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## DETERMINANTS OF FINANCIAL STRUCTURE OF INDIAN CEMENT INDUSTRY: A NEW METHODOLOGICAL APPROACH

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### ABSTRACT

The financial structure can be made initially from the point of view of the time for which funds are needed. It includes both the sources of finance, i.e., long-term and short-term. Thus financial structure refers to the makeup of permanent capital of firm. Over the past, many researchers have tried to establish the factors which influence a firm's financial structure. The association between a firm's financial structure and its size, profitability similar other operating characteristics have gained considerable importance. Some of them have presented affirmative evidences in respect of a particular factor or a group of factors as determinant of corporate financial structure; others have presented dissenting evidences in respect of the same factor or factors to be a clear determinant of financial structure. Therefore in this study an attempt has been made to study the corporate financial structure relationship with reference to size, profitability, operating leverage, external financing and income gearing. Attempts are also made here to offer an econometric interpretation to the factors which determine the financial structure of selected companies of Indian cement industry.

### KEYWORDS

Financial Structure, Sources of Finance, Size, Profitability, Operating Leverage and Income Gearing.

### INTRODUCTION

Accounting regarding the financial structure of a business consists of three elements: assets, liabilities and capital. The financial structure provides an insight in to the various types of sources tapped to finance, the total assets employed in a business enterprise. That part of financial structure which represents long-term sources is known as capital structure. Since the balance sheet is a detailed form of the fundamental, or structure equation, it is set for the financial structure of an enterprise. It states the nature and amount of each of the various assets, liabilities and property interest of the owner or owners. Stating the nature of the assets, liabilities and capital is not as difficult as stating their amounts. The financial structure can be made initially from the point of view of the time for which funds are needed. It includes both the sources of finance, i.e., long-term and short-term. Thus financial structure refers to the makeup of permanent capital of firm. Over the past, many researchers have tried to establish the factors which influence a firm's financial structure. The association between a firm's financial structure and its size, profitability similar other operating characteristics have gained considerable importance. Some of them have presented affirmative evidences in respect of a particular factor or a group of factors as determinant of corporate financial structure; others have presented dissenting evidences in respect of the same factor or factors to be a clear determinant of financial structure. Scott<sup>1</sup> and Scott et al<sup>2</sup> presented empirical evidences claiming that industrial class has got influence on the firm's financial structure. Remmers, et al<sup>3</sup> in their study, however, presented dissenting evidence arguing that neither size nor industry class is a clear determinant of the firm's financial structure. Therefore in this study an attempt has been made to study the corporate financial structure relationship with reference to size, profitability, operating leverage, external financing and income gearing. Attempts are also made here to offer an econometric interpretation to the factors which determine the financial structure of selected companies of Indian cement industry.

### OBJECTIVES OF THE STUDY

The primary purpose of the present study is to obtain a true insight into the financial structure determinants of the selected cement companies in India.

### HYPOTHESES

The following hypothesis are framed and tested for the study.

- (i) Financial leverage is independent of industry class.
- (ii) Financial leverage is independent of industry size.
- (iii) Financial leverage and profitability are independent of each other.
- (iv) Financial leverage and operating leverage have got no association between them.
- (v) Financial leverage and external financing are independent of each other.
- (vi) Financial leverage has got no association with income gearing.

The above hypotheses have been taken for the study and they have been tested with the help of chi-square test and 'F' test.

### SELECTION OF SAMPLE

Keeping in view the scope of the study, it is decided to include all the companies under cement industry working before or from the year 1995-96 to 2009-10. But, owing to several constraints such as non-availability of financial statements or non-working of a company in a particular year, merged companies, it was compelled to restrict the number of sample companies to eight. The Capitaline and CMIE database publish key financial data of Indian corporate sector systematically. Hence, Capitaline and CMIE databases proved to be complimentary to finalize the sample for the study. The exhaustive list of cement industry in India from Capitaline was cross checked with CMIE database to sort out companies to fit in as the sample for the study. The comprehensive list of companies prepared from the database was modified by sorting out the firms using the following criteria; Which were not in operation for a year during the period of study; Which were in operation but non-availability of data for the whole study period; Which were merged with another company during the period of study; Which were not listed in Bombay Stock Exchange; and which had above 20,00,000 MT installed capacity. There were 42 large cement companies and 94 mini cement companies operated in India. The list of large cement companies selected included in the present study along with year of incorporation and their market share is presented in Table 1. It is evident from Table 1 that sample companies represent 39.13 percentage of market share in the Indian cement industry.

**DETERMINANTS OF FINANCIAL STRUCTURE-ECONOMETRIC ANALYSIS**

In this part an attempt is made to measure the degree of relationship that exists between a firm's financial structure and the different factors which have bearing on the financial structure. The objective of this discussion is to examine the determinants of financial structure in the selected Indian cement companies during the study period. Based on earlier empirical studies, the specific factors are chosen for analyzing determinants of financial structure in Indian cement industry. The factors considered in the model and their measurement is described in methodology. The model to be estimated using from specific cross section data proposed is as follows:

$$FL = b_0 + b_1 PR_{ij} + b_2 OL_{ij} + b_3 S_{ij} + b_4 PROFIT_{ij} + b_5 EF_{ij} + b_6 IG_{ij}$$

Where,

$PR_{ij}$	-	Payout Ratio - for firm (i) in year (j)
$OL_{ij}$	-	Operating Leverage - for firm (i) in year (j)
$S_{ij}$	-	Size - for firm (i) in year (j)
$Profit_{ij}$	-	Profitability - for firm (i) in year (j)
$EF_{ij}$	-	External Financing - for firm (i) in year (j)
$IG_{ij}$	-	Income Gearing - for firm (i) in year (j)

The results of the regression analysis are presented in the Table 76 to Table 83.

**FINANCIAL LEVERAGE AND INDUSTRY**

The first hypothesis relates to the possible association between companies and financial structure. Firms in the same industry should experience similar amount of business risk because they produce similar products, incur similar set of rules, regulations, guidelines and environment. Since business risk has got relationship with the types of product, and the product with types of industries, there is reason to believe that a firm's financial structure is influenced by its industrial classification. The same logic should also hold good for inter-industry comparison. Since industries deal with different products, operate under different environment, rely on different technology, have different cost structure, their business risks should essentially be different. As such, their financial structures should also be different. To test whether the financial leverage of selected Indian cement companies significantly differs, Analysis of Variance (ANOVA) has been applied and result of which is displayed in Table 2. It is evident from Table 2 that F ratio (8.57) is higher than the table value of F (2.10) at 5 per cent level of significance. This indicates that the means of the financial leverages of the selected companies of Indian cement industry differ significantly. Thus the null hypothesis that financial leverage is independent of industrial class is rejected leading to the conclusion that financial leverage depends upon industrial class.

**FINANCIAL LEVERAGE AND SIZE**

Large firms are generally more diversified, enjoy easier access to capital markets, receive higher credit ratings and pay lower rates of interest on borrowed capital. Moreover as the level of activity increases with size, more debt is expected in the financial structure of large corporations. Hence, size of the firm should be positively related to its financial structure. The same logic should also hold good for inter-industry variations. In order to test the validity of the second null hypothesis that financial leverage and industry size are independent, correlation co-efficient between financial leverage and industry size have been calculated for all the selected cement companies during the study period. To test the significance of correlation co-efficient, t values have also been computed. From the Table 3, it is observed that the results found in respect of the hypothesis concerning financial leverage and industry size. It is apparent from this table that negative correlation between financial leverage and industry size in Associated Cement Companies Limited, Birla Corporation Limited, Grasim Industries Limited and Whole Industry. Further, the table reveals that positive correlation between financial leverage and industry size in Chettinad Cement Corporation Limited, Dalmia Cement Limited, India Cements Limited, Madras Cements Limited and Shree Cement Limited. The relations are statistically significant at 5 per cent level in case of all the selected companies and whole industry during the study period and the null hypothesis is rejected.

**FINANCIAL LEVERAGE AND PROFITABILITY**

The third hypothesis is pertaining to the relationship between a firm's profitability and its financial structure. A firm's ability to generate internal surpluses for business expansion depends upon its earning capacity. A more profitable firm may be considered to be in a better position to generate internal funds by way of reserves and surpluses. As reserves and surpluses will grow, the firm's dependence on external financing will decline, and consequently its dependence on debt capital too. This is because, a firm going for external funds will certainly prefer low-cost source and debt will be the first choice. Hence, a negative relationship should exist between a firm's financial leverage and its profitability. This phenomenon should also be true for industry level comparison, for profitability differs from industry to industry. In order to test the validity for the null hypothesis that financial leverage and profitability are independent of each other, correlation co-efficient between financial leverage and profitability have been calculated along with t value for all the selected companies and whole industry and empirical results are presented in Table 3. It is evident from the Table 3 that the existence of negative correlation between financial leverage and profitability in all the selected companies except Dalmia Cement Limited and Shree Cement Limited and the relation are statistically significant at 5 per cent level in case of all the selected companies and whole industry during the study period. The null hypothesis is rejected.

**FINANCIAL LEVERAGE AND OPERATING LEVERAGE**

The fourth hypothesis relates to the suspected influence of operating leverage on financial structure. Ferri and Jones<sup>4</sup> define operating leverage as "the use of fixed costs in the firm's production scheme but is generally associated with the employment of fixed assets". According to them, the use of fixed assets can magnify the variability of the firm's future income and hence, "operating leverage should be negatively related to the firm's financial structure". Determining the validity of this hypothesis in case of Indian cement industry was thus the purpose of the fourth test. In order to test the validity of the null hypothesis that financial leverage and operating leverage have got no association between them, correlation co-efficient between financial leverages and operating leverages have been calculated along with t value for all the selected companies and whole industry and empirical results are presented in Table 3. In case of Indian cement industry, however a definite conclusion could not be reached as far as the relationship between operating leverage and financial leverage is concerned. Empirical evidences from Table 3 show that there exists negative correlation between operating leverage and financial leverage in case of Associated Cement Companies Limited, Dalmia Cement Limited, India Cements Limited and Shree Cement Limited and the relationships are statistically significant at 5 per cent level. The table also reveals that there exists positive correlation between financial leverage and operating leverage in case of Birla Corporation Limited, Chettinad Cement Corporation Limited, Grasim Industries Limited and Madras Cements Limited. Thus, the null hypothesis that operating leverage and financial leverage are independent of each other could not be fully rejected in the sense there exists both negative as well as positive correlation between them in different companies in the same period.

**FINANCIAL LEVERAGE AND EXTERNAL FINANCING**

The fifth hypothesis relates to the association between the external financing and financial structure. Generally firms prepare internal to external financing and they will prefer the safest security first, i.e., they will choose debt before equity financing, in case they seek external financing to finance real investments with a positive net present value. This implies that when external financing will increase, the proportion of debt in the total financing will also increase. Hence there should exist, a positive relationship between external financing and firm's financial leverage. This logic should also be valid for inter-industry comparison. Empirical evidence form Table 3 shows that there exists a strong and statistically significant positive relationship between financial leverage and external financing in case of Associated Cement Companies Limited, Chettinad Cement Corporation Limited, Dalmia Cement Limited, India Cements Limited, Madras Cements Limited and Shree Cement Limited. The Table 3 further shows that the existence of negative significant correlation between financial leverage and



external financing in case of Birla Corporation Limited, Grasim Industries Limited and Whole Industry. Thus the null hypothesis that financial leverage and external financing are independent of each other could not be fully rejected in the sense there exists both positive as well as negative correlation between them in different companies in the same period.

### FINANCIAL LEVERAGE AND INCOME GEARING

The sixth and the last hypothesis relates to the possible association between income gearing and a firm's financial leverage. Income gearing is considered to be a measure of corporate vulnerability to fluctuations in general economic conditions. Since firms operate under different economic conditions, and economic conditions have bearing on capital as well as debt markets, there should exist relationship between income gearing and a firm's financial leverage. Empirical evidence from Table 3 shows that there exists a statistically significant positive relationship between income gearing and corporate financial structure in case of Birla Corporation Limited, Chettinad Cement Corporation Limited, Grasim Industries Limited, India Cements Limited, Madras Cements Limited and Whole Industry. In case of Birla Corporation Limited, India Cements Limited and Whole Industry, the relations though positive are found to be statistically insignificant. Thus, while rejecting the null hypothesis that there is no association between income gearing and financial leverage, it may conclude that income gearing and financial leverage are positively correlated except in Associated Cement Companies Limited, Dalmia Cement Limited and Shree Cement Limited.

### DETERMINANTS OF FINANCIAL STRUCTURE-ECONOMETRIC ANALYSIS

In this part an attempt is made to measure the degree of relationship that exists between a firm's financial structure and the different factors which have bearing on the financial structure. The objective of this discussion is to examine the determinants of financial structure in the selected Indian cement companies during the study period. Based on earlier empirical studies, the specific factors are chosen for analyzing determinants of financial structure in Indian cement industry. The factors considered in the model and their measurement is described in methodology. The model to be estimated using from specific cross section data proposed is as follows:

$$FL = b_0 + b_1 PR_{ij} + b_2 OL_{ij} + b_3 S_{ij} + b_4 PROFIT_{ij} + b_5 EF_{ij} + b_6 IG_{ij}$$

Where,

$PR_{ij}$	-	Payout Ratio - for firm (i) in year (j)
$OL_{ij}$	-	Operating Leverage - for firm (i) in year (j)
$S_{ij}$	-	Size - for firm (i) in year (j)
$Profit_{ij}$	-	Profitability - for firm (i) in year (j)
$EF_{ij}$	-	External Financing - for firm (i) in year (j)
$IG_{ij}$	-	Income Gearing - for firm (i) in year (j)

The results of the regression analysis are presented in the Table 76 to Table 83.

### WHOLE INDUSTRY

Analysis of the regression results of Indian cement industry (Table 4) reveals that the adjusted  $R^2$  is 0.89 and the F ratio is significant, which implies that the independent variables collectively explain 89 percentage of the total variations in the dependent variable. The analysis shows that variables like payout ratio, operating leverage, size, profitability and income gearing which are found to be statistically significant in explaining financial structure of Indian cement industry. However the external financing is found to be statistically insignificant in explaining financial structure of Indian cement industry. As far as the importance of individual variable are concerned, operating leverage followed by income gearing, external financing, size, payout ratio and profitability are found to be the most important factors explaining the variations in the financial structure of Indian cement industry during the study period. The results thus indicate that the independent variables explaining the dependent variable well during the study period.

### ASSOCIATED CEMENT COMPANIES LIMITED (ACCL)

Analysis of regression results of the factors determining financial structure of Associated Cement Companies Limited are presented in Table 5. It is evident from the table that the independent variables explain about 99 per cent variation in the dependent variable. The analysis shows that factors like payout ratio, operating leverage, size, profitability and income gearing are found to be statistically significant in explaining the financial structure of Associated Cement Companies Limited. However, external financing is found to be statistically insignificant. It is evident from the results that income gearing is the stronger determinant of financial structure followed by external financing, payout ratio, profitability, operating leverage and size. The overall explanatory power of regression appears to be good. This may be inferred from the co-efficients of determinants ( $R^2$ ). It is 99 per cent and the adjusted explanation is 98 per cent.

### BIRLA CORPORATION LIMITED (BCL)

The results of analysis of the regression of Birla Corporation Limited are presented in Table 6. Analysis of the regression results shows that the adjusted  $R^2$  is 0.95 and the F ratio is significant, which implies that the independent variables collectively explain 95 percentage of the total variation in the dependent variable. The analysis shows that payout ratio, operating leverage, size, profitability, external financing and income gearing are found to be statistically significant in explaining financial structure of Birla Corporation Limited. It is also found that operating leverage has been the most important factor influencing the financial leverage of Birla Corporation Limited followed by income gearing, payout ratio, external financing, profitability and size. The results thus indicate that the independent variables explain dependent variable well during the study period.

### CHETTINAD CEMENT CORPORATION LIMITED (CCCL)

The results of regression analysis of the factor determining the financial structure of Chettinad Cement Corporation Limited are presented in Table 7. It is found from the Table 7 that the independent variables collectively explain about 72 per cent of the total variations in the dependent variable in Chettinad Cement Corporation Limited during the study period. The analysis shows that factors like payout ratio, operating leverage, size, profitability, external financing, income gearing are found to be statistically significant in explaining financial structure of Chettinad Cement Corporation Limited. As far as individual variables are concerned, it is found that size, followed by operating leverage, external financing, profitability, income gearing and payout ratio are the most significant variables influencing the financial structure of Chettinad Cement Corporation Limited during the study period. The results also indicate that the independent variables explain the dependent variable well in Chettinad Cement Corporation Limited during the study period.

### DALMIA CEMENT LIMITED (DCL)

The results of regression analysis of the factor determining the financial structure of Dalmia Cement Limited are presented in Table 8. It is found from the Table 8 that the independent variables collectively explain about 79 per cent of the total variations in the dependent variable in Dalmia Cement Limited during the study period. The analysis shows that factors like payout ratio, operating leverage, size, profitability, external financing and income gearing are found to be statistically significant in explaining financial structure of Dalmia Cement Limited. As far as individual variables are concerned, it is found that size, followed by profitability, external financing, income gearing, payout ratio and operating leverage are the most significant variables influencing the financial structure of Dalmia Cement Limited during the study period. The results also indicate that the independent variables explain the dependent variable well in Dalmia Cement Limited during the study period.

**GRASIM INDUSTRIES LIMITED (GIL)**

The results of regression analysis of the factor determining the financial structure of Grasim Industries Limited are presented in Table 9. It is found from the Table 9 that the independent variables collectively explain about 97 per cent of the total variations in the dependent variable in Grasim Industries Limited during the study period. The analysis shows that factors like payout ratio, operating leverage, size, profitability, external financing and income gearing ratio are found to be statistically significant in explaining financial structure of Grasim Industries Limited. As far as individual variables are concerned, it is found that income gearing, followed by payout ratio, operating leverage, external financing, profitability and size are the most significant variables influencing the financial structure of Grasim Industries Limited during the study period.

**INDIA CEMENTS LIMITED (ICL)**

The results of regression analysis of the factor determining the financial structure of India Cements Limited are presented in Table 10. It is found from the Table 10 that the independent variables collectively explain about 69 per cent of the total variations in the dependent variable in India Cements Limited during the study period. The analysis shows that factors like payout ratio, operating leverage, profitability, external financing and income gearing are found to be statistically significant in explaining financial structure of India Cements Limited. The other factor size are found to be statistically insignificant. As far as individual variables are concerned, it is found that payout ratio, followed by income gearing, size, external financing, profitability and operating leverage are the most significant variables influencing the financial structure of India Cements Limited during the study period.

**MADRAS CEMENTS LIMITED (MCL)**

The results of regression analysis of the factor determining the financial structure of Madras Cements Limited are presented in Table 11. It is found from the Table 11 that the independent variables collectively explain about 74 per cent of the total variations in the dependent variable in Madras Cements Limited during the study period. The analysis shows that factors like payout ratio, operating leverage, size, profitability, income gearing are found to be statistically significant in explaining financial structure of Madras Cements Limited. The other factor external financing are found to be statistically insignificant. As far as individual variables are concerned, it is found that payout ratio, followed by operating leverage, income gearing, size, external financing and profitability are the most significant variables influencing the financial structure of Madras Cements Limited during the study period. The results also indicate that the independent variables explain the dependent variable well in Madras Cements Limited during the study period.

**SHREE CEMENT LIMITED (SCL)**

The results of regression analysis of the factor determining the financial structure of Shree Cement Limited are presented in Table 12. It is found from the Table 12 that the independent variables collectively explain about 69 per cent of the total variations in the dependent variable in Shree Cement Limited during the study period. The analysis shows that factors like payout ratio, operating leverage, size, profitability, external financing and income gearing are found to be statistically significant in explaining financial structure of Madras Cements Limited. As far as individual variables are concerned, it is found that size, profitability, external financing, operating leverage, income gearing and payout ratio are the most significant variables influencing the financial structure of Shree Cement Limited during the study period. The results also indicate that the independent variables explain the dependent variable well in Shree Cement Limited during the study period.

**CONCLUSION**

The analysis of determinants of financial structure of Indian cement industry reveals that the selected variables collectively explain 81 percentage of the total variation in Indian cement industry, 98 per cent in Associated Cement Companies Limited, 95 per cent in Birla Corporation Limited, 72 per cent in Chettinad Cement Corporation Limited, 79 per cent in Dalmia Cement Limited, 97 per cent in Grasim Industries Limited, 69 per cent in India Cements Limited, 74 per cent in Madras Cements Limited and 69 per cent in Shree Cement Limited during the study period. As far as the importance of individual variables are concerned, operating leverage followed by income gearing, external financing, size, payout ratio and profitability are found to be the most important factors explaining the variations in the financial structure of Indian cement industry during the study period. The results thus indicate that the independent variables explain the dependent variable well during the study period. The analysis of variance reveals that the means of financial leverage differ significantly in the case of Indian cement industry and all the selected companies.

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## APPENDIX

TABLE 1: LIST OF SAMPLE COMPANIES INCLUDED IN THE PRESENT STUDY

Sl. No.	Companies	Year of Incorporation	Market Share (%)
1	Associated Cement Companies Limited	1936	10.16
2	Birla Corporation Limited	1919	2.69
3	Chettinad Cement Corporation Limited	1962	1.91
4	Dalmia Cement Limited	1951	2.12
5	Grasim Industries Limited	1946	5.42
6	India Cements Limited	1947	9.71
7	Madras Cements Limited	1957	3.32
8	Shree Cement Limited	1979	3.8
	<b>Total</b>		<b>39.13</b>

Source: PROWESS Database

TABLE 2: ANALYSIS OF VARIANCE (ANOVA) FOR FINANCIAL LEVERAGES OF SELECTED INDIAN CEMENT COMPANIES

Companies	Mean		No. of items		
Associated Cement Companies Limited	0.45		15		
Birla Corporation Limited	0.47		15		
Chettinad Cement Corporation Limited	0.63		15		
Dalmia Cement Limited	0.52		15		
Grasim Industries Limited	0.40		15		
India Cements Limited	0.56		15		
Madras Cements Limited	0.61		15		
Shree Cement Limited	0.51		15		
Source of variations	Sum of Squares	Df	Mean square	F ratio	F Value (at 5%)
Between the years	0.48	14	0.03	2.99*	1.79
Between the companies	0.69	7	0.10	8.57*	2.10
Error	1.12	98	0.01		
<b>Total</b>	<b>2.29</b>	<b>119</b>			

\* - Significant of at 0.05 level

Source : Computed

TABLE 3: CORRELATION COEFFICIENTS, T-VALUES AND LEVELS OF SIGNIFICANCE OF FINANCIAL LEVERAGE AND DIFFERENT FACTORS

Industry	Correlation between	r-value	t-value	Significant / Not significant
Associated Cement Companies Limited	FL and size	-0.667	123.43	Significant*
	FL and profit	-0.924	9.77	Significant*
	FL and ol	-0.068	4.09	Significant*
	FL and ef	0.077	18.13	Significant*
	FL and ig	-0.227	4.72	Significant*
Birla Corporation Limited	FL and size	-0.854	123.46	Significant*
	FL and profit	-0.928	4.53	Significant*
	FL and ol	0.780	6.43	Significant*
	FL and ef	-0.624	25.19	Significant*
	FL and ig	0.792	0.63	Not Significant
Chettinad Cement Corporation Limited	FL and size	0.438	149.83	Significant*
	FL and profit	-0.014	16.88	Significant*
	FL and ol	0.157	4.78	Significant*
	FL and ef	0.428	5.67	Significant*
	FL and ig	0.571	5.50	Significant*
Dalmia Cement Limited	FL and size	0.753	122.79	Significant*
	FL and profit	0.248	14.74	Significant*
	FL and ol	-0.414	1.69	Not Significant
	FL and ef	0.740	3.36	Significant*
	FL and ig	-0.341	6.43	Significant*
Grasim Industries Limited	FL and size	-0.900	160.42	Significant*
	FL and profit	-0.350	16.97	Significant*
	FL and ol	0.442	5.33	Significant*
	FL and ef	-0.776	13.48	Significant*
	FL and ig	0.892	10.36	Significant*
India Cements Limited	FL and size	0.013	114.93	Significant*
	FL and profit	-0.425	9.83	Significant*
	FL and ol	-0.721	0.74	Not Significant
	FL and ef	0.064	8.54	Significant*
	FL and ig	0.534	0.83	Not Significant
Madras Cements Limited	FL and size	0.512	150.13	Significant*
	FL and profit	-0.667	17.36	Significant*
	FL and ol	0.604	11.42	Significant*
	FL and ef	0.395	5.16	Significant*
	FL and ig	0.449	9.55	Significant*
Shree Cement Limited	FL and size	0.664	130.95	Significant*
	FL and profit	0.570	12.76	Significant*
	FL and ol	-0.026	1.84	Significant*
	FL and ef	0.606	4.52	Significant*
	FL and ig	-0.051	3.65	Significant*
Whole Industry	FL and size	-0.104	16.03	Significant*
	FL and profit	-0.737	9.28	Significant*
	FL and ol	0.221	4.30	Significant*
	FL and ef	-0.295	4.89	Significant*
	FL and ig	0.869	0.33	Not Significant

FL - Financial Leverage, profit – profitability, ol - operating leverage, ef - external financing, ig - income gearing \* - Significant of at 0.05 level  
Source: Computed

TABLE 4: FACTORS DETERMINING THE FINANCIAL STRUCTURE OF INDIAN CEMENT INDUSTRY – REGRESSION ANALYSIS

[Dependent variable- Financial Leverage (FL)] ( $FL = b_0 + b_1PR + b_2OL + b_3S + b_4PROFIT + b_5EF + b_6IG$ )

Independent variables	Regression Co-efficients	t-value	Significant / Not significant
Payout Ratio (PR)	-0.02	3.56	Significant*
Operating Leverage (OL)	0.18	3.82	Significant*
Size (S)	-0.02	2.42	Significant*
Profitability (PROFIT)	-0.02	3.91	Significant*
External Financing (EF)	-2E-06	1.08	Not Significant
Income Gearing (IG)	0.17	6.43	Significant*
<b>Constant =</b>	<b>0.90</b>		
<b>R<sup>2</sup> =</b>	<b>0.89</b>		
<b>Adj R<sup>2</sup> =</b>	<b>0.81</b>		

**TABLE 5: FACTORS DETERMINING THE FINANCIAL STRUCTURE OF ASSOCIATED CEMENT COMPANIES LIMITED – REGRESSION ANALYSIS**

[Dependent variable- Financial Leverage (FL)] (FL =  $b_0 + b_1PR + b_2OL + b_3S + b_4 PROFIT + b_5EF + b_6IG$ )

Independent variables	Regression Co-efficients	t-value	Significant / Not significant
Payout Ratio (PR)	-0.01	4.83	Significant*
Operating Leverage (OL)	-0.10	3.28	Significant*
Size (S)	-0.78	3.28	Significant*
Profitability (PROFIT)	-0.03	8.82	Significant*
External Financing (EF)	-3.6E-05	0.31	Not Significant
Income Gearing (IG)	0.68	4.44	Significant*
<b>Constant =</b>	<b>19.14</b>		
<b>R<sup>2</sup> =</b>	<b>0.99</b>		
<b>Adj R<sup>2</sup> =</b>	<b>0.98</b>		

**TABLE 6: FACTORS DETERMINING THE FINANCIAL STRUCTURE OF BIRLA CORPORATION LIMITED – REGRESSION ANALYSIS**

[Dependent variable- Financial Leverage (FL)] (FL =  $b_0 + b_1PR + b_2OL + b_3S + b_4 PROFIT + b_5EF + b_6IG$ )

Independent variables	Regression Co-efficients	t-value	Significant /Not significant
Payout Ratio (PR)	0.01	4.08	Significant*
Operating Leverage (OL)	1.08	4.49	Significant*
Size (S)	-0.78	5.89	Significant*
Profitability (PROFIT)	-0.02	8.94	Significant*
External Financing (EF)	-0.001	2.87	Significant*
Income Gearing (IG)	0.20	4.69	Significant*
<b>Constant =</b>	<b>6.38</b>		
<b>R<sup>2</sup> =</b>	<b>0.97</b>		
<b>Adj R<sup>2</sup> =</b>	<b>0.95</b>		

**TABLE 7: FACTORS DETERMINING THE FINANCIAL STRUCTURE OF CHETTINAD CEMENT CORPORATION LIMITED – REGRESSION ANALYSIS**

[Dependent variable- Financial Leverage (FL)] (FL =  $b_0 + b_1PR + b_2OL + b_3S + b_4 PROFIT + b_5EF + b_6IG$ )

Independent variables	Regression Co-efficients	t-value	Significant / Not significant
Payout Ratio (PR)	-0.02	2.86	Significant*
Operating Leverage (OL)	0.09	1.89	Significant*
Size (S)	0.15	4.66	Significant*
Profitability (PROFIT)	-0.0003	2.46	Significant*
External Financing (EF)	0.0001	3.64	Significant*
Income Gearing (IG)	-0.0003	2.54	Significant*
<b>Constant =</b>	<b>1.04</b>		
<b>R<sup>2</sup> =</b>	<b>0.76</b>		
<b>Adj R<sup>2</sup> =</b>	<b>0.72</b>		

**TABLE 8: FACTORS DETERMINING THE FINANCIAL STRUCTURE OF DALMIA CEMENT LIMITED – REGRESSION ANALYSIS**

[Dependent variable- Financial Leverage (FL)] (FL =  $b_0 + b_1PR + b_2OL + b_3S + b_4 PROFIT + b_5EF + b_6IG$ )

Independent variables	Regression Co-efficients	t-value	Significant / Not significant
Payout Ratio (PR)	-0.34	3.39	Significant*
Operating Leverage (OL)	-0.42	4.65	Significant*
Size (S)	0.15	4.07	Significant*
Profitability (PROFIT)	0.003	1.95	Significant*
External Financing (EF)	6.04E-05	3.87	Significant*
Income Gearing (IG)	-0.25	1.35	Significant**
<b>Constant =</b>	<b>-0.99</b>		
<b>R<sup>2</sup> =</b>	<b>0.82</b>		
<b>Adj R<sup>2</sup> =</b>	<b>0.79</b>		

**TABLE 9: FACTORS DETERMINING THE FINANCIAL STRUCTURE OF GRASIM INDUSTRIES LIMITED – REGRESSION ANALYSIS**

[Dependent variable- Financial Leverage (FL)] (FL =  $b_0 + b_1PR + b_2OL + b_3S + b_4 PROFIT + b_5EF + b_6IG$ )

Independent variables	Regression Co-efficients	t-value	Significant / Not significant
Payout Ratio (PR)	0.41	2.91	Significant*
Operating Leverage (OL)	0.41	1.79	Significant*
Size (S)	-0.47	7.46	Significant*
Profitability (PROFIT)	-0.01	3.36	Significant*
External Financing (EF)	-7.5E-05	4.42	Significant*
Income Gearing (IG)	0.57	7.20	Significant*
<b>Constant =</b>	<b>9.81</b>		
<b>R<sup>2</sup> =</b>	<b>0.98</b>		
<b>Adj R<sup>2</sup> =</b>	<b>0.97</b>		

**TABLE 10: FACTORS DETERMINING THE FINANCIAL STRUCTURE OF INDIA CEMENTS LIMITED – REGRESSION ANALYSIS**

[Dependent variable- Financial Leverage (FL)] ( $FL = b_0 + b_1PR + b_2OL + b_3S + b_4 PROFIT + b_5EF + b_6IG$ )

Independent variables	Regression Co-efficients	t-value	Significant / Not significant
Payout Ratio (PR)	0.16	2.84	Significant*
Operating Leverage (OL)	-1.56	3.87	Significant*
Size (S)	0.01	0.04	Not Significant
Profitability (PROFIT)	-0.01	3.66	Significant*
External Financing (EF)	1.06E-05	2.86	Significant*
Income Gearing (IG)	0.04	2.27	Significant*
<b>Constant =</b>	<b>-4.97</b>		
<b>R<sup>2</sup> =</b>	<b>0.76</b>		
<b>Adj R<sup>2</sup> =</b>	<b>0.69</b>		

**TABLE 11: FACTORS DETERMINING THE FINANCIAL STRUCTURE OF MADRAS CEMENTS LIMITED – REGRESSION ANALYSIS**

[Dependent variable- Financial Leverage (FL)] ( $FL = b_0 + b_1PR + b_2OL + b_3S + b_4 PROFIT + b_5EF + b_6IG$ )

Independent variables	Regression Co-efficients	t-value	Significant / Not significant
Payout Ratio (PR)	0.49	3.55	Significant*
Operating Leverage (OL)	0.46	2.63	Significant*
Size (S)	0.16	2.21	Significant*
Profitability (PROFIT)	-0.01	3.17	Significant*
External Financing (EF)	4.92E-05	1.59	Significant**
Income Gearing (IG)	0.24	1.79	Significant*
<b>Constant =</b>	<b>-0.43</b>		
<b>R<sup>2</sup> =</b>	<b>0.85</b>		
<b>Adj R<sup>2</sup> =</b>	<b>0.74</b>		

**TABLE 12: FACTORS DETERMINING THE FINANCIAL STRUCTURE OF SHREE CEMENT LIMITED – REGRESSION ANALYSIS**

[Dependent variable- Financial Leverage (FL)] ( $FL = b_0 + b_1PR + b_2OL + b_3S + b_4 PROFIT + b_5EF + b_6IG$ )

Independent variables	Regression Co-efficients	t-value	Significant / Not significant
Payout Ratio (PR)	-0.03	3.48	Significant*
Operating Leverage (OL)	-0.02	1.14	Not Significant
Size (S)	0.21	3.19	Significant*
Profitability (PROFIT)	0.01	2.52	Significant*
External Financing (EF)	0.0001	2.77	Significant*
Income Gearing (IG)	-0.02	3.17	Significant*
<b>Constant =</b>	<b>0.29</b>		
<b>R<sup>2</sup> =</b>	<b>0.74</b>		
<b>Adj R<sup>2</sup> =</b>	<b>0.69</b>		

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