The Determinants of Debt Ownership Structure – Some Empirical Evidence

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INTRODUCTION

To open its doors, a new business requires capital, and still more capital is needed, if the firm is to expand. Every business transaction involves funds directly or indirectly. With the increasing financial requirements, firms tend to have higher influx of capital. A firm requires both equity forms of finance as well as debt to cater to its requirement. At the same time, there is always a need for critical examination by the finance manager to decide on the optimum mix of equity and debt. The financing decision of the firm i.e. the deciding of the proportions of debt and equity is one of the basic decisions oriented to the achievement of the maximization of the shareholders wealth.

And therefore, the corporate, are forced to have clear vision on whether to go for equity or debt. Even if the firm decides to choose debt form of financing, they need to have a clear vision on the factors that contribute to the choice of debt and how to go about the forms of debt.

Hence, determination of optimum debt level and its impact on the firms overall capital structure is regarded as an integral part of the firms financial decisions. The financial decision is not only confined to fund raising operations but extends beyond it, to cover utilization of funds and monitoring its uses.

Thus the crux of financial decision lies in decision making in the areas of optimum level of debt, method of raising those funds and various sources from which the debt can be raised. In determining the level of debt, the main consideration lies in, as to how much funds the firm should raise in the form of debt capital to fund its operations. In analyzing the method of raising debt capital, emphasis is laid on whether the organization can go for short-term debt capital or long-term debt capital. Analysts prefer long-term capital rather than going for short-term debt capital, as in case of short-term debt capital, sometimes, the debt matures before the profit is earned out of the proposed projects. Hence, the emphasis is on the long term debt capital. Next comes the decision on the sources of funds, whether they are from individuals, lending organizations, especially banks etc.

The above decisions are intimately related. Since the decisions on the amount of debt capital are intimately connected with other business functions, the managers should call upon the advice of other functional executives of the firm while making decisions, particularly, in regard to sources from which the required funds can be generated.

BACKGROUND OF THE STUDY

Up to the middle of the 1950's, the literature of corporate finance consisted mainly of descriptions of methods and institutions. It was not until Franco Modigliani and ***Merton Miller***, in 1958, presented their now-famous theorem, and at about the same time ***James Tobin*** (Nobel Prize 1981) and others started to develop the theory of portfolio selection. Thus emerged the scientific theory concerning the connection between financial market characteristics and the financing of investments, debts, taxes, etc. The theory witnessed rapid development, as these were the theoretical base for any scientific investment analysis.

The first ***Modigliani-Miller (1958)*** theorem concerned the question of how the market value of a firm is affected by the volume and structure of its debts. The central proposition of the theorem gave a clear answer to the proposition - neither the volume nor the structure of the debts affect the value of the firm, provided that the financial markets work perfectly, that there are no taxes and that there is no bankruptcy costs. While analyzing the tax effect in the cost of capital ***MM (1963)*** found that in the presence of corporate income taxes but in the absence of bankruptcy risk, there is a linear relationship between the value of the levered firm and that of its debt. This implies that a firm should maximize its use of debt in order to capture the benefit of tax subsidy on interest payments. ***De Angelo and Masulis (1980)*** demonstrated that with the presence of corporate tax shield substitutes for debt (e.g. depreciation, depletion, amortization, and investment tax credits), each firm can have "a unique interior optimum leverage decision with or without leverage related costs". But, ***Boquist and Moore's (1984)*** findings did not support the tax shield hypothesis at the firm level; however, they did find weak evidence in support of the theory at the industry level. They, however, like other researchers, found that total leverage especially debt

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leverage varies across industry groupings. ***Ho and Singer (1982)*** argued that even if short-term and long-term debts have the same priority in bankruptcy, short-term debt has a higher effective priority outside bankruptcy, because it is paid first. Thus issuing short-term debt to finance new investment projects offers potential benefits that are similar to those from issuing secured debt for controlling the underinvestment problem. ***Stulz and Johnson (1985)*** demonstrated theoretically that secured debt reduces a firm's opportunities to engage in asset substitution. Firms with proportionately more tangible assets, which can serve more easily as collateral, find it difficult to shift to riskier projects when specific assets secure their debt. ***Lewis' (1990)*** argue that if optimal debt-asset ratios and debt-maturity structures are chosen simultaneously, then taxes do not affect optimal debt structure. ***Schiantarelli & Sembenelli (1997)*** argued that the firms tend to match assets with liabilities, and more profitable firms have more long-term debt. Long-term debt has a positive effect on firms' performance, but this is not true when a large fraction of that debt is subsidized. In spite of all these discussions, it is unfortunate that only very little debt financing is available to early-stage entrepreneurs, because lenders expect loans to be paid back in a pre-defined and timely manner with interest. Furthermore, lenders expect borrowers to demonstrate their credit – worthiness by providing collateral, which in essence guarantees repayment.Due to their inherent high risk and lack of liquidity, early-stage companies are not considered sufficient collateral for debt financing.

Hence the study aims towards examining the relationship of debt structure of the firms taking into consideration certain independent variables like Free Cash Flow, Growth, Bankruptcy cost, Non Debt Tax Shield, Profitability, Size and Collateral value. The study analyzes the impact of various independent variables on debt financing pattern as applied to the selected industries and provides a better idea about the major determinants that affect the debt choices to the early stage entrepreneurs.

METHODOLOGY

The data selected has been collected from Prowess Centre for Monitoring Indian Economy (CMIE). A sample of 30 companies was selected at random across six manufacturing industries, such as Cement, Food, Paper, Pharmacy, Steel and Textile that are of different assets sizes. These firms were categorized as small sized, medium sized and large sized based on the fixed assets they hold (less than 250 crores – small sized; 250 to 500 crores – medium sized & more than 500 crores – large sized) pertaining to the years 1996–97 to 2005–06.

The independent variables like free cash flow, growth, bankruptcy cost, non debt tax shield, profitability, size and collateral value are used as the determinants to analyze the dependent variable i.e.., the total debt ownership structure. Multiple Regression analysis is used to identify the various factors that influence debt financing pattern. Supplementing this analysis, correlation analysis has been used for a one-to-one relationship between the variables.

Several independent variables are taken with the view to assess the determinants of debt capital structure and its influences in deciding the debt pattern. The independent variables are:

(i) Agency Costs of Debt

Firms with higher costs of debt are expected to have lower debt levels. Agency costs of debt include monitoring and control costs and this can be proxied by free cash flow which includes the variables as follows:

$$FCFLOW = EBIT + DEP + AMO - TAX - DIV - INT$$

Where,

EBIT = earnings before interest and tax and abnormal return
DEP = depreciation expenses
AMO = amortization reported separately
TAX = total tax paid
DIV = total dividends paid on ordinary and preference shares
INT = net interest expenses

(ii) Bankruptcy Costs

Firms with higher bankruptcy costs are expected to have lower debt levels. To proxy bankruptcy costs, the standard deviation of the first difference in earning before interest and taxes (EBIT) scaled by the mean value of the firm's total assets has been used. However, due to potential contemporaneous correlation of total assets with other variables, the numerator is scaled by interest expenses.

$$\text{Bankruptcy Cost (BC)} = \frac{\text{Standard Deviation of First Differences in EBIT}}{\text{Interest Expenses}}$$

(iii) Non – Debt Tax Shield

The non-debt tax shields compete with interest as a tax deduction and it is given by the formula:

$$\text{Non – Debt Tax Shield (NDTS)} = \frac{\text{Total Annual Depreciation Expenses}}{\text{Total Assets}}$$

(iv) Growth

Growth refers to the growth in investment of the firms. It is computed by measuring the annual changes in total assets. Firms with higher growth are expected to have lower debt levels as well as the firms that are aspiring higher growth, are expected to have higher debt levels.

(v) Profitability

Profitability is yet another important variable taken into consideration. Firms with higher profitability are expected to have lower debt level and at the same time the firms with lower profitability have no other choices except increasing the present debt level. To proxy profitability, net income of the firms scaled by total sales has been used.

$$\text{Profitability (PRFTBLTY)} = \frac{\text{Net Income}}{\text{Total Sales}}$$

(vi) Size

Size refers to the size of the firm and it is proxied by natural logarithm of total assets. Firms with greater size are expected to have higher debt levels because they need heavy investment.

(vii) Collateral Value

Collateral value of assets is also called as Tangibility. It is given by the ratio total tangible assets and total assets.

$$\text{Collateral Value (COLVAL)} = \frac{\text{Total Tangible Assets}}{\text{Total Assets}}$$

The model specification is as follows:

$$LEV = \alpha + \beta_1 FCFLOW + \beta_2 GROWTH + \beta_3 BNKRCST + \beta_4 NDTS + \beta_5 PRFTBLTY + \beta_6 SIZE + \beta_7 COLVAL + \varepsilon$$

Where

LEV	= Long –Term Debt (LTD), Short Term Debt (STD) and Total Debt (TD)
FCFLOW	= Free cash flow as proxy for Agency cost
GROWTH	= Growth in investment (Annual change in total assets)
BNKRCST	= Bankruptcy cost (Standard deviation of first difference in Earning before Interest and Tax Scaled by Total Assets)
PRFTBLTY	= Profitability (Net Income scaled by Total Sales)
SIZE	= Firm Size (Natural logarithm of Total Assets)
COLVAL	= Collateral Value of Assets, also called Tangibility (Ratio of Tangible Assets to Total Assets)
α	= Constant
$\beta_1 \ldots \beta_7$	= Estimated coefficients
ε	= Error Term

RESEARCH FINDINGS AND INTERPRETATION:

The descriptive statistics of the dependent and independent variables for all companies from all industry categories are presented in Table 1. It can be observed from the table that Long term debt (LTD) ranges from 0.000 to 2.831 with an average of 0.434, Short term debt (STD) ranges from 0.046 to 1.335 with an average of 0.342 and Total debt (TD) ranges from as low as 0.127 to as high as 3.383 with an average of 0.776 for all selected companies during the period of study from 1996-97 to 2005-06. The average agency cost, Growth, Bankruptcy cost and NDTS is 155.72 crores, 0.079, 1.669 and 0.050 respectively.The average Profitability, Size and Collateral value of assets (tangibility) are 0.036, 6.375, and 0.577 respectively for all selected companies.

Table 1: Descriptive statistics of dependent and independent variables

(N = 280)

Variables	Mean	Std.Dev.	Median	Minimum	Maximum
LTD	0.434	0.276	0.428	0.000	2.831
STD	0.342	0.204	0.299	0.046	1.335
TD	0.776	0.330	0.725	0.127	3.383
FCFLOW	155.724	620.513	43.180	-607.210	7943.920
GROWTH	0.079	0.158	0.067	-0.604	0.845
BNKRCST	1.669	3.817	0.524	0.000	34.938
NDTS	0.050	0.025	0.046	0.002	0.150
PRFTBLTY	0.036	0.124	0.056	-0.739	0.355
SIZE	6.375	1.354	6.102	3.530	10.260
COLVAL	0.577	0.217	0.580	0.053	1.214

Source: Computed from Annual Reports

Table 2 shows the correlation matrix for the variables in use for all selected companies. An examination of the table shows that Free Cash Flow (FCFLOW), Growth (GROWTH), Bankruptcy Cost (BNKRCST) and Profitability (PRFTBLTY) have significant negative correlation and COLVAL has significant positive correlation with LTD. NDTS with negative in sign and PRFTBLTY with positive in sign are significantly correlated with STD. Further, it is found that Growth, Bankruptcy Cost and Profitability are negatively correlated whereas Non Debt Tax Shield and Collateral value are positively correlated with Total Debt.

Table 2: Correlation matrix across dependent and independent variables

Variables	LTD	STD	TD	FCFLOW	GROWTH	BNKRCST	NDTS	PRFTBLTY	SIZE	COLVAL
LTD	1.00									
STD	-0.08	1.00								
TD	0.79**	0.55**	1.00							
FCFLOW	-0.15**	0.05	-0.09	1.00						
GROWTH	-0.25**	-0.11	-0.27**	0.02	1.00					
BNKRCST	-0.31**	0.06	-0.22**	0.08	0.13*	1.00				
NDTS	0.00	0.20**	0.12*	0.09	-0.37**	0.10	1.00			
PRFTBLTY	-0.66**	-0.20**	-0.68**	0.15	0.31**	0.18**	-0.15**	1.00		
SIZE	0.03	0.14*	0.11	0.36**	-0.12*	0.02	-0.14*	-0.16**	1.00	
COLVAL	0.31**	0.10	0.32**	0.12*	-0.47**	-0.16**	0.59**	-0.30**	0.12*	1.00

*Significant at 5%level. **Significant at 1% level.

Table 3 shows the results for three regression models for each debt variable. However, among the three models, the fit of the Model 3 for Long Term Debt, Short Term Debt and Total Debt are more expressive compared to other remaining two models for respective leverage variables as the Adjusted R^2 is higher for the selected models.

An observation of the results of Model 3 for Long Term Debt (LTD) shows that the beta coefficients of Bankruptcy Cost (BNKRCST), Non-debt tax shield (NDTS), Profitability (PRFTBLTY) and Size are significant with negative sign and that of Collateral value of assets (COLVAL) is significant with positive sign with Long Term Debt (LTD).

From model 3 for STD, though explained in variance is very meagre (R^2 value is very low), it is found that the beta coefficients of NDTS and SIZE are significantly positive and that of Profitability is significant negative with STD. The Collateral value of assets, though insignificant, negatively influences Short Term Debt (STD). From the results of the model 3 for Total Debt, it is observed Bankruptcy cost and Profitability are negatively influential while Collateral value of assets (beta = 0.1863, t = 2.65, $p < 0.01$) is positively influential on Total Debt. From the analysis, it was found that all the firms, smaller sized, medium sized and largely sized; require both long term borrowings as well as short term borrowings, irrespective of their sizes.

When the agency cost associated with raising the funds is lower, the firm utilizes the opportunity well and relies upon the Collateral value of assets i.e. the higher level of tangibility to obtain long term funds. And so is the case of profitability.

Table 3: Results of multiple regression showing determinants of debt structure for all companies

	Long-Term Debt			Short-Term Debt			Total Debt		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Intercept	0.6308**	0.6350**	0.6166**	0.1614*	0.1537*	0.1536*	0.7923**	0.7451**	0.7409**
	(8.06)	(8.87)	(9.28)	(2.02)	(2.26)	(2.26)	(8.09)	(16.49)	(16.48)
FCFLOW	0.0000			0.0000			0.0000		
	-(0.13)			(0.26)			(0.11)		
GROWTH	-0.0583	-0.0594		-0.0003			-0.0586		
	-(0.68)	-(0.69)		(0.00)			-(0.55)		
BNKRCST	-0.0091**	-0.0091**	-0.0092**	0.0024	0.0025		-0.0066	-0.0070	-0.0079*
	-(2.82)	-(2.82)	-(2.89)	(0.74)	(0.75)		-(1.65)	-(1.77)	-(2.06)
NDTS	-2.8389**	-2.8494**	-2.7729**	1.9996**	2.0182**	2.1420**	-0.8393	-0.6796	
	-(4.61)	-(4.67)	-(4.63)	(3.17)	(3.29)	(3.63)	-(1.09)	-(0.95)	
PRFTBLTY	-1.3535**	-1.3568**	-1.3695**	-0.2959**	-0.2889**	-0.2777**	-1.6494**	-1.6518**	-1.6519**
	-(13.08)	-(13.55)	-(13.92)	-(2.80)	-(2.87)	-(2.79)	-(12.75)	-(13.60)	-(13.60)
SIZE	-0.0277**	-0.0283**	-0.0277**	0.0226*	0.0236*	0.0245**	-0.0052		
	-(2.81)	-(3.13)	-(3.09)	(2.23)	(2.57)	(2.70)	-(0.42)		
COLVAL	0.3313**	0.3305**	0.3422**	-0.1004	-0.0991	-0.1134	0.2309*	0.2356**	0.1863**
	(4.48)	(4.49)	(4.78)	-(1.32)	-(1.35)	-(1.61)	(2.49)	(2.71)	(2.68)
R^2	0.5278	0.5277	0.5269	0.0985	0.0982	0.0964	0.4833	0.4825	0.4808
Adjusted R^2	0.5156	0.5174	0.5183	0.0753	0.0818	0.0832	0.4700	0.4750	0.4752
F Value	43.43**	50.85**	61.03**	4.24**	5.97**	7.33**	36.35**	64.10**	85.21**
DF	7,272	6,273	5,274	7,272	5,274	4,275	7,272	4,275	3,276

*Significant at 5% level; **Significant at 1% level. Figures in parentheses are 't' values

When there is less profitability for the firm, they need higher level of investment to increase the profitability and hence the firms go for long term borrowings, which could not be obtained other wise.

At the same time, when the costs (both agency costs and bankruptcy costs) associated with raising funds is higher, the firms shift to short term borrowings. The smaller sized firms relied upon short term borrowings when the Collateral value of assets is higher. Whereas the largely sized firms relied on short term borrowings when they have less tangibility (COLVAL) of the assets.

As far as total debt is concerned, it was found that the level of total debt increases with increase in size for smaller sized and largely sized firms whereas it increases with decrease in size of medium sized firms. The sum of long term borrowings and short term borrowings (total debt) level increases with decrease in profitability. With reference to tangibility, the firms prefer debt financing when they have higher level of collateral value of assets.

CONCLUSION

From the study, across industries, it can be concluded that the firms do not have a specific norm or preference for debt choices. Based on the quantity of requirement of funds and the firm's repayment ability, the debt choices of the firm differ. It is assumed from the present empirical study that there may be some other determinants also which can increase the value of R^2 that affect the debt ownership structure of the firms which is not included in the study. Hence with these determinants, the specific norms for debt levels cannot be provided though we can throw light on the factors influencing the debt choices. As evident from the foregoing, it is not possible to comment on whether the aggregate of business debt is too high, too low, or just right. Any such evaluation must be the product of reasoned judgments, reflecting a large number of variables of the type discussed above. Crucial considerations are the distribution of debt and the prospective level of income and employment. Such an analysis brings us to the final criterion for judging debt levels.

However, with these analyzed independent variables, it was found that the firm that has higher profitability and higher tangibility preferred long term debt which goes in line with the study conducted by ***Schiantarelli and Sembennelli (1997).*** The short term debt is considered and this source of fund is incorporated to meet the additional financial requirements in case of an emergency. Hence there are no conclusive common determinants for this type of debt ownership structure.
To sum up, the ratio of total debt in the firm's overall capital structure depends mainly on the major determinants such as collateral value that is the tangibility of the firm, its profitability and the bankruptcy costs associated with the debt ownership structure.

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