

Profitability, Operating Leverage and Industry Class as Determinants of Corporate Capital Structure: A Study on Select Non Government and Non Financial Companies in India

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Abstract — Designing a judicious capital structure for the firm depends on a host of internal and external factors of which size of the firm, its profitability, operating leverage, external financing and fluctuations in the general economic conditions are considered to be very important. Studies by various researchers in the past have produced evidences in support and against a particular factor or a group of factors as clear determinant(s) of corporate capital structure. Scott and Scott and Martin have established that industry class has a bearing on the firm's capital structure. Scott and Martin (1976) also hold the opinion that size of the firm may influence the firm's decision on a particular debt-equity mix. Remmers, Stonehill, Wright and Beekhuisen(1974) on the other hand have presented evidence that neither 'size' nor 'industry class' is a clear determinant of the firm's capital structure. The present study, conducted on 626 selected non government and non financial companies across industries in India reveals that 'operating leverage' and 'industry class' have a significant bearing on the capital structure of the Indian firms whereas 'profitability' could not be a clear determinant of corporate capital structure in India.

Index Terms — size, external financing, financial leverage, industry class, operating leverage, profitability.

1 INTRODUCTION

Financing decision of the firms has always been a complex proposition. It calls for having the right blend of the sources of finance along with a decision on the amount to be included from each such source. The decision becomes more complex when the firm has to have a combination of debt and equity in the total financing keeping its overall objective of 'value maximization' undiluted. The particular combination of debt and equity maintained by the firm at a given point of time has significant implications for the stakeholders on the grounds of solvency and profitability. Debt, because of its fixed commitment as to income and repayment of principal is normally thought of as contributing at the same time to the opportunity for profit and possibility of loss [1]. Although firms tend to take the income advantage of debt, it is certainly not by compromising on the optimality of the capital structure, for a poor financial planning restricts the firm's long term success owing to high cost of debt, inadequate liquidity, and inability to raise funds in the market place.

Over and above, the need for finance also varies across firms and industries depending upon the varied length and technical character of their production processes, the rate of technological advancements, degree of vertical integration, product features, income elasticity of demand, trade customs, time shape of operations and sales, and customs as to the type of sources used[2]. The variations in the nature of industries not only cause differences in the requirement of gross fixed assets but also in the use of various sources of long term finance among the industries[3].

Given the above, and given further that firms need to maximize their values; designing of an optimal capital structure is the key. Designing an optimal capital structure however is influenced by a number of macro and micro economic fac-

tors. Researchers in the past have tried to determine the factors that might be considered as clear determinants of the firm's capital structure so that firms give adequate attention to address these factors. Some of the researchers have presented affirmative evidences in respect of a particular factor or a group of factors as the determinants of corporate capital structure; others have presented dissenting evidences in respect of the same factor or group of factors as clear determinant(s) of the capital structure. Scott [4] and Scott and Martin [5] have empirically established that industrial class has got influence on the firm's capital structure. Scott and Martin [6] are of the view that size might shape the firm's debt-equity mix. Remmers, Stonehill, Wright and Beekhuisen [7], on the other hand, have presented contrary evidence arguing that none of these factors - size or industry class - is a clear determinant of the firm's capital structure. A study conducted by Mohapatra [8] has revealed that industry class and size have significant influence on the capital structure of Indian firms. Another study by Mohapatra [9] on Indian firms has also revealed that corporate vulnerability, external financing and size have influence on the firms' designing of capital structure.

Against the above backdrop, the present paper endeavors to determine the nature and extent to which profitability, operating leverage and industry class influence the firms' designing of capital structure in India.

2 DATA AND VARIABLES

In order to achieve the above mentioned objectives, i.e., to determine if profitability, operating leverage, and industry class

have influence on the firms' capital structure, financial data of 626 non-government and non-financial companies with paid up capital of Rs one core and above, published by the Reserve Bank of India, in its various issues of monthly bulletins over a period of 23 years from 1987-88 to 2009-10 have been collected, compiled and analyzed against four identified variables, namely, financial leverage (FL), operating leverage (OL), profitability (Profit), and industry class(IC), by dividing the time horizon into two slots of 10 years from 1987-88 to 1996-1997 and 13 years from 1997-98 to 2009-10.

Further, the variable 'financial leverage' has been taken as the ratio between total debts to total assets at book value in line with the one taken by Remmers et. al. [10]. Similarly, 'profitability' and 'operating leverage' has been taken as the 'pre-tax return on net assets' and the ratio between 'percentage change in average earnings before interest and taxes to the percentage change in average sales', respectively

3 METHODOLOGY

The 626 companies as mentioned above included in the study have been clubbed into five groups, called the 'industry classes(IC)'. These groups are:

Group -I (coded as IC1) that includes 'Processing and Manufacturing Companies' engaged in the production of Foodstuffs, Textiles, Tobacco, Leather and Leather products thereof.

Group -II (coded as IC2) that includes 'Processing and Manufacturing Companies' engaged in the production of Metals, Chemicals and products thereof.

Group -III (coded as IC3) that 'Processing and Manufacturing Companies'-Not classified under Group-I and II above, and that includes companies like Cement, Paper and paper products, Rubber and rubber products, Mineral Oils, China earth ware and structural clay products.

Group-IV (coded as IC4) that includes 'Other industries', i.e., industries not included under Group-I, II, and III above, and includes companies like Construction, Shipping, Electricity, Hotels and Restaurants, Land and real estate.

The important techniques used for the analysis of data are correlation, analysis of variance (ANOVA), F-test and t-test.

4 ANALYSIS AND FINDINGS

Discussion on the possible association between a firm's financial structure and its profitability, operating leverage, income gearing, external financing, industry class and a host of similar factors has gained considerable importance after the pio-

Industry Class	Period	Correlation between	r-value	t-value	Table value of t at	
					1%	5%
IC1	Period 1	FL and Profit	-0.426	1.476	3.169	2.228
	Period 2	FL and Profit	0.366	1.180	3.250	2.262
IC2	Period 1	FL and Profit	-0.607	2.413	3.169	2.228
	Period 2	FL and Profit	-0.192	0.587	3.250	2.262
IC3	Period 1	FL and Profit	-0.432	1.516	3.169	2.228
	Period 2	FL and Profit	0.294	0.923	3.250	2.262
IC4	Period 1	FL and Profit	-0.320	1.068	3.169	2.228
	Period 2	FL and Profit	0.613	2.325	3.250	2.262

FL = Financial leverage, Profit = Profitability

neering work 'Cost of Capital and Optimal Capital Structure' by Modigliani and Miller [11]. The work of Scott [4], and Scott and Martin [5] too have reported impressive evidence that the firm's financial structure gets influenced by industry class. Study by Remmers et. al.[10] did not however find any association between industry size and industry class as determinant of capital structure.

Keeping the above in view, three distinct hypotheses, such as (i) 'financial leverage is independent of profitability', (ii) 'financial leverage is independent of operating leverage' and (iii) 'financial leverage is independent of industry class' were formulated and tested for determining if profitability, operating leverage and industry class could be taken as deterministic variables affecting the corporate capital structure in India. Details of the analysis and findings as follows:

Financial leverage and profitability

The firm's ability to generate internal surplus for business expansion depends more on its earning capacity. Higher the profitability of the firm, better the firm is in generating internal funds by way of reserves and surpluses. As reserves and surpluses of the firm grow, the firm's dependence on external financing declines; so also its dependence on debt capital. This is because firms going for external sources of funds will cer-

tainly prefer low-cost source and debt will be the first choice. Hence, a negative relationship is expected between the firm's financial leverage and its profitability. This phenomenon should also be true for industry level comparison, for profitability differs from industry to industry.

In order to test the null hypothesis that financial leverage is independent of profitability, correlation coefficient between financial leverage and profitability has been calculated for all the four groups of industries- IC1, IC2, IC3, and IC4 for the period 1987-88 to 1996-1997 and 1997-98 to 2009-10 along with their t-values to test the significance of the findings as shown in Table 1.1.

Table 1.1: Correlation Coefficients(r-values), t-values and level of significance of financial leverage and profitability

Empirical evidence as in Table 1.1 shows that there exists a negative correlation between financial leverage and profitability in all the industry groups in period one and in case of IC2 in period 2. For all other groups in period 2 the relationship is found to be positive though insignificant. Further, the correlation between financial leverage and profitability for IC2 in period 1 is found to be significantly negative at 5% level of confidence, whereas the said relationship is found to be significantly positive for IC4 in period 2 at 5 % level of confidence. Another feature worth noting is that, the same industry while showing a negative correlation in period 1 shows a positive correlation in period 2 despite the fact that its profitability has either remained the same or has gone up. This implies that profitability does not alone determine the financial structure of a firm. A firm, despite of being profitable, may even borrow money to meet its additional funds requirement.

Thus, the null hypothesis that profitability and financial leverage are independent of each other could not be fully rejected in the sense there exists both positive as well as negative correlations between financial leverage and profitability in the same industry in different periods and in different industries in the same period.

Financial leverage and operating leverage

The second hypothesis relates to the possible influence of operating leverage on capital structure. 'Operating leverage may be defined as the firm's ability to use fixed operating costs to magnify the effects of changes in sales on earnings before interest and taxes' [12]. Operating leverage occurs any time a firm has fixed costs that must be met regardless of volume. Ferri and Jones [13] have put operating leverage as 'the use of fixed costs in the firm's production scheme but is generally associated with the employment of fixed assets'. According to them, the use of fixed assets can magnify the variability of the firm's future income and hence, 'operating leverage should be

negatively related to the firm's financial structure'. To determine the validity of this hypothesis, Table 1.2 has been constructed by calculating correlation coefficients between financial leverage and operating leverage for all the four groups of industries, namely, IC1, IC2, IC3, and IC4 for the period 1987-88 to 1996-1997 and 1997-98 to 2009-10 along with their t-values to test the significance and validity of the findings.

Table 1.2: Correlation Coefficients(r-values), t-values and level of significance of financial leverage and operating leverage

Industry Class	Period	Correlation between	r-value	t-value	Table t at 1%	value of 5%
IC1	Period 1	FL and OL	0.325	1.085	3.169	2.228
	Period 2	FL and OL	0.036	0.108	3.250	2.262
IC2	Period 1	FL and OL	0.079	0.251	3.169	2.228
	Period 2	FL and OL	0.341	1.088	3.250	2.262
IC3	Period 1	FL and OL	1.153	0.488	3.169	2.228
	Period 2	FL and OL	0.113	0.342	3.250	2.262
IC4	Period 1	FL and OL	0.610	2.432	3.169	2.228
	Period 2	FL and OL	0.345	1.108	3.250	2.262

FL = Financial leverage, OL = Operating leverage

The test reveals that there exists negative correlation between financial leverage and operating leverage, although, the relations could not be found statistically significant except for IC4 in period 1. In case of IC1 and IC2, a very low degree of positive correlation exists between financial leverage and operating leverage which may be ignored because of their low intensities. The null hypothesis of no association between financial leverage and operating leverage is thus rejected on the basis that there exist negative correlations between them.

Financial leverage and industry class

The third hypothesis relates to the possible association between industry class and capital structure. Firms in the same industry should experience similar amount of business risk, because they produce similar products, incur similar costs, rely on similar technology and operate under similar set of rules, regulations, guidelines and environment. Business risk, defined as uncertainty of future earnings, should substantially determine the amount of debt the capital market should provide to the firm. Since business risk has got relationship with the types of product, and the products with types of industry, there is a reason to believe that a firm's financial structure is influenced by its industry class. As industries deal with differ-

ent products, operate in different environment, use different technology and have different cost structure, their business risks would be essentially be different and so also their capital structure.

Thus, to test if financial leverage is independent of industry class that an analysis of variance (ANOVA) has been conducted on the financial leverage of the four classes of industry-IC1, IC2, IC3, and IC4 for the study period, the result of which has been displayed in Table 1.3.

Table 1.3: Analysis of Variance (ANOVA) for financial leverages of IC1, IC2, IC3, and IC4

Industry class	Mean	No. of items
IC1	0.298	23
IC2	0.271	23
IC3	0.269	23
IC4	0.396	23
Grand Mean	0.308	92

Source of variation	Sum of squares	Degree of freedom	Mean square	F-Ratio	Probability	F-value (at 1%)
Between	0.246	3	0.082	52.761	4.00	2.70
Within	0.136	88	1.550		0E-14	roximat
Total	0.382	91	2E-03			ely

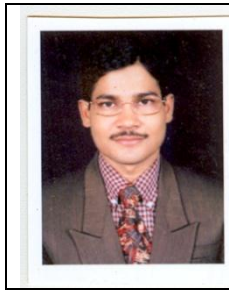
Table 1.3 clearly shows that the F-Ratio, i.e., 52.76 is much higher than the table value of F (i.e., 2.70) at 1 percent level of significance. When compared with the probability F is even significant at less than 1 percent. This indicates that the means of the financial leverages of IC1, IC2, IC3, and IC4 differ significantly. Hence, the null hypothesis that financial leverage is independent of industry class is rejected leading to the inference that industry class has a bearing on the capital structure.

5 Conclusion

The current study leads to the findings that capital structure of Indian industries gets significantly influenced by the industry class and operating leverage whereas profitability does not have significant bearing on the capital structure designed by the Indian industries. As regards profitability as deterministic factor of corporate capital structure, it is found that there exists a both positive as well as negative correlation between financial leverage and profitability in the same industry in different periods and in different industries in the same period. It is also observed that, the same industry while showing a negative correlation in period 1 shows a positive correlation in period 2 despite the fact that its profitability has either remained the same or has gone up. This implies that profitability does not alone determine the financial structure of the firm and instead, firms, despite of being profitable, may even borrow money to meet their additional funds requirement.

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