

IMPACT OF WORKING CAPITAL MANAGEMENT ON FIRM'S PROFITABILITY: A STUDY OF NUMALIGARH REFINERY LTD., INDIA

-Bhargav Gautam Boruah, Department of Commerce, Dibrugarh University, Dibrugarh,

ABSTRACT

The paper is an attempt to assess the impact of working capital management on liquidity and profitability (ROI) of the company and to establish the linear relationship between liquidity and profitability with the help of multi regression model. For assessing the impact, a 13 year period has been considered. The study is based on secondary data collected from published annual reports of the refinery which are analyzed with the help of correlation and ANOVA test. The study focuses on the factors which are responsible for changing the working capital of the refinery which as a result influences the profitability of the refinery. The study shows the result of different independent variables on profitability of the refinery.

Keywords: liquidity, profitability, ROI, working capital.

INTRODUCTIONS

The oil and gas sector is among the six core industries in India and plays a major role in influencing decision making for all the other important sections of the economy.

India's economic growth is closely related to energy demand, which as a result has made the petroleum industry a conducive scope for investment. According to India Brand Equity Foundation report, published in April 2017, with an oil consumption of 8.3 percent year on year to 212.7 million tons in 2016 i.e. 4.1 million barrel a day, it makes India the third largest oil consuming nation in the world after United States (19.39 million bpd) and China (11.96 million bpd). The Hydro Carbon Report 2025 reviews that the oil and gas sector is one of the crucial sectors for energy development in India as this sector accounts for 45 percent of the energy needs of the country. Besides, the crude oil refining sector is one of the major sectors for self-sufficiency in petroleum products and to move towards a consumer oriented competitive market.

Liquidity is an important factor which refers to the short term financial strength of a company i.e. the ability to pay the current financial obligation of the business. Liquidity is measured with the help of liquidity ratios which have a significant effect on the profitability of the concern. Working capital which is the circulating capital and is convertible into

cash or equivalent within a period of one year and those which are required to meet day to day operation. The effective management and control of various components of short term funds is one of the most important function of the organization. Efficient working capital management involves planning and controlling short term liabilities and assets in a manner that eliminates the risk of inability to meet the short term obligation and at the same time avoid the excessive investment in the assets.

Objective of the study

The present work is to assess the financial performance of the refinery over a period of thirteen (13) years i.e. from 2004-05 to 2016-17. The specific objectives of the study are as follows:

1. To assess the importance of management of liquidity through different parameters.
2. To understand the factors affecting the liquidity position of the refinery.
3. To study the impact of selected measures of working capital on profitability of the refinery.

PROFILE OF NUMALIGARH REFINERY LIMITED (NRL)

Numaligarh Refinery Limited (NRL), which is a Public Sector Undertaking (PSU) in Oil and Gas sector and is a subsidiary of M/s Bharat Petroleum Corporation Limited. The refinery was formed in accordance with the historic "Assam Accord", signed on 15 August 1985. The company was incorporated in April 22, 1993 and is promoted by Bharat Petroleum Corporation Ltd (BPCL) and Government of Assam. The shareholding pattern as on 31-03-2016 is :BPCL 61.65%, OIL 26.00%, Government of Assam 12.35%. M/s NRL is located near Numaligarh

Town, Bokakhat Subdivision of Golaghat district in the state of Assam². Numaligarh Refinery Limited (NRL) was incorporated on 22nd April 1993 and designed to process 3 MMTPA low sulphur indigenous crude oil produced from Upper Assam oil fields by adopting state-of-art technologies. In line with Hydro Carbon Vision 2030, the company is planning to extend its expansion capacity from 3MMTPA to 9 MMTPA, which will expand the hydrocarbon industry in the region. Its requirement for crude is being fulfilled from the oil fields of Oil and Natural Gas Corporation Limited and Oil India Limited. The refinery and the marketing terminal are fully automated and are supported by business driven by Enterprise Resource Planning. The refinery became fully operational from June 2000 with commercial production beginning from October 2000².

REVIEW OF EXISTING LITERATURE

Kesseven Padachi (2006)³, studied about the relation between working capital management and corporate profitability. The regression result shows that the high investment in inventory is related with lower profitability. The study of different variables i.e. liquidity, profitability and operational efficiency shows significant changes in the study period and how it has affect the overall performance of the companies have been detailed in the study.

Ramachandran and Janakiraman (2009)⁴ analyses the relationship between efficiency of working capital management and firm's Earnings Before Interest and Tax of the paper industry in India. The study revealed that cash conversion cycle and inventory days have a negative relationship with earnings before interest and

tax, while accounts payable days and accounts receivable days related positively with earnings before interest and tax

Saleem Qasim and Rehman Ur Ramiz (2011)⁵ in their paper documented about the impact of various ratios on profitability of the company with the help of linear regression analysis. They are of the opinion that liquid assets improves profitability in oil and gas industry upto a certain extent but beyond the point holding of liquid assets diminishes profitability.

Mills, Vamamura, (2014)⁶ studied about the cash flow ratios which determines the amount of cash generated over a period of time and compare that to short-term obligations. This gives a clearer picture if the firm has a liquidity problem in connection with its short-term debt paying ability.

Prof. Velnampy T. et.al (2014)⁷ in his paper studied about the performance measurement of manufacturing companies by cash basis

accounting and well as traditional accrual basis accounting. The study highlights about the usefulness of cash flow ratios in conducting the investigation of financial statements of the selected companies.

Ghosh Sourav⁸ in his paper describes about the different methods to determine how liquid the firm is through different ratio analysis. The current ratio and quick ratio becomes important for understanding the need of customers' demand in the retail market which helps in estimating the finished stock to be maintained. Lauri Phillips⁹, Cash conversion cycle shows the relation between liquidity and profitability. It is more important to measured profitability compared to if the company is using current ratio .The higher the ratio the higher the comfort level. All of the cash flow ratios are not uniform but vary by industry characteristics. The analysis of cash conversion cycle helps in analyzing liquidity of the company.

Table 1: Different ratios of Numaligarh Refinery Limited

YEARS	ROI	CR	QR	CATAR	CASR	WCTR	ITR	DTR	CTR
2004-05	29.19	1.32	1.24	0.33	0.27	11.08	4.6	22.29	3.53
2005-06	26.54	1.42	1.28	0.15	0.07	16.26	3.83	19.67	7.63
2006-07	27.81	1.6	1.49	0.17	0.6	17.73	7.07	34.29	3.42
2007-08	16.58	1.32	1.07	0.16	0.05	19.39	7.84	16.67	3.62
2008-09	10.78	1.59	1.53	0.19	0.05	19.61	10.53	58.55	20.54
2009-10	9.46	1.47	1.36	0.66	0.26	13.56	6.58	61.53	34.78
2010-11	10.72	1.4	1.31	0.89	0.32	11.9	5.44	10.92	51.27
2011-12	6.78	1.45	1.38	0.57	0.22	7.84	8.75	16.85	62.45
2012-13	5.22	1.79	1.71	0.51	0.27	8.49	5	11.59	58.27
2013-14	12.61	1.65	1.88	0.54	0.3	7.71	7.62	33.29	19.2
2014-15	21.4	1.96	1.54	0.63	0.46	6.33	6.81	80.03	9.72
2015-16	30.88	2.71	2.5	0.6	0.38	4.82	6.2	12.42	7.19
2016-17	43.86	3.16	2.92	0.6	0.3	5.16	5.58	17.37	8.68

sum	251.83	22.84	21.21	6	3.55	149.88	85.8	395.47	290.3
average	19.37	1.76	1.63	0.46	0.27	11.53	6.6	30.42	22.33
com-pounded annual growth rate	3.18%	6.95%	6.81%	4.71%	0.81%	-5.71%	1.50%	-1.90%	7.17%
standard deviation	11.6	0.56	0.53	0.24	0.16	5.34	1.81	22.41	21.91
coefficient of variation(%)	59.876 97	31.95 544	32.40 154	51.3 477 6	57.96 615	46.33 35	27.48 138	73.67 28	98.0 985 7

Source-Annual Report

Table 2: Correlation Matrix for the study period 2004-05 to 2016-17

	ROI	CR	QR	CATAR	CASR	WCTR	ITR	DTR	CTR
ROI	1								
CR	0.65	1							
QR	0.57	0.96	1						
CATAR	-0.17	0.31	0.32	1					
CASR	0.29	0.31	0.29	0.36	1				
WCTR	-0.22	-0.63	-0.65	-0.71	-0.42	1			
ITR	-0.41	-0.13	-0.1	-0.17	-0.17	0.28	1		
DTR	-0.15	-0.11	-0.18	-0.01	0.16	0.14	0.41	1	
CTR	-0.75	-0.25	-0.18	0.53	-0.1	-0.21	0.1	-0.19	1

Statistically Analyzed Data

The correlation result in the Table 2 shows that there is a variation in the correlation matrix ranging from weak positive (negative) to strong positive (negative) relationship. The relationship value from 0 to 0.3(0 to -0.3) shows a weak positive (negative) relationship between the variables, while relationship from 0.3 to 0.7(-0.3 to -0.7) shows a moderate positive (negative) relationship and from 0.7 to 1.0 (-0.7 to -1.0) indicates a higher positive (negative) relationship.

Table 2 shows the correlation coefficient between ROI and CR is 0.65 which indicates that there is a positive correlation between the profitability and the current ratio. This moderate positive relationship shows that the importance of current ratio on the profitability of the company. The relationship of quick ratio to ROI is significantly positive .But the lower liquidity ratio indicates

a lower margin of safety to meet the company's short term liabilities. The relationship between Current Assets to Total Assets (CATAR) and ROI indicates the when the CATAR increases, the profitability of the company decreases. The Current Assets to Sales Ratio (CASR) and ROI shows that lower the CASR the higher is the scope of profitability of the firm by efficiently employing the working capital of the firm. The relationship between WCTR and ROI is -0.22 which shows that the lower is the investment in working capital, higher is the profitability of the company. The study of correlation coefficient between ROI and CTR shows a negative association of -0.75 means that the result doesn't conform to the principle of improvement of profitability with a rise in the CTR

It can be analyzed from the correlation matrix table that a very high degree of correlation exist QR and CR i.e. (0.96) between WCTR and CATAR (-.71). This high degree of correlation shows that there is an existence of multi collinearity. Existence of multi collinearity indicates a problem .i.e. the regression coefficient becomes less reliable and confidence in the accuracy of equation is questioned to a certain extent .As explained by Kieu10 (2004), correlation higher than or equal 0.70 implies existence of multi collinearity. In our case the relationship between QR and CR implies existence of multi collinearity, therefore either QR or CR should be used in the analysis. So here CR forms a part of the equation of ROI on CR, CATAR, CASR, WCTR, ITR, DTR and CTR.

The multiple regression equation for our study purpose is as follow

$$ROI = b_0 + b_1 CR + b_2 CATAR + b_3 CASR + b_4 WCTR + b_5 ITR + b_6 DTR + b_7 CTR$$

here b_0 is the constant, $b_1, b_2, b_3, b_4, b_5, b_6$ and b_7 are coefficients.)

Table 3 Regression estimates on factors affecting profitability

Regression Statistics	
Multiple R	0.942937
R Square	0.88913
Adjusted R Square	0.733913
Standard Error	5.983232
Observations	13

ANOVA					
	df	SS	MS	F	Significance F
Regression	7	1435.472	205.0674	5.728289	0.036226
Residual	5	178.9953	35.79906		
Total	12	1614.467			

Statistically Analyzed data

Table 3 shows the relationship between dependent variable (ROI) on independent variable (on CR,CATAR,CASR,WCTR.ITR,DTR and CTR) under study. It reveals that profitability measured by the dependent variable and the independent variables are significantly correlated with the correlation coefficient $R=0.942$. It shows that the ROI of the refinery is highly influenced by the independent variables. The table also shows that the model of profitability as measured by profit margin with the coefficient of determination $R^2 = .889$, which indicates that 88.9% of the variation in profitability can be accounted by the joint variation in all the independent variables. This also shows that approximately 88.9% of the variance in the dependent variable is accounted by the regression statistics.

In addition the study indicates that summary of Analysis of Variance and F-Statistics, i.e. $F=5.728$ are significant at 0.036 level. The value of $F=5.728$ is large enough to summarize that the set of independent variables as a whole has been a factor for the change in profitability measured by profit margin. The significance value of F statistic (5.728) is less than the Significance F i.e. 0.036, which means that the variation explained is not due to change and it is fit for analysis. It thus proves the potency of relationship between dependent variables with all the independent variables.

The study mainly focuses on the factors which are responsible for changing the working capital of the refinery as a result which influences the profitability of the refinery. So it becomes necessary on part of the refinery not to infuse much on the working capital which affect the availability of cash or might influences the profit aspect of the refinery. An equilibrium is to be maintained between working capital and investment in current assets so that the profitability of the refinery is not to be hampered. In the present case the contribution made by the respective factors for improving the profitability of the refinery is 88.91%.

Table 4: Correlation Matrix for the study period 2004-05 to 2016-17

	Coefficients	Standard Error(r)	t Stat	P-value
Intercept	18.87164	17.05696	1.10639	0.318927
CR	9.615896	4.844234	1.985019	0.103909
CATAR	-1.76881	13.57176	-0.13033	0.901387
CASR	7.730695	12.9283	0.597967	0.575914
WCTR	0.121365	0.610703	0.19873	0.850302
ITR	-1.46075	1.19118	-1.22631	0.27468
DTR	-0.07746	0.097386	-0.79535	0.462479
CTR	-0.31755	0.128668	-2.468	0.056669

The multiple regression equation of $ROI = 18.871 + 9.615CR - 1.768CATAR + 7.730CASR + 0.121WCTR - 1.460ITR - 0.077DTR - 0.317CTR$.

It is observed from the table that when the CR is increased by one unit, the ROI increases by 9.615 units and this impact of CR on profitability is found to be significant, and for every one unit increase in CATAR the ROI is reduced by 1.768 units. The two results show positive impact of Current Ratio on profitability of the company and the adverse impact of Working Capital Turnover Ratio on company's profitability. For every one unit increase in CASR and WCTR, the ROI is increased by 7.730 and at a nominal rate of 0.121 unit. For one unit increase in ITR, DTR and CTR (keeping other variables constant) the company's profitability is decreased by 1.460, 0.077 and 0.317 units respectively.

The study of correlation analysis reveals that the CR, QR and CASR has a positive relation in association with the profitability, while the CATAR, WCTR, ITR, DTR and CTR has a negative association with the profitability ratio. The relationship of all the ratios with respect to profitability is not significant. The study of multiple regression analysis shows that the independent variables show both positive and negative impact on profitability of the company. The regression coefficient of CR, CASR and WCTR shows a positive influence on profitability and CATAR, ITR, DTR and CTR shows a negative impact on profitability of the company. Out of the regression coefficient CR, CATAR, CASR and ITR has a significant influence on the working capital management of the company in comparison to the other three variables.

References

1. Petroleum Prices, Taxation and Subsidies in India, International Energy Agency, June 2009, OECD/IEA, 2009.
2. <http://www.ideation.nrl.co.in/about/nrl.aspx>
3. Padachi Kessevan, (2006) Trends in working Capital Management and its Impact on Firms' Performance: An Analysis of Mauritian Small Manufacturing Firms, International Review of Business Research Papers, Vol.2, October 2006, pp-45-58.
4. Azhagaiah R. and Muralidharan J., (2009), The Relationship between Working Capital Management Efficiency and EBIT, Managing Global Transitions International Research Journal, Vol 7, No 1nSept, 2009, ISBN 1581 6311, Pp- 61-74.
5. Saleem Q, Rehman Ur Ramiz (2011), Impacts of Liquidity ratios on Profitability (Case of Oil and Gas Companies of Pakistan) Interdisciplinary Journal of Research in Business, vol1, Issue 7, pp 95-98
6. John R. Mills, Jeanne H. Yamahura, The Power of Cash Flow Ratios, Journal Of Accountancy,
7. Prof. Velnampy t, R. Kajanathan (2014), Liquidity, Solvency and Profitability Analysis Using Cash Flow Ratios and Traditional Ratios: The Telecommunication Sector in Sri Lanka., Research Journal of Finance and Accounting, ISSN 2222-1697 (Paper) ISSN 2222-2847 (Online), Vol.5, No.23,
8. Kieu M.N. (2004), Financial management and Profitability of SME in Vietnam, DBA THESIS, Southern Cross University, Australia.
9. Amarjit G., Nahum B., Neil M, (2010) The Relationship Between Working Capital Management And Profitability: Evidence From The United States, Business and Economics Journal, Volume 2010: BEJ-10

10. Dr. Angel Raphella. S., Gomathi Nathan. S, Chitra. G, (2014) Inventory Management- A Case Study, International Journal of Emerging Research in Management & Technology, ISSN: 2278-9359 (Volume-3, Issue-3), March .
11. Dimitrios P. Koumanakos, (2008) The effect of inventory management on firm performance, International Journal of Productivity and Performance Management, June , Pp 355-369.
12. Refining Industry to 2017, Asia-Pacific, Middle East and Africa to Emerge as Key Regions for Infrastructure Investments for Capacity Additions, Global Business Intelligence Research Report.
13. Oil and Gas, India Brand Equity Foundation, April 2017. www.ibef.org
14. Kwadwo Boateng Prempeh, (2015) The impact of efficient inventory management on profitability: evidence from selected manufacturing firms in Ghana. Department of Purchasing and Supply, Sunyani Polytechnic, 14. November , MPRA Paper No. 67889,
15. Amy Myers Jaffe, Ronald Soligo, (2002) The role of inventories in oil market stability, The Quarterly Review of Economics and Finance 42 401– 415.