Impact of Working Capital Management on Corporate Performance: An Empirical Analysis of Selected Public Sector Oil & Gas Companies in India

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Abstract

This paper makes an attempt to examine the impact of working capital management on corporate performance of selected public sector oil & gas companies in India during the period of 10 years (i.e. from 2000-01 to 2009-10). It also makes an endeavour to measure the degrees of associations between the measure of profitability i.e., ROCE and the selected ratios relating to working capital management of the selected companies under study during the study period. A comparative analysis can be done to adjudge the better performing company and to identify the causes of better performance. An attempt has also been undertaken for measuring the sensitivity of return on capital employed (ROCE) to changes in the level of working capital, working capital leverage (WCL) has been computed and applied. Ultimately the article concludes some valid recommendations these deserve the attention of the management of the concerned companies under study, oil and gas sector in India and especially Government.

Keywords: Liquidity, Profitability, PI, UI, EI&WCL.

1. Introduction

India imports nearly 75 percent of its crude oil requirement with a huge outflow in foreign exchange. The indigenous production has stagnated around 34 percent of total requirement of petroleum oil. The current oil production from Barmer field is a significant step towards achieving energy security in our country. At its peck, the crude oil production from this block will be about 20% of the current crude oil production of the country and it will save 7% of the crude oil import bill and reduce import dependence.

Oil and gas sector, being a key sector of Public Sector Enterprises (PSEs) in India, has not been performing well in the current socio-economic environment. The Indian oil & gas sector is one of the six core industries in India and has vested significantly forward linkages with the entire economy. India has been growing at 8-9 percent annually and is commited to accelerate the growth memorundum in the years to come. This would translate into India's energy needs growing many times in the years to come. Hence, there is an emphasized need for wider and more intensive exploration for new finds more efficient and effective recovery, a more rational and optimally balanced global price regime as against the rather wide upward fluctuations of recent times and a spirit of equitable common benefit in global energy co-operation. Considering the high priority of our government to enhance energy security of country and making petroleum products available to common man at affordable prices, Ministry of Petroleum & Natural Gas has adopted multi-pronged strategy. Stable crude oil prices are the first requirement for sustained economic development of our country. During the last 4-5 years, the prices of crude oil in international market have been on a roller coaster ride creating uncertainty. This volatility created problems for the import dependent economies. The Indian response to the volatility was measured one. Due to unprecedented rise in international prices, when crude touched an all time high of US $ 147 per barrel, the under-recoveries of PSU oil marketing companies during 2008-09 were more than Rs one lakh crore. Therefore, it is extremely important to ensure that the domestic oil companies continuously strive to improve their performances in order to save the vast amount of foreign

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exchange, which is being spent on the imports of crude oil and various petroleum products.

In this paper an attempt has been made to identify the causes of poor performance and low profitability and recommendations have been propounded to improve the financial performance of the said sector so that it can compete and sustain in the present competitive and changing environment. The ownership, management, and control of the said sector are completely vested to the government. This is the major concern of government how the performance of the said can be enhanced so that it can contribute a large amount on the part of total revenue to the national income of the country. Financial performance can be enriched in various ways, viz. effective utilization of fixed capital, maintaining a sound working capital management position, judicious handling of investment opportunities, utilization of better production capacity, etc. to earn sufficient surplus for the growth and to maintain the perpetual succession in the present competitive and changing environment.

2. Objectives of the Study

The main objective of the present study is to assess the efficiency of working capital management of ONGC, IOCL, OIL, BPCL, HPCL and GAIL, being the six giant public sector oil and gas companies in India, on the basis of available data collected from the published annual reports of the selected companies over the period of 10 years (i.e. from 2000-2001 to 2009-2010). The specific objectives of this study are as follows:

- To find out the degrees of associations between liquidity and profitability of the concerned companies under study during the study period.
- To assess the Working Capital Leverage (WCL) position for examining the sensitivity of return on capital employed (ROCE) to changes in the level of working capital of the selected companies under study during the study period.
- To make a comparative analysis of the efficiency of working capital management of the concerned companies under study during the study period.
- To provide valid recommendations these deserve the attention of the management of the concerned companies under study, oil and gas sector in India and especially government.

3. Literature Review

Several studies have been conducted throughout the globe regarding the association between profitability and efficiency of working capital management. Some of the most valuable and well reputed studies are shown below.

Abhipsa, Rahul, Somnath, Subramanian and Parashar (2010) tried to examine the relationship between working capital management and profitability of selected companies with special reference to power and automobile sector. This paper would probably aid in giving better insights into what are the essential parameters that a company based in India needs to look into while deciding its working capital management in order to sustain its profitability.

Bhayani (2004) conducted an empirical study on Gujarat Ambuja Cements Ltd. for assessing the impact of working capital on its profitability during 1993-94 to 2002-03. The study also highlighted a significant association between the working capital and profitability.

Danuletiu (2010) studied to analyze the efficiency of working capital management of companies from Alba County. The relation between the efficiency of working capital management and profitability was examined using Pearson's correlation analysis and using a sample of 20 annual financial statements of companies covering period 2004 to 2008. The conclusion of this study was that there is a weak negative linear relationship between working capital management indicators and profitability rates.

Chakraborty (1976) examined the relationship between profitability and working capital turnover in Indian Sugar, cement and fertilizer industries and reported a positive association.

Prasad (2000) conducted a study on the working capital management in paper industry. He revealed that the executives properly recognized the role of efficient use of working capital on liquidity and profitability. But he could not achieve it in practice due to the sub-optimum utilization of working capital.

Mukherjee (1988) made a study on working capital management of twenty central public sector undertakings and revealed that out of 20, positive association was found between liquidity and profitability in 11 cases and negative association in 9 cases. However, the study

ultimately concluded an adverse relationship between liquidity and profitability as a whole.

Mallick and Sur (1998) made an attempt to analyze the impact of working capital management on profitability in Indian tea industry with the help of some statistical tools and techniques. The study revealed that, out of the nine ratios relating to working capital management five ratios registered positive association and the remaining four ratios showed negative association with the profitability indicator.

Rao and Rao (1999) undertook a similar type of study where ten ratios relating to working capital management were selected. Out of these indicators, positive association was noticed only in three.

Chundawat and Bhanawat (2000) analyzed the working capital management practices in IDBI, with the help of some relevant ratios and they observed that the working capital management of IDBI associated companies was more effective than the industry as a whole.

Sur & Rakshit (2005) conducted a study regarding the linkage between asset management and profitability in 25 selected companies in different Indian industries. The study registered both positive and negative association between receivable turnover and profitability. However, the combined provision showed a weak evidence of the inverse association between the profitability and inventory turnover. More specifically, "The result of the analysis of multiple determinations makes it clear that 47.75% of the total variation in the corporate profitability was accounted for by the joint variation in the efficiency of receivable management, inventory management and long term operating asset management".

Singh and Pandey (2008) said that working capital management is the management of current assets and current liabilities. Maintaining high inventory levels reduces the cost of possible interruption in the production process or of loss of business due to the scarcity of products, reduces supply costs and protects against price fluctuations. Granting trade credit favors the firm's sales in various ways. Trade credit can act as an effective price cut and incentives to customers to acquire merchandise at times of low demands. Thus, greater the investment in current assets, lower is the risk, and profitability obtained. Similarly trade credit is a spontaneous source of financing that reduces the amount required to finance the sums tied up in the inventory and account receivables. Profitability and liquidity comprises the salient and all too often conflicting goals of working capital management. The conflicts arise because the maximum of firm's returns could seriously threaten liquidity and on the other hand, the pursuit of liquidity has a tendency to dilute returns.

Goswami and Sarkar (2011) made an attempt to provide an insight into the conceptual side of trade-off between liquidity and profitability and to assess the liquidity and profitability position of different airways companies viz. Air India, Indian Airlines, Kingfisher and Jet Airways during the period of 6 years (i.e. from 2000-01 to 2005-06). Ultimately, the article concluded that the relationship between efficiency of debtors' management system and overall profitability position is found to be negative for Kingfisher Airlines. The receivable management of the company Jet Airways has a significant influence on the overall profitability during the selected study period. The association between profitability and ITR does not conform to the accepted principle for both Kingfisher and Air India. Again, the association between QR and ROCE does not conform to the accepted principle for both Indian Airlines and Jet Airways during the given study period.

Sarkar (2011) made an attempt to measure the impact of liquidity management on profitability of ONGC Ltd. for the accounting period from 2004-05 to 2009-10. The general perception is that top professional management is to design a policy so that risk can be minimized and profitability can be maximized to strike a balance between risk and profitability. The article concluded that out of selected eight ratios relating to working capital management during the study period, three ratios namely CATAR, CASR and ITR registered positive associations with the selected profitability ratio viz. ROCE and the remaining ratios like CR, QR, WCTR, DTR and CTR witnessed negatiove associations with the selected profitability ratio. Again, CR & ITR both have significant contribution towards its overall profitability during the study period. The study of its working capital leverage (WCL) registered fluctuating trends during the given study period. The values of WCL throughout the entire study period are always less than unity (i.e. less than one). Hence, it may be concluded that the increase in its profitability is less than the proportion to decrease in working capital throughout the entire study period.

Mandal & Hossain (2010) made an attempt to assess the impact of working capital management on liquidity,

profitability and risk of BPCL during the study period from 1999-2000 to 2008-09. The study also highlighted attention on the conceptual side of working capital and made an endeavour to observe and test the profitability and liquidity position of it. In this paper the researchers also made an attempt to examine the correlation between liquidity and profitability as well as between profit and risk. Multiple regression model was used to establish the linear relationship between liquidity and profitability. The study was based on secondary data collected from the published annual reports of BPCL over the period under consideration. Some managerial and statistical tools viz. correlation, multiple regression, etc. and statistical tests viz. t-test, F-test, etc. have been used to test the significance of the results of the empirical study. The study showed that there was a significant association between liquidity and profitability of it during the given study period. From the study it was also observed that the relationship between risk and profitability was n**ot s**tatistically significant. From the analysis, so far, it may be concluded that the management of working capital is highly useful to ensure better productive capacity, sound liquidity, and good profitability of the enterprize particularly the PSEs in India.

4. Data Base and Methodology

The study of association between working capital management and corporate performance of Oil and Natural Gas Corporation of India (ONGC), Indian Oil Corporation Limited (IOCL), Oil India Limited (OIL), Bharat Petroleum Corporation Limited (BPCL), Hindustan Petroleum Corporation Limited (HPCL) and Gas Authority of India Limited (GAIL) for the accounting period from 2000-01 to 2009-10 is mostly based on the data collected from the secondary sources. "Capitaline 2000" data base package and SPSS statistical package have also been used for procuring and compiling data. The ratios which have been applied for highlighting the efficiency of working capital management are current Ratio (CR), Quick Ratio (QR), Current Assets to Total Assets Ratio (CATAR), Current Assets to Sales Ratio (CASR), Working Capital to Turnover Ratio (WCTR), Inventory Turnover Ratio (ITR), Debtors Turnover Ratio (DTR) and Cash Turnover Ratio (CTR) and the measure of profitability which has been selected is Return on Capital Employed (ROCE). For assessing the degrees of associations between the working capital management and profitability, Pearson's simple correlation coefficient(r) has been used and Student's t-test has been applied to test the significance of the results of the empirical study. For measuring the overall efficiency between Return on Equity (ROE) and PI, UI and EI, the performance index (PI) has been calculated by using the following formulae:

$$PI_{MWC} = [\sum^{Mi}_{(t-1)} / {}^{Mi}_{t}] / N \times I_T \quad (1)$$

where, I_T = turnover index or sales index defined as $S_t / S_{(t-1)}$

Mi = Individual group of current assets.

N = No. of current assets in the group.

and I = 1, 2,……. N.

In the present study, four items of current assets have been considered viz. inventories, sundry debtors, cash and bank balances and loans and advances. Next, the Utilization Index (UI) has been calculated by using the model:

$$UI_{MWC} = {}^{R}_{(t-1)} / {}^{R}_{t} \quad (2)$$

where, R = Total Current Assets / Net Sales.

And, finally, the Efficiency Index (EI) has been calculated as:

$$EI_{MWC} = PI_{MWC} \times UI_{MWC} \quad (3)$$

5. Computations and Major Findings of the Study

Table 1 reveals that the associations between ROCE and CR are (-) 0.76, 0.15, 0.89, 0.28, (-) 0.31 and (-) 0.18 respectively for the selected companies under study during the study period. These associations are positive in case of IOCL, OIL and BPCL and negative for ONGC, HPCL and GAIL. That means the current ratio has the significant contribution towards the overall profitability of ONGC and OIL during the study period. The generally accepted principle is that the higher the current ratio, the better is the short-term debt paying capacity, the lower is the scope of profitability of a concern and vice-versa, this view conforms for ONGC, HPCL and GAIL, but does not conform for IOCL, OIL and BPCL during the study period. The associations between ROCE and QR are (-) 0.53, (-) 0.04, (-) 0.11, (-) 0.26, 0.06 and 0.03 respectively for the selected companies under study during the study period. These associations are positive for HPCL and GAIL and negative for ONGC, IOCL, OIL and BPCL. That means

Table 1: Analysis of Associations between the Ratios Relating to Working Capital Management and ROCE of the Selected Companies during the Period from 2000-01 to 2009-10

Company\Ratios	*r & \t*	*CR*	*QR*	*CATAR*	*CASR*	*WCTR*	*ITR*	*DTR*	*CTR*
ONGC	r	-0.76	-0.53	0.79	0.38	0.38	0.98	-0.35	-0.04
	t- test	3.31	1.76	3.61	1.16	1.16	13.86	1.05	0.11
IOCL	r	0.15	-0.04	0.72	0.59	-0.25	-0.38	-.31	-0.60
	t- test	0.43	0.11	2.95	2.06	0.73	1.16	0.92	2.21
OIL	r	0.89	-0.11	0.80	0.21	-0.12	0.87	0.46	-0.76
	t- test	5.48	0.31	3.77	0.61	0.34	5.02	1.46	3.31
BPCL	r	0.28	-0.26	0.60	0.03	-0.56	-0.05	-0.50	-0.62
	t- test	0.83	0.76	2.12	0.08	1.91	0.14	1.63	2.22
HPCL	r	-0.31	0.06	0.81	0.39	0.38	0.03	0.12	0.11
	t- test	0.92	0.18	3.95	1.20	1.16	0.08	0.34	0.31
GAIL	r	-0.18	0.03	0.66	0.60	0.45	-0.007	-0.13	-0.46
	t- test	0.52	0.08	2.49	2.12	1.43	0.02	0.37	1.47

Source: Compiled and computed from the published annual reports of the selected companies under study.

Notes: (i) Tabulated values of 't' with (n-2) d .f. i.e., 8 d. f. both at 5% and 1% levels of significance for both tailed tests are 2.31 and 3.36 respectively.

(ii) The calculated values of \t\ in those cases are greater than the tabulated values of 't' , there the association is significant, otherwise, these associations are insignificant with 8 d. f. both at 5% and 1% levels of significance during the study period.

$r \times \sqrt{(n-2)}$

(iii) Formula used for calculating |t| =…….. With (n-2) d. f.

$\sqrt{(1-r2)}$

iv) CR- Current Ratio, QR-Quick Ratio, CATAR-Current Assets Total Assets Ratio, CASR-Current Assets Sales Ratio, WCTR-Working Capital Turnover Ratio, ITR-Inventory Turnover Ratio, DTR-Debtors Turnover Ratio, CTR-Cash Turnover Ratio.

the quick ratio has no significant contribution towards the overall profitability of all the concerned companies under study during the study period. The associations between ROCE and CATAR are 0.79, 0.72, 0.80, 0.60, 0.81 and 0.66 respectively for the selected companies under study during the study period. The values of associations are statistically significant for IOCL and GAIL at 5% level and for ONGC, OIL and HPCL both at 5% and 1% levels, but for BPCL this association is not statistically significant both at 5% and 1% levels of significance during the study period. That means the current assets to total assets ratio has the significant contribution towards the overall profitability of all the concerned companies under study except BPCL during the study period.

Table 1 highlighted the point that the associations between ROCE and CASR for the selected companies under study are 0.38, 0.59, 0.21, 0.03, 0.39 and 0.60 respectively during the study period. The values of associations are not statistically significant both at 5% and 1% levels of significance for all the selected companies under study during the study period. That means the current assets to sales ratio has no significant contribution towards the overall profitability of all the concerned companies under study during the study period. The associations between ROCE and WCTR for the selected companies under study are 0.38, (-) 0.25, (-) 0.12, (-) 0.56, 0.38 and 0.45 respectively during the study period. These associations are positive for ONGC, HPCL and GAIL and negative for IOCL, OIL and BPCL. But, the values of associations are not statistically significant for all the concerned companies under study both at 5% and 1% levels of significance during the study period. That means the working capital turnover ratio has no significant contribution towards the overall profitability of all the concerned companies under study during the study period.

Table 1 depicts that the values of associations between ROCE and ITR for the selected companies under study are 0.98, (-) 0.38, 0.87, (-) 0.05, 0.03 and (-) 0.007

Table 2: Analysis of Associations Between PI and ROE for the Selected Companies Under Study During the Period from 2000-01 to 2009-10

Year/Company	PI						ROE (%)					
	ONGC	IOCL	OIL	BPCL	HPCL	GAIL	ONGC	IOCL	OIL	BPCL	HPCL	GAIL
2000-01	1.25	1.18	1.07	1.20	1.39	1.02	17.25	17.03	15.19	20.41	16.77	20.55
2001-02	0.75	1.13	0.81	0.99	1.61	0.82	22.72	23.53	15.26	21.26	13.36	22.23
2002-03	1.18	0.85	1.21	0.90	0.84	0.99	29.15	34.78	26.52	26.33	23.02	25.86
2003-04	0.94	1.12	1.10	1.15	0.74	1.09	22.87	32.17	23.34	28.97	24.59	25.11
2004-05	1.21	1.20	0.98	2.39	1.17	0.87	27.08	18.96	22.39	15.12	15.13	22.65
2005-06	0.94	1.05	1.39	1.06	2.27	1.01	28.53	17.36	28.89	3.19	4.64	23.16
2006-07	`1.06	1.15	0.89	1.10	1.06	1.46	25.65	24.02	23.94	17.57	16.37	20.95
2007-08	1.36	1.04	1.56	0.87	0.65	0.89	24.94	17.03	22.55	13.54	10.74	20.00
2008-09	1.02	1.50	1.08	1.67	1.14	1.19	21.12	6.92	23.16	6.07	5.36	18.98
2009-10	1.001	0.67	0.82	0.76	1.07	1.00	20.49	18.80	18.96	11.75	11.26	18.69
r	0.07	(-)0.49	0.55	(-)0.18	(-)0.55	(-)0.17	-	-	-	-	-	-
t- test	0.20	1.59	1.88	0.52	1.88	0.49	-	-	-	-	-	-

Source: Compiled and computed from the published annual reports of the selected companies under study**.**

Note: Since, the calculated values of \t\, in all cases, are less than the tabulated values of 't' with 8 d. f., so the associations are statistically insignificant both at 5% and 1% levels of significance during the study period.

PI-Profitability Index, ROE-Return on Equity.

Table 3: Analysis of Associations Between UI and ROE for the Selected Companies Under Study During the Period from 2000-01 to 2009-10

Year/Company	UI						ROE (%)					
	ONGC	IOCL	OIL	BPCL	HPCL	GAIL	ONGC	IOCL	OIL	BPCL	HPCL	GAIL
2000-01	0.88	1.13	1.02	1.20	1.22	0.94	17.25	17.03	15.19	20.41	16.77	20.55
2001-02	0.76	1.13	0.81	0.94	1.16	0.78	22.72	23.53	15.26	21.26	13.36	22.23
2002-03	1.11	0.83	1.12	0.84	0.87	0.88	29.15	34.78	26.52	26.33	23.02	25.86
2003-04	0.88	1.02	1.03	1.12	0.96	1.00	22.87	32.17	23.34	28.97	24.59	25.11
2004-05	1.15	0.99	0.86	0.94	1.16	0.76	27.08	18.96	22.39	15.12	15.13	22.65
2005-06	0.85	1.10	1.04	1.00	1.02	0.94	28.53	17.36	28.89	3.19	4.64	23.16
2006-07	0.95	1.20	0.85	0.77	1.21	1.76	25.65	24.02	23.94	17.57	16.37	20.95
2007-08	1.68	0.94	1.15	1.29	0.70	0.84	24.94	17.03	22.55	13.54	10.74	20.00
2008-09	0.98	1.47	0.88	1.64	1.44	1.13	21.12	6.92	23.16	6.07	5.36	18.98
2009-10	0.96	0.66	0.74	0.55	0.67	0.93	20.49	18.80	18.96	11.75	11.26	18.69
r	0.27	-0.5	0.43	-0.23	-0.18	-0.2	-	-	-	-	-	-
t- test	0.8	1.63	1.34	0.67	0.52	0.58	-	-	-	-	-	-

Source: Compiled and computed from the published annual reports of the selected companies under study.

Note: Since, the calculated values of \t\, in all cases, are less than the tabulated values of 't' with 8 d. f., so the associations are statistically insignificant both at 5% and 1% levels of significance during the study period.

UI- Utilization Index.

Table 4: Analysis of Associations between EI and ROE for the Selected Companies under study during the Period from 2000-01 to 2009-10

Year/Company	*EI*						*ROE (%)*					
	ONGC	*IOCL*	*OIL*	*BPCL*	*HPCL*	*GAIL*	*ONGC*	*IOCL*	*OIL*	*BPCL*	*HPCL*	*GAIL*
2000-01	1.10	1.33	1.09	1.44	1.70	0.96	17.25	17.03	15.19	20.41	16.77	20.55
2001-02	0.57	1.28	0.66	0.93	1.87	0.64	22.72	23.53	15.26	21.26	13.36	22.23
2002-03	1.31	0.71	1.36	0.76	0.73	0.86	29.15	34.78	26.52	26.33	23.02	25.86
2003-04	0.83	1.12	1.10	1.29	0.71	1.09	22.87	32.17	23.34	28.97	24.59	25.11
2004-05	1.39	1.19	0.84	2.25	1.36	0.66	27.08	18.96	22.39	15.12	15.13	22.65
2005-06	0.80	1.16	1.45	1.06	2.31	0.95	28.53	17.36	28.89	3.19	4.64	23.16
2006-07	1.007	1.38	0.76	0.85	1.28	2.57	25.65	24.02	23.94	17.57	16.37	20.95
2007-08	2.28	0.98	1.79	1.12	0.45	0.74	24.94	17.03	22.55	13.54	10.74	20.00
2008-09	0.999	2.21	0.95	2.74	1.64	1.35	21.12	6.92	23.16	6.07	5.36	18.98
2009-10	0.96	0.44	0.61	0.42	0.72	0.93	20.49	18.80	18.96	11.75	11.26	18.69
r	0.21	-0.56	0.5	-0.3	-0.52	-0.19	-	-	-	-	-	-
t- test	0.61	1.91	1.63	0.89	1.79	0.53	-	-	-	-	-	-

Source: Compiled and computed from the published annual reports of the selected companies under study**.**

Note: Since, the calculated values of \t\, in all cases, are less than the tabulated values of 't' with 8 d. f., so the associations are statistically insignificant both at 5% and 1% levels of significance during the study period.

EI- Efficiency Index.

respectively during the study period. These associations are positive for ONGC, OIL and HPCL and negative for IOCL, BPCL and GAIL. Again, the associations are statistically significant for ONGC and OIL both at 5% and 1% levels of significance, but for others these associations are not statistically significant both at 5% and 1% levels of significance during the study period. The computed values of associations entail that the inventory management has the positive influence on the overall profitability of ONGC and OIL under study during the study period. The computed values of associations between ROCE and ITR conform to the acceptable principle for ONGC, OIL and HPCL during the study period. Again, the values of associations between ROCE and DTR for the selected companies under study are (-) 0.35, (-) 0.31, 0.46, (-) 0.50, 0.12 and (-) 0.13 respectively during the study period. These associations are positive for OIL and HPCL and negative for ONGC, IOCL, BPCL and GAIL. But, the associations are not statistically significant for all the concerned companies under study both at 5% and 1% levels of significance during the study period. That means the debtors turnover ratio has no significant contribution towards the overall profitability of all the concerned companies under study during the study period. Lastly, the associations between ROCE and CTR for the selected companies under study are (-) 0.04, (-) 0.60, (-) 0.76, (-) 0.62, 0.11 and (-) 0.46 respectively during the study period. These associations are positive for HPCL and negative for ONGC, IOCL, OIL, BPCL and GAIL. Again, the association is statistically significant for OIL at 5% level of significance, but for others these associations are not statistically significant both at 5% and 1% levels of significance during the study period. That means the cash turnover ratio of OIL has the significant contribution towards its overall profitability during the study period. There is a negative association between increases in the level of sales of automobiles and level of inventory of oil companies. During summer and winter vacations if frequency of tourism increases the volume of inventory of oil companies decreases. During festive or marriage season if LPG demand increases the gas companies should maintain higher amount of inventory (assuming supply is directly proportional to demand). Similar type of seasonalities may affect the other components of working capital, viz. CTR, DTR, CR, QR, WCTR, etc.

Here, the PI (in Table 2) for ONGC is more than one in 7 out of 10 accounting years; it is highest in 2007-08 and lowest in 2001-02. So, the overall performance of ONGC reflects a good sign over the selected study period. Again, the PI for IOCL is more than one in 8 out of 10 accounting years; it is highest in 2008-09 and lowest in 2009-10, so,

its overall performance reflects a very good sign over the study period. Similarly, the PI for OIL is more than one in 6 out of 10 accounting years; it is highest in 2007-08 and lowest in 2001-02, so, its overall performance reflects a moderately good sign over the study period. The PI for BPCL is more than one in 6 out of 10 accounting years; it is highest in 2004-05 and lowest in 2009-10, so, its overall performance reflects a moderately good sign over the study period. Again, the PI for HPCL is more than one in 7 out of 10 accounting years; it is highest in 2005-06 and lowest in 2007-08, so, its overall performance reflects a good sign over the study period. Similarly, the PI for GAIL is more than one in 6 out of 10 accounting years; it is highest in 2006-07 and lowest in 2001-02, so, its overall performance reflects a moderately good sign over the study period. Thus, a value of UI greater than one is always desirable from the management of a company.

Here, the UI (at Table 3) for ONGC is more than one in 3 out of 10 accounting years. It is highest in 2007-08 and lowest in 2001-02. So, it may also be argued that the ability of the concerned company in utilizing its current assets is not satisfactory during the study period. Again, the UI for IOCL is more than one in 6 out of 10 accounting years. It is highest in 2008-09 and lowest in 2009-10. So, it can be argued that the ability of the concerned company in utilizing its current assets is quite satisfactory during the study period. Similarly, the UI for OIL is more than one in 5 out of 10 accounting years. It is highest in 2007-08 and lowest in 2009-10, so, it may be concluded that the ability of the concerned company in utilizing its current assets is satisfactory during the study period. Again, the UI for BPCL is more than one in 6 out of 10 accounting years. It is highest in 2008-09 and lowest in 2009-10. So, it can be concluded that the ability of the concerned company in utilizing its current assets is very satisfactory during the period under study. Similarly, the UI for HPCL is more than one in 5 out of 10 accounting years. It is highest in 2007-08 and lowest in 2009-10. So, it may be argued that the ability of the concerned company in utilizing its current assets is satisfactory during the study period. Lastly, the UI for GAIL is more than one in 3 out of 10 accounting years. It is highest in 2006-07 and lowest in 2004-05. So, it can be argued that the ability of the concerned company in utilizing its current assets is not satisfactory during the period under study.

Here, the EI (in Table 4) for ONGC is more than one in 5 out of 10 accounting years which indicates a quite satisfactory position during the study period. The EI is highest in 2007-08 and lowest in 2001-02. Again, the EI for IOCL is more than one in 7 out of 10 accounting years, which indicates a good working capital management position during the study period. Its EI is highest in 2008-09 and lowest in 2009-10. Similarly, the EI for OIL is more than one in 5 out of 10 accounting years, which indicates a satisfactory working capital management position during the study period. The EI of it is highest in 2007-08 and lowest in 2009-10. Similarly, the EI for BPCL is more than one in 6 out of 10 accounting years, which indicates a good working capital management position during the study period. Its EI is highest in 2008-09 and lowest in 2009-10. Similarly, the EI for HPCL is more than one in 6 out of 10 accounting years, which indicates a good working capital management position during the study period. Its EI is highest in 2005-06 and lowest in 2003-04. Lastly, the EI for GAIL is more than one in 3 out of 10 accounting years that means its working capital management position is not satisfactory during the study period. Its EI is highest in 2006-07 and lowest in 2001-02.

Table 2 reflects that there are positive associations between ROE and PI for ONGC and OIL, but these associations are not statistically significant both at 5% and 1% levels of significance during the selected study period. It also highlights that there are negative associations between ROE and PI for IOCL, BPCL, HPCL and GAIL, and these associations are also statistically insignificant both at 5% and 1% levels of significance during the study period. There are moderate degrees of negative associations between PI and ROE both for IOCL and HPCL, but these associations have no significant contribution towards the profitability from the viewpoint of their owners' during the study period. There is a high degree of positive association between them for OIL, but it has no significant contribution towards profitability from the viewpoint of its owners' during the study period. The degrees of associations between them for ONGC, BPCL and GAIL are very low, so, there are no significant contributions towards the profitability from the viewpoints of their owners' during the given study period.

Table 3 reveals that there are moderately positive associations between UI and ROE both for ONGC and OIL, but these are not statistically significant both at 5% and 1% levels of significance during the study period. Except these two, for others in the study the degrees of

associations between them are negative and also they have no significant contributions towards the profitability from the viewpoints of their owners' during the study period.

Again, Table 4 highlights the point that there are moderate degrees of positive associations between EI and ROE both for ONGC and OIL, but these associations have no significant influences on the profitability from the viewpoints of their owners' during the study period. For others, viz. IOCL, BPCL, HPCL and GAIL, these associations are negative and also they have no significant influences on the profitability from the viewpoints of their owners' during the selected study period.

6. Analysis of Working Capital Leverage (WCL)

WCL measures the sensitivity of Return on Capital Employed (ROCE) due to changes in the level of current assets (CA). The higher the degree of WCL, the greater is the risk and vice-versa. But at the same time, it increases the possibility of higher return on capital employed.

The formula used for measuring the WCL is given below:

$$WCL = \frac{CA}{TA \pm DCA}$$

where, CA=Current Assets, TA= Total Assets, DCA= Change in the level of current assets. (Sharma and Gupta, 1999)

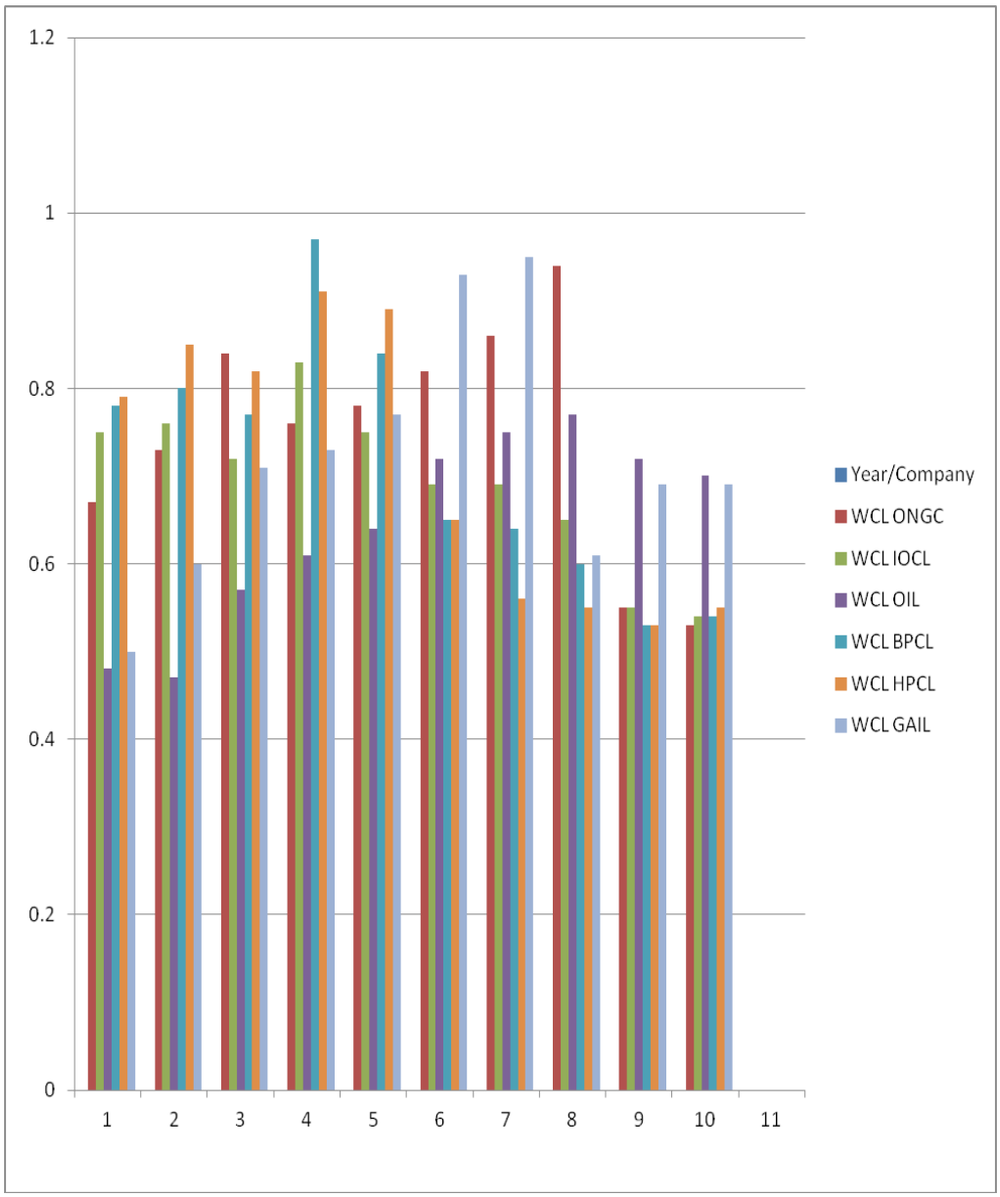
In case of ONGC, it is highest (i.e. 0.94) in 2007-08, indicating the maximum sensitivity of ROCE due to change in the level of investment in current assets during the study period. In 2009-10, the WCL of ONGC Ltd. is found lowest which is computed at 0.53, showing the least responsiveness of ROCE for variability of the level of investment in current assets. Therefore, the variability in the level of investment in current assets is more helpful in 2007-08 and least supportive in 2009-10 for improving its overall profitability. For IOCL, it is highest (i.e. 0.83) in 2003-04, indicating the maximum sensitivity of ROCE due to change in the level of investment in current assets during the study period. In 2009-10, the WCL is found lowest which is computed at 0.54, showing the least responsiveness of ROCE for variability of the level of investment in current assets. Therefore, the variability in the level of investment in current assets is more helpful in 2003-04 and least supportive in 2009-10 for improving its overall profitability. For OIL, it is highest (i.e. 0.77) in 2007-08, indicating the maximum sensitivity of ROCE due to change in the level of investment in current assets during the study period. In 2001-02, the WCL of OIL is found lowest which is computed at 0.47, showing the least responsiveness of ROCE for variability of the level of investment in current assets. Therefore, the variability in the level of investment in current assets is more helpful in 2007-08 and least supportive in 2001-02 for improving its overall profitability. For BPCL, it is highest (i.e. 0.97) in 2003-04, indicating the maximum sensitivity of ROCE due to change in the level of investment in current assets during the study period. In 2008-09, the WCL of BPCL

Table 5: Analysis of WCL of the Selected Companies Under Study During the Study Period From 2000-01 to 2009-10

Year/Company	*WCL*					
	ONGC	*IOCL*	*OIL*	*BPCL*	*HPCL*	*GAIL*
2000-01	0.67	0.75	0.48	0.78	0.79	0.50
2001-02	0.73	0.76	0.47	0.80	0.85	0.60
2002-03	0.84	0.72	0.57	0.77	0.82	0.71
2003-04	0.76	0.83	0.61	0.97	0.91	0.73
2004-05	0.78	0.75	0.64	0.84	0.89	0.77
2005-06	0.82	0.69	0.72	0.65	0.65	0.93
2006-07	0.86	0.69	0.75	0.64	0.56	0.95
2007-08	0.94	0.65	0.77	0.60	0.55	0.61
2008-09	0.55	0.55	0.72	0.53	0.53	0.69
2009-10	0.53	0.54	0.70	0.54	0.55	0.69

Source: Compiled and computed from the published annual reports of the companies under Study.

Chart 1: Diagrammatic Representation of WCL of the Selected Companies Under Study for the Period from 2000-01 to 2009-10



is found lowest which is computed at 0.53, showing the least responsiveness of ROCE for variability of the level of investment in current assets. Therefore, the variability in the level of investment in current assets is more helpful in 2003-04 and least supportive in 2008-09 for improving its overall profitability. For HPCL, it is highest (i.e. 0.91) in 2003-04, indicating the maximum sensitivity of ROCE due to change in the level of investment in current assets during the study period. In 2008-09, the WCL of BPCL is found lowest which is computed at 0.53, showing the least responsiveness of ROCE for variability of the level of investment in current assets. Therefore, the variability in the level of investment in current assets is more helpful in 2003-04 and least supportive in 2008-09 for improving its overall profitability. For GAIL, it is highest (i.e. 0.95) in 2006-07, indicating the maximum sensitivity of ROCE due to change in the level of investment in current assets during the study period. In 2000-01, the WCL of GAIL is found lowest which is computed at 0.50, showing the least responsiveness of ROCE for variability of the level of investment in current assets. Therefore, the variability in the level of investment in current assets is more helpful in 2006-07 and least supportive in 2000-01 for improving its overall profitability.

7. Concluding Remarks and Recommendations

The study of associations between the profitability and the selected key ratios relating to the working capital management of the selected companies under study reveals both positive and negative associations during the study period. Out of selected eight ratios CR, CATAR and ITR for ONGC, CATAR for IOCL, CR, CATAR and ITR for OIL, CATAR for HPCL and GAIL, have the significant influences on the overall profitability of the concerned company under study during the study period. So, the quick ratio and current asset to sales ratio of ONGC, current ratio, quick ratio and current asset to sales ratio of IOCL; quick ratio, current asset to sales ratio of OIL; current ratio, quick ratio, current asset to total asset ratio and current asset to sales ratio of BPCL; current ratio, quick ratio and current asset to sales ratio of HPCL; current ratio, quick ratio and current asset to sales ratio of GAIL have to manage properly and significantly, so that working capital management of the studing companies has a significant contribution towards the overall financial performance that can boost the energy to combat the pricing hike at oil and gas products in the current scenario of the environment of liberalization, privatization and globalization.

Again, the study of associations between ROE and PI, UI and EI for the selected companies under study, have registered both positive and negative relationships, but these associations are not statistically significant both at 5% and 1% levels of significance during the given study period. That means PI, UI and EI have no significant contribution towards the return on owners' equity for all the concerned companies under study during the study period. So, it can be propounded that working capital in the areas of PI, UI and EI are to be managing in such a way that can contribute significantly towards the return on owners' equity for all the concerned companies under study.

The study revealed that the WCL ratios of the selected companies under study are fluctuating in nature during the study period. It also reveals that the values of WCL for all the concerned companies under study are less than unity during the study period. It signifies that the increase in the rate of return on capital employed is less than the proportion to decrease in the level of working capital investment i.e. level of investment in current assets during the study period. To enrich the return on capital employed all the selected companies may increase the WCL ratios in the years to come in order to survive and sustain in the present competitive and changing environment where the pricing hike of oil and gas products is regular and alarming phenomenon in the international market.

More precisely, the worthy findings, path breaking conclusions, and reliable recommendations will ultimately help to improve the financial as well as socio-economic performances of oil and gas sector in India that boosts the studing companies to gain competitive advantages and self sufficiency in the present scenario of the environment of pricing hike prevailing throughout the globe.

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