohlson, Grover & Zmiskwi are the five basic models for bankruptcy. Using Grover model, this study focused on the accuracy of the test models for the prediction of financial distress bankruptcy .

### **REVIEW OF LITERATURE:**

**Arpita Agarwal, Ity Patni (2019)** the study is intended to evaluate the significance of bankruptcy prediction models. The aim of the research is to analysis the best bankruptcy model among 5. The five models are Springate, Ohlson, Zmijewski, Grover and Altman. It is done through comparative analysis in empirical applications. He concludes that while in predicting the performance of the firms, the investors, and policy makers should not only rely on a single bankruptcy model to predict the performance of firms.

**Hasan PAKDAMAN ( 2018 )** this study determine the efficiency of Altman, Springate, Zmijewski and Grover models in prediction of the bankruptcy status of companies admitted to Tehran Stock Exchange. In this research, after determining the normal distribution of data using correlation tests, each of the research hypotheses has been tested and regression test has been used to answer the research hypotheses. Correlation test was also used to examine the significance of each bankruptcy model and for fitting the research model; multiple linear regression was used for panel data. The findings of the research indicate that in the high bankruptcy models, Grover, Altman, Springate and Zmijewski models are better able to predict financial crises.

**RADHA GANESH KUMAR (2012)** in this study the financial performance of Texmo Industries in analysed. This study uses Z- Score model, O-Score model and Zmijewski's model for financial model bankruptcy analysis. The study arrived at the conclusion that Ohlsons model is best among all model.

### **OBJECTIVES OF THE STUDY**

The objectives of the study are as follows:

1. To forecast likelihood of bankruptcy of sample metal and mining units in India.
2. To evaluate investor's creditworthiness through Grover score model.

### **RESEARCH METHODOLOGY:**

Data for this study is collected from the financial statements of bankrupted or to be bankrupted companies over the last 5 years from 2014-15 to 2018-19. The data was collected from money control. To predict the bankruptcy, Grover model is used. The extracted data from the financial statement are fitted into the Grover model. The Grover model is as follows.

#### **Grover Model**

Grover Model is a model created by restoration or redesigns of the model of the Altman Z-Score. It takes X1 and X3 of the Altman model and then adds profitability ratios which are indicated by ROA.

Equation is as follows:

$$\text{Score} = 1.650X1 + 3.404X2 - 0.016ROA + 0.057$$

Description:

X1 = Working capital / Total assets

X2 = Earnings before interest and taxes / total assets

ROA = Net income / Total assets

**DATA ANALYSIS AND INTERPRETATION**

<b>Table1 :RATIO OF WORKING CAPITAL TO TOTAL ASSETS</b>							
<b>SL.NO</b>	<b>COMPANIES</b>	<b>2014-15</b>	<b>2015-16</b>	<b>2016-17</b>	<b>2017-18</b>	<b>2018-19</b>	<b>AVERAGE</b>
1	VEDANTHA	8.9E-06	4.7E-06	6.8E-06	5.2E-06	5.1E-06	0.0006
2	TATA STEEL	1E-05	9.2E-06	1.3E-05	1.8E-05	8E-06	0.0012
3	JSW STEEL	2.1E-05	1.4E-05	1.4E-05	1.5E-05	1.3E-05	0.0015
4	HINDALCO	3.8E-05	4E-05	2.9E-05	3.4E-05	3.4E-05	0.0035
5	COAL INDIA	0.00035	0.00025	0.00024	0.00010	0.00023	0.0236
6	MONNET ISPAAT	8.5E-05	9.7E-05	4.9E-05	3.5E-05	0.00063	0.0180
7	BHUSHAN STEEL	3E-05	5.3E-06	5.7E-06	4.4E-06	8E-05	0.0025
8	ALOK INDUSTRIES	8.1E-05	5.2E-05	3.5E-05	2.6E-06	2.6E-06	0.0035
9	JAYPEE INDUSTRIES	4.58E-08	0.00018	-0.0001	8.8E-05	5.7E-05	0.0042

Source: Computed from annual reports of the sample units from 2014-15 to 2018-19.

Table 1 shows the average ratio of working capital to total assets of sample metal and mining sector from 2015 to 2019. The average net liquid assets to total assets are normally low in all the selected sample sectors. The Vedanta Industries Ltd. recorded negative very low net liquid assets ratio of -0.0006% indicating inadequate liquid assets to meet the demand.

**TABLE 2 : RATIO OF EBIT TO TOTAL ASSETS**

<b>SL.NO</b>	<b>COMPANIES</b>	<b>2014-15</b>	<b>2015-16</b>	<b>2016-17</b>	<b>2017-18</b>	<b>2018-19</b>	<b>AVERAGE</b>
1	VEDANTHA	0.085	-0.331	0.221	0.213	0.112	6.01
2	TATA STEEL	0.250	0.169	0.164	0.181	0.402	23.31
3	JSW STEEL	0.148	-0.243	0.216	0.282	0.383	15.71
4	HINDALCO	0.167	0.183	0.234	0.238	0.217	20.77
5	COAL INDIA	0.003	0.003	0.005	0.006	0.006	0.51
6	MONNET ISPAAT	-0.305	-0.575	-0.648	-0.788	-2.537	-97.07
7	BHUSHAN STEEL	-0.080	-0.238	-0.232	-0.495	-0.109	-23.06
8	ALOK INDUSTRIES	0.065	-0.662	-0.592	-3.336	-0.906	-108.62
9	JAYPEE INDUSTRIES	0.070	-0.096	-0.253	-0.353	-0.193	-16.50

Source: Computed from annual reports of the sample units from 2014-15 to 2018-19.

Table 2 reveals that the average ratio of Earnings before Interest and Taxes to Total Assets of the sample metal and mining units from 2014-15 to 2018-19. The average ratio is recorded highest in Tata steel (23.31%) and Hindalco (20.77 %) when compared to all other sample units. The ratio indicates how effectively a company is using its assets to generate earnings.

Alok Industries ( -108.62 % ) , Monnet Ispaat (-97.07 % ) , Bhushan steel ( -23.06 ) , Jaypee Industries ( -16.5 % ) are showing negative earnings which indicates inadequate long term viability.

<b>TABLE 3 : RATIO OF NET INCOME TO TOTAL ASSETS</b>							
<b>SL.NO</b>	<b>COMPANIES</b>	<b>2014-15</b>	<b>2015-16</b>	<b>2016-17</b>	<b>2017-18</b>	<b>2018-19</b>	<b>AVERAGE</b>
1	VEDANTHA	0.000401	0.000686	0.000912	0.000415	0.000490	0.06
2	TATA STEEL	0.000915	0.001001	0.000870	0.001279	0.001902	0.12
3	JSW STEEL	0.203911	-0.185742	0.271738	0.337156	0.438664	21.31
4	HINDALCO	0.222916	0.239114	0.290079	0.294026	0.272545	26.37
5	COAL INDIA	0.000013	0.000016	0.000023	0.000028	0.000029	0.002
6	MONNET ISPAAT	-0.001067	-0.002560	-0.002677	0.002846	-0.002388	-0.23
7	BHUSHAN STEEL	-0.001268	-0.001098	-0.001090	0.002325	-0.000510	-0.13
8	ALOK INDUSTRIES	0.000304	-0.003112	-0.002782	0.015679	-0.004258	-0.51
9	JAYPEE INDUSTRIES	0.000330	-0.000449	-0.001191	0.001660	-0.000908	-0.08

Source: Computed from annual reports of the sample units from 2014-15 to 2018-19.

Table 3 reveals that the average ratio of Net Income to Total Assets of the sample metal and mining units from 2014-15 to 2018-19. The average ratio is recorded highest in Hindalco (26.37 %) and JSW steel (21.31%). This indicates how efficiently a company can manage its assets to produce profits during a period. Alok Industries (-0.51 %), Monnet Ispaat (-0.23 %), Bhushan steel (-0.13 %), Jaypee Industries (-16.5 %) are showing negative earnings which indicates low profitability.

<b>TABLE 4 : GROVER SCORE FOR SAMPLED COMPANIES</b>					
<b>SL.NO</b>	<b>COMPANIES</b>	<b>X1</b>	<b>X3</b>	<b>ROA</b>	<b>GROVER SCORE</b>
1	VEDANTHA	6%	6.01%	0.06%	0.69

2	TATA STEEL	23%	23.31%	0.12%	1.04
3	JSW STEEL	16%	15.71%	21.31%	0.21
4	HINDALCO	21%	20.77%	26.37%	0.26
5	COAL INDIA	1%	0.51%	0.00%	0.58
6	MONNET ISPAAT	-97%	-97.07%	-0.23%	-0.91
7	BHUSHAN STEEL	-23%	-23.06%	-0.13%	-0.17
8	ALOK INDUSTRIES	-	-	-0.51%	-1.02
9	JAYPEE INDUSTRIES	-17%	-16.50%	-0.08%	-0.11

Source: Computed from annual reports of the sample units from 2014-15 to 2018-19.

Table 4 reveals that the financial health of sample metal and mining companies in India. From the selected companies, Tata steel was the company whose Grover score is greater than all other selected companies. Vedanta, Tata Steel, JSW, Hindalco and Coal India are the companies that are in Healthy Zone. Jaypee Industries, Bhushan steel, Monnet Ispaat and Alok Industries are the companies that are in Bankruptcy zone.

**TABLE 5: FINANCIAL HEALTH OF SAMPLED COMPANIES**

SL.NO	COMPANIES	GROVER SCORE	FINANCIAL HEALTH
1	VEDANTHA	0.69	Healthy Zone
2	TATA STEEL	1.04	Healthy Zone
3	JSW STEEL	0.21	Healthy Zone
4	HINDALCO	0.26	Healthy Zone
5	COAL INDIA	0.58	Healthy Zone
6	MONNET ISPAAT	-0.91	Bankruptcy Zone
7	BHUSHAN STEEL	-0.17	Bankruptcy Zone
8	ALOK INDUSTRIES	-1.02	Bankruptcy Zone
9	JAYPEE INDUSTRIES	-0.11	Bankruptcy Zone

**FINDINGS:**

1. Vedantha, Tata steel, JSW Steel, Hindalco, Coal India are the company that in healthy Zone whose liquid assets holds good to meet their demand.
2. Monnet Ispaat, Bhushan Steel, Alok Industries and Jaypee Industries are in Bankruptcy zone. Because of inadequate long term viability Monnet Ispaat and Alok Industries hold high percentage in Grover score for Bankruptcy.
3. Insolvency proceeding were initiated against Bhushan steel in 2017. And in May 2018, Tata steel has announced the acquisition of Bhushan steel.

**CONCLUSION:**

The companies that are selected for analysis is undergoing financial difficulties in terms of leverage. The analysis shows the main cause for insolvency is improper utilisation of assets to generate earnings. Bhushan Steel Industries had been taken over by Tata steel company in May 2018. Therefore insolvency threat to Bhushan steel is fairly decreasing. This shows the condition of bankruptcy is probable in any company. The warning signs of Grover score model for the bankruptcy zone have the ability to assist management to design effective strategies for better control and management of resources.

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