A PREDICTION OF THE FINANCIAL DISTRESS OF THE MAJOR PLAYERS IN THE FMCG SECTOR USING REVISED ALTMAN Z-SCORE MODEL AND LIQUIDITY RATIOS

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Abstract: This study aims to examine the financial distress among the major players in the FMCG sector. A study of the financial distress of a company is very important from an investor's point of view. It can help an investor decide whether to buy or sell a particular stock. This study is aimed to find out which of the major players may be in financial distress and on the verge of bankruptcy. To evaluate the financial health of the companies, Altman's Z-Score is used along with Liquidity ratios. After obtaining the Altman's Z-Score for three consecutive years i.e. 2013, 2014 and 2015, One-way ANNOVA test statistic is used to find out whether the mean Z-scores of the companies are statistically different from each other. One-way ANNOVA is performed using SPSS Statistics software.

Keywords: Hypothesis Testing, One-way ANNOVA, Altman's Z-Score, Bankruptcy, Financial Distress, FMCG Sector

Introduction: The Altman Z-score is a statistical tool used to measure the likelihood that a company will go bankrupt. Z-scores are used to predict corporate defaults and an easy-to-calculate control measures for the financial distress status of companies in academic studies. Z-score was devised by Edward Altman, a professor at New York University.

Financial ratios can often help us to paint a picture of the long-term viability of a firm. However, this is not always the case; sometimes the ratios of a firm give conflicting views. To help eliminate this confusion, Altman developed the Z-Score in the late 1960s to explicitly address the likelihood that a company would go bankrupt.

Z-Score Formula (Original Model): These five ratios are weighted using the following formula:

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

Where: A = Working Capital/Total Assets, B = Retained Earnings/Total Assets, C = Earnings before Interest & Tax/Total Assets, D = Market Value of Equity/Total Liabilities, E = Sales/Total Assets

When analyzing the Z-Score of a company, the lower the value, the higher the odds that the company is headed toward bankruptcy. Altman came up with the following rules for interpreting a firm's Z-Score:

Below 1.8, indicates a firm is headed for bankruptcy;

Above 3.0, indicates a firm is unlikely to enter bankruptcy; and Between 1.8 and 3.0 is a statistical "gray area."

Need of the Study: Financial distress or bankruptcy of an organization means inability of the organization to pay its liabilities. Given the relatively high frequency of bankruptcies filed by publicly traded businesses, and the threat posed to all stakeholders that rely on the firm's solvency for their own success, a reliable bankruptcy model with consistent predictive power is essential in today's environment.

Bankruptcies seem to unfold rapidly and news about them seems unexpected, although the signs may have been evident for a few years. Naturally, many organizational stakeholders are interested in finding a reliable method to predict bankruptcy and financial distress.

It is important for the companies also to check their financial health regularly to avoid bankruptcy suddenly. To date, the methods designed to predict bankruptcy events have had mixed reviews. Altman's Z-score formula is one of the best models with a high accuracy.

Literature Review: Many studies have been conducted since 1960 regarding the corporate failure and many methods have been developed, still the original concept of Altman seems to be the most powerful method.

Grice and Ingram (2001) analyses the generalibility of application of Z-score. The study finds negative results in application of Z-score in recent periods and to manufacturing firms, but positive results for predicting distress other than bankruptcy as it was originally developed for bankruptcy.

Pompe and Bilderbeek (2005) examine predictive power of different financial ratios. From the study of small and medium size firms in different phases of bankruptcy they found that every ratio has some indicative power of financial distress.

Sandian and Porporato (2007) studied the usefulness of ratios in predicting the corporate bankruptcy in Argentina. With the study of 22 companies, they concluded that solvency and profitability ratios are being well used and it also depends upon the preference of decision maker which model to use. Still Z-score can be used for this purpose as it uses both solvency and profitability indicators.

Mwendamo Isaac Mazaba (2010) used the Altman's Z-score to assess the appropriateness of Management's use of going concern principle in preparation of financial statements. After analyzing the data the study concludes that Z-score is quite accurate in

predicting failure of companies that eventually fail. The Z-score accuracy is high for companies liquidated within 2 years after the last audited financial statements for the companies who failed.

Sanobar Anjum (2012) provides a comparison of the different models which are commonly used. Majorly five different types of bankruptcy prediction model are discussed in the paper. Multiple discriminant analysis is the crux of the research paper. Altman's Z-score model is discussed in detail describing the changes occurring to the equation so as to make it a perfect prediction model.

Bal and Raja (2013) studies the earnings management and techniques to predict solvency position. Their study uses Z-score to predict financial distress of IOCL and concludes that as per original Z-score the financial position of the company is not that much good.

Gnyana Ranjan Bal (2015) uses Altman's Z-score to predict corporate bankruptcy of select FMCG companies. By applying Z-score and select liquidity ratios the study concludes that the investors can use this model to analyze financial position of the companies. Further the study suggests that the companies should regularly estimate Z-score for making strategies to improve their financial position.

Research Objectives: The objective of this research is to apply Altman's Z-score and Liquidity ratios to predict bankruptcy and financial distress of the FMCG companies taken into consideration. The study ranges for a period of three years from 2013 to 2015 for five FMCG companies. Secondly, this study aims to find out which of the companies taken into consideration show a sound financial position and which company's financial position shows a continuous improvement over the three year period. This will be done by comparing the Z-scores and the Liquidity ratios of the five companies.

Data and Methodology: Data Collection:

This study is based on the data extracted from Annual Reports of the companies. Liquidity ratios have been extracted from moneycontrol.com.

Sample Selection: The Altman's Z-Score is calculated for 5 companies who are among the major players in the FMCG Sector.

The companies selected are:

- Hindustan Unilever Limited (HUL)
- India Tobacco Company Limited (ITC Ltd.)
- Colgate Palmolive (India) Limited
- Marico Limited
- Emami Limited

Hypothesis Development:

- Ho: $\mu1 = \mu2 = \mu3 = \mu4 = \mu5$
  (There is no significant difference between the Z-score of the companies)
- H1: $\mu1 \neq \mu2 \neq \mu3 \neq \mu4 \neq \mu5$
  (There is significant difference between the Z-score of the companies i.e. atleast one pair is significantly different from the others)

Methodology: Z-Score Formula (Revised Model - 1993):

In the present study, Altman's Z-score revised model has been applied to predict the bankruptcy of the companies taken into consideration. The model is:

Z-Score = 6.56A + 3.26B + 6.72C + 1.05D

where, A = Working Capital/Total Assets, B = Retained Earnings/Total Assets, C = Earnings Before Interest & Tax/Total Assets, D = Book Value of Equity/Total Liabilities

While analysing the Z-Score of a company, the lower the value, the higher the odds that the company is headed toward bankruptcy. Altman came up with the following rules for interpreting a firm's Z-Score:

Below 1.10, indicates a firm is headed for bankruptcy;

Above 2.60, indicates a firm is unlikely to enter bankruptcy; and

Between 1.10 and 2.60 is a statistical "gray area."

Liquidity Ratios: To examine the liquidity of the companies, the following ratios have been calculated:

Current Ratio: This ratio explains the relation between the current assets and current liabilities of an organization.

Current Ratio= Current Assets/ Current Liabilities

Quick Ratio: This ratio indicates whether an organization is in a position to pay its current liabilities immediately.

Quick Ratio= Quick Assets/ Current Liabilities

Where Quick Assets= Current Assets - Stock - Prepaid Expenses

Limitations: Whenever you use financial ratios to analyze a company, it is important to keep in mind that no analysis technique is perfect, and the Z-Score is no exception. If a company is "cooking the books" i.e. it is window dressing its financial statements, its data is not a true representation of the strength of the company. One should know that the Z-Score is only as good as the data that goes into it.

Findings and Analysis: *Findings and Analysis based on Altman's Z-score computation:*

After analyzing the Z-score table (table 1 in Annexure), it can be said that none of the companies taken into consideration may enter into bankruptcy since none of the companies Z-score in any of the years is below 1.10.

Three out of the five companies taken into consideration show an increasing trend in their Z-score. HUL's Z-score increased from 2.69 in 2013 to 3.43 in 2015. ITC's Z-score increased from 4.03 in 2013 to 4.33 in 2015. Marico's Z-score increased from 2.04 in 2013 to 3.80 in 2015. Marico shows the greatest increase in its Z-score over the three year period.

Colgate has shown a decreasing trend in its Z-score. Its Z-score decreased substantially from 11.32 in 2013

to 7.53 in 2014. Its Z-score declined further to 7.25 in 2015.

Emami shows a differential trend in its Z-score than its competitors. Its Z-score increased from 5.29 in 2013 to 5.74 in 2014, but its Z-score declined from 5.74 to 5.21 in 2015.

In general, the period from 2013-2015 has been good for FMCG companies, though the Z-score of some of the companies have declined in some of the years over the three year period. The investors and the companies themselves should certainly remain upbeat for the future.

Findings and Analysis based on Current Ratio: It can be observed from the Current ratio table (table 2 in Annexure) that none of the companies for any of the years show a poor current ratio. Majority of the companies show an improving trend in their current ratio in 2015 as compared to previous years.

HUL's current ratio is below the standard ratio of 1, but it remains consistent through the three year period, whereas ITC, Colgate and Emami show a good and improving current ratio throughout the three years. Marico's current ratio decreased from 2013 to 2014, but over the three year period its current ratio increased from 1.37 in 2013 to 1.55 in 2014.

Hence, it can be concluded that the financial position of the companies is improving and none of the companies under consideration should have a problem in paying its short-term debts.

Findings and Analysis based on Quick Ratio: The standard Quick ratio is 1, however this varies widely by industry. In general, the higher the ratio, the greater the company's liquidity to meet its obligations using liquid assets.

From Quick Ratio Table (table 3 in Annexure) Emami's Quick ratio is better than its competitors, though it has slightly decreased over the period. Emami's quick ratio is well above the standard ratio of 1. Marico, Colgate and ITC show a decent quick ratio of around 0.8-0.9, since the cost involved in FMCG sector is huge and there are low involvement and low priced products, the Industry standard Quick Ratio should ideally be below 1. HUL's Quick ratio remains consistent around 0.5, which is moderate as compared to its competitors.

Overall, all the companies under consideration should be able to meet its short-term obligations. HUL may struggle a bit to quickly pay-off its debts than the others. However, this does not mean that HUL may be approaching bankruptcy.

Findings and Analysis based on One-way ANNOVA using SPSS: The test statistic used here is One-way ANNOVA. As it is one side hypothesis and non – directional, Level of Significance is 5% i.e. α is 0.05. This means that if p-value > 0.05, Accept Ho and reject H1, if p-value < 0.05, Accept H1 and reject Ho

From Descriptives table (table 4 in Annexure), we observe that the mean value of HUL is 3.03 (μ_1=3.0333), ITC is 4.19 (μ_2=4.1900), Colgate is 8.70 (μ_3=8.7000), Marico is 2.96 (μ_4=2.9567) and Emami is 5.41 (μ_5=5.4133)

Referring to Levene's Homogenity of Variances table (table 5 in Annexure), The Levene's for homogeneity of Variances is significant ($p<0.05$) indicating that the assumption of homogeneity of variance has been violated.

The ANNOVA summary table (table 6 in Annexure) shows that p-value is 0.000 which is less than α; therefore, we can say that there is no evidence to accept Ho and hence H1 is accepted. It can be concluded that there is significant difference between the Z-score of the companies.

From Post Hoc table (table 7 in Annexure), the following pairs are statistically similar to each other:

- HUL-ITC
- HUL-Marico
- HUL-Emami
- ITC-Marico
- ITC-Emami
- Marico-Emami

Conclusion: It can be concluded that none of the companies taken into consideration will enter bankruptcy in the near future. Through the ANNOVA summary table, it can be concluded that the Z-scores of companies differ from each other i.e. the financial health of companies differ from each other. It can also be concluded that it is not necessary that the company whose profit and market share is higher than the others in a particular sector may the most financially healthy company in that sector.

All Investors and also the company themselves should analyse the Z-score before making any decision in order to avoid any financial failure. If Z-score is also calculated along with the Liquidity ratios, it will give a better understanding for decision-making.

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Annexures:

Table 1: Altman's Z-score (Revised Model)

Company	Year		
	2015	2014	2013
HUL	3.43	2.98	2.69
ITC	4.33	4.21	4.03
Colgate	7.25	7.53	11.32
Marico	3.80	3.03	2.04
Emami	5.21	5.74	5.29

[Source: Author's computation]

Table 2: Current Ratio

Company	Year		
	2015	2014	2013
HUL	0.78	0.77	0.78
ITC	1.49	1.30	1.27
Colgate	1.10	0.89	0.77
Marico	1.55	1.28	1.37
Emami	1.52	1.68	1.30

[Source: www.moneycontrol.com]

Table 3: Quick Ratio

Company	Year		
	2015	2014	2013
HUL	0.49	0.46	0.47
ITC	0.90	0.70	0.64
Colgate	0.84	0.68	0.54
Marico	0.81	0.93	0.97
Emami	1.34	1.31	1.40

[Source: www.moneycontrol.com]

Table 4: Descriptives table

Descriptives

Z_score

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
HUL	3	3.0333	.37287	.21528	2.1071	3.9596	2.69	3.43
ITC	3	4.1900	.15100	.08718	3.8149	4.5651	4.03	4.33
Colgate	3	8.7000	2.27330	1.31249	3.0528	14.3472	7.25	11.32
Marico	3	2.9567	.88229	.50939	.7649	5.1484	2.04	3.80
Emami	3	5.4133	.28572	.16496	4.7036	6.1231	5.21	5.74
Total	15	4.8587	2.38687	.61629	3.5369	6.1805	2.04	11.32

[Source: Author's computation through SPSS]

Table 5: Levene's Statistic table

Test of Homogeneity of Variances

Z_score

Levene Statistic	df1	df2	Sig.
7.918	4	10	.004

[Source: Author's computation through SPSS]

Table 6: ANNOVA table

ANOVA

Z_score

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	67.380	4	16.845	13.607	.000
Within Groups	12.380	10	1.238		
Total	79.760	14			

[Source: Author's computation through SPSS]

Table 7: Post Hoc table

Multiple Comparisons

Z_score Bonferroni

(I) Company	(J) Company	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
HUL	ITC	-1.15667	.90846	1.000	-4.4102	2.0969
	Colgate	-5.66667*	.90846	.001	-8.9202	-2.4131
	Marico	.07667	.90846	1.000	-3.1769	3.3302
	Emami	-2.38000	.90846	.256	-5.6336	.8736
ITC	HUL	1.15667	.90846	1.000	-2.0969	4.4102
	Colgate	-4.51000*	.90846	.006	-7.7636	-1.2564
	Marico	1.23333	.90846	1.000	-2.0202	4.4869
	Emami	-1.22333	.90846	1.000	-4.4769	2.0302
Colgate	HUL	5.66667*	.90846	.001	2.4131	8.9202
	ITC	4.51000*	.90846	.006	1.2564	7.7636
	Marico	5.74333*	.90846	.001	2.4898	8.9969
	Emami	3.28667*	.90846	.047	.0331	6.5402
Marico	HUL	-.07667	.90846	1.000	-3.3302	3.1769
	ITC	-1.23333	.90846	1.000	-4.4869	2.0202
	Colgate	-5.74333*	.90846	.001	-8.9969	-2.4898
	Emami	-2.45667	.90846	.222	-5.7102	.7969
Emami	HUL	2.38000	.90846	.256	-.8736	5.6336
	ITC	1.22333	.90846	1.000	-2.0302	4.4769
	Colgate	-3.28667*	.90846	.047	-6.5402	-.0331
	Marico	2.45667	.90846	.222	-.7969	5.7102

*. The mean difference is significant at the 0.05 level.

[Source: Author's computation through SPSS]

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