DIAGNOSIS OF FINANCIAL HEALTH OF CONSUMER GOODS (WHITE GOODS) INDUSTRY IN INDIA

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ABSTRACT

A company's financial health is best indicated by its profit performance. But profit cannot be considered as the only important bottom line to assure the financial health of a company. Along with profitability liquidity, solvency & turnover is also equally important. Normally to assess the financial health of the company or to analyse the financial statements of the company, Ratio Analysis is widely used. Ratios give analysis of different aspects of a company on a standalone basis. Moreover, the calculation & interpretation of different ratios also does not have a common base. Z – Score Analysis integrates five key performance ratios into a single score, thus giving investors a better reality check of the financial health of the company in which they are intending to invest. This paper applies Z – Score Model to all the Consumer Goods (White Goods) Industries listed on BSE in India. An attempt is made to calculate and analyze Z – Score of the selected companies on the basis of their past five years performance and to comment on the probability of bankruptcy in these companies. White Goods refers to heavy consumer durables like Air Conditioners, Washing Machines, Refrigerators, etc.

KEY WORDS – financial performance, Z – Score Analysis, Ratio Analysis, Bankruptcy determination, White Goods.

INTRODUCTION

Finance is the back bone of any industry. Every business unit in order to carry out its operations smoothly needs to earn profit. Now business operates in a dynamic, unpredictable & highly volatile environment. It is important for units to be financially healthy to stand headstrong in this competitive era.

A firm becomes bankrupt if its liabilities exceeds than what its assets represent. Business unit fail because of many reasons like – incompetent management, international competition, high interest rates, downfall in demand etc.

According to **Adeyemi**, Financial distress is a situation in which a business unit is having managerial, operational & financial difficulties. If prediction of bankruptcy based on analysis and study of distress in the business unit becomes possible, management may be in the position to revive the business unit and avert bankruptcy by taking necessary steps before it is too late. Moreover, if investors are in a position to analyze about the financial health of the business unit in which they are desirous to invest, they may take prudent decision so as to ensure maximum return in their investment.

The first multivariate bankruptcy prediction model was developed by E.I. Altman from New York University in the late 1960's. After this pioneering work, the multivariate approach to failure prediction spread worldwide among researchers in finance, banking, and credit risk. Failure prediction models are important tools for bankers, investors, asset managers, rating agencies, and even for the distressed firms themselves.

INTRODUCTION, THEORY, CALCULATION AND INTERPRETATION OF Z- SCORE ANALYSIS

(Wikipedia) The Z-score formula for predicting bankruptcy was published in 1968 by Edward I. Altman. The formula may be used to predict the probability that a firm will go into bankruptcy within two years. Z-scores are used to predict corporate defaults and are an easy-to-calculate control measure for the financial distress status of companies in academic studies. The Z-score uses multiple corporate income and balance sheet values to measure the financial health of a company. The Z-score is a linear combination of four or five common business ratios, weighted by coefficients. The coefficients were estimated by identifying a set of firms which had declared bankruptcy and then collecting a matched sample of firms which had survived, with matching by industry and approximate size (assets).

Altman applied the statistical method of discriminant analysis to a dataset of publicly held manufacturers. The estimation was originally based on data from publicly held manufacturers, but has since been re-estimated based on other datasets for private manufacturing, non-manufacturing and service companies.

The Z-score formula: $\boldsymbol{Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 1.0X_5}$.

X_1 = working capital / total assets. (It measures liquid assets in relation to the size of the company).

X_2 = retained earnings / total assets. (It measures profitability that reflects the company's age and earning power).

X_3 = earnings before interest and taxes / total assets. (It measures operating efficiency apart from tax and leveraging factors).

X_4 = market value of equity / book value of total liabilities. (It adds market dimension that can show up share’s price fluctuation as a possible red flag).

X_5 = sales / total assets. (It is a standard measure for total asset turnover).

Z-Score is interpretation: **Z > 2.99 – Safe Zone; 1.81 < Z < 2.99 – Grey Zone and Z < 1.81 Distress Zone**

REVIEW OF LITERATURE

A study conducted by (Coopers, 2002) on 1,200 publicly owned manufacturing companies (data from 1998 to 2001) concluded that the Z-score remains a viable measure of financial distress.

It has been used to predict viability in a number of sectors like telecommunications (Permatasari, 2006), textiles industry (Malik, 2016), pharmaceuticals (R., 2009), etc. In all these situations, it was found that the respective industries were in distress financial situation, which was later proved correct. The studies thus proved that Altman model of Z-score would provide accurate prediction of financial distress.

(Aloy Niresh, 2015) Based on their study concluded that there was greater likelihood in the firms listed under the Trading Sector to go bankrupt in the near future. Moreover, none of the firms listed under the Trading Sector were financially sound. Hence, the ultimate responsibility is vested in the hands of top management to bring their organizations back on track or to build them up as financially sound since it is beneficial to the companies, its stakeholders and eventually to the country.

(C, 2016) Altman Z score is a likely hood and not a prediction. From a company's financials, it may look likely that bankruptcy looms, but the management may well succeed in improving matters. However, for the thinking investor, it's wise to keep an eye on this number and have an insight into a company's solvency.

(Sajjan, 2016) In her 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. 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.

(Yi, 2012) The financial data of China's 40 listed real estate companies is processed in this study, and statistic analysis is conducted, so as to judge the effectiveness of Z-score model on financial risk early warning of China's listed real estate companies.

(Rawi, 2008) The researchers used Altman Z-scores and ratio analysis approaches to conclude their views why the firm under study went bankrupt. Therefore, we concluded that Altman's model may be used as an indicator and perhaps evidence to determine the firm's bankruptcy- in the future. We know that a mathematical model is an abstraction of reality, therefore, we believe that further evidence and economic indicators may be needed to determine outcome of the firm's future operating activities and its financial position performance.

(Amulya, 2017) The results reveal that for Motorcycles/Mopeds manufacturers are doing substantially well supported with high demand from middle income group. Scooters and 3-wheelers are facing prominent fluctuations which have constituted own strategies to compete. Both Passenger car and commercial vehicle manufacturers are confronting serious issues since major policy changes in recent years.

RESEARCH METHODOLOGY

1. **Objectives:**

a) **Primary:** To identify the solvency of Consumer Goods (White Goods) Industries listed on BSE by using Z-Score Model.
b) **Secondary:** To carry out the comparative analysis of the financial position of the said industries.

2. **Research Design:**

Descriptive research design is followed.

3. **Population of the Study:**

All the companies segmented into different sectors listed on the BSE comprise of the population of the study.

4. **Sample Size:**

Consumer Goods (White Goods) Industries are selected. Total of 8 companies are listed in this sector on BSE:

1. Whirlpool Corporation
2. Symphony Limited
3. Blue Star Limited
4. Jhonson Controls – Hitachi Air Conditioning Limited
5. IFB Industries Limited
6. LEEL Electricals Limited
7. Fedders Electrics & Engineering Limited
8. Value Industries Limited

5. **Type of Data & Data Collection:**

Secondary Data collected from the Annual Reports of the Company are used for this study.

6. **Tools & Techniques of Analysis:**

a) Altman's Z-Score Model
b) Mean, Standard Deviation & Coefficient of Variation
c) Comparison of Profitability & Z-Score of the companies

7. **Limitations of the Study:**
1. Time frame of 5 years is only considered
2. Z-Score Analysis only predicts the likelihood of bankruptcy and not bankruptcy
3. Use of secondary data

ANALYSIS & INTERPRETATION

Z-SCORE ANALYSIS:

1. **Whirlpool Corporation:**

Variables	Measures	2017	2016	2015	2014	2013
1.2x1	Liquidity	0.4086	0.42948	0.35575	0.26029	0.18937
1.4x2	Profitability	0.66015	0.64572	0.59736	0.54711	0.49617
3.3x3	Operating Efficiency	0.54428	0.53054	0.53753	0.36938	0.43421
0.6x4	Market performance	0.57503	0.89408	0.99027	1.22343	1.19239
1.0x5	Solvency	1.51606	1.69135	1.78145	1.80658	2.00272
Z-Score		3.70411	4.19117	4.26236	4.20680	4.31486
Analysis		Safe	Safe	Safe	Safe	Safe

From the above, it can be interpreted that the Financial Stability of the Company is quite good. The Company has managed to maintain their Z-Score in Safe Zone throughout the selected period. Z-Score is on a higher side indicating good financial health. It is true, the Company has witnessed a fall in the Z-Score but it is still in Safe Category. The Company has a very good market share and brand value attached to it. Because of this, the market share of the company is also quite high. Investment in shares of this Company might be a very good idea both from profitability as well as safety point of view.

2. **Symphony Limited:**

Variables	Measures	2017	2016	2015	2014	2013
1.2x1	Liquidity	0.60294	0.20063	0.24013	0.1092	0.58946
1.4x2	Profitability	1.14961	1.15709	1.03188	0.9779	1.02043
3.3x3	Operating Efficiency	1.46428	1.53677	1.39409	1.3849	1.23863
0.6x4	Market performance	0	0	2.95385	1.966	1.966
1.0x5	Solvency	1.23398	1.1393	1.34223	1.39705	1.24853
Z-Score		4.45081	4.03379	6.96219	5.83506	6.06305
Analysis		Safe	Safe	Safe	Safe	Safe

Z-Score performance of the company is quite good. The values of Z-Score are on a higher side promising good financial health. Performance of the company is very good, especially on long term Solvency front. The company falls in Safe Zone throughout the selected period. Profitability of the company is also on a higher side. Investors can invest in the shares of this company as there are no signs of any kind of distress here.

3. Blue Star Limited:

Variables	Measures	2017	2016	2015	2014	2013
1.2x1	Liquidity	0.06466	0.0269	-0.0329	-0.0066	-0.0264
1.4x2	Profitability	0.48022	0.35698	0.38764	0.32045	0.31761
3.3x3	Operating Efficiency	0.22534	0.19789	0.21732	0.18535	0.16099
0.6x4	Market performance	3.71546	1.39806	2.40374	3.83087	3.2143
1.0x5	Solvency	1.5837	1.37328	1.40511	1.23948	1.31774
Z-Score		6.06937	3.35311	4.38088	5.56955	4.9842
Analysis		Safe	Safe	Safe	Safe	Safe

It is quite evident from the above tabulations that the company is in good financial state. It has Z-Score of more than 2.99 in all the years and is in Safe Zone throughout. In fact, the Z-Scores are quite impressive and on a higher side in all the years. It is also seen that the company had negative working capital in the years of 2012-13, 2013-14 & 2014-15. Even then, the Z-Score was noted on a higher side. However, manufacturing units should maintain ideal Ratio of 2:1 for liquidity. Investment in the Company is Safe as there are no probable signs of distress or bankruptcy.

4. Jhonson Controls – Hitachi Air Conditioning Limited:

Variables	Measures	2017	2016	2015	2014	2013
1.2x1	Liquidity	0.20099	0.10221	0.11600	0.10496	0.14302
1.4x2	Profitability	0.52311	0.41736	0.37092	0.39188	0.26745
3.3x3	Operating Efficiency	0.36530	0.23486	0.33440	0.10101	0.11064
0.6x4	Market performance	0.43958	0.45909	0.58993	0.59097	0.29550
1.0x5	Solvency	1.78891	1.47863	1.45861	1.44631	1.11884
Z-Score		3.31787	2.69214	2.86986	2.63513	1.93546
Analysis		Safe	Grey	Grey	Grey	Grey

In general, it can be said that the company's financial viability is improving over the period the years. The Company has been able to land itself in a Safe Zone in 2016-17. In prior years the company was in Grey Zone. However, Z-Score was as low as 1.93 in 2012-13 and the company have managed to improve it over the years. It should also be noted that the company is facing tough competition and might not be able to increase its market share due to this. Still, owing to good market reputation and some extra efforts to increase profitability & improvement in Working Capital Management may increase the attractiveness of the investment in it. There are very good chances that the company might be able to give high returns in future and investors can invest their funds in this company.

5. IFB Industries Limited:

Variables	Measures	2017	2016	2015	2014	2013
1.2x1	Liquidity	0.19133	0.16933	0.17048	0.1977	0.28664
1.4x2	Profitability	0.65564	0.66698	0.62778	0.64619	0.7135
3.3x3	Operating Efficiency	0.23557	0.15586	0.26116	0.15831	0.26733
0.6x4	Market performance	0.89707	0.87736	0.71213	0.76634	0.73627
1.0x5	Solvency	1.91226	1.89649	1.63636	1.59197	1.70136
Z-Score		3.89187	3.76603	3.40790	3.36051	3.70509
Analysis		Safe	Safe	Safe	Safe	Safe

It is clearly evident, that the company has outperformed itself every year and has shown increase in financial strength & feasibility every year. The Z-Score of the company falls in Safe category for all the selected years. A good Z-Score is possible because of balanced performance in all the areas – liquidity, profitability, solvency & activity. Investment in this company is 100% safe and the investors will definitely optimize their return on investment owing to popularity of the company in the said segment.

6. LEEL Electricals Limited:

Variables	Measures	2017	2016	2015	2014	2013
1.2x1	Liquidity	0.27450	0.25202	0.29054	0.26694	0.21131
1.4x2	Profitability	0.52703	0.51348	0.56555	0.56564	0.61080
3.3x3	Operating Efficiency	0.33540	0.36803	0.36820	0.36873	0.33827
0.6x4	Market performance	0.41702	0.27134	0.22662	0.16665	0.21915
1.0x5	Solvency	1.29147	1.15488	1.04531	0.97029	0.96965
Z-Score		2.84541	2.55976	2.49622	2.33824	2.34917
Analysis		Grey	Grey	Grey	Grey	Grey

From the above computation, we can confer that the company is in Grey Zone which means that it might face financial distress in the years to come. However, the likelihood is quite low since the values of Z-Score are near to 2.99. Further, it is observed that Net Working Capital is maintained on a lower side which might result into short term liquidity crunches also. Besides, the company is earning profits but the profitability is on a lower side resulting into lower Z-Score. Investors should invest their funds after considering all the pros & cons. No doubt the company enjoys good reputation in the segment of White Goods and more or less their investment is safe but they might not be able to get the expected or higher return on their investment in this company.

7. **Fedders Electrics & Engineering Limited:**

Variables	Measures	2017	2016	2015	2014	2013
1.2x1	Liquidity	0.20770	0.20157	0.20395	0.20282	0.12970
1.4x2	Profitability	0.49582	0.45269	0.42460	0.42762	0.42580
3.3x3	Operating Efficiency	0.26436	0.24549	0.33905	0.42234	0.36827
0.6x4	Market performance	1.20961	0.39407	0.30627	0.19077	0.13839
1.0x5	Solvency	1.12941	0.86834	1.09310	1.07818	1.07108
Z-Score		3.30691	2.16215	2.36698	2.32173	2.13324
Analysis		Safe	Grey	Grey	Grey	Grey

It is evident from the above calculations that the Z-Score of the company has improved in the last year. The Company is in Safe Zone in 2017, but in all the earlier years it was in Grey Zone. Particularly, 2016 had not been a good year for the company. However, in spite being in Grey Zone, the company has managed quite a decent score. Company is slowly and gradually increasing its market share and sales which is a good sign. This may be because of overall increase in demand for White Goods. Investment in this Company is a little risky. However, it is equally true that investment in the company is not totally unsafe.

8. **Value Industries Limited:**

<table>
<tr><th>Variables</th><th>Measures</th><th>2017</th><th>2016</th><th>2015</th><th>2014</th><th>2013</th></tr>
<tr><td>1.2x1</td><td>Liquidity</td><td>-0.1583</td><td>-0.0741</td><td rowspan="7">2016 was considered of 15 months period as in 2015, it operated only for the Period of 3 months.</td><td>0.11309</td><td>0.1259</td></tr>
<tr><td>1.4x2</td><td>Profitability</td><td>0.13605</td><td>0.18738</td><td>0.20378</td><td>0.23411</td></tr>
<tr><td>3.3x3</td><td>Operating Efficiency</td><td>0.02839</td><td>0.1735</td><td>0.08058</td><td>0.03226</td></tr>
<tr><td>0.6x4</td><td>Market performance</td><td>0.11285</td><td>0.10796</td><td>0.1025</td><td>0.04197</td></tr>
<tr><td>1.0x5</td><td>Solvency</td><td>0.75223</td><td>1.24153</td><td>0.92079</td><td>0.84274</td></tr>
<tr><td>Z-Score</td><td></td><td>0.87122</td><td>1.63625</td><td>1.42075</td><td>1.27699</td></tr>
<tr><td>Analysis</td><td></td><td>Distress</td><td>Distress</td><td>Distress</td><td>Distress</td></tr>
</table>

Performance of the company is not satisfactory. The company has a Z-Score below 1.81 in all the years. Moreover, due to some internal management issues, in the financial year 2014-15 the company has operated only for a period of 3 months. Management of the company should start taking steps to revive the company and take it out of distress. The main reason for this situation is lower profitability & operational efficiency. This may be due to severe competition from the other firms in the same industry. Also, other companies are large multinationals while this one is an Indian Company which was a Private Limited Company subsequently converted into Public Company. Investment in this company is risky for the investors.

CALCULATIONS OF MEAN, STANDARD DEVIATION & COEFFICIENT OF VARIATION:

1. Mean of each Company is calculated as total of Z-Score of the individual year divided by 5

2. Standard Deviation of each Company is calculated using the formula:

$$S.D = \sqrt{\frac{\sum x^2_i}{n} - (\sum x_i)^2}$$

3. Coefficient of Variation of each Company is calculated using the formula:

$$CV = \frac{SD}{Mean} \times 100$$

Company	Mean	Standard Deviation	Coefficient of Variation
Whirlpool	4.1359	0.220247	5.325250
Symphony Limited	5.4690	1.078244	19.71556
Blue Star Limited	4.8714	0.946687	19.43357
Jhonson Controls	2.6901	0.446971	16.61540
IFB Industries	3.6263	0.207173	5.71307
LEEL Electricals	2.5718	0.184517	7.17462
Fedders	2.4582	0.433705	17.64319
Value Industries	1.0410	0.279294	26.82939

Mean of Z-Scores of the Company indicates their average performance over the period of five years. Consolidated performance also indicates that Value Industries might be facing problems of bankruptcy. Similarly, Companies like Whirlpool, Symphony Limited, IFB Industries and Blue Star Limited are in Safe Zone throughout and investment in such companies is safe, while Average Z-Score of Jhonson Controls, LEEL Electricals and Fedders falls in Grey Zone. However, the Mean Values are not too low in these companies also.

Coefficient of Variation is a measure of relative variability. It shows the extent of variability in relation to the mean of the population. Generally Lower CV is preferred because it indicates less variability. From the above, we can confer that Whirlpool & IFB Industries have shown less variability and the result of Value Industries is on a very high side indicating higher risk.

COMPARISON OF PROFITABILITY AND Z-SCORE OF THE COMPANIES:

Company	Net Profit earned in 2016-17 (amount in Crores)	Rank on the basis of Net Profit	Z-Score in 2016-17	Rank on the basis of Z-Score
Whirlpool	310.49	1	3.70411	4
Symphony Limited	173.16	2	4.45081	2
Blue Star Limited	111.97	3	6.06937	1
Jhonson Controls	81.04	4	3.31787	6
IFB Industries	50.97	5	3.89187	3
LEEL Electricals	85.14	6	2.84541	7
Fedders	20.56	7	3.30691	5
Value Industries	-59.01	8	0.87122	8

Net Profit performance measures only the operational efficiency of the firm. Z-Score Analysis on the other hand provides a more comprehensive analysis of the financial health of the company by distilling 5 key performance measures into a single score. On the basis of Profitability of the last year top three Companies are – Whirlpool, Symphony & Blue Star; while on the basis of Z-Score Value of last year, top three companies are – Blue Star, Symphony & IFB.

CONCLUSION

Z-Score Analysis gives investors a clear snapshot of the financial health of the company. Lower the Score higher are the chances that a company is heading towards bankruptcy. Investors should keep an eye on the

Z-Score of the companies to ensure that their investment is safe. Similarly, Z-Score provides for a quick check of financial health of the company for the management also. If Z-Score indicates a problem company should conduct a more detailed analysis to identify the root cause of the lower Z-Score and try to solve the issue before it is too late.

Company	Average Z-Score	Analysis	Rank	CV	Rank
Whirlpool	4.1359	Safe	3	5.325250	1
Symphony Limited	5.4690	Safe	1	19.71556	6
Blue Star Limited	4.8714	Safe	2	19.43357	7
Jhonson Controls	2.6901	Grey	5	16.61540	4
IFB Industries	3.6263	Safe	4	5.71307	2
LEEL Electricals	2.5718	Grey	6	7.17462	3
Fedders	2.4582	Grey	7	17.64319	5
Value Industries	1.0410	Distress	8	26.82939	8

For Consumer Goods (White Goods) Sector, 50% of the industries have recorded a Safe Z-Score. 38% of the industries fall in Grey Zone while 12% of the industries have shown sign of distress. Overall, the Average Z-Score of the Industry is 3.3512 which indicate that the investment in this sector is Safe and that there are no signs of Financial Distress in near future. Symphony Limited & Blue Star Limited is the safest companies of the sector while Value Industries is the weakest performer. Symphony Limited is the Top Company in Consumer Goods (White Goods) sector on the basis of Z-Score but its CV indicates higher risk. Value Industries ranks last on both the tests indicating serious problems.

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