



## A Study on Determinants of Capital Structure :Special Reference to Cement Companies

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### ABSTRACT

*The issue of determinants of capital structure in developing countries however received little attention. Lately where were only few studies on the determinants of capital structure conducted in the developing countries. To identify the determinants of capital structure of the select cement companies. The sample consists of 7 companies listed under BSE and NSE. The data has been examined using regression analysis. The study reveals that the determinants of capital structure are different from one company to another.*

**KEYWORDS : CAPITAL STRUCTURE ,BUSINESS RISK PROFITABILITY,LIQUIDITY, NDS**

### INTRODUCTION:

Capital is an important and critical resources for all companies. The capital resources for establishing companies can be divided in to two main categories namely equity and debt. Between equity and debt the equity arises when companies sell some of its ownership rights to gain funds for operation and investing activities where as debt is a contractual agreement whereby companies borrow an amount of money and replay it with interest within a stipulated time frame. Capital structure can be referred to as "the mixture of sources of funds a firm used"( debt, equity and preference shares). The amount of debt that a firm uses to finances its asset is called leverage. A firm with a lot of debt in its capital structure is said to be highly leveraged. A firm with no debt is said to be unleveraged.

The issue of determinants of capital structure in developing countries however received little attention. Lately where were only few studies on the determinants of capital structure conducted in the developing countries. One of the recent empirical studies on determining the factors affecting capital structure in developing countries have been attempted by Booth(3) In their studies a sample consisting of 10 developing countries were analyzed . From their analysts the author have concluded that the variables that explain the capital structure in developed nations are also relevant in the developing countries irrespective of difference in institutional factors across these developing countries. In India a thorough study with regards to the determinants of capital structure of stock exchange listed ,non-financial firms was conducted by many researchers ,Much empirical evidences In India a thorough study with regards to the determinants of capital structure of stock exchange listed ,non-financial firms was conducted by many researchers ,Much empirical evidence suggests that there is significant industry influences on capital structure. However in India empirical evaluation of factors determinants the capital structure of companies in each sector individually is very rare.

### REVIEW OF LITERATURE

Waseen anwar (2012) investigated the cross-industry determinants of capital structure. Sample consists of firms from three main industries (textile, cement and power industry) of Pakistan. Five year data from 2005 to 2009 was collected for 199 firms out of which 149 firms from textile industry, 23 from cement industry and 27 from power industry. Leverage was taken as a dependent variable and Profitability, Size, Assets Tangibility, Growth and Non-debt tax shield are taken as independent variables. OLS regression analysis suggested that profitability and assets tangibility are two common deterrents which show the same results in all the three industries. All the other variables show different results across the industries. Results indicated that across the industry determinants of the capital structure were different

P.Pinkova (2012) made an attempt to identify the determinants influencing the capital structure of large and medium -sized enterprises. The sample of the study consisted of 100 companies belonging to NACE division 29 for the period from 2006-2010. Analyses of variance,

regression analysis, correlation were used to identify the determinants of capital structure. Four important factors were size, tangibility, profitability and liquidity. This paper found that the tangibility and leverage were positively related in all cases. Total debt and short term debt were positively related but profitability and long term debt were negatively related. Liquidity and leverage were negatively related in all cases. It concluded that inter industry variation was based on capital structure decision

### OBJECTIVES OF THE STUDY:

The study focus on capital structure of the cement industries. It specifically examined to identify the determinants of capital structure of the select cement companies

### RESEARCH METHODOLOGY:

The data used in the study relates to the manufacturing companies listed in the BSE for which the data is available in the proweess database of CMIE. The period of the study is from 2000-2002to 2012-13. But owing to several constraints such as non-availability of financial statement or the non-working of a company in a particular year, it was compelled to restrict the number of sample 7 companies from cement. The data has been examined using regression analysis.

HO: The exists no relationship between the determinant of capital structure of the selected cement companies to another.

The multiple regression analysis was performed to evaluate the capital structure of Indian cement companies.

The dependent variable considered was debt-equity ratio independent variable:  $X_1$ = Size,  $X_2$ = Growth,  $X_3$ = Assets Structure / Tangibility,  $X_4$ =Liquidity,  $X_5$ = Debt Structure,  $X_6$ = Net-Debt Tax Shield,  $X_7$ =Business Risk and  $X_8$ =Profitability.

Capital structure of Indian cement companies = f (Size, Growth, Assets Structure / Tangibility, Liquidity, Debt Structure, Net-Debt Tax Shield, Business Risk and Profitability)

Measured investors' considered as capital structure of Indian cement companies as dummy variable and run the following regression model to identify whether the capital structure of Indian cement companies. Specifically,

Capital structure of Indian cement companies ( $Y_1$ ) =  $\beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + e$

Where,

$Y_1$ = Capital structure of Indian cement companies

$\beta_0$  = Intercept,  $\beta_1$ - $\beta_8$ = Slopes (estimates of coefficients)

$X_1$  = Size,  $X_2$  = Growth,  $X_3$  = Assets Structure / Tangibility,  $X_4$  = Liquidity,  $X_5$  = Debt Structure

$X_6$  = Net-Debt Tax Shield,  $X_7$  = Business Risk,  $X_8$  = Profitability and

$e$  = Random error, which the authors assumed as NID for this research.

**TABLE: 1  
MULTIPLE REGRESSION MODEL SUMMARY  
CAPITAL STRUCTURE OF INDIAN CEMENT COMPANIES**

Company Name	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	SE	F Value	Sig
ACC Ltd	0.962	0.926	0.779	0.230	6.280	0.047
Ambuja Cements Ltd	0.965	0.932	0.796	0.308	6.853	0.040
Birla Corporation Ltd	0.881	0.776	0.329	0.124	1.736	0.312
Chettinad Cement Corp. Ltd	0.993	0.987	0.960	0.198	37.416	0.002
Deccan Cements Ltd	0.993	0.987	0.960	0.197	37.385	0.002
Gujarat Sidhee Cement Ltd	0.995	0.990	0.970	0.011	49.912	0.001
Heidelberg Cement India Ltd	0.996	0.991	0.974	0.115	58.026	0.001

Level of Significance: 5 per cent

$$Y_1 = \pm 13.611 \pm 3.894 X_1 \pm 0.000 X_2 \pm 2.179 X_3 \pm 0.732 X_4 \pm 0.012 X_5 \pm 20.466 X_6 \pm 0.001 X_7 \pm 8.330 X_8$$

$$Y_2 = \pm 66.814 \pm 21.538 X_1 \pm 0.001 X_2 \pm 9.483 X_3 \pm 2.594 X_4 \pm 0.076 X_5 \pm 24.354 X_6 \pm 0.003 X_7 \pm 19.032 X_8$$

$$Y_3 = \pm 898 \pm 360 X_1 \pm 0.000 X_2 \pm 0.843 X_3 \pm 0.008 X_4 \pm 1.173 X_5 \pm 0.047 X_6 \pm 0.000 X_7 \pm 361 X_8$$

$$Y_4 = \pm 15.636 \pm 5.370 X_1 \pm 0.000 X_2 \pm 1.262 X_3 \pm 0.237 X_4 \pm 1.986 X_5 \pm 2.437 X_6 \pm 0.003 X_7 \pm 5.005 X_8$$

$$Y_5 = \pm 5.168 \pm 1.663 X_1 \pm 0.002 X_2 \pm 2.414 X_3 \pm 0.105 X_4 \pm 1.681 X_5 \pm 7.049 X_6 \pm 0.005 X_7 \pm 11.713 X_8$$

$$Y_6 = \pm 1.097 \pm 0.451 X_1 \pm 0.000 X_2 \pm 0.518 X_3 \pm 0.068 X_4 \pm 0.001 X_5 \pm 1.716 X_6 \pm 0.000 X_7 \pm 0.07 X_8$$

$$Y_7 = \pm 8.159 \pm 2.998 X_1 \pm 0.003 X_2 \pm 1.854 X_3 \pm 0.186 X_4 \pm 0.001 X_5 \pm 20.871 X_6 \pm 0.003 X_7 \pm 7.04 X_8$$

It has been revealed from the above econometric analysis that F ratio (6.280, 6.853, 1.736, 37.416, 37.385, 49.912, 58.026, 24.610, 31.755, 42.156, 6.331, 366.721, 35.316 and 7.164) is statistically significant at 5 per cent level. This indicates the entire regression is significant, it establishes 96.20, 96.50, 88.10, 99.30, 99.30, 99.50, 99.60, percent relationship between the variables tested. From the above table it seen that the coefficient of correlation (R) value .962, .965, .881, .993, .993, .995, .996, which describe good relationship between the variables and the coefficient of determinant (R<sup>2</sup>) .926, .932, .776, .987, .987, .990, .991, value establishes significant association between the 8 variables tested. Therefore the hypothesis framed stands accepted.

The following table shows the value of constant and coefficient value of each attributes to analyze the capital structure of Indian cement companies.

**TABLE: 2  
CAPITAL STRUCTURE OF INDIAN CEMENT COMPANIES**

Variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF

ACC Ltd							
Constant	13.611	8.241	-	1.652	.174	-	-
Size	-3.894	2.214	-1.718	-1.759	.153	.019	51.744
Growth	0.00	.000	.677	.548	.613	.012	82.949
Assets Structure / Tangibility	2.179	3.641	.385	.599	.582	.044	22.486
Liquidity	.732	.930	.196	.787	.475	.296	3.378
Debt Structure	-.012	.022	-.182	-.538	.619	.160	6.242
Net-Debt Tax Shield	-20.466	29.981	-.317	-.683	.532	.086	11.667
Business Risk	.001	.000	1.472	2.040	.111	.035	28.239
Profitability	-8.330	3.158	-1.322	-2.638	.050	.073	13.622
Ambuja Cements Ltd							
Constant	-66.814	50.468	-	-1.324	.256	-	-
Size	21.538	14.470	6.352	1.488	.211	.001	1071.144
Growth	-.001	.001	-4.207	-1.410	.031	.002	523.927
Assets Structure / Tangibility	-9.483	3.988	-.776	-2.378	.076	.160	6.258
Liquidity	-2.594	1.236	-1.203	-2.098	.104	.052	19.351
Debt Structure	-.076	.028	-.893	-2.727	.053	.158	6.311
Net-Debt Tax Shield	24.354	31.555	.427	.772	.483	.056	17.988
Business Risk	-.003	.003	-3.620	-1.254	.278	.002	489.818
Profitability	19.032	14.798	3.071	1.286	.268	.003	335.401
Birla Corporation Ltd							
Constant	-.898	5.266	-	-.171	.873	-	-
Size	.360	2.006	.781	.179	.867	.003	340.124
Growth	.000	.000	-.819	-.375	.727	.012	85.307
Assets Structure / Tangibility	.843	1.218	.453	.692	.527	.130	7.672
Liquidity	-.008	.577	-.029	-.014	.990	.013	79.373
Debt Structure	-.117	.232	-.620	-.505	.040	.037	26.975
Net-Debt Tax Shield	3.047	15.377	.252	.198	.853	.034	29.021
Business Risk	.000	.001	.528	.450	.676	.041	24.613
Profitability	-.361	3.471	-.256	-.104	.922	.009	108.234
Chettinad Cement Corp. Ltd							
Constant	15.636	6.289	-	2.486	.068	-	-
Size	-5.370	2.136	-1.522	-2.514	.066	.009	111.224
Growth	.000	.000	.331	.960	.392	.028	36.190
Assets Structure / Tangibility	1.262	1.710	.143	.038	.001	.088	11.414
Liquidity	.237	.275	.083	.862	.437	.359	2.789
Debt Structure	1.986	.698	.762	2.847	.047	.046	21.708
Net-Debt Tax Shield	2.437	4.058	.155	.601	.580	.049	20.284
Business Risk	-.003	.003	-.258	-1.005	.372	.050	19.927
Profitability	-5.005	2.548	-.368	-1.964	.121	.094	10.651
Deccan Cements Ltd							
Constant	5.168	1.750	-	2.953	.042	-	-
Size	-1.663	.503	-.605	-3.304	.030	.098	10.159

Growth	-.002	.001	-.453	-2.955	.042	.140	7.122
Assets Structure / Tangibility	2.414	.924	.346	2.613	.059	.188	5.309
Liquidity	.105	.193	.092	.544	.616	.116	8.604
Debt Structure	-1.681	.554	-.753	-3.036	.039	.054	18.672
Net-Debt Tax Shield	7.049	11.753	.084	.600	.581	.169	5.920
Business Risk	-.005	.011	-.120	-.454	.673	.048	20.992
Profitability	11.713	5.996	.863	1.953	.122	.017	59.148
Gujarat Sidhee Cement Ltd							
Constant	-1.097	.430	-	-2.551	.063	-	-
Size	.451	.169	.568	2.665	.056	.055	18.316
Growth	0.000	.000	.188	2.016	.114	.284	3.521
Assets Structure / Tangibility	.518	.102	.672	5.070	.007	.141	7.088
Liquidity	-.068	.020	-.374	-3.454	.026	.212	4.724
Debt Structure	-.001	.001	-.142	-1.845	.139	.416	2.404
Net-Debt Tax Shield	-1.716	.572	-.370	-2.999	.040	.163	6.142
Business Risk	0.000	.001	.008	.016	.988	.011	88.564
Profitability	-.007	.126	-.025	-.054	.959	.012	86.678
Heidelberg Cement India Ltd							
Constant	8.159	2.058	-	3.965	.017	-	-
Size	-2.998	.727	-1.352	-4.127	.015	.020	50.255
Growth	.003	.001	1.850	6.931	.002	.030	33.357
Assets Structure / Tangibility	-1.854	.760	-.417	-2.441	.071	.073	13.656
Liquidity	-.186	.118	-.216	-1.583	.189	.114	8.735
Debt Structure	.001	.003	.036	.353	.742	.207	4.841
Net-Debt Tax Shield	-20.871	9.807	-.390	-2.128	.100	.064	15.741
Business Risk	-.003	.003	-.304	-1.093	.336	.028	36.310
Profitability	.704	1.184	.111	.595	.584	.061	16.394

Level of Significance: 5 per cent

To determine whether all independent variables are significant predictors of capital structure of Indian cement companies the information provided in the co-efficient table is to be examined. Out of 8 parameters statements were considered statistically significant. The standardized co-efficient of beta column reveals that investors' consideration on capital structure of Indian cement companies have beta standard co-efficient of ±13.611, ±66.814, ±.898, ±15.636, ±5.168, ±1.097, ±8.159, which are statistically significant at 0.000.

To assess multi-co linearity one looks at the size of tolerance and VIF (Variance Inflated Factor). In mean gap the tolerance indicate the absence of co linearity, where as VIF is inverse (opposite) of tolerance, while observing for large values. If the tolerance value is smaller than .10, then it is concluded that multi-co linearity is in risk. Similarly, if the VIF is 5 or larger, then multi-co linearity is also noted to risk. Since the tolerance value is substantially above .10 and the VIF is smaller than 5 it is concluded that multi-co linearity among the independent variable are statistically significant.

**FINDINGS:**

1. Capital structure of Indian cement companies (ACC Ltd) = ±13.611 (Constant)
2. ±8.330 (Profitability)
3. Capital structure of Indian cement companies (Ambuja Cements Ltd) = ±66.814 (Constant) ±.001 (Growth)
4. Capital structure of Indian cement companies (Birla Corporation Ltd) = ±.898 (Constant)±.117 (Debt Structure)
5. Capital structure of Indian cement companies (Chettinad Cement Corpn. Ltd) = ±15.636 (Constant)±1.262 (Assets Structure / Tangibility)
6. Capital structure of Indian cement companies (Deccan Cements Ltd) = ±5.168 (Constant)±1.663 (Size) ±.002 (Growth) ±1.681 (Debt Structure)
7. Capital structure of Indian cement companies (Gujarat Sidhee Cement Ltd) = ±1.097 (Constant)±.518 (Assets Structure / Tangibility)±.068 (Liquidity)
8. ±1.716 (Net-Debt Tax Shield)

9. Capital structure of Indian cement companies (Heidelberg Cement India Ltd) = ±8.159 (Constant) ,±2.998 (Size) ±.003 (Growth)

To assess capital structure of Indian cement companies multiple regression modeling was performed and to measure the relative importance of the individual dimension of the generated scale, log linear multiple regression Analysis was employed to test the 8 variables such as: Size, Growth, Assets Structure / Tangibility, Liquidity, Debt Structure, Net-Debt Tax Shield, and Profitability and all of them were significant. But Business Risk is not significant with capital structure.

**TABLE: 3**  
**DETERMINANT OF CAPITAL STRUCTURE OF CEMENT COMPANIES**

Name of the Company	S	G	T	L	DS	NDTS	BR	Pr
ACC Ltd								√
Ambuja Cements Ltd		√						
Birla Corporation Ltd			√					
Chettinad Cement Corpn. Ltd					√			
Deccan Cements Ltd	√	√			√			
Gujarat Sidhee Cement Ltd			√	√		√		
Heidelberg Cement India Ltd	√	√						

S-Size, G - Growth, T- Tangibility, L- Liquidity, DS- Debt Structure, NDTS, BR- Business Risk, PR- Profitability

**CONCLUSIONS:**

An empirical study on the determinants of capital structure has shows the relevance of factors in the decision making of the manager when they have to perform the short, medium and long period. The study reveals that the determinants of capital structure were different from one company to another. So that the capital structure frame work is vary from one company to another in selected cement companies.

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