# Financial Leverage and its Determinants: Evidence from Indian Cement Industry

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**Abstract**

*In this study an attempt has been made to examine the determinants of capital structure in companies belonging to the Cement Industry of India. The companies listed in the Bombay Stock Exchange (BSE) and National Stock Exchange (NSE) has been used for the study. The study has been conducted for the period from 1999-2000 to 2010-2011. To study the influence of various independent variables on the capital structure, Multiple Regression Analysis has been carried out taking the "ratio of average total debt to average total assets" as dependent variable and seven variables, which might have some impact on the capital structure, as independent variables. These seven variables are namely "business risk", "size of the firm", "growth rate", "debt service capacity", "degree of operating leverage", "dividend payout", and "earning rate". It is observed from the study that size of the firm, debt service capacity, business risk and growth rate are statistically significant to have an influence in taking capital structure related decisions and considered as determinants of capital structure of the listed companies belonging to the Indian Cement Industry during the period under study.*

**Keywords:** *Financial Leverage, Capital Structure, Multiple Regression Analysis, Cement Industry*

## INTRODUCTION

To determine the optimal capital structure is perhaps one of the important

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functions of Finance Manager. The growth of a firm depends on the investments that it makes which translate into enhanced profits. A firm may use borrowed funds or owner's funds to make such investments. These investments with long-term benefits determine the value of the firm today. But this value not only depends on the investment's expected future cash flows but also on the cost of these funds. Existing theories postulate that neither the borrowing nor the owner's funds is costless.

Thus, capital structure has always been an important, challenging and a central issue in corporate finance. Capital Structure decisions mainly involve determining the right mix of debt and equity. The seminal work of Modigliani and Miller (1958;1963) postulating the irrelevance of capital structure in the valuation of a firm without tax effect and with tax advantage marked the beginning of the capital structure theories. This was followed by the trade-off theory (Miller1977; Myers 2001; Greene, Murinde and Suppakitjarak 2002), pecking order theory or asymmetric information theory (Myers, 1984; Myers and Majluf, 1884) and agency theory (Jensen and Meckling 1976; Haris and Raviv, 1990; Barnea, Haugen and Senbet, 1980). . Phenomenal empirical research has been conducted on the determinants of capital structure in both developed and developing countries. Prominent studies are by Wald (1999), Rajan and Zingales (1995), Pandey (2001), and Ariff (1998).

India is the second largest cement producing country after China and hence plays an important role in the development of the economy in an emerging market like India. Thus, our primary motivation is to determine the factors that influence capital structure decisions of Indian Cement Industry in India.

## BACK GROUND OF INDIAN CEMENT INDUSTRY

The year 1991 was the one when the process of liberalization and globalization hit the Indian economy and pushed our country to break open the "Inward Looking" policy when the emphasis was accorded to protectionism and import substitution. Since 1991, India has proved to be a key player in the world.

The infrastructural Development in India has seen a tremendous boost after 1991. With the increase of construction activities in India it is observed that there is an upward trend in the demand for quality building material and similar products. Cement is an important constituent

in construction activities resulting in the growth of Cement Industry.

Today, India is second major cement producing country following China with approximately having 137 large and 365 mini cement plants. 64% of the demand in cement industry is derived from the housing sector in India and it accounts for about 7-8% of the global production. [Source: Indian Cement Industry by Mr. Binal R Vora]

Despite of the fact that the cement industry has grown at a rapid rate in the last decade reflecting a compounded growth of 8% still the per capita consumption remains low compared to the world average. In long term various drivers that will result in rapid growth in the cement industry would depend upon infrastructural spending, rapid growth in rural housing and peaking interest rate. The growth prospects in Indian Cement Industry are very much closely linked with growth of overall economy, real estate and construction industry in general. Some of the leading companies in Indian Cement Industry include Gujarat Ambuja Cement, ACC, JK Cements etc.

## Reasons for Selecting Cement Industry

India is the second largest cement producing country after China. Since liberalization process started in the year 1991 the Indian Cement Industry is showing rapid growth. Due to the high growth potential seen in this sector a few transnational companies have ventured in this market. In the last 10 years this sector has recorded a CAGR (Compounded Annual Growth Rate) of 7-8% as against the world cement industry average of 3.5%.

With the advent of globalization the Indian Cement Industry is very much in process of restructuring itself to cope up with alteration in global economic and trading system. Cement being one of the important elements in construction work is seeing a rapid growth and expansion in this sector. The consumptions of cement have increased by approximately 7.5% in domestic sector.

At present around 93% of the total capacity in the cement industry is based on modern and environment-friendly dry process technology. The induction of advanced technology has helped the industry immensely to conserve energy and fuel and to save materials substantially. Only the rest 7% uses old wet and semi-dry process technology. There is also a huge scope of waste heat recovery in the cement plants, which lead to reduction in the emission level and hence improves the environment.

These are some of the reasons why cement industry is considered to be one of the sunrise industries in India. Some of the foreign cement manufacturers are engaging themselves in agreements and deals with their India counter parts to have a share of the growth. Hence the purpose for selecting cement industry is to understand factors determining the capital structure of Indian Cement Industry which is considered to be one of happening industry in Indian Scenario with a lot of potential growth opportunities in the future.

## LITERATURE REVIEW:

It is proposed to present briefly some of the research studies conducted by different researchers pertaining to the present study:

**Patrik Baur (2004)** in his research paper "Determinants of Capital Structure: Empirical Evidence of Czech Republic" published in Czech Journal of Economics and Finance have

examined the factors determining the Capital Structure like profitability, tangibility, growth opportunity, volatility etc. As per the empirical analysis, it was concluded that leverage is positively to size and tax but is negatively correlated to profitability, tangibility and growth opportunity.

**Keshar J. Baral (2004)** in his research paper "Determinants of Capital Structure: A Case Study

of Listed Companies of Nepal" published in The Journal of Nepalese Business Studies has tried to determine the factors determining the capital structure of companies listed in Nepal Stock Exchange. A cross sectional analysis was done taking into consideration industries from different sectors like trading, commercial banks, hotels etc. It was found from the result that size, growth rate and earning rate are statistically significance influence on capital structure decisions.

**Jian Chen and Roger Stranger (2006)** in their research paper "The Determinants of Capital Structure: Evidence from Chinese Listed Companies, published in Springer tries to explore the determinants of Capital Structure of companies listed in Shanghai Stock exchange and Shenzhen Stock Exchange in China in 2003. Pecking Order theory and Trade off Theory were utilized to test the significance of variables taken into consideration like profitability, size of the firm, risk of the firm, age of the firm, tax factor. From the study, it was found that size, risk and age of the firm are positively related to the debt ratio while profitability is

negatively related. Tax factor does not affect capital structure. In this paper ownership structure is also taken into consideration which negatively effects capital structure.

**Kinga Mazur (2007)** in his research paper "The Determinants of Capital Structure Choice: Evidence from Polish Companies," published in Springer has tried to examine the fact whether the financing decision of polish firms are influenced by pecking order theory or Trade off Theory. First of all multi-collinearity problem was investigated to find out the correlation existing between different variables taken into consideration like assets structure, profitability, growth opportunities, liquidity, firm size, product uniqueness, earnings volatility, non-debt tax shields, dividend policy, and the effective tax rate. Finally multi – regression model was run so as to investigate the relationship between capital structure and potential determinants. It was observed that pecking order hypothesis best explains the financing choice of polish firms.

**Mohammed Amidu (2007)** in his research paper "Determinants of capital structure of banks in Ghana: An empirical approach", published in Baltic Journal of Management have tried to examine the determinants of Capital Structure of banks in Ghana. The research concludes that some of the factors that determine the capital structure of the banks in Ghana are profitability, growth rate, corporate tax, growth, asset structure and Bank size. Multi Regression Model has been used so as to understand the significance of different factors influencing the capital structure decisions of the banks of Ghana.

**Fitim Deari and Media Deari (2009)** in their research paper "Determinants of Capital Structure: Case of Companies Listed on Zagreb Stock Exchange", published in Zagreb International Review of Economics & Business have tried to investigate into the factors determining Capital Structure. The study concludes that profitability, tangibility, size and growth effects capital structure decisions while non debt tax shield does not affect capital structure decisions.

**Erdinc Karadeniz, Serkan Yilmaz Kandir, Mehmet Balcilar and Yildirim Beyazit Onal (2009)** in their research paper "Determinants of capital structure: Evidence from Turkish lodging companies" published in International Journal of Contemporary Hospitality Management (Emerald) has tried to investigate into the factors affecting the capital structure decisions of Turkish lodging companies listed in Istanbul Stock Exchange. The finding concludes that tangibility of assets, effective tax rates and return on assets are negatively related to leverage while firm size, growth opportunity , non debt tax shield do not appear to be related

to capital structure.

**Shahjanpour, Ghalambor and Aflatooni (2010)** in their research paper "The Determinants of Capital Structure Choice in Iranian Company" published in International Research Journal of Finance and Economics have tried to determine the various factors which affect the capital structure of the company listed in Tehran Stock Exchange. Correlation Technique was utilized to test the problem of multi collinearity and finally regression analysis was run. From the analysis it was found that liquidity was negatively related to capital structure while payout ratio was positively related to capital structure. Non Debt Tax shield was not related. It was concluded that majority of the items were consistent with pecking order theory.

**Nadeem Ahmed Sheikh and Zongjun Wang (2011)** in their research paper "Determinants of capital structure: An empirical study of firms in manufacturing industry of Pakistan," have tried to investigate into the factors determining the capital structure of 160 firms listed in Karachi Stock Exchange during 2003-2007. The multi - regression model was run and it was concluded from the study that profitability, tangibility, earning volatility, liquidity are negatively related to leverage while firm size is positively related to leverage. It is also observed that non debt tax shield and growth opportunity has no significance influence on capital structure.

## OBJECTIVE OF THE STUDY

This study is basically undertaken so as to investigate the independent variables on which the dependent variable i.e. the financial leverage depends upon and also to test the significance of different explanatory variables of Capital Structure which would help the finance manager to take various decisions. The industry taken into consideration for the study includes the Indian Cement Industry.

The independent variables taken into consideration for the study which might have some impact on the capital structure decisions of Indian Cement Industry are as "Business Risk", "Size of the Firm□, "Growth Rate", "Debt Service Capacity", "Degree of Operating Leverage", "Dividend Payout" and "Earning Rate". The various variables have been explained under the next heading.

## DETERMINANTS OF CAPITAL STRUCTURE:

### Size of the Firm (log sales):

Sales turnover increases a firm's profit, which would also increase its debt service capacity (Interest) and that would make a firm capable of affording more of debt. The financial institutions and Banks would easily provide loan if a firm's sales turnover is sound.

### Business Risk

From the financial point of view it can be said that it is an important variable as its composition is defining the COV (coefficient of variation) of profit before interest and tax of any firm which is very important aspect for the capital structure of a firm.

### Asset Growth

It is also an important aspect for the capital structure of a firm. Firms with high future asset growth opportunities is more likely to use more of equity financing because a higher leveraged company is more likely to pass up profitable investment opportunities.

### Earning Rate

Earning rate is very vital variable for a firm because if a firm's earning rate is high then the lenders, shareholders will show interest on that firm. A firm having a high earning rate and sales turnover would not rely on debt capital but if it goes for external financing, it would face no difficulty in bearing the fixed charges associated with it.

### Dividend Payout

Firm's with high dividend payout ratio seems to be attractive from the shareholders point of view and the firms with low dividend payout ratio seems that the firm's retention ratio is high and with which a firm using these high retention amount of profit can utilize it for financing and it need to rely on debt capital.

### Debt Service Capacity (Interest)

A higher debt service capacity (Interest) ratio is desirable; but too high a ratio indicates that the firm is very conservative in using debt, and that it is not using credit to the best advantage of shareholders. The firm with higher debt service capacity has a good financial condition with large amount of earnings, and a firm would not face difficulty in bearing the high interest charges if it goes for loan.

### Degree of Operating Leverage

The high degree of operating leverage can magnify the variability in future profit earnings. There is a negative relation between operating leverage and debt level in capital structure. The higher the operating leverage, the greater the chance is of business failure.

## RESEARCH METHODOLOGY

### Source of Data

This study is conducted based on secondary data of the selected companies of Indian Cement industry. Using Prowess Database software, list of all the cement companies has been determined which are listed and permitted to trade in BSE and NSE. Apart from this, information has also been obtained from Centre for Monitoring Indian Economy (CMIE) and annual financial statements downloaded from websites of respective companies while conducting our research.

### Sampling and Population

For the purpose of this study, the listed number of companies from Indian Cement Industry which are listed and permitted to trade in BSE and NSE is taken as the population. Overall 60 cement companies were extracted from Prowess Database Software. Due to unavailability of information of one form or other out of 60 Companies, 38 Companies were finally selected. The required variable for the study has been extracted for 38 Companies ranging from time period of 1999-2000 to 2010-11.

### Hypothesis Framed

The following Null Hypotheses are framed which needs to be tested:

**HO1:** There is no significant relation between the size of the firm (log sales) and financial leverage.

**HO2:** There is no significant relation between the business risk and financial leverage.

**HO3:** There is no significant relation between the growth rate (assets) and financial leverage.

**HO4:** There is no significant relation between the earning rate and financial leverage.

**HO5:** There is no significant relation between the dividend payout and financial Leverage.

**HO6:** There is no significant relation between the debt service capacity (Interest) and financial leverage.

**HO7:** There is no significant relation between the degree of operating leverage and financial leverage.

## SPECIFICATION OF THE MODEL

The following multiple regression models has been used to test the theoretical relation between the financial leverage and other independent variables of the firm of Indian Cement Companies:

$$Y = a + b_1 X 1 + b_2 X 2 + b_3 X 3 + b_4 X 4 + b_5 X 5 + b_6 X 6 + b_7 X 7 \quad (1)$$

Where,

X1 = size of the firm (log of average sales)
X2 = business risk (Sd PBIT/Average PBIT)
X3 = growth rate (Assets)
X4 = earning rate (Average PBIT/Average Total Assets)
X5 = dividend payout (Div/PAT)
X6 = debt service capacity (Interest)
X7 = degree of operating leverage
a = constant term of the model
$b_i$ = coefficients of the model

### Variables Taken Into Consideration for the Study

**Dependent Variable (Y)**

The ratio of average total debt to average total assets. The total debt includes both Current liabilities &provisions and Borrowings

It is given by:

$$FL = TD / TA \quad (2)$$

Where, FL=financial leverage,
TD=Average of total debt of the fiscal years from 1999 to 2011
TA= Average of total assets of the fiscal years from 1999 to 2011.

## Independent Variables

**Size of the Firm (X1)**: The logarithm of sale of the firms. It is given by:

$$X1 = Log\ (Sales) \quad (3)$$

Where,

Sales = Average sale of the fiscal years from 1999 to 2011.

**Business Risk (X2)**: The coefficient of variation in earnings before interest and tax. It is given by:

$$X2 = \sigma\ EBIT / \mu\ EBIT \quad (4)$$

Where,

μEBIT = Average of the expected earnings before interest and tax of the fiscal years from 1999 to 2011

σEBIT = the standard deviation of earnings before interest and tax of the fiscal years from 1999 to 2011.

**Growth Rate (X3)**: The compound growth rate of total assets. It is given by

$$X3 = \{(TA_n / TA_{n-1}) \wedge (1/n)\ 1\} \quad (5)$$

Where,

$TA_n$ =total assets at the end of the observed period i.e. 2011

$TA_o$ =total assets at the beginning of observed period i.e.1999 (n=number of observed period).

**Earning Rate (X4)**: The return is taken on total assets. It is given by:

$$X\ 4 = EBIT / TA \quad (6)$$

Where,

EBIT= Average earnings before interest and tax for the fiscal years from 1999 to 2011.

TA= Average total assets for the fiscal years from 1999 to 2011.

**Dividend Payout (X5)**: The ratio of dividend to total income available to shareholders. Here, dividend includes only dividend paid and proposed. It is given by:

$X5$=DIV/PAT (7)

Where,

DIV=Average total dividend paid and proposed for the fiscal years from 1999 to 2011.

PAT= Average income (PAT) available to shareholders for fiscal years from 1999 to 2011.

**Debt Service Capacity (X6)**: It is taken in terms of interest coverage ratio. It is given by: X6=EBIT/Interest (8)

Where,

Interest=Average of total interest charge for fiscal years from 1999 to 2011.

EBIT= Average earnings before interest and tax for the fiscal years from 1999 to 2011.

**Degree of Operating Leverage (X7)**: It is taken as a percentage change in EBIT as a proportion of percentage change in sales. It is given by:

$$X7= \{(EBIT_t - EBIT_{t-1})/ EBIT_{t-1}\} \div \{(Sales_t - Sales_{t-1})/ Sales_{t-1}\} \quad (9)$$

Where,

$EBIT_t$ = Earnings before Interest and Tax of the $T^{th}$ year.
$EBIT_{t-1}$ = Earnings before Interest and Tax of the $T\text{-}1^{th}$ year
$Sales_t$ = Net Sales of the $T^{th}$ Year
$Sales_{t-1}$ = Net Sales of $T\text{-}1^{th}$ Year
Eg t = Fiscal Year 2000
t-1 = Fiscal Year 1999.

## EMPIRICAL ANALYSIS

### Regression Analysis

Multiple regressions was run in SPSS 16.0 to test the hypotheses. Financial

Leverage was taken as the dependent variable and other variables like Business Risk, size of the firm, Growth rate, Earning rate, Debt Service Capacity, Degree of Operating Leverage and Dividend Payout as Independent variables as per the model.

It can be observed from Table 1 that R square is .747 i.e. 74.7% of the dependent variable (Financial Leverage) is explained by Independent variables (Business Risk, size of the firm, Growth rate, Earning rate, Debt Service Capacity, Degree of Operating Leverage and Dividend

Payout).

The Result of Table 1 is produced below:

**Table 1: Regression Results (R2)**

**Model Summary**

| | | | **Adjusted R** | **Std. Error of the** |
|---|---|---|---|---|
| Model | R | R Square | Square | Estimate |
| | | | | |
| 1 | .864[a] | .747 | .662 | .23473 |

a. Predictors: (Constant), Degree of Operating Leverage, Growth Rate, Dividend Payout, Debt Service Capacity, Business Risk, Size of the Firm, Earning Rate

It can be observed from Table 2 it can be observed that Business Risk (t value of -3.490 and p value of .002), Debt Service Capacity (t value of -3.976 and p value of .001) and Growth rate (t value of 2.654 and p value of .015) are significant factors as determinants of capital structure. Variables having p-value > 0.05 and t-values are within the range of -2 to +2 seems not to be important enough in the model.

The result of Table 2 is produced below:

**Table 2 : Regression Results (Significant and Insignificant Variables)**

**Coefficients**

| | | | | **Standardized** | | |
|---|---|---|---|---|---|---|
| | | **Unstandardized Coefficients** | | **Coefficients** | | |
| **Model** | | **B** | **Std. Error** | **Beta** | **t** | **Sig.** |
| | | | | | | |
| 1 | (Constant) | .525 | .287 | | 1.829 | .082 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Business Risk | -.257 | .074 | -.557 | -3.490 | .002 |
| | Size of the Firm | .109 | .089 | .205 | 1.227 | .233 |
| | Debt Service Capacity | -.100 | .025 | -.689 | -3.976 | .001 |
| | Growth Rate | .208 | .078 | .563 | 2.654 | .015 |
| | Dividend Payout | .084 | .210 | .053 | .398 | .695 |
| | Earning Rate | 2.127 | 1.187 | .435 | 1.791 | .088 |
| | DOL | .017 | .011 | .186 | 1.509 | .146 |

a. Dependent Variable: Financial Leverage

Taking into consideration the above statement, it can be observed from the Table 1 and Table 2 that Size of the Firm (t value of 1.227 and p value of .233), Dividend Payout (t value of .398 and p value of .695), Earning Rate (t value of 1.791 and p value of .088) and Degree of Operating Leverage (t value of 1.509 and p value of .146) are insignificant factors and not so important in the model.

Multicollinearity is the undesirable situation where the correlations among the independent variables are strong. Variance Inflation Factor (VIF) basically helps to assess the multicollinearity problem. Multi Collinearity increases the standard error of the coefficients. Increased standard error in turn means that coefficient of some independent variables may be found not to be significantly different from zero, whereas without multi collinearity or with lower standard errors, these same coefficient might be found significant.

In other words, multi collinearity may misleadingly inflate the standard errors. Thus, it makes some variables statistically insignificant while they should be otherwise significant. If no two variables are correlated then VIF will be 1. If VIF (Variance Inflation Factor) of one of the variable is around or greater than 5, there is a collinearity associated with that variable. If a variable has VIF of around or greater than 5 then we can remove such variable to have a better result with regression.

It can be observed from Table 3 that VIF of Earning rate is very high [4.894(around 5)] and hence the variable can be removed to get a better result from multi regression analysis.

The result of Table 3 is produced as below:

**Table 3: VIF(Variance Inflation Factor)**

| | **Coefficientsa** | | |
|---|---|---|---|
| | | **Collinearity Statistics** | |
| **Model** | | **Tolerance** | **VIF** |
| 1 | Business Risk | .473 | 2.112 |
| | Size of the Firm | .432 | 2.316 |
| | Debt Service Capacity | .401 | 2.495 |
| | Growth Rate | .268 | 3.731 |
| | Dividend Payout | .675 | 1.480 |
| | Earning Rate | .204 | 4.894 |
| | Degree of Operating | .792 | 1.263 |
| | Leverage | | |

a. Dependent Variable: Financial Leverage

Multi Regression is again run in SPSS.The dependent variable is taken to be Financial Leverage and the independent variables are Business Risk, Size of the firm, Growth rate, Dividend payout, Debt Service Capacity and Degree of Operating Leverage.

Collinearity Diagnostic is run in SPSS to check the VIF (Variation Inflation Factor) of the independent variables.

It can be observed from Table 4 that VIF is below 2 and multi collinearity problem does not exist among the independent variables.

The result of Table 4 is produced as below:

**Table 4 : VIF(after removal of Earning rate)**

| | **Coefficientsa** | | |
|---|---|---|---|
| | | **Collinearity Statistics** | |
| **Model** | | **Tolerance** | **VIF** |
| 1 | Business Risk | .651 | 1.536 |
| | Size of the Firm | .562 | 1.780 |
| | Debt Service Capacity | .638 | 1.568 |
| | Growth Rate | .653 | 1.531 |
| | Dividend Payout | .784 | 1.275 |
| | Degree of Operating | .821 | 1.218 |
| | Leverage | | |

a. Dependent Variable: Financial Leverage

It is observed from that Table 5 that R square is .708 i.e. 70.8% of the Dependent variable is explained by the independent variables which is

satisfactory in nature.

The result of Table 5 is produced below:

**Table 5: Regression Results ($R^2$)[after removal of Earning rate]**

**Model Summary**

| | | | Adjusted R | Std. Error of the |
|---|---|---|---|---|
| Model | R | R Square | Square | Estimate |
| 1 | .842a | .708 | .629 | .24622 |

a. Predictors: (Constant), Degree of Operating Leverage , Growth Rate , Dividend Payout , Debt Service Capacity , Business Risk, Size of the Firm

It is observed from Table 6 that Business Risk (t value of -2.856 and p value of .009) , Size of the Firm (t value of 2.271and p value of .033), Debt Service Capacity (t value of -3.468 and p value of.002 ) and Growth Rate (t value of 5.996 and P value of .000) are significant determinants of Capital Structure of Indian Cement Industry.

Dividend Payout (t value of -.277 and p value of .784) and Degree of Operating Leverage (t value of 1.139 and p value of .267) are not statistically significant factors determining Capital Structure of Indian Cement Industry.

The result of Table 6 is produced below:

**Table 6: Regression Results [after removal of Earning rate]**

**Coefficients[a]**

| | | | | Standardized | | |
|---|---|---|---|---|---|---|
| | | Unstandardized Coefficients | | Coefficients | | |
| **Model** | | **B** | **Std. Error** | **Beta** | **t** | **Sig.** |
| 1 | (Constant) | .330 | .279 | | 1.184 | .249 |
| | Business Risk | -.188 | .066 | -.408 | -2.856 | .009 |
| | Size of the Firm | .185 | .082 | .349 | 2.271 | .033 |
| | Debt Service Capacity | -.073 | .021 | -.500 | -3.468 | .002 |
| | Growth Rate | .316 | .053 | .854 | 5.996 | .000 |
| | Dividend Payout | -.057 | .205 | -.036 | -.277 | .784 |
| | Degree of Operating | .013 | .012 | .145 | 1.139 | .267 |
| | Leverage | | | | | |

In the previous step, the variables which are significant determinants of capital structure had been identified. In this model it is attempted to remove the unimportant variables to conduct stepwise regression. Basically two insignificant variable had been identified i.e. Degree of operating leverage (t value of 1.139 and p value of .267) and Dividend Payout (t value of -.277 and p value of .784).

By removing Degree of Operating Leverage having t value of 1.139 and p value of .267 the results are observed in Table 7 and 8.

It is observed from table 7 that R Square is .691 i.e. 69.1% of the dependent variable (Financial Leverage) is explained by Independent variable.

The result of Table 7 is produced below:

**Table 7: Regression Results (R2) [after removal of insignificant variables]**

**Model Summary**

| | | | Adjusted R | Std. Error of the |
|---|---|---|---|---|
| **Model** | **R** | **R Square** | **Square** | **Estimate** |
| 1 | .831[a] | .691 | .624 | .24780 |

a. Predictors: (Constant), Dividend Payout , Debt Service Capacity , Growth Rate , Business Risk, Size of the Firm

It is observed from Table 8 that four independent variables are statistically significant factors determining Capital structure of Indian Cement Industry. They are

i) Business Risk (t value of -2.661 and p value of .014).
ii) Size of the Firm (t value of 2.124and p value of .045).
iii) Debt Service Capacity (t value of -3.256 and p value of .003)
iv) Growth Rate (t value of 5.880 and p value of .000).

The result of Table 8 is produced below:

**Table 8: Regression Results [after removal of insignificant variables]**

**Coefficients[a]**

| | | | | Standardized | | |
|---|---|---|---|---|---|---|
| | | Unstandardized Coefficients | | Coefficients | | |
| **Model** | | **B** | | **Beta** | **t** | **Sig.** |

| | | | Std. Error | | | |
|---|---|---|---|---|---|---|
| 1 | (Constant) | .349 | .280 | | 1.246 | .225 |
| | Business Risk | -.173 | .065 | -.374 | -2.661 | .014 |
| | Size of the Firm | .173 | .081 | .326 | 2.124 | .045 |
| | Debt Service Capacity | -.064 | .020 | -.443 | -3.256 | .003 |
| | Growth Rate | .311 | .053 | .840 | 5.880 | .000 |
| | Dividend Payout | -.078 | .205 | -.050 | -.382 | .706 |

a. Dependent Variable: Financial Leverage

## Durbin Watson Test:

This test is required to check the data tends to Time series Data or the Data is Stationary one.

It is observed from Table 9 (Annexure) that the Durbin Watson is 1.716 which is out of the range of -1.5 to +1.5 which proves that the data is not a time series data, it is stationary one and Regression analysis can be done.

The result of Table 9 is produced below:

**Table 9: Durbin Watson test**

**Model Summary[b]**

| | | | Adjusted R | Std. Error of the | |
|---|---|---|---|---|---|
| **Model** | **R** | **R Square** | **Square** | **Estimate** | **Durbin-Watson** |
| 1 | .864a | .747 | .662 | .23473 | 1.716 |

a. Predictors: (Constant), Dividend Payout , Degree of Operating Leverage , Growth Rate , Debt Service Capacity , Business Risk, Size of the Firm , Earning Rate

b. Dependent Variable: Financial Leverage

## Testing of Hypothesis

The null hypothesis framed earlier has been accepted or rejected as below:

HO1: There is no significant relation between the size of the firm (log sales) and financial leverage. (HO1 is rejected as there is significant relation between the size of the firm and financial leverage.)

HO2**:** There is no significant relation between the business risk and financial leverage.

(HO2 is rejected as there is significant relation between the business risk and financial Leverage.)

HO3: There is no significant relation between the growth rate (assets) and financial leverage.
(HO3 is rejected as there is significant relation between the growth rate (assets) and Financial leverage.)

HO4: There is no significant relation between the earning rate and financial leverage.
(HO4 is accepted as there is no significant relation between the earning rate and financial Leverage.)

HO5: There is no significant relation between the dividend payout and financial leverage.
(HO5 is accepted as there is no significant relation between the dividend payout and financial leverage.)

HO6: There is no significant relation between the debt service capacity (Interest) and financial Leverage.
(HO6 is rejected as there is significant relation between the debt service capacity (Interest) and financial leverage)

HO7: There is no significant relation between the degree of operating leverage and financial Leverage.
(HO7 is accepted as there is no significant relation between the degree of operating leverage and financial leverage)

## IMPLICATIONS

From the study it can be said that Dividend payout and Degree of operating leverage seems not to be statistically important and they do not influence the capital structure of a firm whereas Growth rate, Debt service capacity (Interest), Size of the firm (log sales) and Business risk (Sd PBIT/Average PBIT) are statistically important variables for determining the capital structure of a firm. Let us have a look into the implication of the variables considered as statistically important variables for determining the capital structure of Indian Cement Industry.

### Debt Service Capacity (Interest)

It indicates the extent to which earnings may fall without causing any embarrassment to the firm regarding the payment of the interest charges. A higher ratio is desirable but too high a ratio indicates that the firm is very conservative in using debt, and that it is not using credit to the best advantage of shareholders. Here debt service capacity (Interest)

with negative value depicts that it is a negatively influencing the capital structure of the firm i.e. the firm has a good financial condition with large amount of earnings, so the firm would depend less on debts and more on internal financing.

### Size of the firm (log sales)

It is the most important variable for every firm because a firm's sustainability mostly depends on it, and also the income part which is directly proportion to the sales turnover, higher is the sales turnover higher will be the earnings and lower is the sales turnover lower will be the earnings. From this it can also be said that if a firm's sales turnover increases its profit, which would also increase its debt service capacity (Interest) and that would become capable of affording more of debt. The financial institutions and Banks would easily provide loan if a firm's sales turnover is sound.

### Growth Rate (Assets):

It is also an important aspect for the capital structure of a firm. Firms with high future asset growth opportunities is more likely to use more of equity financing because a higher leveraged company is more likely to pass up profitable investment opportunities.

## CONCLUSION

It has been an endeavor in this section to rank the significant variables influencing Capital structure of Indian Cement Industry as per their beta values (absolute values has been taken for the study) and identify the most important variable influencing the capital structure.

The result is displayed in the Table 10 below:

Significant Variables: Business Risk, Size of the firm, Debt Service Capacity and Growth Rate. P-values, t-values and Beta:

| Independent Variables | | P-values | t-values | Beta | Influence on Capital structure |
|---|---|---|---|---|---|
| Growth rate (1) | | 0.000 | 5.880 | .840 | Positive |
| DSCR(2) | | 0.003 | -3.256 | -.443 | Negative |
| Business Risk (3) | | 0.014 | -2.661 | -.374 | Negative |
| Size of the (4) | firm | .045 | 2.124 | .326 | Positive |

As it is observed from the above table that:

1) Growth rate with Beta value of .840 has been ranked 1 having a positive influence on Capital Structure.
2) Debt Service Capacity with beta value of .443 has been ranked 2 having negative influence on Capital structure
3) Business Risk with beta value of .374 has been ranked 3 having negative influence on capital structure
4) Size of the firm with beta value of .326 has been ranked 4 having a positive influence on capital structure.

These facts conclude that Growth rate, Debt service capacity (Interest coverage), Business risk and Size of the firm play a major role in determination of the financial leverage in Indian Cement Industry while dividend payout ratio and degree of operating leverage does not influence the financial leverage of a firm. This may, if monitored by concerned authority properly and timely would prevent the financial crisis in financial sector in future.

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