

Determinants of Capital Structure : A study of Indian Cement Industry

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ABSTRACT

A proper blend of debt and equity is a significant financial decision of the corporate firm from the perspective of its shareholders and other stakeholders. The excessive use of debt may endanger the survival of a corporate firm while the conservative policy may deprive the advantage of cheaper debt. An appropriate capital mix influences both the return and risk of the shareholders. The proper and efficient management of capital structure yields two advantages: (i) maximization of profit and wealth of shareholders, and (ii) minimization of cost of capital. Therefore, the financial manager is confronted with the task of determining determinants of a capital structure of the firm, which on the one hand maximizes the wealth of the owners and on the other hand minimizes the cost of funds. The present study examines the fixed capital structure of companies with a view to identify the factors determining their capital structure. The study is related to the selected companies in the cement industry. The present study covers a period of 14 years based on annual study from 1991-92 to 2004-05. The study is confined to cement industry pertaining to Large Public Limited Companies in Private Sector in India.

Keywords: Capital Structure, Profit, Cost of capital, Wealth, Fixed assets, Working capital, Intangible assets.

Introduction

One of the fundamental questions in the corporate finance for a firm is to decide on a financing grid ranging from issuing equity or raising debt or mix of two. Capital structure decision of the firm is a significant managerial decision, which influences the shareholders return and risk. The market value of the share may be affected by the capital structure decision. Capital is a limited productive resource in developing economies and proper utilization of this resource promotes the rate of growth, cuts down the cost of production and above all improves the efficiency of the productive system. Capital is life blood of a business organization and can be broadly categorized into fixed capital and working capital. All fixed assets, intangible assets, investments and 'other assets' which are retained permanently in the business are financed by fixed capital, which consists of long term liabilities. In other words, fixed capital is a part of capital which is invested in land and building, plant and machinery, furniture and fittings, goodwill and patents etc. The working capital refers to short term funds required for financing the duration of the operating cycle normally

an accounting year in a business unit. The efficient management of fixed capital and working capital is of strategic importance as the success of the enterprise greatly depends upon its optimum utilization. The issue of efficient financial management is of crucial importance to corporate world since it is linked with profitability and financial soundness of the business. In order to achieve the two objectives of high profit and financial soundness, the financial manager must be careful in managing the capital structure of a firm.

Review of the literature

Titman (1984) suggests that customers avoid purchasing a firm's product if they think that the firm might go out of business and therefore not stand behind its product especially if the products are unique. Consequently firms that produce unique products might avoid using debt.

Brennan & Schwartz (1988) argue that the call or conversion feature makes convertible debt relatively insensitive to asymmetric information (between management and investors) about the risk of the firm.

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Stein (1992) argues that if the firms privately know that their stock is undervalued they prefer to avoid issuing equity.

Demirguc-Kunt and Maskimovic (1996) investigate empirically the effects of stock market development on the financing choice of the firms and find that firms in country with an underdeveloped stock market first increase their debt-equity ratios as their stock markets develop and that the debt equity finance are complimentary.

Bhole & Mahakud (2004) in their study of trends and determinants of capital structure in respect of public and private companies developed the panel data model. They conclude that two variables, size and liquidity, are the significant determinants of corporate capital structure.

Seetanaah, Padachi & Ronoowah (2007) in their study of 38 firms of stock exchange of Mauritius for the period of 1994-2004 showed that the most important factor influencing the capital structure choice are profitability, size, tangibility and liquidity. Other factors like business risk, non debt tax shield effects and growth opportunities do not seem to affect the capital structure.

Methodology

The study is based on the secondary sources of information. The relevant data for the measurement of variables was taken from the Bombay stock exchange Directory and supplemented with other published sources. The study is related to the selected companies in the cement industry. The present study covers a period of 14 years based on annual study from 1991-92 to 2004-05. The study is confined to cement industry pertaining to Large Public Limited Companies in Private Sector in India. In order to examine the objectives of the study, several statistical techniques such as ratios, percentage, and standard deviation, co-efficient of variation have been used. Further, multiple regression technique was also employed to estimate fixed capital models. The overall fitness of the model was verified by the estimated values of R^2 , t, F and Durbin Watson statistics. The multiple regression analysis was performed with the help of statistical package of social science (SPSS).

Structure of Gross Fixed Capital

The structure of various components of gross fixed capital is studied to obtain a deep insight into the

configuration of fixed assets of the industry. This will be useful in knowing the comparative and distinctive features that characterize the assets held by the cement industry of large public limited companies. Table 1 displays the structure of gross fixed capital of cement industry during the study period.

Table 1. Structure of Gross Fixed Capital in Cement Industry (1991-05)

S.No	Gross Fixed Capital	Mean	Standard Devia- tion	Co- efficient of Variation
1	Share of Land & Building	12.60	1.46	11.62
2.	Share of Plant and Machinery	72.12	4.96	6.88
3.	Share of Capital work-in progress	8.72	3.69	42.28
4.	Share of Furniture & office Equipments	1.56	4.22	270.51
5.	Share of other assets	5.00	1.61	32.06

It is evident from the Table 1 that plant and machinery occupies a major share in the total value of gross fixed assets in respect of cement industry during the review period. This is the single largest component of fixed assets in all cement units. Being a capital intensive industry, cement industry showed the maximum of 72.12 per cent of gross fixed capital in the form of plant and machinery with reasonable stability since their co-efficient of variation was 6.88 per cent only. The average proportion of capital invested on Land and buildings was 12.60 per cent of gross fixed capital, followed by capital work-in-progress (8.72 per cent), other fixed assets (5 per cent) and furniture office equipments (1.56 per cent). The erratic fluctuations were noticed in the share of components of work in progress, Furniture's office equipments and other fixed assets during the study period.

Model on Fixed Capital

In order to determine the time series estimation of the effects of various determinants of fixed capital viz., Net sales, Lagged accumulated depreciation, Borrowing, Capital-Output ratio, Accumulated depreciation, Lagged net fixed capital and Lagged net sales on net fixed capital stocks of cement industry.

$$GFC_t = b_0 + b_1 S_t + b_2 AD_{t-1} + u_t \quad \dots\dots\dots (1)$$

$$GFC_t = b_0 + b_1 S_t + b_2 B_t + u_t \quad \dots\dots\dots (2)$$

$$NFC_t = b_0 + b_1 S_t + b_2 (K/Q)_t + u_t \quad \dots\dots\dots (3)$$

$$NFC_t = b_0 + b_1 S_{t-1} + b_2 AD_t + u_t \quad \dots\dots\dots (4)$$

$$NFC_t = b_0 + b_1 S_t + b_2 NFC_{t-1} + u_t \quad \dots\dots\dots (5)$$

Where GFC = Gross Fixed Capital

NFC = Net Fixed Capital

S = Net Sales

AD_{t-1} = Lagged accumulated Depreciation

B = Borrowing

(K/Q) = Capital Output Ratio

AD = Fixed Accumulated Depreciation

NFC_{t-1} = Lagged Net Fixed Capital

S_{t-1} = Lagged Net Sales

b₀, b₁ and b₂ = Relevant Regression Co-efficients

u = Error Term.

Theoretically, the parameter with respect to net sales (b₁) is expected to be specified as non-negative value i.e. b₁>0 in model (1). It indicates that the increase in sales would justify the need for expansion of gross block. The parameter of lagged accumulated depreciation is expected to have non negative value i.e. b₂ > 0 in model (1). In model (2), the parameter associated with the borrowing (b₂) is predicted to obtain positive sign implying that an increase in borrowings could bring some positive additions to gross fixed capital. In model (3), the parameter associated with the net sales (b₁) is expected to be positive, i.e. b₁>0. It refers to the fact that an increase in sales would justify the need for expansion of net block. Further it is measured on "a priori" basis that the functional relationship between net block and capital-output ratio is positive, the expected sign of the co-efficient of (K/Q) is to be positive, i.e. b₂>0 in model (3).

As regarded the Co-efficient of lagged net sales, theoretically it is expected to assume positive value, i.e., b₁>0. This sign property reveals that there is an 'a priori' reason to believe that increase in accumulated

depreciation would tend to reduce net block. Therefore, the co-efficient associated with accumulated depreciation is predicted to possess negative sign (b₂<0) in model (4). It also suggests that the net fixed capital is positively dependent upon lagged net fixed capital in model (5).

Results

Model 1: The co-efficient of multiple determinations (R²) reveals that Net Sales and lagged accumulated depreciation would explain 96 per cent of variability in the gross fixed capital of cement industry during the reference period. The overall significance of the regression depicted by F value is 182.03 considered to be highly significant. The co-efficient of net sales (b₁) obtains positive sign as expected and emerges statistically significant. It is observed that increase in sales would contribute an equal increase in capital invested on fixed assets. The co-efficient associated with lagged accumulated depreciation is statistically invalid. It implies that lagged accumulated depreciation has no impact on gross fixed capital during the reference period.

$$\text{Model - 1: } GFC_t = b_0 + b_1 S_t + b_2 AD_{t-1} + u_t$$

$$GFC_t = -210.87 + 1.24 S_t + 0.22 AD_{t-1} \\ (7.90)^* \quad (0.58)$$

$$R^2 = 0.96, \quad F = 182.04, \quad DW = 0.47$$

* Significant at 5% level

Model 2: The explanatory power of the model of gross fixed capital is good (measure by R² and F ratio). The R² statistic values exhibit 99 per cent of variation in gross fixed capital which could be determined by the explanatory variables viz. Net sales and borrowing during the study period. It is evident from the results that the impact of net sales turns out to be insignificant on gross fixed capital stock. The value of co-efficient of net sales (b₁) is less than unity in cement industry. It indicates that increase in gross fixed capital stocks was lower than increase in net sales with respect to borrowing; its co-efficient value (b₂) obtains positive sign in cement industry and being significant. The value of b₂ is greater than unity which implies that cement industry experienced more than proportionate increase in gross block as a result of increase in gross block as a result of increase in borrowing.

Model - 2: $GFC_t = b_0 + b_1 S_t + b_2 B_t + u_t$

$$GFC_t = 155.21 + 0.03S_t + 1.67B_t$$

(0.14) (6.28)*

$R^2=0.99$, $F=612.19$, $DW=1.05$,

* Significant at 5% level

Model 3: The impact of net sales turns out to be more significant on net fixed capital stocks. The value of the co-efficient of net-sales (b_1) is less than unity in cement industry. It indicates that increase in net fixed capital stock was lower than the increase in net sales. Another co-efficient associated with (K/Q) i.e., b_2 appears with positive sign and it is highly significant. A greater positive impact of (K/Q) variable on net fixed capital was noticed in the case of cement industry. This was due to capital intensive nature of this industry. The explanatory power of independent variables would be 97 percent in net fixed capital stock by the cement industry and the model has a goodness of fit as the calculated value of F-ratio is found to be greater than the critical table value of F ratio.

Model - 3: $NFC_t = b_0 + b_1 S_t + b_2 (K/Q)_t + u_t$

$$NFC_t = -3285.54 + 0.75 S_t + 2051(K/Q)_t$$

13.55 (3.28)*

$R^2 = 0.97$, $F=236.83$, $DW = 0.251$

* Significant at 5% level

Model 4: The explanatory power of the model of net fixed capital is good. The R^2 statistic value highlights 97 per cent of variations in net fixed capital which could be determined by the explanatory variables viz. lagged net sales and accumulated depreciation during the study period with respect to lagged net sales, its co-efficient value (b_1) possesses positive sign in cement industry during the reference period and being insignificant. As regards accumulated depreciation, the value of its co-efficient (b_2) is positive as expected theoretically and significant statistically in case of cement industry. This indicates that accumulated depreciation exerted a positive impact on net fixed capital, i.e., increase in accumulated depreciation fund to replace the fixed assets would tend to increase net fixed capital.

Model - 4: $NFC_t = b_0 + b_1 S_{t-1} + b_2 AD_t + u_t$

$$NFC_t = -56.93 + 0.06 S_{t-1} + 1.861 AD_t$$

0.83 (12.03)*

$R^2=0.97$, $F=259.16$, $DW=1.127$

* Significant at 5% level

Model 5: The co-efficient of multiple determinations (R^2) of the model reveals the net sales and lagged net fixed capital stock would cause 95 percent of variability in the net fixed capital of this industry during the study period. The overall significance of the model fitted well for this industry and it is supported by the estimated value of F-Ratio. The co-efficient of net sales (b_1) obtains positive sign as expected and emerges significant statistically in the case of cement industry. The magnitude of b_1 is less than unity, showing that increase in net sales would tend to expand the investment on fixed assets at less than proportionate rate. As in the case of influence of lagged net fixed capital on net fixed capital, it is not significant in terms of 'a priori' and statistical specifications.

Model - 5: $NFC_t = b_0 + b_1 S_t + b_2 NFC_{t-1} + u_t$

$$NFC_t = -157.21 + 0.76 S_t + 0.16 NFC_{t-1}$$

(7.91)* 1.42

$R^2 = 0.95$, $F= 159.38$, $DW=0.783$

* Significant at 5% level

Conclusion

The regression results of the models on gross fixed capital shows that net sales has turned out to be significant variable and it was related positively with the gross fixed capital. Similarly, borrowings, capital-output ratio (K/Q), and accumulated depreciation had been largely influencing growth of fixed capital stocks in the cement industry during the study period. All these factors affect the capital structure decision in some or the other ways and help the management in arriving at an optimal capital structure. The results of this study will be useful to the financial decision-makers to plan their capital structure. This will help in maximizing the value of a firm and achieving the main objectives of the business. So it is suggested that while

raising finance for companies, management of the company should give due importance to capital structure decision by considering various determinants of capital structure.

References:

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| <p>? Bansal, Anand. (1994). The EBIT-EPS approach to capital structure. <i>The Management Accountant</i>. pp. 78-82.</p> <p>? Chandrasekhar. (1989). Aspect of growth structure change in Indian industry. <i>Economic and political weekly</i>, XIII (45): 72-100.</p> <p>? Jitendra Mahkud and Bhole. (2004). Determinants of corporate capital structure in India a dynamic panel data analysis. <i>ICFAI Journal of Applied Finance</i>, 9(6):41.</p> <p>? Kakani, R. (1999) "The determinants of Capital Structure: An Econometric Analysis" <i>Finance India</i> Vol. 13, pp.54-60</p> | <p>? Myers, Stewart (2001) "Capital Structure" <i>Journal of Economic perspectives</i>, Vol.15, pp.87-95</p> <p>? Mahesh Chand Grag and Chander. (2002). Determination of capital structure in India. <i>The Management Accountant</i>, 37(2): 16-20.</p> <p>? Mall. (1987). Trends in capital structure of medium and large private limited companies. <i>The Chartered Accountant</i>, pp. 14-17.</p> <p>? Stein, J. (1992) "Convertible Bonds as Backdoor Equity Finance" <i>Journal of Financial Economics</i> Vol.32pp.7-12</p> <p>? Siddhartha Sinha.(1993). Inter-industry variations in capital structure. <i>Economic and Political Weekly</i>, XXVIII (35): M93-M94.</p> <p>? Titman, S. (1984) "The effect of Capital structure on a Firm's Liquidation Decision" <i>Journal of Financial Economics</i>, Vol.13pp.138-140</p> |
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