Examining The Relationship Among Liquidity, Efficiency, And Profitability Using Accounting Ratios In Indian Cement Industry

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Abstract:
This study aims to investigate how liquidity and efficiency influence firms' profitability. Accounting data of ten years was used to calculate relevant ratios. The sample size consisted of five cement companies listed in stock exchanges of India. Multiple regression technique was used to evaluate the impact of liquidity and management efficiency on profitability. Current ratio and quick ratio were used to test liquidity. Besides, inventory turnover ratio and assets turnover ratio were used to test management efficiency. Net profit margin (NPM), return on assets (ROA), return on capital employed (ROCE), and return on equity (ROE) were the variables used to measure profitability. The findings highlighted that there was significant impact of ITR and ATR on profitability but current ratio and quick ratio has insignificant impact on profitability on all companies under study.
Keywords: *liquidity, efficiency, regression, profitability, cement.*

I. Introduction

Cement is an essential requirement for infrastructural development in the world as well as in India. India is the second largest producer of cement in the world. Many recent initiatives taken by union government like the development of 100 smart cities will increase the importance of the industry. The total cement production in the year 2021 was 294.4 million tones. India accounts for 7% of the global cement production. Indian cement industry is dominated by private companies. Ultratech is the largest cement company in terms of market capitalization. There is only one public sector cement company namely cement corporation of India (CCI). Examining the financial performance of cement industry is very important because it provides employment to large population and is the fifth largest tax contributor to government. Considering theoretical and contextual gaps on how liquidity and efficiency affects profitability, this study made an attempt to examine the impact of liquidity and efficiency on profitability of cement industry in the decade.

Liquidity refers to how quickly an asset is converted into cash. The liquidity of business highlights the short term stability of a firm. Liquidity management helps small businesses to assess their financial performance. It is measured by current ratio and quick ratio. The ideal current ratio is 2:1 which shows that current assets must be atleast twice of current liabilities. The strong current ratio shall be from 2 to 3 and must not be less than 1. Furthermore, a firm exists for only for profit. If there is no profit, there is no business and firm shut down their operations. All firms try to improve profitability. There are different ways to measure profitability. These include gross profit margin (GPM), net profit margin (NPM), return on assets (ROA), return on capital employed (ROCE), return on equity (ROE).

II. Literature Review

Khan and Khokhar (2015) conducted an empirical analysis of listed cement companies in Saudi Arabia during 2008 to 2012. Selected ratios namely debt to equity ratio, inventory turnover ratio, debtors' turnover ratio (DTR), creditors' velocity, and net profit margin were used for analysis. Debt to equity ratio, inventory turnover ratio, creditors' velocity, has a significant impact on net profit margin while DTR has insignificant impact on NPM. **Kumara and Abhilasha (2015)** used profitability, liquidity, solvency, and efficiency ratios to examine the financial performance of Indian automobile companies. The period of the research was eight financial years. It was revealed that very weak but positive correlation was found between GPR, ROCE and ROA. The results highlighted significant impact of liquidity and solvency ratios on profitability (ROA). However, efficiency ratios which includes debtors turnover ratio, inventory turnover ratio, fixed assets turnover ratio have insignificant impact on ROA. **Khan and Dalyeen (2016)** examined the

financial performance of Indian cement companies. The duration of the study was 2006 to 2015 and the number of cement companies were five. ANOVA was used as the statistical tool which highlighted significant difference in gross profit ratio, net profit ratio, current ratio, quick ratio, and debt equity ratio among the selected companies. **Pervez (2016)** evaluated the financial performance of Steel Authority of India Limited (SAIL) from 2005 to 2014. Current ratio and quick ratio were less than the industry averages which means that the liquidity position of SAIL was not good during the study period. Long term solvency and profitability position was satisfactory during study period. Furthermore, management efficiency of SAIL was declined over the study period. **Khan (2017)** used liquidity, profitability, management efficiency, solvency, and market valuation ratios to analyze the decadal financial performance of NTPC. Accounting data available in the annual reports were used to compute relevant ratios and thereafter multiple regression was run in SPSS for data analysis. The proxy measures of profitability were ROCE, ROA, and ROE. The outcomes show insignificant impact of current ratio and inventory turnover ratio on profitability whereas the impact of debt-equity ratio on profitability was significant. **Zuhroh (2019)** conducted a study on 31 firms listed in Indonesia Stock Exchange. The period of the research was 2012-2016. The results after application of path analysis highlighted that profitability variable have a significant and positive effect on the firm value. But, liquidity and size variables directly gave a negative and insignificant effect. Besides, the findings proved that leverage is a variable which mediates the effect of liquidity, size and profitability on the firm value. **Ali & Faisal (2020)** examined the performance of petrochemical companies of Saudi Arabia. Secondary data was used for the period of 2004-2016. The findings highlighted the surprising performance of selected petrochemical companies due to under-use of the assets brought about by low interest and lower costs of the items administered by some interior and outer factors. Debt-equity ratio was used as the independent variable while gross profit ratio, ROA, ROE was used as dependent variables to measure profitability. the relationship between capital structure and profitability, utilization of resources, and liquidity of the companies is negative. **Aman and Altass (2021)** examined the performance of the airline industry in pre and post covid-19. Tabulation, frequencies, and mean techniques were used to draw the conclusion. operating profit margin, net profit, ROCE and were at acceptable levels before COVID-19 which showed the performance of the airline industry was good before the pandemic. On the contrary, a significant decrease in all indicators were recorded after the pandemic. **Thi Kim, Duvernay, and Thanh (2021)** investigated the impact of micro and macro factors on 30 listed food processing companies in Vietnam. Data was collected from 2014 to 2019 and analyzed by using STATA software. The results highlighted that total assets turnover ratio (ATR) and growth in sales significantly influence financial performance, when it is measured by return on equity (ROE) or return on sales (ROS). Besides, the research also found negative impact of leverage on return on sale of firm and it was advised to decrease the debt so that ROS could increase. Moreover, there was great difference in financial performance between government enterprises and non government owned enterprises.

III.   Research Gap
The review of literature highlights that numerous studies were carried out on financial performance in India. But, an empirical gap was revealed with respect to the studies in cement industry. Therefore, this study is identical from previous studies as it examines the impact of liquidity and efficiency on the profitability of listed cement companies in India. In addition to, this research has taken into consideration ten financial years from 2011 to 2020.

IV.   Objectives of the Study
1. To examine the impact of liquidity and management efficiency on the profitability in selected cement companies.
2. To evaluate the differences in profitability ratios in selected cement companies.
3. To find out the differences in liquidity ratios in selected cement companies.
4. To examine the differences in efficiency ratios in selected cement companies.

Hypotheses related with objective 1
H_1: Liquidity and efficiency have a significant impact on ROE.
H_2: Liquidity and efficiency have a significant impact on ROCE.
H_3: Liquidity and efficiency have a significant impact on ROA.
H_4: Liquidity and efficiency have a significant impact on NPM.

Hypotheses related with objective 2
H_5: There is a significant difference in NPM of the selected companies.
H_6: There is a significant difference in ROCE of the selected companies.
H_7: There is a significant difference in ROE of the selected companies.

H_8: There is a significant difference in ROA of the selected companies.

Hypotheses related with objective 3
H_9: There is a significant difference in current ratios of the selected companies.
H_{10}: There is a significant difference in quick ratios of the selected companies.

Hypotheses related with objective 4
H_{11}: There is a significant difference in assets turnover ratios of the selected companies.
H_{12}: There is a significant difference in inventory turnover ratios of the selected companies.

Population and Sample Size
The population of the study consists of all listed cement companies of India. The sample size for this research includes five companies which were listed in Indian stock exchange BSE and NIFTY. The list of selected companies is shown in table 1.

Table 1: Sample Size of the study

	Indian Companies	Market Capitalization as on 14th Jan,2022 (in crores)
1	Ultratech Cement (UTC)	219,582.18
2	Shree Cement	96,895.93
3	Ambuja Cements	78,710.98
4	ACC	43,456.79
5	Ramco Cements	23,910

Source: https://www.moneycontrol.com/india/stockpricequote/cement-major/acc/ACC06

Statistical Tools Used
The current research used mean, standard deviation, Skewness, Kurtosis, Pearson correlation, multiple linear regression to test the hypotheses. Before applying multiple regression, all the assumptions like normality of data, multicollinearity, were examined.

Research Model of the study
Figure 1 highlights the research model of the study. Liquidity and management efficiency were the independent variables whereas profitability was the dependent variable. Current ratio and quick ratio were used to test liquidity. Besides, inventory turnover ratio and assets turnover ratio were used to test management efficiency. NPM, ROA, ROCE, and ROE were used to test profitability. Ratios were calculated from annual reports of all companies.

Table 2: Dependent and Independent Variables Used in the study

Variables	Ratios Used	Symbols
Liquidity	Current Ratio	CR, QR
	Quick Ratio	
Management Efficiency	Inventory Turnover Ratio	ITR
	Assets Turnover Ratio	ATR
Profitability	Net Profit Margin	NPM
	Return on Assets	ROA
	Return on Capital Employed	ROCE
	Return on Equity	ROE

RESEARCH MODEL OF THE STUDY
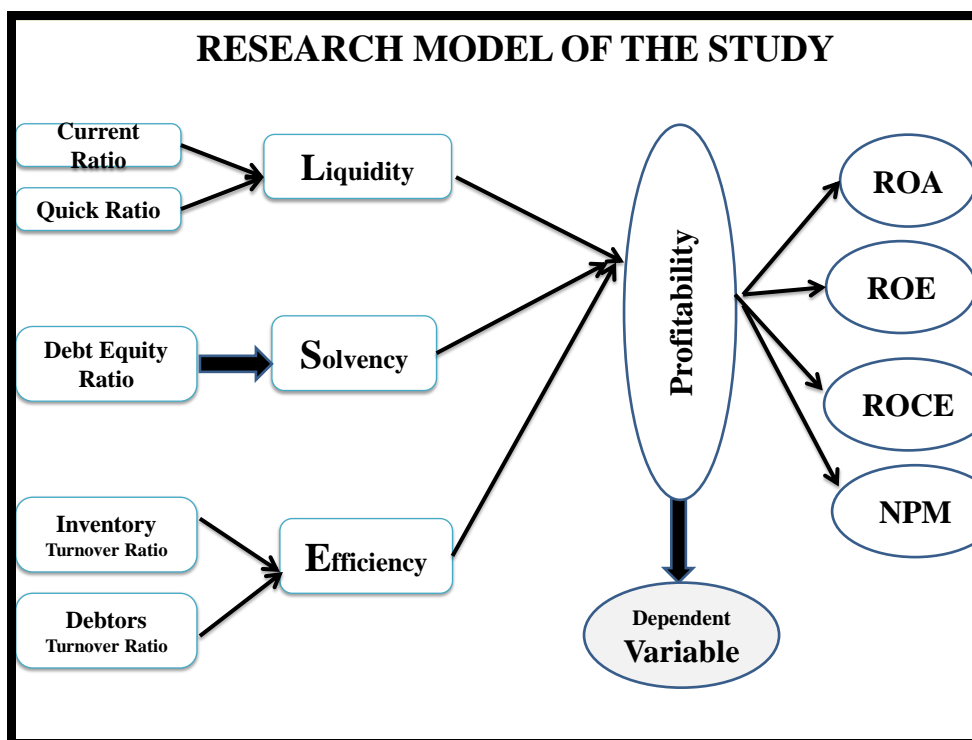
Regression Models

Multiple regression has been used to estimate the regression line.

$ROCE_t = \beta0 + \beta_1CR_t + \beta_2QR_t + \beta_3ITR_t + \beta_4ATR_t + e$

$ROE_t = \beta0 + \beta_1CR_t + \beta_2QR_t + \beta_3ITR_t + \beta_4ATR_t + e$

$ROA_t = \beta0 + \beta_1CR_t + \beta_2QR_t + \beta_3ITR_t + \beta_4ATR_t + e$

$NPM_t = \beta0 + \beta_1CR_t + \beta_2QR_t + \beta_3ITR_t + \beta_4ATR_t + e$

Where,

$ROCE_t$ = Return on Capital Employed at time t (Profitability)

ROA_t = Return on Assets at time t (Profitability)

ROE_t = Return on Equity at time t (Profitability)

NPM_t = Net Profit Margin at time t (Profitability)

CR_t = Current Ratio at time t (Liquidity)

QR_t = Quick Ratio at time t (Liquidity)

ITR_t = Inventory turnover ratio at time t (Efficiency)

ATR_t = Assets turnover ratio at time t (Efficiency)

$\beta0$ = Intercept.

β_1 to β_4 = Coefficients of the explanatory variables.

e = stochastic error term at time t.

Table 3: Net Profit Margin (NPM) of Companies

Year	UTC	Ambuja	Shree	ACC	Ramco	Mean	SD	Skewness	Kurtosis
2011	10.54	14.36	6.07	12.59	8.06	**10.324**	3.341	-0.125	-1.537
2012	13.35	13.33	10.48	9.24	11.82	**11.644**	1.535	-0.41	-1.793
2013	13.15	14.13	17.95	9.68	10.53	**13.088**	3.274	0.7091	0.0217
2014	10.57	14.99	13.37	9.8	3.73	**10.492**	4.322	-1.005	1.2014
2015	8.78	8.53	6.6	4.87	6.64	**7.084**	1.309	-0.318	-1.069
2016	9.99	10.13	20.73	5.39	15.52	**12.352**	5.756	0.5241	-0.33
2017	10.99	11.94	15.58	6.89	16.43	**12.366**	3.763	-0.491	-0.609
2018	7.49	13.09	14.07	10.17	12.61	**11.486**	1.504	-0.963	-0.191
2019	6.03	13.1	8.11	8.67	9.83	**9.148**	1.965	0.7202	1.2481
2020	13.42	15.74	13.19	10.26	11.19	**12.76**	2.103	0.3145	-0.512
Mean	**10.43**	**12.934**	**12.61**	**8.756**	**10.63**	**11.074**			
SD	2.497	2.211	4.830	2.381	3.858	3.537			
Min	6.03	8.53	6.07	4.87	3.73	3.73			
Max	13.42	15.74	20.73	12.59	16.43	20.73			
ANOVA (F value)=2.684**									

Table 3 highlights the net profit margin of selected Indian cement companies for the period of ten years. Industry average during the year 2013 was the highest (13.088) whereas it was lowest in the year 2015. The performance of the industry was also satisfactory in the year 2020 as NPM remained around 13%. NPM trend was observed being fluctuated in the past ten years. 2015 and 2019 were the two years wherein the performance was below the average of 11.07%. As far as individual performance is concerned; Ambuja cement recorded the highest NPM (approx 13%) among all companies followed by Shree cements. The performance of Ramco cements was also equal to UltraTech cement despite the fact that Ramco is much smaller in size than UltraTech cement. ACC was the company whose NPM was below the industry averages in all years. Moreover, skewness and kurtosis was also highlighted by table 3. Their values were also under the acceptable limits which proved that data was normal. Furthermore, ANOVA was also applied by SPSS to check the differences in NPM across selected companies in the study period. The F value was 2.684 ($p>0.05$). Thus, H_5 is accepted.

Table 4: Return on equity (ROE) of Companies

Year	UTC	Ambuja	Shree	ACC	Ramco	Mean	SD	Skewness	Kurtosis
2011	13.16	15.22	10.55	18.63	12.16	**13.944**	3.089	0.8204	0.2992
2012	19.02	14.73	22.62	14.36	18.78	**17.902**	3.369	0.3192	-1.12
2013	17.43	13.64	26.12	14.01	17.02	**17.644**	5.036	1.6181	2.8543
2014	12.54	14.81	16.71	14.13	5.54	**12.746**	4.296	-1.578	2.8711
2015	10.68	7.83	8.07	6.97	9.16	**8.542**	0.817	0.81	0.2585
2016	10.95	4.81	16.69	6.95	18.05	**11.49**	5.815	0.0656	-2.562
2017	10.97	6.25	17.39	9.77	17.35	**12.346**	4.845	0.0261	-2.155
2018	8.6	7.07	15.55	14.31	13.74	**11.854**	3.317	-0.561	-2.583
2019	8.64	6.88	9.9	11.79	11.34	**9.71**	1.923	-0.541	-1.024
2020	14.24	8.81	12.13	11.17	12.22	**11.714**	1.404	-0.453	1.2782
Mean	**12.623**	**10.005**	**15.573**	**12.209**	**13.536**	**12.789**			
SD	3.468	4.102	5.698	3.644	4.296	4.521			
Min	8.60	4.81	8.07	6.95	5.54	4.81			
Max	19.02	15.22	26.12	18.63	18.78	26.12			
ANOVA (F value)=2.206**									

Table 4 highlights the return on net worth/equity of selected Indian cement companies for the period of ten years. Industry average during the year 2012 was the highest (approx 18%) whereas it was lowest in the year 2015. ROE trend was observed being fluctuated in the past ten years because the performance in 2015 and 2019 was much below the average of 13%. As far as individual performance is concerned; Shree cement recorded the highest ROE (15.57%) among all companies followed by Ramco cements. The figures regarding Ambuja cement were very critical because it was the only company whose ROE was below the industry averages (13%) in all years. Besides, there was an increasing trend of ROE during 2011 to 2014 but thereafter it started reducing and has not reached where it was in 2014. Moreover, skewness and kurtosis were also used to find the normality of data. Their values were also under the acceptable limits which proved that data was normal. Furthermore, ANOVA was also applied by SPSS to check the differences in ROE across selected companies in the study period. The F value was 2.206 ($p>0.05$). Thus, H_5 is accepted.

Table 5: Return on Capital Employed (ROCE) of Companies

Year	UTC	Ambuja	Shree	ACC	Ramco	Mean	SD	Skewness	Kurtosis
2011	10.54	14.36	6.07	12.59	8.06	**10.324**	3.341	-0.125	-1.537
2012	13.35	13.33	10.48	9.24	11.82	**11.644**	1.535	-0.41	-1.793
2013	13.15	14.13	17.95	9.68	10.53	**13.088**	3.274	0.7091	0.0217
2014	10.57	14.99	13.37	9.8	3.73	**10.492**	4.322	-1.005	1.2014
2015	8.78	8.53	6.6	4.87	6.64	**7.084**	1.309	-0.318	-1.069
2016	9.99	10.13	20.73	5.39	15.52	**12.352**	5.756	0.5241	-0.33
2017	10.99	11.94	15.58	6.89	16.43	**12.366**	3.763	-0.491	-0.609
2018	7.49	13.09	14.07	10.17	12.61	**11.486**	1.504	-0.963	-0.191
2019	6.03	13.1	8.11	8.67	9.83	**9.148**	1.965	0.7202	1.2481
2020	13.42	15.74	13.19	10.26	11.19	**12.76**	2.103	0.3145	-0.512
Mean	**10.43**	**12.93**	**12.61**	**8.76**	**10.64**	**11.08**			

SD	2.497	2.211	4.830	2.381	3.858				
Max	13.42	15.74	20.73	12.59	16.43				
Min	6.03	8.53	6.07	4.87	3.73				
ANOVA (F value)=2.411**									

**Not Significant at 5%
Source: Calculated from Company's Financial Reports

Table 5 highlights the return on capital employed of selected Indian cement companies for the period of ten years. Industry average during the year 2013 was the highest (13%) whereas it was lowest (7.08%) in the year 2015. RoNW trend was observed being fluctuated in the past ten years because the performance in 2015 and 2019 was much below the average of 11%. As far as individual performance is concerned; Ambuja cement and Shree cements recorded the highest ROCE (approx 13%). The ROCE of UTC and Ramco cements were almost similar and ACC recorded the lowest ROCE in the study period. The ROCE of ACC is in declining trend. ROCE is continuously decreasing after 2011 which means that it's in declining trend. It has never crossed the figure 12.59% which it achieved in 2011. It means it's a matter of concern for ACC. Moreover, skewness and kurtosis were also used to find the normality of data. Their values were also under the acceptable limits which proved that data was normal. Furthermore, ANOVA was also applied by SPSS to check the differences in RoNW across selected companies in the study period. The F value was 2.411 ($p>0.05$). Thus, H_5 is accepted.

Table 6: Return on Assets (ROA) of Selected Companies

Year	UTC	Ambuja	Shree	ACC	Ramco	Mean	SD	Skewness	Kurtosis
2011	7.02	10.64	4.24	10.91	3.69	**7.3**	3.412	0.0898	-2.931
2012	10.66	10.43	10.35	8.88	6.35	**9.334**	1.658	-1.544	1.8946
2013	9.68	9.98	16.29	9.04	6.23	**10.244**	3.678	1.279	2.7587
2014	7.2	10.76	10.74	9.16	2	**7.972**	3.619	-1.455	1.8814
2015	5.72	5.7	5.33	4.59	3.42	**4.952**	0.875	-1.237	0.7331
2016	6.18	3.99	12.07	4.48	7.94	**6.932**	3.239	1.1493	0.8992
2017	6.68	5.07	11.99	6.14	9.26	**7.828**	2.719	0.9153	-0.331
2018	4.1	5.9	9.14	9.4	7.83	**7.274**	1.43	-0.668	-1.299
2019	3.48	5.66	6.25	7.95	6.23	**5.914**	0.9	-0.594	1.7719
2020	7.59	7.02	8.11	7.8	5.98	**7.3**	0.823	-1.161	0.9655
Mean	6.831	7.515	9.451	7.835	5.893	7.505	2.235		
SD	2.208	2.642	3.633	2.131	2.257	2.791			
Min	3.48	3.99	4.24	4.48	2	2			
Max	10.66	10.76	16.29	10.91	9.26	16.29			
ANOVA (F value)=2.503**									

**Not Significant at 5%
Source: Calculated from Company's Financial Reports

Table 6 highlights the return on assets **(ROA)** of selected cement companies for the period of ten years. The average of the industry during the year 2013 was the highest (10%) whereas it was lowest (5%) in the year 2015. ROA trend was observed being declined in the past ten years because the performance in 2015 and 2019 was much below the average of 9.59%. As far as individual performance is concerned; Shree cement recorded the highest ROA (9.45%) among all companies during the study period. ACC and Ambuja highlighted almost similar ROA's. The least ROA (5.893) in the industry was found with Ramco cements. Besides, Ramco and UTC were the two companies whose ROA was below the industry averages. Shree cements has shown better performance due to higher ROA than industry averages. Moreover, skewness and kurtosis were also used to find the normality of data. Their values were also under the acceptable limits which proved that data was normal. Furthermore, ANOVA was also applied by SPSS to check the differences in ROA across selected companies in the study period. The F value was 2.503 ($p>0.05$). Thus, H_8 is accepted.

Table 7: Current Ratio of Selected Companies

Year	UTC	Ambuja	Shree	ACC	Ramco	Mean	SD	Skewness	Kurtosis
2011	1.37	1.54	1.32	1.33	0.64	**1.24**	0.34	-1.852	3.9175
2012	1.49	1.75	1.35	1.42	0.69	**1.34**	0.385	-1.379	2.8001
2013	1.25	1.95	1.6	1.35	0.78	**1.386**	0.427	-0.184	0.4588
2014	1.57	1.9	1.56	0.97	0.73	**1.346**	0.465	-0.36	-1.84
2015	0.9	2.03	1.61	0.9	0.83	**1.254**	0.502	0.9278	-1.417

2016	0.86	1.32	1.56	0.82	0.88	**1.088**	0.309	0.8746	-1.674
2017	0.7	1.44	1.22	1.28	0.7	**1.068**	0.281	-0.355	-2.874
2018	0.65	1.72	1.12	1.52	0.7	**1.142**	0.395	0.1587	-2.533
2019	0.61	1.74	1.37	1.69	0.67	**1.216**	0.432	-0.338	-3.04
2020	0.6	1.15	0.94	1.99	0.67	**1.07**	0.496	1.4519	2.1166
Mean	**1**	**1.654**	**1.365**	**1.327**	**0.729**	**1.215**	**0.403**		
SD	0.382	0.285	0.224	0.363	0.077	0.425			
Min	0.6	1.15	0.94	0.82	0.64	0.6			
Max	1.57	2.03	1.61	1.99	0.88	2.03			
ANOVA (F value)=15.309**									

**Not Significant at 5%
Source: Calculated from Company's Financial Reports

Table 7 highlights the current ratio of selected cement companies for the period of ten years. The standard current ratio is 2:1. The astonishing feature of the data was that the industry average has never touched the threshold of 2:1 in the past ten years. Ambuja, Shree cement and ACC were considered at satisfactory position as their current ratio was more than 1. So far Ramco cement is concerned; current ratio was very low during the study period. It has never reached even 1:1 and hence it can be said that there was lack of liquidity in the company. Moreover, skewness and kurtosis were also used to find the normality of data. Their values were also under the acceptable limits which proved that data was normal. Furthermore, ANOVA was also applied by SPSS to check the differences in current ratios across selected companies in the study period. The F value was 15.309 ($p < 0.05$). Thus, H_9 is rejected.

Table 8: Quick Ratio of Selected Companies

Year	UTC	Ambuja	Shree	ACC	Ramco	Mean	SD	Skewness	Kurtosis
2011	0.99	1.21	0.96	1	0.37	**0.906**	0.312	-1.647	3.4869
2012	1.04	1.43	1.1	1.09	0.36	**1.004**	0.391	-1.304	2.8755
2013	0.88	1.62	1.23	1.01	0.41	**1.03**	0.438	-0.133	0.5684
2014	1.16	1.62	1.02	0.64	0.33	**0.954**	0.482	0.1051	-0.48
2015	0.59	1.75	0.98	0.58	0.47	**0.874**	0.503	1.5961	2.24
2016	0.66	1.08	0.86	0.57	0.51	**0.736**	0.23	0.8527	-0.584
2017	0.55	1.21	0.92	1.05	0.42	**0.83**	0.297	-0.274	-2.238
2018	0.54	1.41	0.92	1.21	0.4	**0.896**	0.382	-0.002	-2.238
2019	0.65	1.54	1.05	1.49	0.4	**1.026**	0.459	-0.205	-2.357
2020	0.67	1	0.73	1.82	0.4	**0.924**	0.526	1.4263	2.3278
Mean	**0.773**	**1.387**	**0.977**	**1.046**	**0.407**	**0.918**	0.402		
SD	0.225	0.252	0.136	0.399	0.052	0.4			
Min	0.54	1.00	0.73	0.57	0.33	0.33			
Max	1.16	1.75	1.23	1.82	0.51	1.82			
ANOVA (F value)=22.059**									

**Not Significant at 5%
Source: Calculated from Company's Financial Reports

Table 8 highlights the quick ratio of selected Indian cement companies for the period of ten years. The standard quick ratio is 1:1. Ambuja has achieved high liquidity because its quick ratio has always more than 1. The liquidity position of ACC and Shree cements were at satisfactory level because it's equal to 1. Besides, the liquidity at Ramco cements was of much concern because quick ratio was only 0.41. It has never reached even 1:1 and hence it can be said that there was lack of liquidity in the company. Moreover, skewness and kurtosis were also used to find the normality of data. Their values were also under the acceptable limits which proved that data was normal. Moreover, ANOVA was also applied by SPSS to check the differences in quick ratios across selected companies in the study period. The F value was 22.059 ($p < 0.05$). Thus, H_{10} is rejected.

Table 9: Inventory Turnover Ratio of Selected Companies

Year	UTC	Ambuja	Shree	ACC	Ramco	Mean	SD	Skewness	Kurtosis
2011	6.8	9.25	8.54	9.2	6.67	8.092	1.056	-0.412	-3.103
2012	8.99	9.89	11.72	10.01	6.63	9.448	1.842	-0.68	1.4073
2013	8.59	9.81	10.54	9.95	6.44	9.066	1.609	-1.338	1.4234
2014	8.56	11.23	7.27	9.34	5.37	8.354	2.197	-0.121	0.0012
2015	8.34	10.57	7.02	9.92	7	8.57	1.634	0.2702	-2.598

2016	10.41	11.2	6.76	10.37	6.55	9.058	2.093	-0.509	-3.118
2017	12.21	9.93	7.35	10.11	6.86	9.292	1.505	0.1554	-1.417
2018	9.89	8.89	6.48	8.82	7.87	8.39	0.988	-0.693	0.5041
2019	10.56	12.23	7.38	13.72	9.2	10.618	2.486	-0.075	-1.018
2020	10.6	15.23	8.34	15.31	8.32	11.56	3.472	0.3261	-3.085
Mean	**9.495**	**10.823**	**8.14**	**10.675**	**7.091**	9.2448	1.888		
SD	1.537	1.846	1.720	2.110	1.090	2.185			
Min	6.8	8.89	6.48	8.82	5.37	5.37			
Max	12.21	15.23	11.72	15.31	9.20	15.31			
ANOVA (F value)=9.093 **									

**Not Significant at 5%

Source: Calculated from Company's Financial Reports

Table 9 highlights the inventory turnover ratio (ITR) of selected cement companies for the period of ten years. ITR indicates how quickly a company is selling goods. The higher the ITR, the better it is and vice versa. The highest ITR in the industry was recorded during the years 2019 and 2020. As far as individual performance is concerned; Ambuja and ACC recorded the highest ITR among all companies during the study period. The least ITR in the industry was found with Ramco cements. Ramco's ITR was below the industry averages in all years. In 2014, its ITR was the lowest (5.37) whereas the industry averages at that time was 8.34. Moreover, skewness and kurtosis were also used to find the normality of data. Their values were also under the acceptable limits which proved that data was normal. Furthermore, ANOVA was also applied by SPSS to check the differences in ITR across selected companies in the study period. The F value was 9.903 ($p>0.05$). Thus, H_8 is accepted.

Table 10: Assets Turnover Ratio of Selected Companies

Year	UTC	Ambuja	Shree	ACC	Ramco	Mean	SD	Skewness	Kurtosis
2011	66.58	74.11	69.9	85.87	45.86	68.464	14.55	-0.818	1.7639
2012	79.81	78.31	98.75	95.22	53.75	81.168	17.79	-0.917	0.6995
2013	73.62	70.65	90.74	92.3	59.19	77.3	13.92	-0.072	-1.838
2014	68.15	71.78	80.33	92.56	53.62	73.288	14.18	-0.033	0.3101
2015	65.13	66.8	80.69	92.16	51.55	71.266	15.22	0.2173	-0.557
2016	61.91	39.38	58.26	83.03	51.18	58.752	15.97	0.6671	1.228
2017	60.82	42.46	76.96	89.22	56.35	65.162	18.08	0.2131	-0.917
2018	54.78	45.09	64.93	92.36	62.14	63.86	16.97	1.1889	2.1027
2019	57.74	43.22	77.15	91.65	63.46	66.644	17.88	0.2098	-0.469
2020	56.6	44.62	61.55	76.04	53.43	58.448	11.56	0.7187	1.1644
Mean	64.514	57.642	75.926	89.041	55.053	68.435	15.61	0.1374	0.3488
SD	7.877	15.812	12.741	5.811	5.352	16.129			
Min	54.78	39.38	58.26	76.04	45.86	39.38			
Max	79.81	78.31	98.75	95.22	63.46	98.75			
ANOVA (F value)=18.433 **									

**Not Significant at 5%

Source: Calculated from Company's Financial Reports

Table 10 highlights the assets turnover ratio (ATR) of selected cement companies for the period of ten years. ATR indicates how efficient a company is in generating sales from its assets. The higher the ATR, the better it is and vice versa. The highest ATR in the industry was recorded during the year 2012 only. As far as individual performance is concerned; ACC recorded the highest ATR among all companies during the study period. The least ATR in the industry was found with Ramco cements. Ramco's ATR was much below the industry averages in all years. In 2012, its ATR was the lowest (53.75) whereas the industry averages at that time was 81.16. In fact, ATR of Shree cement in that year was around 100. Moreover, skewness and kurtosis were also used to find the normality of data. Their values were also under the acceptable limits which proved that data was normal. Furthermore, ANOVA was also applied by SPSS to check the differences in ITR across selected companies in the study period. The F value was 18.433 ($p>0.05$). Thus, H_8 is accepted.

Table 11: Multiple Regression Results

Independent Variables	Regression Coefficients of Dependent Variables			
	Model 1	Model 2	Model 3	Model 4
	ROE	ROA	ROCE	NPM
Inventory Turnover Ratio (ITR)	0.421**	0.366**	0.297**	0.345**

Assets Turnover Ratio (ATR)	0.304**	0.253**	0.324**	0.298**
Current Ratio	0.095	0.029	0.017	0.407**
Quick Ratio	0.035	0.044	0.096	0.075
Adjusted R²	0.574	0.651	0.497	0.503
Durbin Watson	2.547	2.953	2.307	2.875

**Significant at 5%
Source: Output of SPSS_25

Table 11 shows the results of hypotheses tested (objective 1) with the application of multiple regression in summarized form. For Model 1, the adjusted R^2 shows that 57% variation in ROE was explained by the selected variables whereas the remaining was attributed to other factors which were not considered in this model. Current ratio and quick ratio were not significant to ROE but ITR and ATR were significant. It means H_1 is partially accepted and partially rejected because liquidity has no impact on profitability but efficiency ratios like ITR and ATR have significant impact on ROE.

For model 2, the adjusted R^2 shows that 65% variation in ROA was explained by the selected variables whereas the remaining was attributed to other factors which were not considered in this model. ITR and ATR were significant but current ratios and quick ratios were not significant to ROA. It brings to the discussion that liquidity has no impact on profitability but efficiency ratios have significant impact on profitability but efficiency ratios. It means H_2 is partially accepted.

The regression results on model 3 shows the value of adjusted R^2 was 0.497 which means that 49% variation in ROCE was explained by the selected variables whereas the remaining was attributed to other factors which were not considered in this model. Current ratio and quick ratio were not significant to ROCE but ITR and ATR were significant. It means H_3 is partially accepted and partially rejected because liquidity has no impact on profitability but efficiency ratios like ITR and ATR have significant impact on ROCE.

As far as model 4 is concerned; the results are not diverge from other three models. The adjusted R^2 was 0.503 which shows that 50% variation in NPM was explained by the selected variables whereas the remaining was attributed to other factors which were not considered in this model. ITR and ATR were significant but current ratios and quick ratios were not significant to NPM. It brings to the discussion that liquidity has no impact on profitability but efficiency ratios have significant impact on profitability but efficiency ratios. It means H_4 is partially accepted.

V.   Conclusion

The present study was conducted to investigate how liquidity and efficiency influence firms' profitability. The population of the study consisted of all cement companies which were listed in Indian stock exchange BSE and NIFTY. The sample size for this research included five companies namely Ultratech Cement (UTC), Shree Cement, Ambuja Cements, ACC, and Ramco Cements. Accounting data of ten years was used to calculate relevant ratios. Liquidity and management efficiency were the independent variables whereas profitability was the dependent variable. Current ratio and quick ratio were used to test liquidity. Besides, inventory turnover ratio and assets turnover ratio were used to test management efficiency. Net profit margin (NPM), return on assets (ROA), return on capital employed (ROCE), and return on equity (ROE) were the variables used to measure profitability. Various statistical tools like mean, standard deviation, Skewness, Kurtosis, Pearson correlation, one way ANOVA, multiple linear regression were used to test the hypotheses. The values of skewness and kurtosis on all study variables were fall under the acceptable limits which proved that data was normal. Furthermore, ANOVA was also applied by SPSS to check the differences in selected ratios across selected companies in the study period.

The results of ANOVA highlighted that there was no significant impact in profitability ratios (NPM, ROE, ROCE, ROA) across selected companies during the study period. It means all the hypotheses related with question 2 were rejected. On the contrary, significant impact in liquidity ratios (current ratio and quick ratio) across selected companies was found during the study period. It means all the hypotheses related with objective 3 were accepted. Furthermore, the regression results highlighted that current ratio and quick ratio were not significant to profitability ratios ROE, ROCE, ROA, NPM. But ITR and ATR were significant to selected profitability ratios. It means all the hypotheses related with objective 1 were partially accepted and partially rejected. It can be said that liquidity has no impact on profitability but efficiency have significant impact on profitability.

Liquidity is an area which needs due attention. Current ratio and quick ratio of all companies indicated poor liquidity position during the study period. The current ratio of the industry has not reached the standard limit of 2:1 in any year from 2011 to 2020. It is suggested that all companies must reduce current liabilities and increase current assets to a reasonable level to improve their liquidity ratios. Moreover, Inventory Turnover Ratio (ITR) of the industry highlighted a good picture over the period of study. The standard ITR is said to 5 to

10 times and ITR of all the selected companies was around or more than 5. It shows that the problem of under-stocking and over-stocking was not found in the industry.

Limitations and directions for future research

This study depends on secondary data of ten years collected through annual reports of five cement companies only. Therefore, future researches ought to be conducted by including other cement companies which were not included in this study and data should include some more years. Besides, a comparative study of cement industry with other industries should be taken to find out the variation in financial performances of cement industry with other industries. Furthermore, multiple regression technique was used for analyzing the impact of study variables and Structural Equation modeling (SEM) should be used for the upcoming researches.

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