
Impact of Short-Term Solvency on Operational Efficiency: A Study on Cement Industry

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Abstract

The purpose of this paper is to measure/assess the link between short-term solvency and operational efficiency of selected cement companies in India. The researcher has collected, compiled and analysed publicly available data. The data for the study are different financial ratios. Short-term solvency of the sample companies is measured from the current ratio whereas operational efficiency is accessed from P ratios. These ratios are collected from the Annual Reports of selected companies over the period 2003 to 2012. Descriptive as well as inferential statistical tools are used to draw conclusions. The result suggests that the liquidity and profitability of the sample companies are not uniform and the association between quick ratio and operational efficiency is negative. The study depends more on empirical procedures rather than a theoretical justification. The research is totally based on publically available information and limited with regard to the time span and sample size. No holdout sample has been used. The entire data set is subjected to simple statistical analysis. This to some extent limits the findings and implications.

Profitability and liquidity give importance on two different aspects. Liquidity gives importance on holding a huge investment in liquid assets whereas profitability suggests a low level of investment in liquid assets. Simply the managers have to make a trade-off between these two decisions for the smooth running of the business. The present study focuses on two issues - does the increase in profitability affect the liquidity of an organisation? Are these ratios of companies in the same industry similar?

Key Words: Short-term Solvency, Operational Efficiency, Current Ratio, P- ratio

1.0 Introduction

A ratio is the quantitative relationship expressed in mathematical term between two individuals and group of figures connected with each other in some logical manner. Further, the quantitative relationship between two or more accounting figures that appear in the Profit Loss Accounts or Balance Sheet is called as Financial/Accounting Ratio. It is one of the common and widely accepted means of communicating financial information to different groups of stakeholders of a firm. The financial ratio analysis is based on the principle that 'a single accounting figure by itself may not communicate any meaningful information but when expressed as a relative to some other figure, it gives some significant information'. In this respect, ratio analysis is useful in disclosing details of the financial position, liquidity position, overall solvency, operating efficiency and overall profitability of any organisation.

Transitional phase (1940 to 1950) of finance is the extension of traditional phase. In the transitional phase, importance is assigned to the day-to-day problem of finance. The day-to-day problems of financial management focus on funding sufficient cash to meet current obligations. Liquidity refers maintaining cash, bank balance and other current assets to discharge the current obligations as and when arises. Technically this refers to short term solvency. How profitable the firm is no matter, but it has to maintain minimum liquidity to meet its current obligations. Inability to finance current operations creates liquidity risk. Liquidity risk hampers the creditworthiness, solvency and survival of the firm in the long run.

The profitability ratios are the yardstick of measuring operational efficiency of the firm. Different groups of

stakeholders use P-Ratio for different purpose. Management is interested in the overall profitability and operational efficiency of the firm, whereas, the equity shareholders are interested in the ultimate returns available to them. Creditors, as stakeholders, can measure the profitability of the firm by analysing P-Ratios.

Profit maximisation and wealth maximisation are two main objectives of every organisation. These two objectives may be achieved through a better management of resources. The resources for any organisation are "seven Ms," which stand for man, machine, material, method, minute, management and money. Managerial efficiency aims at right combination of people, process, and technology for enhanced productivity and value of any organisation through proper management of seven Ms.

2.0 Literature Review

Deloof (2003), conducted a research on working capital management and profitability in which he investigated the relationship between gross operating income and receivables, inventories and accounts payables of Belgian companies. A negative relation is found between profitability and number of days under average collection period, inventory holding period. The wealth maximisation is possible only through a reduction in number of days of the average collection period, inventory holding period.

Collier et.al. (2004), in their article 'An example of the use of financial ratio analysis: the case of Motorola' concluded that computation of financial ratio is a complicated process for companies that do not readily fall into a single industry because of the integration of different industry characteristics.

In their study "The rapport between working capital management and profitability of listed companies in the Athens stock exchange" Lazaridis & Tryfonidis (2006), examined the relationship between gross profit and accounts receivables, accounts payables, inventory. The sample is consisting of 131 firms listed on the Athens Stock Exchange. The period of study is four years i.e. from 2001 to 2004. By using correlation and regression tool for research they identified statistically significant relationship between profitability and variables of liquidity.

Paradogonas (2007), in his research article "Financial performance of large and small firms: evidence from Greece" attempted to specify different factors responsible for firm's profitability. This study was conducted in Greece on 3035 manufacturing firms, collecting data over five years from the year 1995 to 1999. The regression model is used to arrive at any conclusion. The dependent variable of the regression model is profitability and the independent variables are size, managerial efficiency, debt structure, investment in fixed assets and sales. He concluded that investment in fixed assets significantly affects the profitability of the firm.

According to Ibam (2008), fixed assets are acquired for the purpose of generating sales revenue. Fixed assets

turnover ratio establishes a relationship between fixed assets and sales to measure the efficiency and productivity of fixed assets management. From an investor's point of view, higher the fixed asset ratio, better the asset management.

White (2008), conducted research on "Accounts Receivable: Analyzing the Turnover Ratio" and concluded that the efficiency in managing the current assets can be easily accessed from accounts receivable turnover ratio.

Return on Assets ratio establishes a relationship between Net Profit and Total Assets. Zain (2008), concluded that the ratio is an indicator of company's ability to generate income/profit using its assets. A high ratio indicates better utilisation of assets whereas low ratio indicates difficulties in the utilization of assets to generate income. Further, describing profit margin ratio he concluded that it is a relationship between sales and profits through which the operating efficiency of a firm can be easily assessed.

Jo (2009), in his article "Inventory Analysis: A Guide to Analyzing Inventory for Small Business Owners" discussed on the measurement of financial performance through inventory turnover ratio analysis. Inventory includes raw materials, work-in-progress and finished goods whereas inventory turnover ratio includes inventory turnover and average inventory holding period. This ratio is a yardstick to know about effective inventory management.

Gopinathan (2009), concluded that the financial statement of a company contains a substantial amount of financial information. The ratios help in evaluating the overall performance of a company which guide the investors in their investment decision.

James (2009) concluded that Income Statement and Balance Sheet are the two major source of information for any type of financial analysis. The operating/profit performance can be measured through ratios of Income Statement and Balance Sheet. The profit ratios are the indicator of company's performance in terms of profits compared to revenue generated from sales. Further, in his research on asset turnover ratio, he concluded that Balance Sheet is the showcase of the net worth of the company. The performance of the assets in terms of generating revenue can be measured by comparing it with sale figure appears in the income statement.

Mtewa (2010), pointed out that the fixed assets are the productive assets which have life more than one account period and being used in the production of goods or services. The fixed assets appear in the Balance Sheet are tangible or intangible in nature. The performance of these assets can be easily estimated from fixed asset turnover ratio.

Dong and Su (2010), examined the relationship between components of working capital and profitability of Vietnamese firms over 3 years from the year 2006 to 2008. They observed a significant negative relationship between gross operating profit and inventory days, and

receivable days. They concluded that the profitability of the firm decreases due to increase in number of days in inventory and receivable under cash conversion cycle.

Gill et al. (2010), established relationship between working capital management and profitability in their article "The Relationship between Working Capital Management and Profitability: Evidence from the United States". The period of study was three years i.e. from 2005 to 2007. The sample was of 88 firms, drawn from the New York Stock Exchange. The authors have identified statistically significant relationship between average inventory days and profitability of a firm whereas negative relation between accounts receivable and profitability. They concluded that profitability of the firms can be increased by reducing the number of days in account receivables.

Karaduman et al. (2010), investigated the impact of working capital management practices on the profitability. They considered 'return on assets' as the yardstick to measure the profitability and 'receivable and inventory days' as components of working capital. 140 companies from the Istanbul Stock Exchange selected randomly for the study. They identified a statistically significant negative association between return on assets and accounts receivable, inventory days.

Jamali and Asadi (2012), investigated the relationship between the management efficiency and profitability of Indian automobile industry. Thirteen automobile companies in Pune are selected for the study. Pearson Coefficient correlation is applied to prove the hypothesis. They concluded that profitability and management efficiency are highly correlated to each other.

Okwo et.al (2012), in their article "Investment in Fixed Assets and Firm Profitability: Evidence from the Nigerian Brewery Industry" measure the impact of level of investment in fixed assets on operating profit. The study was based on a sample of four Nigerian brewery companies over eleven years from 1999 to 2009. Regression technique and correlation statistical tool are used to ascertain the impact of level of fixed asset on the profitability of the firm. They concluded that the relationship between these two variables is positive. Further, they suggested that investment in fixed asset does not have any strong impact on the profitability of the firm.

Dhillon and Vachhrajani (2013), measured the impact of operational efficiency on overall profitability. They conducted the research on Gujarat Industries Power Company Limited over a period of six years i.e. from 2005-06 to 2010-11. Activity ratio was considered as the source of operational efficiency. Earning Power was considered as the indicator of profitability. Using Karle Pearson's coefficient correlation tool on the secondary data they identified an insignificant positive correlation between operational efficiency and overall profitability.

3.0 Variables of the Study

This section explains the description and estimation of variables related to liquidity and operational profitability.

3.1 Current Ratio

Current Ratio is the common, popular and broad measure to study the liquidity of a firm. This ratio gives an idea of the ability of the firm to pay current liabilities out of its current assets. It indicates the margin of safety for the current obligations (liabilities) of the firm. Generally, twice of current assets over current liabilities is considered to be satisfactory.

- $\text{Current Ratio} = \frac{\text{Total Current Assets}}{\text{Total Current Liabilities}}$

3.2 Quick Ratio

It is a better way to measure the liquidity of the firm as compared to the Current Ratio. It establishes relationship between quick/liquid assets and the current liabilities. Current assets are considered to be liquid if it is convertible into cash without loss of time and value. The quick asset of a firm is the sum of current assets less of inventory and prepaid expenses. Quick Ratio of 1:1 is considered to be satisfactory.

- $\text{Quick Ratio} = \frac{\text{Liquid Assets}}{\text{Total Current Liabilities}}$

3.3 Gross Profit Ratio (GP Ratio)

The gross profit is the difference between the sales revenue and the cost of production including direct expenses. The GP Ratio is also called as average mark up ratio.

- $\text{Gross Profit Ratio} = \left(\frac{\text{Gross Profit}}{\text{Net Sales}} \right) \times 100$

This Ratio reflects the efficiency with which the firm produces/purchases the goods. At a constant efficiency, change in GP Ratio is because of change in selling price or cost price or raw material consumption per unit. The GP Ratio should be analyzed and studied as time series by comparing the result with other firms or with other industries.

3.4 Operating Profit Ratio (OP Ratio)

The operating profit refers to the profit generated from the operation of the firm. The operating profit is also known as Earnings before Interest & Taxes (EBIT). The OP Ratio is the percentage of pure profit earned on every rupee of sales made.

- $\text{Operating Profit Ratio} = \left(\frac{\text{Operating Profit}}{\text{Net Sales}} \right) \times 100$

This Ratio measures the efficiency with which the firm not only manufactures/purchases the goods but also sells the goods. The OP Ratio in conjunction with the GP Ratio can depict whether changes in the profitability of the firm are caused by change in manufacturing efficiency or administrative efficiency.

3.5 Net Profit Ratio (NP Ratio)

The NP Ratio measures the efficiency of the management in generating additional revenue over and above the total cost. The total cost is an aggregate of manufacturing, administrative, selling and distribution cost of the product. The NP Ratio is the relationship between the net profit (after tax) and the net sales.

- $\text{Net Profit Ratio} = (\text{Net Profit} / \text{Net Sales}) \times 100$

This ratio also indicates the net contributions made by every one rupee of sales. It simply discloses the proportion of sales revenue available to the owners and the extent to which the sales revenue can decrease or the cost can increase without inflicting a loss on the owners.

3.6 Cash Profit Ratio

Cash profit refers to profit earned in cash. The Cash Profit Ratio establishes relationship between the profit earned in cash and the net sales.

- $\text{Net Profit Ratio} = (\text{Cash Profit} / \text{Net Sales}) \times 100$

4.0 Statement of the Problem

Estimating exact need of working capital is not possible. The certainty in 'estimating working capital need' reduces the amount of investment in current assets. Huge investment in current assets restricts investment in fixed assets and leads to a low rate of return on investment whereas less investment in current assets interrupts the operating activity of a firm. Investment in current assets is guided by working capital financing policy. Conservative working capital financing policy gives importance on the huge investment in current assets which means preference over low return and low risk, whereas aggressive policy aims at the higher return and higher risk. This is the risk-return trade-off otherwise called trade off between liquidity and profitability.

Liquidity is used in technical sense and reflects the ability of an organisation to repay the obligations as and when they mature. To avoid liquidity risk, the firm has to hold a huge volume of cash and cash equivalents which adversely affect the profitability of the firm. Need for higher profitability compels to hold a relatively low level of current assets. It leads to a profitable situation for the firm because fewer funds are tied up in idle current assets. This situation is a risky situation as solvency is threatened by profitability.

5.0 Research Gap

Earlier literature on liquidity had considered turnover ratios as the parameter of liquidity, not the current ratios. Further, in profitability, the over profitability is taken care. But there is a drought in research regarding the impact of different Current Ratios on specific P-Ratios. No specific attempt was made to evaluate the association between short-term solvency and operational efficiency for a specific industry. This study has identified the above gaps.

6.0 Objectives & Methodology

6.1 Objectives of the study

On the basis of the research gap, the objectives of the present study are

- To examine the liquidity position of sample companies

- To examine the operational efficiency of sample companies
- To analyze the impact of liquidity on operational efficiency over the period of study.

6.2 Methodology

The current study is analytical in nature. Critical evaluations of the secondary data (basically panel type data) are made to draw any conclusion on the research area. The data covers different financial ratios explained in variables of the study.

6.2.1 Sampling

Cement Industry in India is the universe of the current study. The companies satisfied certain criteria have been identified and taken as sample frame. Purposively two criteria are set for sieving out the companies.

- The company should be a listed company in any one of the stock exchanges.
- Chronological availability of the data for the period of 10 years i.e., 2003 to 2012.

Considering above conditions, seven companies are selected. Each selected company is treated as a sample unit of research. The total sample unit was approximated to 7 companies.

6.2.2 Details of Sample

The companies selected from Cement Industry are Ambuja Cement, ACC, OCL, India Cements, Madras/Ramaco Cement, Birla Cement and Prism Cement.

6.2.3 Period of the Study

Period of the study for the above research work is ten financial years i.e., from 2003 to 2012.

7.0 Data

The data for the study are related to liquidity and operational efficiency of the selected companies. Gross Profit Ratio, Operating Profit Ratio and Net Profit Ratio are the variables of Operational Efficiency whereas Current Ratio, Quick Ratio and Cash Profit Ratio are the variables of Liquidity. All these ratios are collected over a period 2003 to 2012 which constitute the panel data matrix for the study.

7.1 Sources of Data

The data for the study are collected from secondary sources i.e. from Annual reports and web site of selected companies, the web site of BSE and NSE, and money control.com.

7.2 Techniques used

Descriptive as well as inferential statistical tools are used to arrive at any conclusion. The 1st and 2nd hypothesis for the study is tested at 90% of significance level whereas a 3rd hypothesis for the study is tested at 95% of significance level.

7.3 Hypotheses

In order to conduct the study and examine the objectives, the researcher has formulated following hypotheses

- H_{01} : Liquidity among selected sample is uniform
 H_{02} : Operational efficiency among selected sample is uniform
 H_{03} : There is no impact of Managerial efficiency on Operational efficiency

8.0 Limitations of the study

The study depends more on empirical procedures rather than theoretical proof on Managerial and Operational efficiency. The researcher has drawn conclusion by way of analyzing the financial ratios and not used any actual figure or theoretical modelling. The period of study is restricted to the financial years covering 2003 -2012. The sample size for the study is seven companies those are only from Cement Industry, therefore, any generalization of the findings of the study may be subjected to certain cautions. Several other qualitative factors, which have an influence on Liquidity and Operational efficiency and such factors, are not taken into consideration in this study.

Analysis

Table 1 : Details of Current Ratio

Year/ Companies	Ambuja	ACC	OCL	Indian	Madras	Birla	Prism
2003	1	0.43	0.87	1	0.44	0.58	0.92
2004	0.63	0.54	0.91	1.05	0.59	0.6	0.97
2005	0.76	0.58	0.96	1.1	0.44	0.71	0.87
2006	1.08	0.77	0.82	1.53	0.45	0.59	0.94
2007	1.03	0.86	0.83	2	0.74	0.67	0.61
2008	1.26	0.89	0.83	1.43	0.56	0.73	0.79
2009	0.89	0.67	0.81	1.13	0.6	0.98	0.8
2010	1.07	0.68	1.27	1.46	0.7	0.92	0.87
2011	1.14	0.87	1.46	1.28	0.69	0.9	0.93
2012	1.22	0.72	0.95	0.95	0.38	0.94	0.77
Descriptive statistics							
N	10	10	10	10	10	10	10
Range	0.63	0.46	0.65	1.05	0.36	0.40	0.36
Min.	0.63	0.43	0.81	0.95	0.38	0.58	0.61
Max.	1.26	0.89	1.46	2.00	0.74	0.98	0.97
Mean	1.01	0.70	0.97	1.29	0.56	0.76	0.85
Std. Dev.	0.20	0.15	0.22	0.32	0.13	0.16	0.11
Skew.	-0.76	-0.39	1.71	1.18	0.05	0.22	-1.15
Kurt.	0.01	-0.72	2.05	1.41	-1.52	-1.88	1.45

Source : Compiled & Computed Data

The result of Current Ratio reveals the safety margin available for short-term credit in a year. Current asset, twice of current liabilities (the result of the ratio 2:1) is considered to be satisfactory. The Current Ratio of India Cement in the year 2007 is equal to two. 0.38 is the minimum value of Current Ratio and is recorded for Ma-

dras cement in the year 2012. The industry average is 0.877. The highest average value of Current Ratio is 1.29 and is recorded for India Cements whereas the lowest value is recorded for Madras Cements. Companies like Ambuja Cement, India Cements and OCL have average Current Ratio above the industry average.

Table 2 : Details of Quick Ratio

Year/ Companies	Ambuja	ACC	OCL	Indian	Madras	Birla	Prism
2003	1.04	0.49	1.08	1.64	0.54	0.42	0.31
2004	0.31	0.43	0.95	2.53	0.56	0.45	0.32
2005	0.35	0.42	1.28	2.16	0.51	0.52	0.3
2006	0.7	0.61	1.35	2.62	0.53	0.48	0.32
2007	0.64	0.55	1.29	2.97	0.78	0.62	0.25
2008	0.74	0.61	0.92	1.49	0.7	0.65	0.35
2009	0.57	0.42	0.91	1.23	0.63	0.9	0.42
2010	0.75	0.43	1.22	1.54	0.64	0.93	0.61
2011	0.85	0.58	1.41	1.69	0.6	0.96	0.63
2012	0.95	0.46	0.74	1.35	0.34	1	0.54
Descriptive statistics							
N	10	10	10	10	10	10	10
Range	0.73	0.19	0.67	1.74	0.44	0.58	0.38
Min.	0.31	0.42	0.74	1.23	0.34	0.42	0.25
Max.	1.04	0.61	1.41	2.97	0.78	1.00	0.63
Mean	0.69	0.50	1.12	1.92	0.58	0.69	0.41
Std. Dev.	0.24	0.08	0.23	0.60	0.12	0.23	0.14
Skew.	-0.33	0.42	-0.28	0.66	-0.45	0.23	0.80
Kurt.	-0.45	-1.80	-1.32	-1.08	1.33	-1.97	-1.04

Source : Compiled & Computed Data

Quick ratio measures the ability of the firm to repay current obligation without realization of the stock. The level of quick assets equal to quick liabilities is considered to be satisfactory for this ratio. From the Table 2, it is clear that the quick ratio of India Cement is consistently greater than one whereas the quick ratio of ACC, Madras Cement and Prism Cement is less than one over the

period of study. The average score of Quick Ratio of OCL and India Cement is greater than one as well as greater than the industry average. 1.92 is the highest average score of Quick Ratio recorded for India Cement whereas 0.41 is the lowest average score of Quick Ratio recorded for Prism Cement.

Table 3 : Details of Operating Profit Margin

Year/ Companies	Ambuja	ACC	OCL	Indian	Madras	Birla	Prism
2003	27.6	13.25	16.59	4.67	24.54	5.21	16.03
2004	27.92	17.02	16.17	11.77	23.82	6.7	20.49
2005	28.12	18.21	13.77	12.24	20.5	11.26	22.91
2006	34.71	29.17	14.28	17.3	20.75	14.72	26.52
2007	36.2	28.15	19.84	33.04	35.25	31.51	43.17
2008	28.85	24.66	26.1	35.88	37.26	33.38	38.58
2009	27.07	31.95	24.43	27.94	30.75	24.71	27.23
2010	25.18	21.42	28.33	20.54	30.88	33.31	17.78
2011	22.92	18.42	20.74	10.26	24.12	20.88	9.6
2012	25.41	19.33	14.1	21.49	29.52	18.27	6.2
Descriptive statistics							
N	10	10	10	10	10	10	10
Range	13.28	18.70	14.56	31.21	16.76	28.17	36.97
Minimum	22.92	13.25	13.77	4.67	20.50	5.21	6.20
Maximum	36.20	31.95	28.33	35.88	37.26	33.38	43.17
Mean	28.40	22.16	19.44	19.51	27.74	20.00	22.85
Std. Deviation	4.12	6.07	5.34	10.28	5.86	10.62	11.66
Skewness	.99	.33	.55	.33	.34	.00	.44
Kurtosis	.49	-1.04	-1.22	-.96	-1.15	-1.47	-.29

Source : Compiled & Computed Data

Table 3 contents the operating profit ratio of the selected Cement Companies. The average value of operating profit ratio reveals an excess of sales revenue over and above the operating cost in a year. The highest average value of operating profit ratio recorded for Ambuja Cements whereas the lowest average value of operating profit ratio

recorded for OCL. To judge whether each company's operating profit ratio is good or not, it is compared with the average operating profit ratio of the industry. The industry average is 22.87. The average value of operating profit ratio of Ambuja Cements and Madras Cements is above the industry average.

Table 4 : Details of Gross Profit Margin

Year/ Companies	Ambuja	ACC	OCL	Indian	Madras	Birla	Prism
2003	23.19	12.28	14.95	-24.03	14.27	2.35	5.14
2004	25.01	15.54	15.14	-3.11	17.01	6.25	15.14
2005	25.44	17.32	11.95	2.43	16.95	9.79	18.64
2006	33.74	28.97	12.87	8.52	18.06	14.13	23.56
2007	36.26	23.72	17.53	26.82	34.35	31.2	42.81
2008	24.65	20.59	22.66	31.68	32.61	30.98	34.94
2009	22.87	27.68	19.36	21.89	25.31	22.3	23.37
2010	19.93	16.29	19.99	14.22	23.9	30.74	14.61
2011	17.67	13.33	12.4	3.11	15.69	17.86	6.24
2012	19.6	14.41	5.42	15.51	21.77	14.78	2.93
Descriptive statistics							
N	10	10	10	10	10	10	10
Range	18.59	16.69	17.24	55.71	20.08	28.85	39.88
Minimum	17.67	12.28	5.42	-24.03	14.27	2.35	2.93
Maximum	36.26	28.97	22.66	31.68	34.35	31.20	42.81
Mean	24.84	19.01	15.23	9.70	21.99	18.04	18.74
Std. Deviation	5.96	5.96	4.95	16.26	7.03	10.54	12.94
Skewness	1.02	.72	-.47	-.76	.84	.05	.63
Kurtosis	.39	-.94	.50	.88	-.52	-1.34	-.24

Source : Compiled and Computed Data

The value of gross profit ratio reveals the excess of sales revenue over and above the cost of goods sold in a year. Out of six companies, the gross profit ratio of Indian Cement in the year 2003 is -24.03 and the gross profit ratio of Prism Cements in the year 2007 is 42.81. These two values are the lowest and highest value of gross

profit ratio for the seven sample companies. The industry average of gross profit ratio is 18.22. The highest average value of gross profit ratio recorded for Ambuja Cements whereas the lowest value recorded for Indian Cements. The average gross profit ratio of Indian Cements and OCL is below the industry average.

Table 5 : Details of Net Profit Margin

Year/ Companies	Ambuja	ACC	OCL	Indian	Madras	Birla	Prism
2003	12.41	5.93	5.76	-22.52	2.05	0.44	-9.58
2004	16.63	9.59	5.71	-9.39	4.77	3.93	-1.54
2005	17.85	16.85	5.7	0.39	7.5	7.59	5.84
2006	23.86	21.16	6.16	2.92	7.79	10.25	10.83
2007	30.53	20.44	9.38	21.2	19.48	20.56	25.02
2008	22.11	16.29	14.9	20.66	20.21	22.45	27.09
2009	16.78	19.69	10.25	12.44	14.27	17.68	15.09
2010	16.84	14.26	11.78	9.33	12.55	24.9	8.8
2011	14.16	13.78	7.63	1.94	7.97	14.25	2.82
2012	12.86	9.13	2.11	6.93	11.71	10.03	-0.66
Descriptive statistics							
N	10	10	10	10	10	10	10
Range	18.12	15.23	12.79	43.72	18.16	24.46	36.67
Minimum	12.41	5.93	2.11	-22.52	2.05	.44	-9.58
Maximum	30.53	21.16	14.90	21.20	20.21	24.90	27.09
Mean	18.40	14.71	7.94	4.39	10.83	13.21	8.37
Std. Deviation	5.62	5.18	3.69	13.25	5.97	8.14	11.63
Skewness	1.19	-.39	.48	-.74	.35	-.06	.34
Kurtosis	1.21	-1.00	.17	.72	-.72	-1.14	-.49

Source : Compiled and Computed Data

The top three performers of cement industry from net profit ratio point of view are Ambuja Cements, ACC and Birla Cement. The average net profit ratio of these companies is respectively 18.4, 14.71 and 13.21. The average net profit ratio of the cement industry is 11.12.

Comparing industry average with individual average it is observed that the average net profit ratio of OCL, Indian Cement, Madras Cement and Prism Cement is less than the industry average.

Table 6 : Details of Cash Profit Margin

Year/ Companies	Ambuja	ACC	OCL	Indian	Madras	Birla	Prism
2003	22.01	11.17	10.2	-13.03	12.21	3.83	-0.25
2004	24.95	14.33	10.68	-1.41	13.81	7.12	5.93
2005	25.29	21.95	10.19	7.09	16.01	10.19	12.65
2006	29.04	25.53	10.57	8.01	14.23	13.04	16.19
2007	34.61	21.57	13.38	25.74	24.03	23.06	29.16
2008	21.17	19.22	16.72	26.46	24.78	24.25	30.67
2009	20.46	23.61	16.06	20.88	19.72	18.4	18.86
2010	20.01	17.36	19.34	14.36	19.5	25.19	12.65
2011	17.9	15.03	15.55	8.06	16.24	16.32	6.19
2012	21.22	17.04	10.6	12.97	19.73	12.49	2.87
Descriptive Statistics							
N	10	10	10	10	10	10	10
Range	16.71	14.36	9.15	39.49	12.57	21.36	30.92
Min.	17.90	11.17	10.19	-13.03	12.21	3.83	-0.25
Max.	34.61	25.53	19.34	26.46	24.78	25.19	30.67
Mean	23.67	18.68	13.33	10.91	18.03	15.39	13.49
Std. Dev.	5.00	4.52	3.36	12.17	4.25	7.35	10.49
Skew.	1.30	-0.09	0.61	-0.59	0.36	-0.06	0.54
Kurt.	1.49	-0.83	-1.14	0.32	-0.94	-1.18	-0.68

Source : Compiled and Computed Data

Table 6 contents the cash profit ratio of the selected Cement Companies. Cash profit ratio reveals the relationship between profit earned in cash and sales revenue. In other words, it is an indicator of cash generating power of an organization from its operation. The highest average value of cash profit ratio recorded for Ambuja Cements whereas the lowest value recorded for India Cement. The average industry cash profit ratio is 16.21. The average of cash profit ratio of Ambuja Cement, Madras Cement and ACC is above the industry average.

Hypotheses Testing

H_{01} : *Liquidity among selected sample is uniform*

It has been assumed that liquidity among selected sample is uniform. To verify the correctness of the statement 'F' test has been applied on current ratio of different companies. Current ratio and quick ratio are the variables through which the researcher measures the liquidity of selected companies.

Table 7 : ANOVA Summary; Variables under Liquidity

Variables		Sum of Squares	df	Mean Square	F	Sig.
Current Ratio	Between Groups	3.453	6	.575	15.117	.000
	Within Groups	2.398	63	.038		
	Total	5.851	69			
Quick Ratio	Between Groups	16.612	6	2.769	34.328	.000
	Within Groups	5.081	63	.081		
	Total	21.693	69			

Source : Computed Data

The ANOVA test result is summarised in Table 7. The test is carried out at 6 (n1) and 63 (n2) df at 90% confidence level. The observed 'F' value is 15.117 ($p < .001$) and 34.328 ($p < .001$) respectively for current ratio and quick ratio. The p value for both the ratio is less than 0.1 (the target level of significance where the test is carried out). This result suggests rejection of the null hypothesis (*Liquidity among selected sample is uniform*). It is clear from the result that the liquidity of all six sample companies is not uniform.

H_{02} : *Operational efficiency among selected sample is uniform*

The researcher has assumed that operational efficiency among selected sample is uniform. The researcher has applied 'F' test to check the correctness of the statement on selected ratios among different companies. Operating profit margin, gross profit margin, net profit margin and overall profitability are the variables through which the researcher measures the operational efficiency of selected companies.

Table 8 : ANNOVA Summary; Variables under Operational Efficiency

		Sum of Squares	df	Mean Square	F	Sig.
Operating profit margin	Between Groups	861.075	6	143.513	2.133	.062
	Within Groups	4237.926	63	67.269		
	Total	5099.002	69			
Gross Profit Margin	Between Groups	1404.100	6	234.017	2.381	.039
	Within Groups	6191.172	63	98.273		
	Total	7595.273	69			
Net profit margin	Between Groups	1333.634	6	222.272	3.208	.008
	Within Groups	4364.988	63	69.286		
	Total	5698.622	69			
Cash profit margin	Between Groups	1021.738	6	170.290	3.601	.004
	Within Groups	2978.939	63	47.285		
	Total	4000.677	69			

Source : Computed Data

The output of 'F' test summarised in the Table 8. The observed 'F' value is 2.133 ($p < 0.0626$ (n_1) & 63(n_2) df), 2.381 ($p < 0.039$, 6 (n_1) & 63(n_2) df), 3.208 ($p < 0.0086$ (n_1) & 63(n_2) df) and 3.601 ($p < 0.0046$ (n_1) & 63(n_2) df) respectively for Operating Profit Margin, Gross Profit Margin, Net Profit Margin and Cash Profit Margin. Further,

a detailed analysis of 'F' value discloses that the p value of all four parameters is less than 0.1. So the null hypothesis (*Operational efficiency among selected sample is uniform*) is to be rejected.

H₀₃: There is no impact of Liquidity on Operational efficiency

Table 9 : Correlation Result of Liquidity and Operational efficiency

		Current Ratio	Quick Ratio
Operating profit margin	Pearson Correlation	.046	-.171
	Sig. (2-tailed)	.708	.157
	N	70	70
Gross Profit Margin	Pearson Correlation	-.067	-.308**
	Sig. (2-tailed)	.582	.010
	N	70	70
Net profit margin	Pearson Correlation	.016	-.249*
	Sig. (2-tailed)	.898	.038
	N	70	70
Cash profit margin	Pearson Correlation	.022	-.264*
	Sig. (2-tailed)	.854	.027
	N	70	70

*. & **. Correlation is significant at the 0.05 & 0.01 level (2-tailed).

Source : Computed Data

Table 9 contains the correlation result of liquidity and Operational efficiency. A positive correlation is found between current ratio and operating profit margin, current ratio and net profit margin, current ratio and cash profit margin whereas the correlation between current ratio and gross profit margin is negative. The value of four correlation coefficient is very small as well as the significance level is very low. All these results are not significant at 5% level.

The correlation of quick ratio with operating profit margin, gross profit margin, net profit margin, and cash profit margin is negative. The magnitude of the relationship of the quick ratio is significant at 1% level with gross profit

margin whereas significant at 5% level with net profit margin and cash profit margin. Further, correlation of quick ratio with operating profit is negative and not significant at 5% level. So the hypothesis (*There is no impact of Liquidity on Operational efficiency*) rejected.

9.0 Findings and Conclusion

Summary of Findings

The key objective of the research work was to examine the relationship between liquidity and operational efficiency for selected companies over the period of study. Measuring liquidity and operational efficiency the researcher has arrived at following points viz:

- The current and quick ratio of India cement is highest among all the seven sample companies selected from the cement industry in India.
- In operational efficiency, operating profit, gross profit, net profit and cash profit ratio of Ambuja cement is the highest.

Further, measuring the impact of liquidity on operating efficiency, the following points are identified by the researcher

- The association between current ratio and four variables of operational efficiency is minuscule and not significant at 5% level. Further, the association between gross profit and the current ratio is negative.
- The association between quick ratio and four variables of operational efficiency is negative and significant at 5% level.

10.0 Concluding Note

The liquidity and profitability decision does not come under 'Mutual Exclusive' decision for the manager. A mutual exclusive decision says acceptance of one compels rejection of other. Liquidity and profitability both are equally important for the firm. A trade-off between them is decided by the level of current assets of the firm. The conservative policy advice huge balance of absolute current assets at the cost of reducing profitability whereas aggressive policy suggests low current assets with increasing profitability. Concentrating on above, the researcher observed the profitability of Ambuja cement is the best among all the selected companies. At the same time, the liquidity position of India Cement is the best. The profitability of all the companies is inversely related to liquidity. These sample companies have made a better trade-off between liquidity and profitability for their growth and survival.

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