AN EMPERICAL STUDY ON LIQUIDITY POSITION OF SELECTED PETROLEUM COMPANIES

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Abstract: In business, economics or investment, point of view liquidity is an asset's ability to be sold without causing a significant movement in the price and with minimum loss of value. Money, or cash in hand, is the most liquid asset and can be used immediately to perform economic actions like buying, selling, or paying debts and taking care of immediate wants and needs. Liquidity is considered as the backbone of any organization. The proper assessment of liquidity is crucially important for any business concern because it helps in forecasting the future behavior. The present study focuses on investigation of the liquidity position of selected petroleum companies with the help of liquidity ratios for the time span from2009-10 to 2015-16.Analysis of variance and student's t test are used to analyses and to explicate the importance of difference between actual and estimated values at 5 per cent level of significance. It also provides valuable and relevant suggestions to enhance.

Keywords: - Liquidity, Ratios, Liquid Assets, Current Ratio, Quick Ratio, Absolute Liquidity Ratio.

INTRODUCTION

Working Capital is the most vital aspect of the business concern because it plays an important role in making financial management decisions. High working capital or low working capital, both are dangerous for any business concern. A finance manager should actually maintain an optimum level of working capital for the smooth functioning and high inflow of profits. Liquidity actually means the availability of funds to meet all the expenses as they fall due. Effective management of liquidity is the most crucial function of a finance manager because it ensures proper functioning as well as stability in financial matters of a business concern. Traditionally liquidity was dependent on accepting deposits and sanctioning loans to public, but in modern era due to global financial system, increase in financial activities and modern financial products have increased the scope of liquidity and liquidity risk management. Investments in risky instruments, lack of universality and improper implementation of liquidity management are some of the basic reasons for liquidity risk, that's why liquidity management is acquiring consideration all over the world economy. The business owners and managers wants to construct a strategy which helps them in managing their day to day operations effectively, increase profitability and increase shareholder's wealth. In case of petroleum industry where the focus of business is on long-term assets because of the heavy expenses on extracting raw material, higher operating expenses, heavy research and development expenses managing profitability becomes crucial for finance managers especially when we talk about the level of profit which satisfies long-term interest of the firm. Petroleum firms are dealing with immense competition on one hand and strict regulations on other hand. That's why it is very difficult for finance manager to maintain adequate liquidity positions of the firms. The present study is based on net working capital concept. Excessive working capital results in unnecessary accumulation of inventories and idle funds which earns no returns. On the other hand, insufficient working capital also suffers from operating inefficiencies and because of this inefficiency firm's goodwill decreases which hammers the growth of the firm. Therefore, it is very important to determine the appropriate amount of working capital in order to maintain adequate liquidity position of the company.

Review of literature:-

Abuzarand Eljelly (2004) studied the relationship between profitability and liquidity of Saudi Arabian companies. The study found significant negative relation between the firm's profitability and its liquidity level.

Garcia Teruel and Martinez Solano (2007) studied the effects of working capital management on the profitability of a sample of small and medium sized Spanish firms. Those managers can create value by reducing their inventories and the number of days for which their accounts are outstanding. They have concluded that shortening the cash conversion cycle also improves the firm's profitability and liquidity.

A.Danuletiu (2010) examined the relationship between working capital management and profitability of companies. They used sample of 20 company's financial statement from period of 2004-08. They used different variables of liquidity management and divide firms on the basis of offensive and defensive policy. They conclude that there is negative relationship between liquidity and profitability.

Phuong et al: (2010) made an attempt to show the significance relationship between firm's liquidity, profitability, cash conversion cycle and its components. For this purpose they collect secondary data for a period of 2006-2008. They found that there is negative relationship between firm's liquidity and profitability with cash conversion cycle, number of days account receivable and number of day's inventory handled.

Shin and Soenen (1998) researched the relationship between working capital management and value creation for shareholders. The standard measure for working capital management is the cash conversion cycle. Cash conversion period reflects the time span between disbursements and collection of cash. They found a strong negative relationship between the lengths of the firm's net trading cycle and its profitability. Based on the findings, they suggest that one possible way to create shareholder value is to reduce firm's net trading cycle.

Statement of Problem:-

Many researchers have studied that working capital plays a very important role in the success of any business organization. Continuously monitoring the management of liquidity should be the primary object of a finance manager so that he can maximize profits. The major reason of ineffective liquidity management is inability to make adequate profits. Companies are developing various strategies to improve their liquidity position which are usually neglected in times of favorable business conditions. The present study has been carried out keeping in view the prime importance of Liquidity and Liquidity management in any organization.

Research Sample Design:-

The current study has been carried out by taking a sample of three major petroleum companies in India, viz, Bharat Petroleum Corporation Limited (BPCL) ,Indian Oil Corporation Limited (IOCL) and Hindustan Petroleum Corporation Limited (HPCL). The relevant data have been mainly gathered from the published annual reports and accounts of these petroleum companies. The other sources of information are trade journals, newspaper and other published Information.

Research Methodology:-

The study emphasis on the analysis of liquidity position of three major petroleum companies. In this study mean, standard deviation, Student's t-test and Analysis of Variance tools have been applied. The methodology of Liquidity and Turnover ratios have been adopted to withdraw results regarding the liquidity position of three petroleum companies. Nine liquidity ratios such as Current Ratio (CR), Quick Ratio (QR), Absolute Liquidity Ratio (ALR), Inventory Turnover Ratio (ITR), Debtors Turnover Ratio (DTR), Average Collection Period (ACP), Creditors Turnover Ratio, Current Assets Turnover Ratio (CATR), and Working Capital Turnover Ratio (WCTR) have been calculated and analyzed to examine the liquidity position of the petroleum companies. This research study is an attempt to draw meaningful conclusion on the liquidity positions of the three petroleum companies by using statistical tools. . The study covers the period of seven years, from 2009-10 to 2015-16.

Objectives of the Study:-

This study has the following extensive objectives:-

- To study the overall proportion of liquidity maintained by the Indian Oil Corporation Limited (IOCL), Bharat Petroleum Corporation Limited (BPCL) and Hindustan Petroleum Corporation Limited (HPCL).
- To compare the liquidity position of these three companies.
- To explore the liquidity management of these three companies with the help of ratio analysis technique.
- To compare the different liquidity ratios of these three companies.
- Test the significance of difference by using parametric Student's't' test and Analysis of Variance.
- To derive important conclusions and suggestions to improve the efficiency and effectiveness of liquidity management of these three companies.

Research Hypothesis and Testing:-

Hypothesis testing begins with an assumption called hypothesis that we make about a population parameter. A hypothesis is a supposition made as a basis for reasoning. Hypothesis testing enables a decision maker to draw inferences more precisely. In the present world, it is not possible to draw any conclusion accurately without proving it objectively. To test the validity of the conclusion or claim, hypothesis testing is applied to decide whether the claim is true or false. Hypotheses testing enable a decision maker to draw inferences more precisely. The following Hypotheses have been set and tested on 5% level of significance and the degree of freedom has been taken to 12 in the present study.

H_0: There is no significant difference between the different liquidity aspects of the selected petroleum companies.

H_1: There is a significant difference between the different liquidity aspects ofthe selected petroleum companies.

Liquidity Ratio Analysis of IOCL, BPCL and HPCL:-

Ratio analysis is the most important and commonly used technique for analysis of overall liquidity of a business organization. Often, a ratio is a symptom like the blood pressure, pulse or the temperature of a person. An analyst can x-ray by its use the financial growth and development and the present condition of a firm. Therefore, they should be compared with the norms of the industry and rates for previous period of a similar firm for the same period. It should be remembered that ratios are only guides in analysis and not conclusive ends in themselves. This study identifies the factors that fetch benefits or harms of the liquidity position of selected petroleum companies.

(1.) Current Ratio(CR):-

It may be defined as the ratio of current assets to current liabilities. According to accounting principles, a current ratio of 2: 1 is supposed to be an ideal ratio. The higher the ratio, the better it is, because the firm will be able to pay its current liabilities more easily. However, a very high ratio of 2: 1 may indicate the poor liquidity policy of the management. On the other hand, if the current ratio is less than the ideal ratio, it indicates lack of liquidity and shortage of working capital.

Table-1

Current Ratio of the Petroleum Companies under Study from 2008-09 to 2015-16

(in times)

Year	IOCL	BPCL	HPCL
2009-10	1.43	1.38	1.25
2010-11	1.40	1.26	1.36
2011-12	0.94	0.85	0.86
2012-13	1.03	0.90	0.88
2013-14	0.99	1.03	1.13

2014-15	0.98	0.93	1.16
2015-16	0.91	0.89	1.03
Mean	1.10	1.03	1.10
S.D.	0.22	0.21	0.19
C.V.	0.21	0.20	0.17
Minimum	0.91	0.89	0.86
Maximum	1.43	1.38	1.36

Source: Annual reports and accounts of the companies under study for the period 2008-09 to 2015-16.

The table 1 is showing the current ratio of IOCL, BPCL and HPCL during the study period. The current ratio is showing fluctuating trend during the study period. The coefficient of variation is highest for IOCL 0.21, followed by BPCL 0.20 and HPCL 0.17. The standard Deviation is highest of IOCL 0.22, followed by HPCL 0.19 and BPCL 0.21.The mean is highest of IOCL and HPCL 1.10 followed by BPCL 1.03. The ratio of IOCL ratio varied between 0.91 to 1.43, BPCL ratio varied between 0.89 to 1.38 and HPCL ratio varied between 0.86 to 1.36.It is less than 2:1 in all the three petroleum companies selected for the study. So we can conclude that the liquidity position of all the three petroleum companies are not up to the mark. They have to maintain higher level of liquidity.

(2.) Quick Ratio (QR):-

It is generally used for judging the short-term debt repaying capacity of a business. It is also called the solvency ratio, acid test ratio, quick ratio and liquid ratio. This ratio shows the availability of cash for meeting very short-term or immediate payments. For the purpose of this ratio, only liquid assets and current liabilities are used. An ideal quick ratio is said to be 1:1, which means for every rupee of current liability, the firm should have equal amount of liquid funds available all the times. If liquid ratio of any organisation goes below 1:1, then its liquidity position is deemed to be contingent. Generally, the more the liquid ratio, the better is the liquid position of an organisation and the firm can easily meet the current claims at a short notice.

Table-2

Quick Ratio of the Petroleum Companies under Study from 2008-09 to 2015-16

(in times)

Year	IOCL	BPCL	HPCL
2009-10	0.53	0.67	0.49
2010-11	0.57	0.56	0.51
2011-12	0.50	0.50	0.41
2012-13	0.56	0.51	0.50
2013-14	0.52	0.53	0.59
2014-15	0.53	0.48	0.62
2015-16	0.51	0.45	0.55
Mean	0.54	0.53	0.52
S.D.	0.03	0.08	0.07
C.V.	0.05	0.14	0.13
Minimum	0.50	0.45	0.41
Maximum	0.57	0.67	0.62

Source: Annual reports and accounts of the companies under study for the period 2008-09 to 2015-16.

The table 2 is presenting the quick ratio of IOCL, BPCL and HPCL during the study period. The quick ratio is showing fluctuating trend during the study period. The coefficient of variation is highest for BPCL 0.14, followed by HPCL 0.13 and IOCL 0.05.The standard Deviation is highest of BPCL 0.08, followed by HPCL 0.07 and IOCL 0.03. The mean is highest of IOCL 0.54, followed by BPCL 0.53 and HPCL 0.52. The ratio of IOCL ratio varied between 0.50 to 0.57, BPCL ratio varied between 0.45 to 0.67 and HPCL ratio varied between 0.41 to 0.62. It is less than 1:1 in all the three petroleum companies selected for the study. So we can conclude that the liquidity position of all the three petroleum companies are not up to the mark. They have to maintain higher level of liquidity.

(3.) Absolute Liquidity Ratio (ALR):-

The importance of adequate liquidity, in the sense of the ability of a firm to meet current/short-term obligations, when they become due for payment, can hardly be over-stressed. Liquidity is a prerequisite for the very survival of a firm. The term absolute liquid assets refer to cash, bank deposits and marketable securities. : Ideal Ratio is 0.5:1. It is assumed that fifty paisa worth of absolute liquid assets are considered sufficient for one rupee worth of current liabilities.

Table-3

Absolute Liquidity Ratio of the Petroleum Companies under Study from 2008-09 to 2015-16

(in times)

Year	IOCL	BPCL	HPCL
2009-10	0.04	0.02	0.01
2010-11	0.02	0.03	0.02
2011-12	0.01	0.02	0.01

2012-13	0.01	0.05	0.01
2013-14	0.02	0.01	0.03
2014-15	0.01	0.04	0.02
2015-16	0.01	0.07	0.01
Mean	0.02	0.04	0.03
S.D.	0.01	0.03	0.02
C.V.	0.65	0.60	0.50
Minimum	0.01	0.01	0.01
Maximum	0.04	0.05	0.03

Source: Annual reports and accounts of the companies under study for the period 2008-09 to 2015-16.

The table 3 is presenting the absolute liquidity ratio of IOCL, BPCL and HPCL during the study period. The absolute liquidity ratio is showing fluctuating trend during the study period. The coefficient of variation is highest for IOCL 0.65, followed by BPCL 0.60 and HPCL 0.50. The standard Deviation is highest of BPCL 0.03, followed by HPCL 0.02 and IOCL 0.01. The mean is highest of BPCL 0.04, followed by HPCL 0.03 and IOCL 0.02.. The ratio of IOCL ratio varied between 0.01 to 0.0.04, BPCL ratio varied between 0.01 to 0.05 and HPCL ratio varied between 0.01 to 0.03. It is less than but near to 0.5:1 in all the three petroleum companies selected for the study. So we can conclude that the liquidity position of all the three petroleum companies are not in a very good position. They have to increase their efforts to maintain higher level of liquidity.

(4.) Inventory Turnover Ratio (ITR):-

This ratio shows the relationship between the cost of goods sold and the average stock held by the company. It indicates the speed with which the stock is rotated into sales during the year. The higher ratio means, the stock is converted into sales quickly, while the lower ratio shows that the stock is converted into sales in longer duration and inventories remains lying in the warehouse.

Table-4

Inventory Turnover Ratio of the Petroleum Companies under Study from 2008-09 to 2015-16

(in times)

Year	IOCL	BPCL	HPCL
2009-10	4.71	8.46	6.42
2010-11	5.03	6.98	5.83
2011-12	4.96	8.44	6.21
2012-13	4.69	9.16	7.03
2013-14	4.56	9.06	7.94
2014-15	4.59	8.22	7.58
2015-16	4.53	7.63	8.12
Mean	4.72	8.28	7.02
S.D.	0.20	0.77	0.89
C.V.	0.04	0.09	0.13
Minimum	4.53	6.98	5.83
Maximum	5.03	9.16	8.12

Source: Annual reports and accounts of the companies under study for the period 2008-09 to 2015-16.

The table 4 is presenting the inventory turnover ratio of IOCL, BPCL and HPCL during the study period. The inventory turnover ratio is showing fluctuating trend during the study period. The coefficient of variation is highest for HPCL 0.13, followed by BPCL 0.09 and IOCL 0.04. The standard Deviation is highest of HPCL 0.89, followed by BPCL 0.77 and IOCL 0.20. The mean is highest of BPCL 8.28, followed by HPCL 7.02 and IOCL 4.72. The ratio of IOCL ratio varied between 4.53 to 5.03, BPCL ratio varied between 6.98 to 9.16 and HPCL ratio varied between 5.83 to 8.12.It is clear from above analysis that IOCL was unable to convert its stock into sales as promptly as that of BPCL and HPCL.

(5.) Debtors Turnover Ratio (DTR):-

Debtors turnover ratio concentrates on the credit and collection policy followed by the firm. This ratio throws light on the speed with which the amount is collected from debtors. A higher debtors Turnover ratio shows the efficiency in collection from Debtors. I.e. Debtors are collected more promptly and chances of bad debts are minimized. A lower debtors Turnover ratio reflects that credit sales have been made to customers who do not deserve much credit. It increases chances of the bad debt losses.

Table-5

Debtors Turnover Ratio of the Petroleum Companies under Study from 2008-09 to 2015-16

(in times)

Year	IOCL	BPCL	HPCL
2009-10	30.76	44.35	29.29
2010-11	29.60	37.93	32.88
2011-12	26.15	37.05	36.66

2012-13	29.12	28.62	34.24
2013-14	28.22	42.88	29.09
2014-15	30.38	44.22	28.40
2015-16	32.55	51.95	31.46
Mean	29.54	41.00	31.72
S.D.	2.03	7.34	3.06
C.V.	0.07	0.18	0.10
Minimum	26.15	28.62	28.40
Maximum	32.55	51.95	36.66

Source: Annual reports and accounts of the companies under study for the period 2008-09 to 2015-16.

The table 5 is presenting the Debtors turnover ratio of IOCL, BPCL and HPCL during the study period. The debtors turnover ratio is showing fluctuating trend during the study period. The coefficient of variation is highest for BPCL 0.18, followed by HPCL 0.10 and IOCL 0.07.The standard Deviation is highest of BPCL 7.34, followed by HPCL 3.06 and IOCL 2.03. The mean is highest of BPCL 41.00, followed by HPCL 31.72 and IOCL 29.54. The ratio of IOCL varied between 26.15 to 32.55, BPCL ratio varied between 28.62 to 51.95 and HPCL ratio varied between 28.40 to 36.66. Therefore, it is concluded that the credit and collection policy of BPCL was more efficient and effective as compared to HPCL and IOCL.

(6.)Average Collection Period (ACP):-

The average collection ratio indicates the number of days within which debts are collected. Prompt debt collection is always in the interest of the business because cash would be readily available to the company. . A longer collection period would result in cash deficit and the associated costs attached to it or we can say that longer period reflects delay in payments by debtors whereas shorter collection period implies prompt payment by the debtors.

Table-6

Average Collection Period of the Petroleum Companies under Study from 2008-09 to 2015-16

(in days)

Year	IOCL	BPCL	HPCL
2009-10	11.87	8.23	12.46
2010-11	12.33	9.62	11.10
2011-12	13.96	9.85	9.96
2012-13	12.53	12.76	10.66
2013-14	12.93	8.51	12.55
2014-15	12.01	8.25	12.85
2015-16	11.21	7.03	11.60
Mean	12.41	9.18	11.60
S.D.	0.87	1.84	1.08
C.V.	0.07	0.20	0.09
Minimum	11.21	7.03	9.96
Maximum	13.96	12.76	12.85

Source: Annual reports and accounts of the companies under study for the period 2008-09 to 2015-16.

The table 6 is presenting the average collection period of IOCL, BPCL and HPCL during the study period. The average collection period is showing fluctuating trend during the study period. The coefficient of variation is highest for BPCL 0.20, followed by HPCL 0.09 and IOCL 0.07.The standard Deviation is highest of BPCL 1.84, followed by HPCL 1.08 and IOCL 0.87. The mean is highest of IOCL 12.41, followed by HPCL 11.60 and BPCL 9.18. The ratio of IOCL varied between 11.21 to 13.96, BPCL ratio varied between 7.03 to 12.76 and HPCL ratio varied between 9.96 to 12.85. Therefore, it is concluded that the collection policy of BPCL was more efficient and effective as compared to HPCL and IOCL.

(7.) Creditors Turnover Ratio (CTR):-

Creditors turnover ratio is important from the point of view of short-term lenders and trade creditors. If the creditors turnover ratio is low, it means that the company is following a liberal credit policy. However, if the creditors turnover ratio is high, it indicates the collection efficiency of the management.

Table-7

Creditors Turnover Ratio of the Petroleum Companies under Study from 2008-09 to 2015-16

(in times)

Year	IOCL	BPCL	HPCL
2009-10	3.25	3.43	6.71
2010-11	4.21	3.26	7.34
2011-12	4.12	7.57	7.12

2012-13	4.44	7.29	7.10
2013-14	4.13	8.84	8.86
2014-15	3.53	6.45	8.43
2015-16	3.56	6.04	9.50
Mean	3.89	6.13	7.87
S.D.	0.44	2.10	1.06
C.V.	0.11	0.34	0.13
Minimum	3.25	3.26	6.71
Maximum	4.44	8.84	9.50

Source: Annual reports and accounts of the companies under study for the period 2008-09 to 2015-16.

The table 7 is presenting the creditors turnover ratio of IOCL, BPCL and HPCL during the study period. The creditors turnover ratio is showing fluctuating trend during the study period. The coefficient of variation is highest for BPCL 0.34, followed by HPCL 0.13 and IOCL 0.11. The standard Deviation is highest of BPCL 2.10, followed by HPCL 1.06 and IOCL 0.44. The mean is highest of HPCL 7.87, followed by BPCL 6.13and IOCL 3.89. The ratio of IOCL varied between 3.25 to 4.44, BPCL ratio varied between 3.26 to 8.84 and HPCL ratio varied between 6.17 to 9.50. Therefore, it is concluded that the collection efficiency of HPCL was more efficient and effective as compared to BPCL and IOCL.

(8.)Current Assets Turnover Ratio (CATR):-

This ratio gives information about the efficient, or inefficient, use of current assets and over-investment or under-investment in these assets, in other words we can say that this ratio reflects the efficiency and capacity of working capital. A higher value of this ratio indicates circulation of current assets, while a lower ratio indicates stagnation in the flow of current assets.

Table-8

Current Assets Turnover Ratio of the Petroleum Companies under Study from 2008-09 to 2015-16

(in times)

Year	IOCL	BPCL	HPCL
2009-10	3.59	5.18	4.91
2010-11	3.64	5.49	4.65
2011-12	3.57	5.37	4.85
2012-13	3.48	6.25	5.40
2013-14	3.52	6.56	5.61
2014-15	4.56	7.86	7.48
2015-16	3.92	6.74	6.52
Mean	3.75	6.21	5.63
S.D.	0.38	0.95	1.03
C.V.	0.10	0.15	0.18
Minimum	3.48	5.18	4.65
Maximum	4.56	7.86	7.48

Source: Annual reports and accounts of the companies under study for the period 2008-09 to 2015-16.

The table 8 is presenting the current assets turnover ratio of IOCL, BPCL and HPCL during the study period. The current assets turnover ratio is showing fluctuating trend during the study period. The coefficient of variation is highest for HPCL 0.18, followed by BPCL 0.15 and IOCL 0.10.The standard Deviation is highest of HPCL 1.03, followed by BPCL 0.95 and IOCL 0.38. The mean is highest of BPCL 6.21, followed by HPCL 5.63 and IOCL 3.75. The ratio of IOCL varied between 3.48 to 4.56, BPCL ratio varied between 5.18 to 7.86 and HPCL ratio varied between 4.65 to 7.48.It is therefore, concluded that the liquidity management of BPCL from this point of view was far much better in comparison to the liquidity management of HPCL and IOCL.

(9.) *Net Working Capital Turnover Ratio (NWCTR):-*

The working capital turnover ratio is calculated to find out whether an organisation has used its working capital efficiently or not. A higher ratio indicates that the working capital has been used efficiently and a lower ratio indicates that the working capital has not been used efficiently.

Table-9

Net Working Capital Turnover Ratio of the Petroleum Companies under Study from 2008-09 to 2015-16

(in times)

Year	IOCL	BPCL	HPCL
2009-10	11.79	16.83	23.67
2010-11	12.80	24.37	17.45
2011-12	-50.75	-27.30	-27.55
2012-13	97.35	-51.72	-38.66
2013-14	-562.81	222.05	46.28
2014-15	-461.59	-91.87	49.04
2015-16	-33.09	-44.86	224.42

Mean	-140.9	6.79	42.09
S.D.	259.58	103.06	87.20
C.V.	-1.84	15.19	2.07
Minimum	-562.81	-91.87	-38.66
Maximum	97.35	222.05	224.42

Source: Annual reports and accounts of the companies under study for the period 2008-09 to 2015-16.

The table 9 is presenting the net working capital turnover ratio of IOCL, BPCL and HPCL during the study period. The current assets turnover ratio is showing fluctuating trend during the study period. The coefficient of variation is highest for BPCL 15.19, followed by HPCL 2.07 and IOCL -1.84. The standard Deviation is highest of IOCL 259.58, followed by BPCL 103.06 and HPCL 87.20. The mean is highest of HPCL42.09, followed by BPCL 6.79 and for IOCL it is negative -140.90. The ratio of IOCL varied between -562.81 to 97.35, BPCL ratio varied between -91.87 to 222.05 and HPCL ratio varied between -38.66 to 224.42.It is therefore, concluded that HPCL is optimally utilizing its working capital in comparison to the utilization of BPCL and IOCL.

Through this research paper we have made an attempt to examine the liquidity positions of three petroleum companies. Especially for inspecting the variability of data statistical technique C.V. is used. A coefficient of variation (C.V.) is a statistical measure helpful in analyzing data and it is a useful statistic for comparing the degree of variation from one data series to another, even if the means are drastically different from one another. Higher C.V. shows less stable, consistent or less uniform data on the other hand lower C.V. shows more consistent, more stable and more homogeneous data. It can be discovered from 9 ratio tables IOCL seems to be more consistent in seven ratios such as QR, ITR, DTR, ACP, CTR, CATR and NWCTR and HPCL seems to be more consistent in CR and ALR.

Hypotheses Testing

(1.) Student's t-test

Student's t-test**,** in statistics is a method of testing hypotheses which compares two averages (means) of a small sample and conclude, if they are different from each other. The t-test also tells you how significant the differences are. This paper has made an attempt to analyze inter-company liquidity positions by making 3 different combinations of two companies from the selected three sample petroleum companies IOCL, BPCL and HPCL for examining the intercompany liquidity positions and also to determine the significance of difference in the nine types of ratio of the companies. . For this purpose total 27 different Hypotheses have been formulated and statistically tested at 5% level of significance. These nine tables present the results of this test along with the conclusion whether the null hypotheses have been accepted or rejected.

Student's 't' Test for Inter–Company Comparison of Different Liquidity Ratios

't'Table 10:- Current Ratio of the Petroleum Companies

Particular	***IOCL - BPCL***	***IOCL - HPCL***	***BPCL - HPCL***
Ho (Null Hypotheses)	μIOCL = μ BPCL	μIOCL = μ HPCL	μBPCL = μ HPCL
H1 (Alternative Hypotheses)	μIOCL ≠ μ BPCL	μIOCL ≠ μ HPCL	μBPCL ≠ μ HPCL
Degree of Freedom (n1 + n2 = 2)	12	12	12
Level of significance	5%	5%	5%
Type of test	One–tailed	One–tailed	One–tailed
Sig. Value(S.V)	0.05	0.05	0.05
Calculated value of 't'(t.V.)	0.592	0.990	0.568
Values	t.V ≥ S.V (Accepted) t.V ≤ S.V (Rejected)	t.V ≥ S.V (Accepted) t.V ≤ S.V (Rejected)	t.V ≥ S.V (Accepted) t.V ≤ S.V (Rejected)
Result, Ho is	***Accepted***	***Accepted***	***Accepted***
Descriptive Conclusion	There is no Difference between Means of the Ratios of IOCL & BPCL	There is no Difference between Means of the Ratios of IOCL & HPCL	There is no Difference between Means of the Ratios of BPCL & HPCL

Source: Annual reports and accounts of the companies under study for the period 2008-09 to 2015-16 and t-test is computed with the help of SPSS.

Inference:-*Table 10 concludes that our null hypotheses in all the three combinations have been accepted therefore we can conclude that there is not any significant difference between the current assets of IOCL, BPCL and HPCL.*

't'Table 11:- Quick Ratio of the Petroleum Companies

Particular	*IOCL - BPCL*	*IOCL - HPCL*	*BPCL - HPCL*
Ho (Null Hypotheses)	μIOCL = μ BPCL	μIOCL = μ HPCL	μBPCL = μ HPCL
H1 (Alternative Hypotheses)	μIOCL ≠ μ BPCL	μIOCL ≠ μ HPCL	μBPCL ≠ μ HPCL
Degree of Freedom (n1 + n2 = 2)	12	12	12
Level of significance	5%	5%	5%
Type of test	One–tailed	One–tailed	One–tailed
Sig. Value(S.V)	0.05	0.05	0.05
Calculated value of 't'(t.V.)	0.922	0.803	0.911
Values	t.V ≥ S.V (Accepted) t.V ≤ S.V (Rejected)	t.V ≥ S.V (Accepted) t.V ≤ S.V (Rejected)	t.V ≥ S.V (Accepted) t.V ≤ S.V (Rejected)
Result, Ho is	*Accepted*	*Accepted*	*Accepted*
Descriptive Conclusion	There is no Difference between Means of the Ratios of IOCL & BPCL	There is no Difference between Means of the Ratios of IOCL & HPCL	There is no Difference between Means of the Ratios of BPCL & HPCL

Source: Annual reports and accounts of the companies under study for the period 2008-09 to 2015-16 and t-test is computed with the help of SPSS.

Inference:-*Table 11 concludes that our null hypotheses in all the three combinations have been accepted therefore we can conclude that there is not any significant difference between the quick assets of IOCL, BPCL and HPCL.*

't'Table 12:- Absolute Liquidity Ratio of the Petroleum Companies

Particular	*IOCL - BPCL*	*IOCL - HPCL*	*BPCL - HPCL*
Ho (Null Hypotheses)	μIOCL = μ BPCL	μIOCL = μ HPCL	μBPCL = μ HPCL
H1 (Alternative Hypotheses)	μIOCL ≠ μ BPCL	μIOCL ≠ μ HPCL	μBPCL ≠ μ HPCL
Degree of Freedom (n1 + n2 = 2)	12	12	12
Level of significance	5%	5%	5%
Type of test	One–tailed	One–tailed	One–tailed
Sig. Value(S.V)	0.05	0.05	0.05
Calculated value of 't'(t.V.)	0.078	0.786	0.047
Values	t.V ≥ S.V (Accepted) t.V ≤ S.V (Rejected)	t.V ≥ S.V (Accepted) t.V ≤ S.V (Rejected)	t.V ≥ S.V (Accepted) t.V ≤ S.V (Rejected)
Result, Ho is	*Accepted*	*Accepted*	*Rejected*
Descriptive Conclusion	There is no Difference between Means of the Ratios of IOCL & BPCL	There is no Difference between Means of the Ratios of IOCL & HPCL	There is a Difference between Means of the Ratios of BPCL & HPCL

Source: Annual reports and accounts of the companies under study for the period 2008-09 to 2015-16 and t-test is computed with the help of SPSS.

Inference:-*Table 12 concludes that our null hypotheses in the two combinations (IOCL -BPCL) and (IOCL -HPCL) have been accepted therefore we can conclude that there is not any significant difference between these two combinations of three petroleum companies, but our one hypotheses between (BPCL-HPCL) is rejected that means there is a difference between means of these two companies.*

't'Table 13:-Inventory Turnover Ratio of the Petroleum Companies

Particular	*IOCL - BPCL*	*IOCL - HPCL*	*BPCL - HPCL*

Ho (Null Hypotheses)	µIOCL = µ BPCL	µIOCL = µ HPCL	µBPCL = µ HPCL
H1 (Alternative Hypotheses)	µIOCL ≠ µ BPCL	µIOCL ≠ µ HPCL	µBPCL ≠ µ HPCL
Degree of Freedom (n1 + n2 = 2)	12	12	12
Level of significance	5%	5%	5%
Type of test	One–tailed	One–tailed	One–tailed
Sig. Value(S.V)	0.05	0.05	0.05
Calculated value of 't'(t.V.)	0.000	0.000	0.015
Values	t.V ≥ S.V (Accepted) t.V ≤ S.V (Rejected)	t.V ≥ S.V (Accepted) t.V ≤ S.V (Rejected)	t.V ≥ S.V (Accepted) t.V ≤ S.V (Rejected)
Result, Ho is	***Rejected***	***Rejected***	***Rejected***
Descriptive Conclusion	There is a Difference between Means of the Ratios of IOCL & BPCL	There is a Difference between Means of the Ratios of IOCL & HPCL	There is a Difference between Means of the Ratios of BPCL & HPCL

Source: Annual reports and accounts of the companies under study for the period 2008-09 to 2015-16 and t-test is computed with the help of SPSS.

Inference:-*Table 13 concludes that our null hypotheses in all the three companies have been rejected therefore we can conclude that there is a significant difference between the means of IOCL, BPCL and HPCL.*

't'Table 14:-Debtors Turnover Ratio of the Petroleum Companies

Particular	***IOCL - BPCL***	***IOCL - HPCL***	***BPCL - HPCL***
Ho (Null Hypotheses)	µIOCL = µ BPCL	µIOCL = µ HPCL	µBPCL = µ HPCL
H1 (Alternative Hypotheses)	µIOCL ≠ µ BPCL	µIOCL ≠ µ HPCL	µBPCL ≠ µ HPCL
Degree of Freedom (n1 + n2 = 2)	12	12	12
Level of significance	5%	5%	5%
Type of test	One–tailed	One–tailed	One–tailed
Sig. Value(S.V)	0.05	0.05	0.05
Calculated value of 't'(t.V.)	0.002	0.142	0.009
Values	t.V ≥ S.V (Accepted) t.V ≤ S.V (Rejected)	t.V ≥ S.V (Accepted) t.V ≤ S.V (Rejected)	t.V ≥ S.V (Accepted) t.V ≤ S.V (Rejected)
Result, Ho is	***Rejected***	***Accepted***	***Rejected***
Descriptive Conclusion	There is a Difference between Means of the Ratios of IOCL & BPCL	There is no Difference between Means of the Ratios of IOCL & HPCL	There is a Difference between Means of the Ratios of BPCL & HPCL

Source: Annual reports and accounts of the companies under study for the period 2008-09 to 2015-16 and t-test is computed with the help of SPSS.

Inference:-*Table 14 concludes that our null hypotheses in the two combinations (IOCL-BPCL) and (BPCL-HPCL) have been rejected therefore we can conclude that there is a significant difference between the means of these two combinations of three petroleum companies, but our one hypotheses between (IOCL-HPCL) is accepted that means there is not any significant difference between means of these two companies.*

't'Table 15:-Average Collection Period of the Petroleum Companies

Particular	***IOCL - BPCL***	***IOCL - HPCL***	***BPCL - HPCL***
Ho (Null Hypotheses)	µIOCL = µ BPCL	µIOCL = µ HPCL	µBPCL = µ HPCL

H1 (Alternative Hypotheses)	µIOCL ≠ µ BPCL	µIOCL ≠ µ HPCL	µBPCL ≠ µ HPCL
Degree of Freedom (n1 + n2 = 2)	12	12	12
Level of significance	5%	5%	5%
Type of test	One–tailed	One–tailed	One–tailed
Sig. Value(S.V)	0.05	0.05	0.05
Calculated value of 't'(t.V.)	0.001	0.150	0.011
Values	t.V ≥ S.V (Accepted) t.V ≤ S.V (Rejected)	t.V ≥ S.V (Accepted) t.V ≤ S.V (Rejected)	t.V ≥ S.V (Accepted) t.V ≤ S.V (Rejected)
Result, Ho is	***Rejected***	***Accepted***	***Rejected***
Descriptive Conclusion	There is a Difference between Means of the Ratios of IOCL & BPCL	There is no Difference between Means of the Ratios of IOCL & HPCL	There is a Difference between Means of the Ratios of BPCL & HPCL

Source: Annual reports and accounts of the companies under study for the period 2008-09 to 2015-16 and t-test is computed with the help of SPSS.

Inference:-*Table 15 concludes that our null hypotheses in the two combinations (IOCL-BPCL) and (BPCL HPCL) have been rejected therefore we can conclude that there is a significant difference between the means of these two combinations of three petroleum companies, but our one hypotheses between (IOCL-HPCL) is accepted that means there is not any significant difference between means of these two companies.*

't' Table 16:- Creditors Turnover Ratio of the Petroleum Companies

Particular	***IOCL - BPCL***	***IOCL - HPCL***	***BPCL - HPCL***
Ho (Null Hypotheses)	µIOCL = µ BPCL	µIOCL = µ HPCL	µBPCL = µ HPCL
H1 (Alternative Hypotheses)	µIOCL ≠ µ BPCL	µIOCL ≠ µ HPCL	µBPCL ≠ µ HPCL
Degree of Freedom (n1 + n2 = 2)	12	12	12
Level of significance	5%	5%	5%
Type of test	One–tailed	One–tailed	One–tailed
Sig. Value(S.V)	0.05	0.05	0.05
Calculated value of 't'(t.V.)	0.017	0.000	0.074
Values	t.V ≥ S.V (Accepted) t.V ≤ S.V (Rejected)	t.V ≥ S.V (Accepted) t.V ≤ S.V (Rejected)	t.V ≥ S.V (Accepted) t.V ≤ S.V (Rejected)
Result, Ho is	***Rejected***	***Rejected***	***Accepted***
Descriptive Conclusion	There is a Difference between Means of the Ratios of IOCL & BPCL	There is a Difference between Means of the Ratios of IOCL & HPCL	There is no Difference between Means of the Ratios of BPCL & HPCL

Source: Annual reports and accounts of the companies under study for the period 2008-09 to 2015-16 and t-test is computed with the help of SPSS.

Inference:-*Table 16 concludes that our null hypotheses in the two combinations (IOCL-BPCL) and (IOCL-HPCL) have been rejected therefore we can conclude that there is a significant difference between means of these two combinations of three petroleum companies, but our one hypotheses between (BPCL-HPCL) is accepted that means there is not any significant difference between means of these two companies.*

't'Table 17:- Current Assets Turnover Ratio of the Petroleum Companies

Particular	***IOCL - BPCL***	***IOCL - HPCL***	***BPCL - HPCL***
Ho (Null Hypotheses)	µIOCL = µ BPCL	µIOCL = µ HPCL	µBPCL = µ HPCL

H1 (Alternative Hypotheses)	µIOCL ≠ µ BPCL	µIOCL ≠ µ HPCL	µBPCL ≠ µ HPCL
Degree of Freedom (n1 + n2 = 2)	12	12	12
Level of significance	5%	5%	5%
Type of test	One–tailed	One–tailed	One–tailed
Sig. Value(S.V)	0.05	0.05	0.05
Calculated value of 't'(t.V.)	0.000	0.001	0.298
Values	t.V ≥ S.V (Accepted) t.V ≤ S.V (Rejected)	t.V ≥ S.V (Accepted) t.V ≤ S.V (Rejected)	t.V ≥ S.V (Accepted) t.V ≤ S.V (Rejected)
Result, Ho is	***Rejected***	***Rejected***	***Accepted***
Descriptive Conclusion	There is a Difference between Means of the Ratios of IOCL & BPCL	There is a Difference between Means of the Ratios of IOCL & HPCL	There is no Difference between Means of the Ratios of BPCL & HPCL

Source: Annual reports and accounts of the companies under study for the period 2008-09 to 2015-16 and t-test is computed with the help of SPSS.

Inference:-*Table 17 concludes that our null hypotheses in the two combinations (IOCL-BPCL) and (IOCL-HPCL) have been rejected therefore we can conclude that there is a significant difference between means of these two combinations of three petroleum companies, but our one hypotheses between (BPCL-HPCL) is accepted that means there is not any significant difference between means of these two companies.*

't'Table 18:- Net Working Capital Turnover Ratio of the Petroleum Companies

Particular	***IOCL - BPCL***	***IOCL - HPCL***	***BPCL - HPCL***
Ho (Null Hypotheses)	µIOCL = µ BPCL	µIOCL = µ HPCL	µBPCL = µ HPCL
H1 (Alternative Hypotheses)	µIOCL ≠ µ BPCL	µIOCL ≠ µ HPCL	µBPCL ≠ µ HPCL
Degree of Freedom (n1 + n2 = 2)	12	12	12
Level of significance	5%	5%	5%
Type of test	One–tailed	One–tailed	One–tailed
Sig. Value(S.V)	0.05	0.05	0.05
Calculated value of 't'(t.V.)	0.187	0.102	0.502
Values	t.V ≥ S.V (Accepted) t.V ≤ S.V (Rejected)	t.V ≥ S.V (Accepted) t.V ≤ S.V (Rejected)	t.V ≥ S.V (Accepted) t.V ≤ S.V (Rejected)
Result, Ho is	***Accepted***	***Accepted***	***Accepted***
Descriptive Conclusion	There is no Difference between Means of the Ratios of IOCL & BPCL	There is no Difference between Means of the Ratios of IOCL & HPCL	There is no Difference between Mean of the Ratios of BPCL & HPCL

Source: Annual reports and accounts of the companies under study for the period 2008-09 to 2015-16 and t-test is computed with the help of SPSS.

Inference:-*Table 18 concludes that our null hypotheses in all the three combinations have been accepted therefore we can conclude that there is not any significant difference between the means of IOCL, BPCL and HPCL.*

(2.) ANOVA (Analysis of Variance):-

ANOVA is a statistical technique which helps in figuring out if you need to reject or accept the null hypothesis. The one-way analysis of variance (ANOVA) is used to determine whether there are any statistically significant differences between the means of three or more independent (unrelated) groups. In other words we can say that it is a test of groups to see if there is a difference between them or not. The

objective of employing ANOVA test is to test whether the performance of all the samples of the firms differ significantly or there is no significant difference, across study period.

ANNOVA TEST

Table19:- ANOVA results for the Current Ratio of the Petroleum Companies

Source of Variation	*SS*	*Df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0.018028571	2	0.00901429	0.215915	0.807860513	4.900068945
Within Groups	0.751485714	18	0.04174921			
Total	0.769514286	20				

Source: ANNOVA test is computed with the help of Ms Excel Software.

Inference:- *$F_{cal} \leq F_{crit}$ We accept null hypothesis Ho and conclude that the current ratio of sample companies do not differ significantly.*

Table20:- ANOVA results for the Quick Ratio of the Petroleum Companies

Source of Variation	*SS*	*Df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0.000180952	2	9.0476E-05	0.02554908	0.97481	4.900068945
Within Groups	0.063742857	18	0.00354127			
Total	0.06392381	20				

Source: ANNOVA test is computed with the help of Ms Excel Software

Inference:- *$F_{cal} \leq F_{crit}$ We accept null hypothesis Ho and conclude that the quick ratio of sample companies do not differ significantly.*

Table21:- ANOVA results for the Absolute Liquidity Ratio of the Petroleum Companies

Source of Variation	*SS*	*Df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0.00149524	2	0.0007476	3.651163	0.046667	4.900069
Within Groups	0.00368571	18	0.0002048			
Total	0.00518095	20				

Source: ANNOVA test is computed with the help of Ms Excel Software.

Inference:- *$F_{cal} \leq F_{crit}$ We accept null hypothesis Ho and conclude that the absolute liquidity ratio of sample companies do not differ significantly.*

Table22:- ANOVA results for the Inventory Turnover Ratio of the Petroleum Companies

Source of Variation	*SS*	*Df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	45.46335	2	22.73168	47.62033	6.48E-08	4.900069
Within Groups	8.592343	18	0.477352			
Total	54.0557	20				

Source: ANNOVA test is computed with the help of Ms Excel Software.

Inference:- *$F_{cal} \geq F_{crit}$ We reject null hypothesis Ho and conclude that the Inventory Turnover ratio of sample companies differ significantly.*

Table23:- ANOVA results for the Debtors Turnover Ratio of the Petroleum Companies

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	518.567	2	259.2835	11.55225	0.000592	4.900069
Within Groups	403.9995	18	22.44442			
Total	922.5665	20				

Source: ANNOVA test is computed with the help of Ms Excel Software.

Inference:- *$F_{cal} \geq F_{crit}$ We reject null hypothesis Ho and conclude that the Debtors Turnover Ratio of sample companies differ significantly.*

Table24:- ANOVA results for the Average Collection Period of the Petroleum Companies

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*

Between Groups	39.4747	2	19.73735	11.13336	0.000713	4.900069
Within Groups	31.9106	18	1.772811			
Total	71.3853	20				

Source: ANNOVA test is computed with the help of Ms Excel Software.

Inference:- *$F_{cal} \geq F_{crit}$ We reject null hypothesis Ho and conclude that the Average Collection Period of sample companies differ significantly.*

Table 25:- ANOVA results for the Creditors Turnover Ratio of the Petroleum Companies

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	55.5673524	2	27.78367619	14.58187	0.000172	4.900069
Within Groups	34.2964286	18	1.905357143			
Total	89.863781	20				

Source: ANNOVA test is computed with the help of Ms Excel Software.

Inference:- *$F_{cal} \geq F_{crit}$ We reject null hypothesis Ho and conclude that the Creditors Turnover Ratio of sample companies differ significantly.*

Table 26:- ANOVA results for the Current Assets Turnover Ratio of the Petroleum Companies

Source of Variation	*SS*	*Df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	23.033781	2	11.51689048	16.39000242	8.83523E-05	4.900069
Within Groups	12.6482	18	0.702677778			
Total	35.681981	20				

Source: ANNOVA test is computed with the help of Ms Excel Software.

Inference:- *$F_{cal} \geq F_{crit}$ We reject null hypothesis Ho and conclude that the Current Assets Turnover Ratio of sample companies differ significantly.*

Table27:- ANOVA results for the Net Working Capital Turnover Ratio of the Petroleum Companies

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	131936.1174	2	65968.05869	2.311687	0.127772	4.900069
Within Groups	513661.7287	18	28536.76271			
Total	645597.8461	20				

Source: ANNOVA test is computed with the help of Ms Excel Software.

Inference:- *$F_{cal} \leq F_{crit}$ We accept null hypothesis Ho and conclude that the Net Working Capital Turnover Ratio of sample companies not differ significantly.*

After applying ANOVA we can conclude that in some liquidity and turnover ratios our null hypothesis is accepted and in some cases it has been rejected.

Conclusion and Suggestions:-

The period chosen for the study was actually challenging for petroleum sector as well as for Indian economy. The economy was facing depression on not only at national level but also at international level. In this challenging time it was very difficult for all businesses to perform with its efficiency. The study was conducted with the target to analyze liquidity position of the three petroleum firms IOCL, BPCL and HPCL. The seven year time period from 2009-10 to 2015-16 had been chosen. The ratio analysis (both liquidity and turnover ratios), statistical techniques standard deviation, coefficient of variation, student's t-test and ANOVA test has been applied to get actual and purified results of liquidity positions of all the three sample companies. Standard deviation measures the variation in data. Higher the standard deviation, higher would be the variation and lower deviation shows the consistent data.

It is evident from the ratio analysis that the current, quick and absolute ratios of these three petroleum companies are less than their ideal ratios which predicts the liquidity position of these companies are not up to the mark or we can say that there is shortage of working capital. It is concluded that out of three companies selected for this study, the liquidity position was comparatively better in IOCL. Therefore, It is suggested that the companies should increase investment in current assets, increase short-term investments, increases in working capital etc. as to improve their liquidity positions.

It is analyzed from the above study that the turnover ratio of BPCL is the highest except average collection period, creditors turnover ratio and net working capital turnover ratio which reveals the ability of BPCL to effectively manage the current assets, efficiently employ the current assets, generate higher level of profits, generate larger amount of sales and speedy conversion of cash into investments. Therefore, it is suggested

that companies should increase their liquidity positions by providing cushions to creditors, adequate margin of safety to creditors, optimum utilization of resources, decrease the cost of productions by fair means, increase in short term investments all these steps should be taken with great care especially in case of IOCL because it has the lowest ratios which conclude that the company failed to utilize current assets efficiently.
The result of student's t-test conclude that the sample petroleum companies manage their short term solvency position in different ways and their liquidity management is not equally efficient and effective.
ANOVA test is applied to present the clear picture and significant differences within or among the sample companies in liquidity management practices over the study period. After analyzing test we can conclude that, there are significant differences (among or within companies) in liquidity management policies therefore we can state that sample companies manage their liquidity position in a very different manner according to their comfort.

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