Determinants of Profitability for Cement Industry: An Evidence from India

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Abstract:

We ascertain the determinants of profitability for cement industry. We use the financial data of thirty eight cement industry stocks in India. The result of the data shows that logarithm of PBIT by total assets, logarithm of sales, working capital to total assets, working capital to operating expenditure and working capital to net sales emerge as major variables for the performance. The results of the study may be used to compare with other foreign cement companies to understand the determinants of profitability. Further studies can be undertaken for company wise analysis.

Key words: Net Profit Ratio, Net Profit to Assets, Return on Investment, Return on Equity, Operating profit to Total Asset, Operating Profit to Total Assets, Cement Industry companies.

1. Introduction:

WAllowing the private participation is a good move for infrastructure in the country, investor need to understand the financial performance position and ascertain the factors for financial performance of the infrastructure companies. Frederick et.al (1984) studied the risk-return characteristics of the portfolios and compared them with fundamentals and found that rankings are correlated with variability of returns. Karthikeyan (2000) shown the relationship between the financial performance and financial forecasting. Yeh and Hoshino (2000) studied how mergers and acquisitions impact and reports that these have positive impact. Rakesh (2018) studied factors for capital structure and reported that financial performance variables are the significant firm-level factors of capital structure. Manjunatha and Gujjar (2018a; 2018b) shown net income of the organization is not enough to determine its efficiency unless profit margin, asset turnover, financial leverage is taken into consideration. Kavitha and Mohanraj (2019) found that capital structure is negatively related with liquidity while it is positively related with cost of debt, size of the business, liquidity, financial performance and collateral value of asset. Manjunatha et.al (2020) found that return on equity is better in creating positive shareholders wealth and further shows that return on sales, return on assets and assets turn over are significantly relationship with ROE. Praveen and Manjunatha (2021) studied three factors DuPont model and five factors DuPont model and proved the good relationship between return on equity, asset turnover and profit margin. Manjunatha and Vikas (2021) shown the difference in the financing pattern of selected infrastructure sectors in India.

More research has been conducted on factors of performance of companies in the western countries, there are a few studies in the Indian context. Authors sample data used for their studies is also limited to one sector/few sectors. Studies by Karthikeyan (2000) and Rakesh (2018) have generally favored the factors of performance in India. There is no robust conclusive evidence that whether we can use particular variables to know the factors of performance in India and further Kavitha and Mohanraj (2019) suggested to use large sample for longer span of time to ascertain the relationship between profitability of firms and liquidity, leverage, profitability and efficiency ratios. Therefore, we study on cement industry performance by using financial ratios and regression analysis for results

for the cement sector in India. Manuscript is organized in four parts. Part 1 is the introduction; Part 2 presents objectives and methodology; Part 3 analyses the results; Part 4 presents the summary and conclusions. References and tables are given after Part 4.

2. Objectives and Methodology

2.1   We have set following objective based on the evidence of review of literature

- To test the factors affecting the permanence of cement sector

2.2 Data and Sample:

We use the financial data of thirty eight companies in cement industry which are listed in the Indian stock exchanges. The required annual reports are obtained from the capital market line data base and prowess data base. We use the annual reports and the various corporate news releases of the companies. The criteria for selection of stocks: a) listed and traded companies in Indian stock exchanges and b) financial data should be available for the years 1999-2000 to 2017-2018. The total number of companies included in this study, using the above criteria is thirty eight. The profitability measures of 10 dependent variables viz. a) Net Profit Ratio(NPR); b) Net Profit to Total Assets (NPTA); c) Operating Profit Ratio(OPR); d) Return on Investment (Long Term) ratio{ROI(LT)}; e) Return on Investment (Total) ratio(ROI); f) Return on shareholders' Equity(ROE); g) Return on Total Assets(ROTA); h) Return on Fixed Assets(ROFA); i) Retained Earnings to Total Assets(RETA) and j) Operating Profit to Total Assets(OPTA) and 41 independent variables viz. 1) current ratio; 2) liquid ratio; 3) inventory to working capital; 4) current liabilities to net worth; 5) current liabilities to total assets; 6) working capital to net sales; 7) working capital to operating expenditure; 8) cash flow to current liabilities; 9) inventory turnover ratio;

10) receivables turnover ratio; 11) creditors turnover ratio; 12) total assets turnover ratio; 13) fixed assets turnover ratio; 14) working capital turnover ratio; 15) current assets turnover ratio; 16) long term debt to equity (net worth ratio); 17) total debt-equity ratio; 18) total debt (exclusive current liabilities) to debt + equity; 19) total debt (exclusive current liabilities) to total assets ratio; 20) capital gearing ratio; 21) proprietary ratio (fixed assets/shareholders equity); 22) leverage ratio; 23) long term debt to total capitalization (book value); 24) long term debt to total asset; 25) short term debt to total debt(including current liabilities); 26) EPS ; 27) pay-out ratio; 28) price to earnings ratio; 29) book value per share: 30) price to book value ratio; 31) net fixed assets to total Assets; 32) working capital to total assets; 33) retained earnings to total assets; 34) market value of equity to book value of debt; 35) market equity or market capitalization; 36) market value of firm; 37) logarithm of sales; 38) logarithm of total assets; 39) dividend to paid up capital; 40) PBIT to total assets; 41) cash profits to sales are computed from financial statements of cement companies from the years 2000 to 2018 are aggregated for the cement industry.

2.3 Tools of analysis:

Forty one different financial ratios are used to ascertain how these ratios influence the performance of the cement sector. Ten ratios representing as profitability are dependent variables and forty one ratios are taken as independent variables for cement industry. The following regression equations are designed to test the relationship and significance.

We use following 10 ratios as dependent variables and 41 ratios as independent variables for regressions.

$$NPR = \alpha i + \beta 1^* \text{ variable} i + ei \qquad \ldots 1$$

$$NPTA = \alpha i + \beta 1^* \text{ variable} i + ei \qquad \ldots 2$$

$$OPR = \alpha i + \beta 1^* \text{ variablei} + ei \qquad \dots 3$$

$$ROI(LT) = \alpha i + \beta 1^* \text{ variablei} + ei \qquad \dots 4$$

$$ROI = \alpha i + \beta 1^* \text{ variablei} + ei \qquad \dots 5$$

$$ROE = \alpha i + \beta 1^* \text{ variablei} + ei \qquad \dots 6$$

$$ROTA = \alpha i + \beta 1^* \text{ variablei} + ei \qquad \dots 7$$

$$ROFA = \alpha i + \beta 1^* \text{ variablei} + ei \qquad \dots 8$$

$$RETA = \alpha i + \beta 1^* \text{ variablei} + ei \qquad \dots 9$$

$$OPTA = \alpha i + \beta 1^* \text{ variablei} + ei \qquad \dots 10$$

We show co-efficients and their corresponding probability values (p-values) for cement industry which results in 410 regression lines (41x10) in Tables 1A & 1B.

3. Results and Analysis

The regression result reported in the Table 1A shows the determinants of NPR. Of the forty one independent variables analyzed, twenty four exhibit positive association with NPR and seventeen exhibit negative association. The independent variable has a direct relationship with NPR which means as the independent variable increases, NPR also increases. Of the forty one independent variables analysed, nine exhibit good association with NPR and thirty two exhibit statistically insignificant association. When we analyse nine independent variables with NPR, seven exhibit positive association with NPR and two exhibit negative association. Seven independent variables viz. working capital to net sales, working capital to operating expenditure, assets turnover ratio, working capital to total assets, retained earnings to total assets, logarithm of sales and logarithm of PBIT by assets have good relationship with the NPR and therefore, we conclude that these variables are the affecting the NPR.

Note: The above analysis is based on 41 independent variables of the companies in cement industry. Since this is the first dependent variable taken for analysis, we have used all the 41 variables and interpreted the results. We use only the p-values of the independent variables which have positive factors with the 9 dependent variables that are taken for further analysis. The interpretation of all the independent variables is identical for the remaining 9 dependent variables. Therefore, only the overall interpretation is given to save the space, ensure brevity and avoid monotony.

Further, Table 1A shows that 10 independent variables viz. current ratio, working capital to net sales, working capital to operating expenditure, cash flow to current liabilities, assets turnover ratio, working capital to total assets, retained earnings to total assets, logarithm of sales, logarithm of dividend to paid up capital and logarithm of PBIT by assets are influencing the NPTA. Working capital to net sales, working capital to operating expenditure, assets turnover ratio, working capital to assets, retained earnings to assets, logarithm of sales and logarithm of PBIT by assets are the influencing factors for the OPR. The two independent variables viz. price to earnings ratio and fixed assets turnover ratios are influencing factors for the ROI (LT). The four independent variables viz. liquidity, fixed assets turnover ratio, leverage and retained earnings to assets are the influencing factors for the ROI.

Table 1B show that the price to earnings ratio as independent variable is the influencing factor of the ROE. The twelve independent variables viz. current ratio, liquidity, working capital to net sales, working capital to operating expenditure, working capital to assets, retained earnings to assets, cash flow to current liabilities, assets turnover, EPS, logarithm of sales, logarithm of dividend to paid up capital and logarithm of PBIT by assets are the influencing factors of the ROTA. The nine independent variable viz. working capital to net sales, working capital to operating expenditure, total assets turnover ratio, working capital to total assets, retained earnings to total assets, logarithm of sales, logarithm of total

assets, logarithm of dividend to paid up capital and logarithm of PBIT by total assets are the influencing factors of the ROFA. The nine independent variables viz. current ratio, liquid ratio, working capital to net sales, working capital to operating expenditure, cash flow to current liabilities, working capital to total assets, logarithm of sales, logarithm of dividend to paid up capital and logarithm of PBIT by total assets are the influencing factors of the RETA. The ten independent variable viz. working capital to sales, working capital to operating expenditure, cash flow to current liabilities, total assets turnover ratio, fixed assets turnover ratio, current assets turnover ratio, working capital to total assets, retained earnings to total assets, logarithm of sales and logarithm of PBIT by total assets are the influencing factors of the OPTA.

4. Summary and Conclusion

This paper has attempted to test the factors influencing the performance for cement industry in India. The summary and conclusions of these results are presented in this section. We found that (A) logarithm of PBIT by total assets variable as influencing factor for seven dependent variable viz. NPR,NPTA, OPR, ROTA, ROFA, RETA and OPTA; (B) logarithm of sales variable as influencing factor for seven dependent variable viz., NPR NPTA, OPR ROFA RETA and OPTA. (C) Working capital to total assets as an independent variable emerge as influencing factor for six dependent variable viz. NPR NPTA, OPR ROFA RETA OPTA; (D) working capital to operating expenditure emerge as influencing factors for six dependent variable viz.NPR. NPTA, OPR, ROFA, RETA and OPTA; (E) Working capital to net sales, emerge as influencing factors for six dependent variable viz. NPR. NPTA, OPR, ROFA, RETA, OPTA. Further, we found that, of the 41 independent variables; 19 independent variables not the determinants of profitability for cement industry of the study. We conclude that of the 41 independent variables analysed, five independent variables viz. logarithm of PBIT by total assets, logarithm of sales, working

capital to total assets, working capital to operating expenditure and working capital to net sales emerge as major influencing factors of the permanence of cement industry in India. The results of the study may be used by researchers to compare with other foreign infrastructure companies to understand the determinants of profitability of the infrastructure industries. We have analysed only the listed companies and further studies can include unlisted companies. Further studies can also be undertaken for company wise analysis in cement industry and infrastructure companies in India.

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6. Tables

Table 1A: Determinants of Profitability for Cement Industry in India

DV	a		b		c		d		e	
IV	*i*	*ii*	*i*	*ii*	*i*	*ii*	*i*	*ii*	*i*	*ii*
1	51.8	0.2	0.0	0.0*	12.6	0.3	2.8	0.5	7.9	0.7
2	43.6	0.4	0.0	0.1	10.2	0.4	2.5	0.6	8.7	0.7
3	1.1	0.9	0.0	0.3	0.6	0.7	0.2	0.8	1.0	0.7
4	0.0	1.0	0.0	0.7	0.0	0.9	0.1	0.6	-3.4	0.0*
5	-324.3	0.0*	-0.3	0.0*	-75.1	0.1	22.5	0.1	-220.7	0.0*
6	23.7	0.0*	0.0	0.0*	5.8	0.0*	0.5	0.1	1.3	0.4
7	79.4	0.0*	0.0	0.0*	19.3	0.0*	-0.3	0.8	14.0	0.0*
8	20.3	0.5	0.0	0.0*	5.7	0.5	4.5	0.3	13.2	0.3
9	0.1	0.8	0.0	0.4	0.0	0.7	0.0	0.5	0.0	0.7
10	0.0	0.8	0.0	0.2	0.0	0.9	0.0	0.4	0.0	0.9
11	0.1	1.0	0.0	0.6	-0.6	0.9	-0.5	0.6	3.7	0.5
12	364.4	0.0*	0.1	0.00*	82.3	0.0*	9.0	0.5	13.6	0.8
13	91.1	0.1	0.0	0.3	18.1	0.1	10.3	0.0*	-28.1	0.2
14	0.0	0.9	0.0	0.5	0.0	0.9	0.0	0.7	0.0	0.9
15	67.5	0.2	0.0	0.3	16.3	0.3	-0.3	0.9	-23.1	0.3
16	-9.4	0.3	0.0	0.0*	-2.2	0.3	-1.4	0.0*	0.2	1.0
17	-0.1	1.0	0.0	0.6	-0.1	0.9	0.1	0.6	-3.4	0.0*
18	-0.2	0.8	0.0	0.4	0.0	0.9	-2.5	0.5	-0.1	0.8
19	-84.1	0.6	0.0	0.6	-13.3	0.8	-38.9	0.0*	131.5	0.1
20	-13.7	0.5	0.0	0.1	-4.7	0.4	-3.2	0.1	5.4	0.6
21	0.0	1.0	0.0	0.6	0.0	0.9	0.1	0.6	-4.0	0.0*
22	-171.8	0.1	-0.1	0.0*	-36.0	0.2	-30.1	0.0*	7.0	0.9
23	-58.6	0.6	-0.1	0.1	-6.4	0.8	11.7	0.5	-90.9	0.0*
24	-246.3	0.2	-0.2	0.0*	-46.6	0.3	-37.4	0.0*	-5.4	0.9
25	-48.0	0.4	0.0	0.0*	-7.9	0.6	-8.8	0.1	-4.0	0.9
26	0.0	0.4	0.0	0.1	0.0	0.2	0.0	0.4	0.0	0.9
27	-30.1	0.9	0.2	0.7	-9.1	0.9	97.7	0.9	-257.8	0.6
28	-21.2	0.0*	0.0	0.0*	-4.9 0.0*	5.3 0.0*	-27.9	0.0*		
29	0.0	0.8	0.0	0.4	0.0	0.7	0.0	0.9	0.0	0.9
30	0.0	0.6	0.0	0.4	0.0	0.4	0.0 0.6	0.0	1.0	
31	134.0	0.6	0.1	0.1	50.6	0.4	-42.4	0.0*	237.8	0.0*
32	350.9	0.0*	0.3	0.0*	86.0	0.0*	-19.0	0.1	168.2	0.0*
33	295.1	0.0*	0.2	0.0*	73.7	0.0*	-1.9	0.8	93.5	0.0*
34	0.0	0.6	0.0	0.3	0.0	0.6	0.0	0.8	0.0	0.9
35	0.0	0.8	0.0	0.4	0.0	0.7	0.0	0.8	0.0	0.8
36	0.0	0.8	0.0	0.4	0.0	0.7	0.0	0.8	0.0	0.8
37	39.4	0.0*	0.0	0.0*	11.2	0.0*	-1.4	0.5	8.7	0.3

38	-6.7	0.8	0.0	0.1	0.4	0.9	-3.8	0.1	6.2	0.5
39	36.3	0.5	0.0	0.0*	9.0	0.5	3.9	0.3	11.5	0.6
40	21.7	0.0*	0.1	0.0*	6.2	0.0*	5.2	0.2	34.0	0.1
41	-29.5	0.1	0.0	0.0*	-7.4	0.1	-3.4	0.1	-1.0	0.9
42	24	32	26	25	25	33	22	34	27	31
43	17	9	15	16	16	8	19	7	14	10
44		17		16		18		20		23
45		15		9		15		14		8
46		7		10		7		2		4
47		2		6		1		5		6

Source: Computed by the researcher using the ratios and fitting the simple linear regression.

Note 1: First row of the Table 1 A serial number a to d represents dependent variables which are explained under the heading 'data and sample'.

Note 2: First column of the Table 1A serial number 1 to 41 represents independent variables

Note 3: Second and third column of the Table1A serial number i and ii indicates co-efficient and p values respectively. Same explanation holds good for column fourth to ninth.

Note 4: Forty second row of the table indicates the number of positive coefficients (N+ve/ $P>0.05$).

Note 5: Forty third row of the table indicates the number of negative coefficients (N –ve/ $P<0.05$).

Note 6: Forty fourth row of the table indicates the number of positive coefficients and their statistical significance (N +ve, $P>0.05$).

Note 7: Forty fifth row of the table indicates the number of negative coefficients and not statistically significant (N-ve, $P>0.05$).

Note 8: Forty sixth row indicates the number of independent variables having relationship with dependent variable (N +ve, $P>0.05$).

Note 9: Forty seventh row of the table indicates the number of independent variables which do not have association with dependent variable (N -ve, $P>0.05$).

Note 10: The*mark in the p-value column shows the corresponding coefficients of the independent variables are at 5% level of significance. N at the top of the table represents the number of observations taken for fitting the regression. For example, the number of companies taken for analysis in construction industry is 132 and therefore, this is the value of N.

Note 11: The source and notes hold good for the Table 1B also.

Table 1B: Determinants of Profitability for Cement Industry in India

DV	f		g		h		i		j	
IV	i	ii	i	ii	i	ii	i	ii	i	ii
1	78.8	0.5	2.9	0.0*	10.0	0.1	0.2	0.0*	0.0	0.9
2	72.6	0.5	3.1	0.0*	8.9	0.1	0.2	0.0*	0.0	0.8
3	1.8	0.9	0.3	0.2	1.0	0.3	0.0	0.5	0.0	0.5
4	-24.8	0.0*	0.0	0.9	0.0	0.8	0.0	0.4	0.0	0.7
5	-333.1	0.4	-20.9	0.0*	-114.8	0.0*	-1.1	0.0*	-0.3	0.0*
6	1.0	0.9	0.3	0.0*	1.1	0.0*	0.0	0.0*	0.0	0.0*
7	10.7	0.8	2.0	0.0*	9.6	0.0*	0.1	0.0*	0.0	0.0*
8	30.6	0.7	3.2	0.0*	6.2	0.1	0.1	0.0*	0.1	0.0*
9	0.4	0.6	0.0	0.5	0.0	0.5	0.0	0.3	0.0	0.2
10	0.0	0.9	0.0	0.1	0.0	0.4	0.0	0.5	0.0	0.4
11	27.3	0.4	-0.3	0.4	-0.2	0.9	0.0	0.8	0.0	0.3
12	-284.2	0.4	9.7	0.0*	39.5	0.0*	0.4	0.1	0.5	0.0*
13	-166.6	0.2	0.8	0.6	5.0	0.4	0.1	0.3	0.1	0.0*
14	-0.2	0.9	0.0	0.3	0.0	0.6	0.0	0.7	0.0	0.6
15	-258.1	0.1	1.3	0.4	7.6	0.3	0.0	0.7	0.1	0.0*
16	-7.1	0.8	-0.7	0.0*	-1.8	0.1	0.0	0.0*	0.0	0.0*
17	-24.8	0.0*	0.0	0.8	-0.1	0.8	0.0	0.3	0.0	0.8
18	-0.6	0.8	0.0	0.4	-0.1	0.4	0.0	0.6	0.0	0.3
19	455.8	0.3	-4.0	0.5	16.6	0.5	-0.3	0.2	-0.2	0.1
20	-17.6	0.8	-0.7	0.3	-2.6	0.4	-0.1	0.0*	0.0	0.0*
21	-29.7	0.0*	0.0	0.9	-0.1	0.8	0.0	0.3	0.0	0.7
22	-94.6	0.7	-7.3	0.0*	-8.5	0.6	-0.5	0.0*	-0.1	0.1
23	-213.0	0.4	-6.5	0.0*	-15.7	0.2	-0.1	0.6	0.0	0.8
24	20.6	1.0	-12.9	0.0*	-26.4	0.3	-0.8	0.0*	-0.2	0.1
25	39.7	0.8	-3.5	0.0*	-7.6	0.3	-0.2	0.0*	-0.1	0.1
26	0.0	0.4	0.0	0.0*	0.0	0.2	0.0	0.1	0.0	0.1
27	109.1	0.1	14.5	0.7	23.1	0.9	1.2	0.5	0.2	0.8
28	4.8	0.0*	-2.1	0.0*	-16.8	0.0*	-0.1	0.0*	0.0	0.0*
29	0.0	0.7	0.0	0.3	0.0	0.6	0.0	0.5	0.0	0.7
30	0.0	0.6	0.0	0.4	0.0	0.4	0.0	0.6	0.0	1.0
31	590.6	0.3	12.7	0.1	51.0	0.1	0.4	0.3	0.3	0.1
32	349.0	0.4	17.0	0.0*	98.7	0.0*	1.1	0.0*	0.3	0.0*
33	310.0	0.3	14.4	0.0*	68.7	0.0*	0.0	0.4	0.3	0.0*
34	0.0	0.8	0.0	0.3	0.0	0.4	0.0	0.5	0.0	0.3
35	0.0	0.8	0.0	0.4	0.0	0.6	0.0	0.5	0.0	0.3
36	0.0	0.8	0.0	0.4	0.0	0.6	0.1	0.0*	0.0	0.3
37	36.9	0.5	1.6	0.0*	7.9	0.0*	0.1	0.1	0.0	0.0*
38	46.7	0.4	0.8	0.3	5.5	0.0*	0.2	0.0*	0.0	0.4

39	84.7	0.5	3.3	0.0*	13.1	0.0*	0.2	0.0*	0.1	0.1
40	37.9	0.8	8.2	0.0*	22.0	0.0*	0.0	1.0	0.1	0.0*
41	20.6	0.6	-0.9	0.1	-1.1	0.6	26.0	24.0	0.0	0.0*
42	28	37	26	22	27	30	14	16	29	26
43	13	4	15	19	14	11		17	12	15
44		27		14		18		7		19
45		10		8		12		9		7
46		1		12		9		7		10
47		3		7		2				5

Note 1: First row of the table 1 B serial number f to j represents dependent variables which are explained data andsample.