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Measuring the uniformity of liquidity and it's financial health: A case study of Bharat heavy electrical ltd.

Atul Kumar Paul
Assistant Professor, Department of Commerce, Karimganj College, Assam
Email: paulatul1974@gmail.com

Abstract: *Profitability and liquidity are important for a concern as it is a vital aspect for a company. If it is carried out effectively, efficiently and consistently, that will assure the financial health of a company. In this study, one company is taken i.e Bharat Heavy Electricals Ltd, between the years 2007-2019, has been used. Return on Capital Employed (ROCE) and Return on Net worth (RNW) have been used as indicators of company's profitability and Liquidity management is treated (C.R, ATR, ITR, DTR and ICR) as independent variables. Multiple regressions, F-test, t-test and Altman Z score model have been used in empirical analysis. The result of analysis indicates that the ROCE has positive significant relationship with the five independent variables while RNW has positive significant relationship with the same independent variables. The present study of the paper aims the impact of profitability on the liquidity, uniformity and its analysis the financial health of Bharat Heavy Electricals Ltd during the study period. The study finds out a meaningful conclusion based on the result of the study.*

Key Words: *Bharat Heavy Electrical Ltd, ROCE, RNW, Altman Z score model.*

1. INTRODUCTION:

Bharat Heavy Electricals Ltd is one of the largest public sector engineering and manufacturing company and it is established in 1964, New Delhi, India. Bharat Heavy Electrical Ltd (BHEL) is integrated power plant equipment manufacturer in India. In the power field, it is also one of international leading companies. BHEL is engaged in the design engineering manufacture construction testing commissioning and servicing of a wide range of products. The company has to manufacture more than 180 products under 30 major groups of products. These groups are major sector of the Indian Economy, namely, Power Generation and Transmission, Transportation, Telecommunication, Renewable Energy, Industry etc. From these groups, the company has produced different type of product such as Electric Motors, Electric Locomotives, Gas & Steam Turbines, Boilers, Generators, Power & Control Systems, Power electrics & Transmission systems etc. The companies divide its operation in two parts- one is Power (60% of sales) and another one is Industry (20%). India generates about 95% of its net sales, but BHEL also sells its products in some 75 other countries. Profitability is a measure of overall company's efficiency in achieving the set-out goals. The primary objective of a business undertaking is to earn profit. Its primary effort is to maximize profit with financial soundness through legal and permitted business operations. Without profit-motive, there is no rational behind establishing a company. Performance analysis is considered for short-term proposition of accepting or rejecting a particular order. Proper management of liquidity is very essential for the smooth functioning of the business undertaking. The disturbances in the liquidity management may put the business in trouble. Without proper management of liquidity, the business cannot reach at appropriate profit level.

2. REVIEW OF LITERATURE:

Swarankar,J & Jain, O.P (2020), in their article," Measuring Financial Health of Dairy Co-Operative in Rajasthan: A Case Study of Kota Dairy". The objective of this paper is to determine the financial health of the Kota dairy in Rajasthan for the period from 2011-12 to 2018-19 by using Altman Z score model and using one sample t-test. But the results of the study indicate that the financial health of the selected company and it revealed that dairy co-operative selected for the study company was in the grey zone in the year 2011-12 and2018-2019 with stability as per financial health.
Elijah Adeyinka Adedeji(2014), in his paper," A Tool for Measuring Organization Performance using Ratio Analysis." The main objective of this paper is to analysis how ratio analysis can be used to measure performance of an organization during the study period. The findings of the study revealed that there is significant relationship between ratio analysis and organizational performances as well as financial ratios highlight the importance of effective management of an organization.
Joshi,L.K & Gosh,S (2012), in their article, "Working capital management of CIPLA limited :an empirical study". The main aim of the study is to examine and evaluate the working capital management of the selected company during the period 2004-05 to 2008-09.The statistical tools is used such as Spearman's Rank Correlation, Motaals test and factor analysis (principle component method). From the analysis, the empirical findings reveal significant positive trend

growth in most of the selected performance indicators and the selected ratios indicate satisfactory performances during the study period.

Rastogil,S & Saxena,P (2015), in their paper," Working Capital Management and Profitability in State Owned Companies: A Case Analysis of National Fertilizers Ltd" The present study of this paper is to examine the relationship between efficient working capital management and financial performance of National Fertilizers Ltd from year 2000-01 to 2011-12. Correlation test & multiple regression tests were used in SPSS as Statistical tools**.** The findings shows that the ratios such as, Cash Turnover Ratio,(CTR) Current Assets to Total Assets Ratio, Inventory Turnover Ratio(ITR), Working Capital Ratio(WCR), Acid Test Ratio,(ATR) Debtors Turnover Ratio(DTR) and; had either a negative or lower degree of positive correlation with profitability.

Vijayakumar, A (2011), in his article, "Cash Conversion Cycle and Corporate Profitability: An empirical enquiry in Indian Automobile Firms". The object of this article is to provide empirical evidence on the effect of Cash Conversion Cycle (CCC) on the profitability of a sample of 20 firms in Indian Automobile Industry for the period 1996-2009. The statistical tools use panel data regression analysis of cross-sectional and time series data. The results of the study found a significant negative relationship between profitability and Accounts Receivable Period (ARP), Inventory Conversion Period (ICP) and Cash Conversion Cycle (CCC) for a sample of Indian automobile industry during the study period.

3. OBJECTIVES OF THE STUDY:

The following are the specific objectives of the study area:

- To examine whether there is any uniformity among the selected aspects relating to the liquidity management of the Bharat Heavy Electrical Ltd.
- To study the financial health of the Bharat Heavy Electrical Ltd by using Altman's Z score model during the study period.
- To study the impact of profitability (financial performance) on the liquidity management of the Bharat Heavy Electrical Ltd.
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4. RESEARCH METHODOLOGY:

The present study is mainly based on secondary data. The study concentrates on BHE LTD. The data has been analyzed using statistical tools like Kendall's coefficient of concordance (W) and for examining the significance of the value of W, Chi-square (χ^2) and Altman's Z-score Model test , regression analysis, F-test and t-test are used. The figures for the purpose of the analysis have been collected from various sources like annual reports of the company for a period of twelve years from 2007-08 to 2018-19. Finally important findings are made out of the results of the analyses.

5. LIMITATION OF THE STUDY:

1. The study is based on secondary data sources.
2. Twelve years data for selected Bharat Heavy Electrical Ltd has been analyzed but the results may not be proper for long run.
3.

6. DATA ANALYSIS:

The ratios in the study period are the financial indicators of Bharat Heavy Electrical ltd. C.R(Current Ratio) measures the liquidity of the company.ATR(Asset Turnover Ratio) is an efficiency indicator of the Company's assets management.ITR(Inventory Turnover Ratio) measures that of its inventory management. DTR (Debtors Turnover Ratio) measures the efficiency of company's debtor's management.ICR (Interest Coverage Ratio) shows the ability of the company to pay interest on its long term debt. ROCE (Return on Capital Employed) influences the overall profitability of the company during the study period. RNW (Return on Net Worth) measures the profitability on shareholder's fund.

Objective No.1. To study whether there is any uniformity among the different aspects of liquidity management of the Bharat Heavy Electrical Ltd.

Table-1 shows the different financial ratios of Bharat Heavy Electrical Ltd.for the years 2007-08 to 2018-19 are given bellow:

Year	C.R	ATR	ITR	DTR	ICR	ROCE	RNW
2018-19	1.93	5.22	3.94	2.33	6.46	5.66	3.78
2017-18	2.18	5.24	3.99	1.59	5.81	4.57	2.46
2016-17	2.32	5.78	3.38	1.33	2.52	2.41	1.53
2015-16	2.31	3.05	2.65	1.1	-2.24	0	0
2014-15	2.19	2.57	3.14	1.17	24.35	4.64	4.23
2013-14	1.99	3.6	3.78	1.43	38.81	11.01	10.9

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2012-13	1.81	4.97	4.01	1.83	76.3	23.37	23.7
2011-12	1.78	5.66	4.11	2.16	201.9	28.56	30.93
2010-11	1.56	6.02	4.37	2.16	165.54	35.94	33.33
2009-10	1.37	5.86	4.03	1.89	197.73	45.47	40.73
2008-09	1.4	5.89	4.17	2.04	158.89	29.88	26.47
2007-08	1.45	5.07	4.35	2.01	126.08	45.23	29.23

Kendall's coefficient of Concordance:

Spearman's rank correlation coefficient fails to determine the degree of relationship among three or more sets of rankings. But Kendall's coefficient of concordance (W) is an appropriate measure of studying the degree of association among three or more sets of rankings. It is usually denoted by W. The value of W is worked out using the following formula.

Kendall's coefficient of Concordance (W) = $\frac{S}{[\frac{1}{12}*K^2*(n*n*n-12)]}$

Where S = $\sum (R_i\text{-}R)^2$, R = Sum of ranks assigned to each individual, R = mean of R, K = number of sets of rankings, N = Number of individuals ranked. When tied ranks occur, the modified formula will be

Kendall's coefficient of Concordance (W) = $\frac{S}{[\frac{1}{12}*K^2*(n*n*n-12)]} - K\sum T$

Where $\sum T = \sum(t^2\text{-}t)/12$ and t = number of objects or individuals involved in a tie

Table-2 shows the analysis of Kendall's Coefficient of concordance among the financial ratio (liquidity management) indicators during the study period.

Year	C.R(R_1)	ATR(R_2)	ITR(R_3)	DTR(R_4)	ICR(R_5)	ROCE(R_6)	RNE(R_7)	Sum=R_i	$(R_i\text{-}R)^2$
2018-19	6	7	8	1	9	8	9	48	6.25
2017-18	4	6	7	8	10	10	10	55	90.25
2016-17	1	4	10	10	11	11	11	58	156.25
2015-16	2	11	12	12	12	12	12	73	756.25
2014-15	3	12	11	11	8	9	8	62	272.25
2013-14	5	10	9	9	7	7	7	54	72.25
2012-13	7	9	6	7	6	6	6	47	2.25
2011-12	8	5	4	2.5	1	5	3	28.5	289
2010-11	9	1	1	2.5	3	3	2	21.5	576
2009-10	12	3	5	6	2	1	1	30	240.25
2008-09	11	2	3	4	4	4	5	33	156.25
2007-08	10	8	2	5	5	2	4	36	90.25
								$\sum R_i$=546	2707.5

R= $\sum R_i/n$
=546/12
= 45.5

Where $\sum T = \sum (t^2\text{-}t)/12$, $\sum T = \sum (2^2\text{-}2)/12$, $\sum T$=.50 and t = number of objects or individuals involved in a tie

Kendall's coefficient of Concordance (W) = $\frac{S}{[\frac{1}{12}*K^2*(n*n*n-12)]} - K\sum T$

$$= \frac{2707.5}{[\frac{1}{12}*7*7*(12*12*12-12)]} - 7*.50$$

$$= \frac{2707-3.5}{7007}$$

=.3858

The calculated value of X^2 = k (n-1)*W = 7(12-1)*.3858 = 29.066 and table value of X^2 with (n-1) d.f.i.e.11 d.f. at 1% level of significance =24.725. Therefore, the computed value of X^2 is greater than table value of X^2 at 1% level of significance.

Kendall's coefficient of concordance (W) among the given seven ratios indicating different aspects of financial ratio (liquidity management) is .3858 which is found to be statistically significant at 1% level.

Objective No.2. To analysis the financial position of Bharat Heavy Electrical Ltd during the study period

For testing the financial position, Altman's Z-score Model is propounded by Prof. Edward Altman in 1968. Z-score is derived from a formula, based on 5 financial ratios to predict the possibility, as to when a company may go into bankruptcy. The discriminate function is as follows:
Z=1.2x1+1.4x2+ 3.3x3+.6x4 + .999x5
Where, X1=Working Capital/Total Assets
X2=Retained Earnings/Total Assets
X3=Earnings before Interest and Taxes/Total Assets
X4=Market Value of Equity/Book value of Total Debt
X5=Sales/Total Assets

Critical values of Altman's Model Score	**Zone**	**Result**
Z<1.81	Distress	Likely to be bankrupt
1.81 <Z< 2.99	Gray Zone	Stable
Z > 2.99	Save Zone	Save

Table-3: Name & formula of financial ratio along with data and figures of Bharat Heavy Electrical Ltd are given bellow:

Year	WC/TA*1.2	RE/TA*1.4	EBIT/TA*3.3	MV/TD*.6	Sales/TA*.999	Z-score
2018-19	.285	2.937	0.105	.006	.471	3.804
2017-18	.394	2.801	0.082	.007	.455	3.739
2016-17	.446	2.695	.034	.005	.485	3.665
2015-16	.449	2.879	-.059	.005	.423	3.697
2014-15	.461	2.853	.104	.004	.454	3.876
2013-14	.436	3.130	.228	.004	.555	4.353
2012-13	.396	3.274	.444	.004	.717	4.835
2011-12	.359	3.759	.510	.004	.752	5.384
2010-11	.371	4.219	.502	.005	.742	5.839
2009-10	.259	4.407	.031	.006	.712	5.415
2008-09	.246	4.665	.027	.007	.687	5.632
2007-08	.269	4.779	.028	.008	.620	5.704

From the above table, it is clear that the calculation value of Z-score above 2.99, then the company is probably in safe financial conditions in during the study period. This means that the current level is going down in the last five years (from 2014-15 to 2018-19) and from 2012-13 and 2013-14 it has better position than the current and again during the last five year position (2007-8 to 2011-12) is better. To measure the change in the financial position of the company the data gathered is analyses with the following hypothesis:
Ho=There is no significant differences in the Altman's Z score of the company during the study period.
To measure the above hypothesis the data of Altman' Z score is analyzed with the help one sample t-test, is given bellow.

Table -4

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Z-score	12	4.66192	.892230	.257565

One-Sample Test

	Test Value = 3.0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Z-score	6.452	11	.000	1.661917	1.09502	2.22881

From the above table, the result of the study revealed that there is a significant differences in the Altman's Z score of the company during the study period as $p<0.01$.
Objective No.3: To study the impact of profitability on the liquidity management of the Bharat Heavy Electrical Ltd.

H_{01}: There is no significant impact of profitability (ROCE) on liquidity management (C.R, ATR, ITR, DTR and ICR)
H_{02}: There is no significant impact of profitability (RNE) on liquidity management (C.R, ATR, ITR, DTR and ICR)
Table-5: For testing the first hypothesis of the study, the impact of profitability (ROCE) on liquidity (C.R, ATR, ITR, DTR and ICR) was computed and F-test was applied to find out the significance of the difference

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.954[a]	.909	.857	6.44593	2.117

a. Predictors: (Constant), Debtor T.R., Average T.R, Current Ratio, Inventory T.R
b. Dependent Variable: Return on Capital Employed

From the above table, it is observed that the R^2 is the proportion of variation in the dependent variable that is explained by the independent variables. It is expressed as a percentage. So 90.9% of the variation in overall satisfaction can be explained by five independent variables in the model.

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2913.746	4	728.437	17.532	.001[b]
	Residual	290.850	7	41.550		
	Total	3204.596	11			

a. Dependent Variable: Return on Capital Employed
b. Predictors: (Constant), Debtor T.R., Average T.R, Current Ratio, Inventory T.R

The table also shows that the overall effect of the five independent variables on overall satisfaction is significant, which the p-value is .01% (i.e. p<.01)

Table-6: For testing the second hypothesis of the study, the impact of profitability (RNW) on liquidity (C.R, ATR, ITR, DTR and ICR), were computed and F-test was applied to find out the significance of the difference.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.923[a]	.853	.768	7.14306	.966

a. Predictors: (Constant), Debtor T.R., Average T.R, Current Ratio, Inventory T.R
b. Dependent Variable: Return on Net Worth

On observation it is found that the R^2 is the proportion of variation in the dependent variable that is explained by the independent variables. It is expressed as a percentage. So 85.3% of the variation in overall satisfaction can be explained by five independent variables in the model.

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2064.689	4	516.172	10.116	.005[b]
	Residual	357.164	7	51.023		
	Total	2421.852	11			

a. Dependent Variable: Return on Net Worth
b. Predictors: (Constant), Debtor T.R., Average T.R, Current Ratio, Inventory T.R

From the above table, it is found that the variable have a significant combined effect on the dependent variable, the p-value is .01(i.e. below 1%)

7. FINDINGS:

Following are the important findings of the study**:**

- From the table-1, it is found that Kendall's coefficient of concordance (W) among the given seven ratios indicating different aspects of financial ratio (liquidity management) is .3863 which is found to be statistically significant at 1% level.
- It is observed that from table-3, that the current financial health of it is going down in the last five years (from 2014-15 to 2018-19) and from 2012-13 and 2013-14 it has better position than the first and again the previous position(2007-8 to 2011-12) is more better as per Altman's Z-score.

- In table-4, one sample t-test portray that there is a significant deference in the Altman's Z-score of Bharat Heavy Electrical Ltd during the study period, since the p-value<0.01
- Under table-5, the correlations of Return on Capital Employed (ROCE) are highly positive (90.9%) and have a significant (p-value<.01) impact on liquidity management (.C.R, ATR, ITR, DTR and ICR) during the study period.
- On observations, table-6, it is found that the correlation of Return on Net-Worth (RNW) are highly positive (85.3) and have a significant impact (p-value<.01) on liquidity (.C.R, ATR, ITR, DTR and ICR) under the study period.

8. CONCLUSIONS:

Both the profitability and liquidity are important for a concern as it is vital aspect for a BHEL. The relationship between them is complicated also as liquidity management does not have a uniform nature. But the uniformity among them should be maintained according to Kendall's coefficient of concordance (W). Profitability is a measure of financial performance and liquidity is a measure of cash positions in the company is to meet its short term obligation. Profitability is also important aspect as the company needs to analyze the reason for low-profit growth in future under the study period. It implies that there was a close as well as significant association among the different aspects of financial performance of Bharat Heavy Electricals Ltd during the study period. In other words, a notable degree of uniformity among the selected seven financial criteria of the company during the period under study was observed. The result of the above study, it is found that the Return on Capital Employed (ROCE) has overall effect on the five independent variables (C.R, ATR, ITR, DTR and ICR) is significant. The Return on Net worth (RNW) is also same significant overall impact on the independent variable (C.R, ATR, ITR, DTR and ICR). The study also reveals that there was a remarkable improvement in the overall profitability of BHEL throughout the period under study. But there is a significant deference in the Altman's Z-score of the companies in financial health during the study period.

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