

# International Journal of Advance Research in Computer Science and Management Studies

Research Article / Survey Paper / Case Study

Available online at: [www.ijarcsms.com](http://www.ijarcsms.com)

## *Determinants of Capital Structure of Indian Cement Industry*

**Maruthu Pandian. P<sup>1</sup>**

Associate Professor & Head, PG and Research Department of  
Commerce, NGM College, Pollachi, India

**Hema Prasanna. S<sup>2</sup>**

Assistant Professor, Department of B.Com(CA), Sree  
Saraswathi Thyagaraja College, Pollachi, India

**Abstract:** *Capital structure decisions are the key financial decisions of a firm since it affect return and risk of shareholders. This study examines the factors that determine the capital structure of Indian cement industry. Sample of the study consists of ten companies of Indian Cement Industry selected on the basis of stratified random sampling techniques. The data used are secondary in nature and it has been collected from ACE Equity database for a period of sixteen years from 1997-1998 to 2012-2013. Correlation, Regression and Stepwise Regression were used for the analysis of the data. The results of the study indicate that, among the fourteen variables, three variables namely Solvency ratio, Return on Equity and the Bank Rate are the prominent variables which determine the capital structure of the Indian Cement Industry.*

**Keywords:** *Capital structure, Debt-equity ratio, Solvency ratio, Return on Equity, Bank Rate.*

### I. INTRODUCTION

Industrial sector has an important role to play in the economy. It contributes 28% of the GDP and it accounts for 22% share in employment (Datt and Sundharam, 2015). Steady industrial growth helps to compliment and sustain continued economic development. Capital structure decisions are the key financial decisions of a firm since it affect return and risk of shareholders. The use of debt may be financially advantageous to the firm as interest on debt is tax deductible, apart from financial benefits the use of debt has also other advantages like non-dilution of control, low transaction cost, easy to raise fund from financial institutions. The benefit that a firm derives from debt is enjoyed by equity shareholders and at the same time when a firm suffers loss, equity share holders are the one who has to bear heavy loss. So firms have to be cautious in deciding the capital structure, thus capital structure decisions are the most important corporate decisions.

The Indian industrial sector underwent significant changes as a result of the economic reforms of 1991, which removed import restrictions, brought in foreign competition, led to privatization of certain public sector industries, liberalized the Foreign Direct Investment (FDI) regime and improved infrastructure. (Shridevi Chandrakant Khuba, 2013) In the light of this situation, it is desirable to identify the factors that determine the capital structure of the select companies in Indian Cement Industry. India's cement industry is the second largest in the world; it plays a vital role in the development of Indian economy. It provides employment to more than a million people directly or indirectly. It is ever growing industry attracting both Indian and foreign investors ([www.ibef.org](http://www.ibef.org))

### II. LITERATURE REVIEW

The pioneers of capital structure research Franco Modigliani and M.H.Miller (1958) demonstrated that a firm cannot increase its value by using leverage as a part of its capital structure. Following their research more number of researches has taken place in this area. Ronald F. Wippen (1966) supported the traditional view that shareholder wealth is enhanced by the firm's judicious use of fixed commitment financing. Sheridan Titman and Roberto Wessels (1988) studied the determinants of capital structure and reported that debt levels are negatively related to the 'uniqueness' of a firm's line of business. Allen D.E. and H. Mizlno (1989) analyzed the determinants of capital structure of Japanese companies and concluded that profitability is the most significant determinant of capital structure. Mitalisen and J.K. Pattanayak (2005) are of the opinion that liquidity, size,

efficiency, growth, quality of assets, profitability and service diversification are the most critical factors that influence the capital structure of a company. Nirmala S (2010) studied the Corporate Capital Structure in India and reported that, Return on Equity is the important factor which is significantly associated with Debt-Equity ratio. Anushu Handoo and Kapil Sharma (2014) identify the most important determinants of capital structure of Indian companies. The study identified that profitability, growth, asset tangibility, size, cost of debt, tax rate and debt serving capacity have significant impact on the leverage structure of the Indian companies. In the post liberalized era many changes have taken place in the Government policies, competition and environment which influence the performance of a company. This study is an attempt to study the corporate capital structure in the post liberalization period.

### III. OBJECTIVE OF THE STUDY

The objective of the study is to determine the factors that determine the capital structure of the select companies in the Indian Cement Industry.

### IV. SIGNIFICANCE OF THE STUDY

The results of the study may help the finance managers of the company to take vital decisions regarding capital structure. The findings may also helpful to the investors to choose the company which gives them a higher return.

### V. LIMITATIONS OF THE STUDY

As the study is based on secondary data, the limitations of the secondary data will influence the study.

### VI. METHODOLOGY

This study has been carried out with a sample of ten companies selected from Indian Cement industry. The companies have been selected on the basis of debt equity ratio and the availability of data for the period of study. The data used are secondary in nature and it has been collected from ACE Equity database for a period of sixteen years from 1997-1998 to 2012-2013. Correlation, Regression and Step wise regression were the statistical tools used for the analysis of the data.

### VII. HYPOTHESES

There exists no association between selected independent variable and the capital structure of the select company.

TABLE I NATURE AND STRENGTH OF RELATIONSHIP BETWEEN SELECT INDEPENDENT VARIABLES AND DEBT EQUITY RATIO – CORRELATION ANALYSIS

Variables	r	r <sup>2</sup>
Size	-0.193*	0.037
Profitability	-0.342**	0.117
Non Debt Tax Shield	.054	0.003
Liquidity	-0.059	0.004
Dividend Payout Ratio	-0.387**	0.150
Growth	-0.160*	0.026
Age	0.058	0.003
Effective Tax Rate	0.020	0.000
Interest Coverage Ratio	-0.277**	0.077
Selling and Distribution Ratio	-0.016	0.000
Return On Equity	-0.448**	0.200
Solvency ratio	-0.503**	0.253
Inflation	-0.288**	0.083
Bank Rate	-0.063	0.004

\* Significant at five per cent level

\*\* Significant at one per cent level

Out of the fourteen variables, six variables such as non-debt tax shield, liquidity, age, effective tax rate, selling and distribution expenses ratio, bank rate are not associated with debt-equity ratio. The variables which are associated with the debt-equity ratio are explained in the following paragraphs

*i) Size:* The size of the companies is found to have significant association with the debt-equity ratio. It is clear from the correlation analysis that this variable which is the natural log of gross tangible assets is negatively correlated with debt equity ratio indicating that an increase in this ratio would decrease the debt level in the capital mix. The co-efficient of determination ( $r^2$ ) shows that the size accounts for 3.7 percent of the variation in the level of capital structure.

*ii) Profitability:* The profitability of the companies is found to be significantly associated with the debt equity ratio. It is revealed from the analysis that this variable which is measured as the ratio of earnings before interest and tax to total assets is negatively associated with debt-equity ratio indicating that an increase in this ratio would decrease the debt level in the capital mix. The coefficient of determination ( $r^2$ ) shows that the profitability accounts for 11.7% of the variation in the level of debt-equity ratio.

*iii) Dividend Payout Ratio:* The dividend payout ratio of the companies is identified to have significant association with the debt equity ratio. It is obvious from the analysis that this variable which is measured as the ratio of total ordinary dividend paid to profit reported is negatively associated with debt-equity ratio indicating that an increase in this ratio would decrease the debt level in the capital mix. The coefficient of determination ( $r^2$ ) shows that the dividend payout ratio accounts for 15 percent of the variation in the level of debt-equity ratio.

*iv) Growth:* The growth of the companies is found to have significant association with the debt equity ratio. It is revealed from the analysis that this variable which is measured as the growth rate of sales is negatively associated with debt-equity ratio indicating that an increase in this ratio would decrease the debt level in the capital mix. The coefficient of determination ( $r^2$ ) shows that growth accounts for 2.6 percent of the variation in the level of debt-equity ratio.

*v) Interest Coverage Ratio:* The interest coverage ratio of the companies is significantly associated with the debt equity ratio. It is clear from the analysis that this variable which is measured as the ratio of earnings before interest and taxes and interest is negatively associated with debt-equity ratio indicating that an increase in this ratio would decrease the debt level in the capital mix. The coefficient of determination ( $r^2$ ) shows that interest coverage ratio accounts for 7.7 percent of the variation in the level of capital structure.

*vi) Return On Equity:* The return on equity of the companies is found to have significant association with the debt equity ratio. It is clear from the analysis that this variable which is measured as the ratio of Profit after tax and net worth is negatively associated with debt-equity ratio indicating that an increase in this ratio would decrease the debt level in the capital mix. The coefficient of determination ( $r^2$ ) shows that return on equity accounts for 20 percent of the variation in the level of debt-equity ratio.

*vii) Solvency Ratio:* The solvency ratio of the companies is significantly associated with the debt equity ratio. It is revealed from the analysis that this variable which is measured as the ratio of total assets and total borrowings plus current liabilities minus advance payment of tax is negatively associated with debt-equity ratio indicating that an increase in this ratio would decrease the debt level in the capital mix. The coefficient of determination ( $r^2$ ) shows that solvency ratio accounts for 25.3 percent of the variation in the level of capital structure.

*viii) Inflation Rate:* The inflation rate is identified to have significant association with the debt equity ratio. It is obvious from correlation analysis that, this variable is negatively associated with debt-equity ratio indicating that an increase in this ratio would decrease the debt level in the capital mix. The coefficient of determination ( $r^2$ ) shows that, inflation rate accounts for 8.3 percent of the variation in the level of debt equity ratio.

Thus the eight variables namely size, profitability, dividend payout ratio, growth, interest coverage ratio, solvency ratio, inflation rate are associated with capital structure of the firm.

### VIII. DETERMINANTS OF CAPITAL STRUCTURE MULTIPLE REGRESSION

The results of the multiple regression analysis indicate that six out of the fourteen explanatory variables are found to be significantly associated with the debt-equity ratio. The variables namely size, current ratio, dividend payout ratio, age, effective tax rate, interest coverage ratio, inflation rate and bank rate are not associated with debt-equity ratio.

TABLE II DETERMINANTS OF CAPITAL STRUCTURE - MULTIPLE REGRESSION ANALYSIS

Variables	Regression coefficient	Standard error	t
Size	0.019	0.086	0.223
Profit	5.928*	2.361	2.511
Non-Debt Tax Shield	-10.173*	4.187	-2.430
Current Ratio	0.044	0.144	0.306
Dividend Pay-out Ratio	-0.004	0.002	-1.800
Growth	-0.931**	0.290	-3.205
Age	0.001	0.005	0.101
Effective Tax Rate	0.394	0.476	0.828
Interest Coverage Ratio	0.006	0.008	0.743
Selling and Distribution expenses Ratio	4.533*	1.937	2.341
Return On Equity	-3.785**	0.770	-4.918
Solvency ratio	-1.110**	0.222	-4.997
Inflation	-0.029	0.044	-0.664
Bank Rate	-0.141	0.109	-1.286

\* Significant at five per cent level

\*\* Significant at one per cent level

Constant	: 4.139
Std. Error of Estimate	: 0.949
$\overline{R}^2$	: 0.415
$R^2$	: 0.466**

*i) Profitability:* The influence of profitability on debt equity ratio is positive and significant at five percent level. The contribution of profitability to debt-equity ratio is 5.928, which shows that an increase in profitability has positive impact on debt-equity ratio, keeping the other variables constant.

*ii) Non Debt Tax Shield:* The regression coefficient between non debt tax shield and debt equity ratio is -10.173. It reveals that, non-debt tax shield is negatively associated with debt-equity ratio which implies when non debt tax shield is increased by one unit it brings down trend by 10.17 units.

*iii) Growth:* When a company grows it will be in a position to generate funds internally. Thus the firm's debt level and growth are expected to have a negative relationship. The influence of growth on debt equity ratio is negative and significant at one percent level. The regression coefficient between growth and debt equity ratio is -0.931. Thus it is clear that growth and debt equity ratio are negatively associated which indicates that an increase of one unit in sales will decrease debt equity ratio by 0.931 units.

*iv) Selling and Distribution Expenses Ratio:* The regression coefficient between selling and distribution expenses ratio and debt equity ratio is 4.533. The influence of selling and distribution expenses ratio on debt equity ratio is positive and significant at five percent level. Thus it is clear that selling and distribution expenses and debt equity ratio are positively associated with capital structure and indicates that an increase of one unit in selling and distribution expenses ratio will increase debt equity ratio by 4.533 units.

v) **Return on Equity:** The regression coefficient between return on equity and debt equity ratio is -3.785 which implies a negative relationship between two variables. This further reveals that, an increase of one unit in return on equity will have a negative impact on debt-equity ratio by 3.78 units.

vi) **Solvency Ratio:** It is clear from the regression analysis that, the influence of solvency ratio on debt-equity ratio is negative and significant at one percent level. It reveals that an increase of one unit of solvency ratio will reduce debt equity ratio by 1.11 units, as the regression coefficient is -1.110

### Regression Equation

$$\text{Debt-Equity Ratio} = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7 + b_8x_8 + b_9x_9 + b_{10}x_{10} \\ + b_{11}x_{11} + b_{12}x_{12} + b_{13}x_{13} + b_{14}x_{14} + e$$

Where,

a	: intercept form	$x_8$	: Effective Tax Rate
$b_1 \dots b_{14}$	: Regression coefficients	$x_9$	: Interest Coverage Ratio
$x_1$	: Size	$x_{10}$	: Selling and Distribution expenses ratio
$x_2$	: Profitability	$x_{11}$	: Return on Equity
$x_3$	: Non Debt Tax Shield	$x_{12}$	: Solvency ratio
$x_4$	: Liquidity	$x_{13}$	: Inflation rate
$x_5$	: Dividend Payout Ratio	$x_{14}$	: Bank rate
$x_6$	: Growth	e	: error term
$x_7$	: Age		

In the regression equation, fourteen explanatory variables have been regressed on Debt Equity ratio. The overall contribution of all the fourteen variables is found by calculating  $R^2$  value which amounts to 0.466. This signifies that the contribution of the fourteen variables to debt-equity ratio amounts to 46.6 per cent. The significance of the regression coefficient is tested through 't' statistics.  $R^2$  value, calculated to ascertain the goodness of fit of the regression equation, has been tested for its significance through 'F' statistics. The levels of confidence chosen for 't' and 'F' statistics are five and one percent.

TABLE III FACTORS PROMINENTLY ASSOCIATED WITH CAPITAL STRUCTURE - STEP WISE REGRESSION ANALYSIS

Step	Constant	SOL	ROE	Bank Rate	SDR	Growth	DPR	$R^2$
1	3.644	-1.173						0.251
2	3.395	-0.918	-2.234					0.331
3	4.979	-0.877	-2.680	-0.233				0.362
4	4.797	-0.932	-2.809	-0.247	3.423			0.381
5	4.929	-0.935	-2.748	-0.255	4.220	-0.627		0.401
6	4.786	-0.810	-2.380	-0.239	4.449	-0.787	-0.004	0.420

To identify the prominent factors that account for the variations in Debt equity ratio, stepwise regression analysis has been carried out. In the stepwise regression equation the variable 'solvency ratio' is included as the first variable and the contribution of this variable is found to be 25.1 percent. In the second step, the variable 'return on equity' is introduced. This variable along with 'solvency ratio' accounts for 33.1 percent. The contribution is 36.2 percent with the introduction of variable 'bank rate'. The contribution became 38.1 with the introduction of variable 'selling and distribution expenses ratio'. The contribution is 40.1

percent with the introduction of variable 'growth' and finally the contribution is 42 with the introduction of variable 'dividend payout ratio'.

The total contribution of the six variables namely 'solvency ratio', 'return on equity', 'bank rate', 'selling and distribution ratio', 'growth', and 'dividend payout ratio' amounts to 42 percent while the contribution of all the fourteen variables works out to 46.6 percent. It can be concluded that the difference in  $R^2$  value i.e.4.6 percent is the contribution of the remaining independent variables to the dependent variable debt-equity ratio.

### IX. SUGGESTIONS

This study identified the determinants that affect the capital structure of the Indian Cement Industry. To conclude, solvency ratio is the prominent variable which determines the capital structure of the Indian Cement Industry, next to solvency ratio, the variable return on equity determines the capital structure. Thus the findings of the study may help the finance managers to identify the factors to be given importance to arrive at optimum capital structure and the results of the study may also help the investors to choose the best company for their investments. There is wide scope to do further research in this area, a study may also be conducted to identify the determinants of capital structure of service industry.

### References

1. Modigliani. F and M.H.Miller (1958) "The cost of capital, corporation finance and the theory of investment" , American Economic Review, Vol. XLVII, pp 261-297.
2. Ronald F. Wippen (1966) in their article titled "Financial structure and the value of the firm", The Journal of Finance, Vol.XXI, No.4.
3. Sheridan Titman and Roberto wessels (1988) " The determinants of capital structure choice", The Journal of Finance, Vol.XLIII, No.1.
4. Allen.D.E and H.Mizlno (1989) "The determinants of corporate capital structure", Applied Economics, Vol.21, pp 569-585.
5. Mitalisen and J.K.Pattanayak(2005) "An empirical study of the factors influencing the capital structure of Indian commercial banks" , The ICFAI Journal of Applied Finance, pp.52-65.
6. Nirmala S (2010) "Corporate Capital Structure in India", Ph.D., unpublished thesis.
7. Shridevi chandrakant khuba (2013), "Role and importance of industries in Indian Economy", Indian Streams Research Journal, Vol.3,Issue.1, Feb.2013.
8. Anushu Handoo and Kapil Sharma (2014) , "A study on determinants of capital structure in India". IIMB Management Review, Vol.26.,No.3.
9. Datt & Sundaram(2015), "Indian Economy", S.Chand & Company Pvt. Ltd., p.85.
10. www.ibef.org

### AUTHOR(S) PROFILE



**P. Maruthu Pandian**, received M.Com degree from Madras University in 1981, M.Phil., Ph.D., from Bharathiar University. He received BGL from Madurai Kamraj University. He has around thirty three years of experience and presently he is working as Associate Professor and Head, PG and Research Department of Commerce, NGM College Pollachi, Affiliated to Bharathiar University.



**S. Hema Prasanna**, received the M.Com degree and M.Phil degree from NGM College, Pollachi in 2001 and 2004, respectively. She received PGDCA degree from Manonmaniam Sundaranar University, Tirunelveli in the year 2001, She completed her MBA degree at Bharathiar university in 2012, She has around nine years teaching experience and at present working as Assistant Professor at Sree Saraswathi Thyagaraja College, Pollachi, , Affiliated to Bharathiar University.