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The Jigsaw of Capital Structure

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Abstract

This research attempts to study the capital structure issue in India in the context of the country's ongoing economic reforms. The corporate sector in the country is characterized by a large number of firms operating in a largely deregulated and increasingly competitive environment. Since 1990, financial liberalization has changed the operating environment of firms, by giving more flexibility to the Indian financial manager in choosing the capital structure of the firm. However, existing studies on the capital structure issue in India have been conducted in the backdrop of strongly interventionist and regulated regime of the pre-reform period.. The study also has some advantages over earlier studies in the context of the data used. First, most of the existing empirical studies on capital structure in India have been restricted in scope due to the poor cross-sectional variation in data. In contrast, the sample used in this study encompasses a wide range of firms and industries. The financial and qualitative data used in the study is obtained from the database *PROWESS* of the Center for Monitoring the Indian Economy for a ten year period, 2000-2001 to 2010-2011.

Keywords: Leverage , Debt-Equity , Capital Structure

1. Introduction

Several competing theories have emerged, since Modigliani and Miller's famous propositions on the capital structure, to test the ground realities of capital market imperfections such as taxes, bankruptcy costs, agency costs, and information asymmetries. Therefore, the determinants of the capital structure of companies have been debated for long in corporate finance. In the light of this debate, this research attempts to test the important determinants of the capital structure of companies. The Miller-Modigliani (MM) arbitrage theorems on capital structure are legendary. They suggest that in perfect markets a firm's financial policies do not affect value. In practice, capital structure matters, because empirical evidence shows consistent pattern of leverage ratios, both across industries and for individual firms over time. Leverage ratios of specific industries have been documented by many researchers. Departures from this rarefied world of frictionless markets lead us to serious consideration of market imperfections and their effect on the share price of the firm. A substantial amount of literature suggests that firms try to maintain a target debt ratio, to some extent influenced by industry-specific imperfections. What makes the capital structure debate especially intriguing is that the theories lead to such different, and in some ways diametrically opposed, decisions and outcomes. For example, some finance scholars have followed Miller and Modigliani in arguing that both capital structure and dividend policy are largely "irrelevant" in the sense that they have no predictable material effects on corporate market values. Another school of thought holds that corporate financing choices reflect an attempt by corporate managers to balance the tax shields of greater debt against potentially large costs of financial distress, including those arising from corporate under investment. But if too much debt can destroy value by causing financial distress and underinvestment, others have argued that too little debt especially in large, mature companies can lead to overinvestment and low returns on capital. Still

others argue that corporate managers making financing decisions are concerned primarily about the "signaling" effects of such decisions—the tendency of stock prices to fall significantly in response to announcements of common stock offerings (which can make such offerings quite expensive for existing shareholders) and to rise in response to leverage- increasing recapitalizations. Building on this signaling argument, MIT professor Stewart Myers has suggested that corporate capital structures are the largely unplanned outcomes of individual financing decisions in which managers follow a financial pecking order a financing rule in which retained earnings are systematically preferred to outside financing, and debt is preferred to equity when outside funding is required.
According to Myers, corporate managers making financing decisions are not really thinking about a long-run target debt to-equity ratio. Instead, they take the path of least resistance and choose what at the time appears to be the lowest-cost financing vehicle generally debt with little thought about the future consequences of these choices Brander and Lewis (1986) and Maksimovic (1988) provide the theoretical framework that links capital structure and market structure. Contrary to the profit maximization objective postulated in industrial organization literature, these theories, like the corporate finance theory, assume that the firm's objective is to maximize the wealth of shareholders, and show that market structure affects capital structure by influencing the competitive behavior and strategies of firms. Firms in the oligopolistic market will follow the strategy of maximizing their output for improving profitability in favorable economic conditions, Brander and Lewis (1986). In unfavorable economic conditions, they would take a cut in production and reduce their profitability. Shareholders enjoy increased wealth in good periods, but they tend to ignore decline in profitability in bad times as unfavorable consequences are passed on to lenders because of shareholders' limited liability status. Thus, the oligopoly firms, in contrast to firms in the competitive markets, would employ higher levels of debt to produce more when opportunities to earn higher profits arise. The implied prediction of the output maximization hypothesis is that capital structure and market structure have positive relationship. In corporate finance, the agency costs theory supports the use of high debt, and it is consistent with the prediction of the output maximization hypothesis.

2. Literature Review

Most empirical studies of capital structure focus on mature market economies, but less has been done in emerging economies. Moreover, existing studies generally repeat empirical tests devised for mature market economies, trying to confirm the universality of mainstream capital structure theories. Not surprisingly, they mainly end up with statistically insignificant coefficients, sometimes even theoretically unacceptable correlations, and relatively low explanatory power for the models. Empirical tests of trade-off and pecking-order theory were conducted by Berk (2006), among others, who studied the leverage drivers of Slovenian blue-chip firms. He tests the dependence of leverage on the tangibility of assets, growth rate, future growth opportunities, firm size, earnings volatility, profitability, and value of non-debt tax shields in the periods 2000–01 and 2002–03. He finds that, in the first period, only profitability, and in the second period, only tangibility of assets significantly affects firm leverage. The correlation between both explanatory variables and leverage is negative, and Berk (2006) thus concludes that the pecking order hypothesis explains capital structure choice in Slovenian firms better than does trade-off theory. Although private firms use significantly more debt to finance their activities, he finds that their financial policies do not differ significantly from the financial policies of public listed firms Berk (2006). Hussain and Nivorozhkin (1997), who examined the capital structure of Polish firms, find higher leverage in large, new, foreign-owned firms; firms with a stronger cash position and firms with low ownership concentration. Cornelli, Portes and M. Schaffer (1996), investigating whether the financial sector in Hungary and Poland provided enough funds to firms and whether it is monitoring them adequately, find a negative correlation for profitability and tangibility of assets with leverage and a positive correlation between

size and leverage. The results of their study are generally supported by Nivorozhkin (2002), who investigates the determinants of capital structures of listed Hungarian firms. However, Baer and Gray (1995), who conduct a similar regression analysis on a sample of Polish firms, find positive but mainly insignificant coefficients on these variables. Klapper, Sarria-Allende and.Sulla(2002) studying financing patterns in small and medium-sized firms in Eastern Europe, again evaluate the key relation between various debt ratios and determinants of leverage as predicted by modern capital structure theory. They find that leverage is positively correlated with size and growth and negatively correlated with age. The correlation between profitability and long-term debt is found to be negative, whereas the correlation between profitability and short-term debt, as well as total debt, is positive. They observe a negative correlation between tangibility of assets and short-term and total debt, a positive correlation between tangibility and long-term debt, and a negative correlation between non-debt tax shields and all types of debt ratios.

3. Objective of Study & Methodology

3.1 Objective of Study

The objective of this study is to shed light on the factors determining capital structure of Indian firms. The changes in the financial markets during the past decade of liberalization have certainly made an impact on the financial structure of corporate units.

3.2 Data collection

The period of study is from 2000-01 to 2010-11. The study covers all the listed companies in the manufacturing companies in India. Companies for which the data is not available are omitted. The total number of companies studied in this industry is 284. The financial and qualitative data used in the study is obtained from the database *PROWESS* of the Center for Monitoring the Indian Economy for a period, 2000-2001 to 2010-2011. Only non-financial, non-banking and non-governmental firms that are included in the BSE 100, BSE 200, BSE 500, BSE Midcap Index, BSE Smallcap Index, SENSEX, S&P CNX 500, CNX Midcap, CNX Midcap 200, Nifty Junior and Nifty, and for whom all relevant data are available for proposed period of study are included in the sample.

3.3 Research Methodology

The study employs a panel regression model. Panel data refers to data containing time series observations of a number of economic units; observations in panel data involve at least two dimensions – a cross sectional dimension reflecting differences between individual units, for example firms (usually denoted by a subscript i) and a time series dimension reflecting changes within the firm over time (usually denoted by the subscript t). This capacity to blend inter firm differences and intra firm dynamics, an attribute that either cross sectional or time series data alone could not achieve, has made panel data models indispensable in social science research. Such pooling as discussed above results in advantages in two counts; first, panel data gives more informative data, more variability, less collinearity among variables, more degrees of freedom and more efficiency; second, it minimizes the bias that might result if individual observations are
aggregated into broad aggregates.

4. Interpretation and Findings

In the panel data model developed here the dependent variable long-term borrowing is defined as a ratio of Long term borrowing to total assets, the term (long term) having its usual definition with respect to time. The independent variables include size of the firm (Size), profitability(Prof), Collateral value of assets (COVA), growth (G), uniqueness (Uniq), Non depreciation tax Shield (NDTS), liquidity (L), stock liquidity (SL) and

degree of international activity (DIA). The study employs a panel regression model and takes the following form.

$$(LTB/TA)i,t = \beta_0 + \beta_1 Sizei,t + \beta_2 Profi,t + \beta_3 COVAi,t + \beta_4 Gi,t + \beta_5 Uniqi,t + \beta_6 NDTSi,t + \beta_7 Li,t + \beta_8 SLi,t + \beta_9 DIAi,t + eit$$

Where Size is measured as the natural logarithm of sales, profitability is measured as a ratio of operating income to total assets, Collateral value of assets is measured as a ratio of net fixed assets to total assets, growth measured by the growth in total assets, uniqueness is measured as a ratio of selling expenses to sales, Non-depreciation tax shield is measured as a ratio of depreciation charges to total operating income, liquidity measured by ratio of current assets to current liabilities, Stock liquidity here is measured by the ratio of number of days a stock is traded to the total number of trading days per year. degree of international activity, measured as a ratio of total foreign exchange earnings as a proportion of sales revenue

Hypothesis:

H_1: Long Term Borrowing is positively related to size (H_{01})
H_2: Long Term Borrowing is negatively related to profitability (H_{02})
H_3: Long Term Borrowing is positively related to collateral value of assets(H_{03})
H_4: Long Term Borrowing is negatively related to growth (H_{04})
H_5: Long Term Borrowing is negatively related to firm's uniqueness(H_{05})
H_6: Long Term Borrowing is negatively related to available depreciation tax shield (H_{06})
H_7: Long Term Borrowing is positively related to company liquidity (H_{07})
H_8: Long Term Borrowing is negatively related to stock liquidity. (H_{08})
H_9: Long Term Borrowing is negatively related to the degree of international activity. (H_{09})

4.1 Interpretation and Findings

Before testing the above mentioned hypothesis using the above panel data, the Likelihood Ratio (LR) test, Lagrange Multiplier (LM) test and Hausman specification tests are carried out for the sample of firms (manufacturing industry) to know the significance of firm and time effects in the data set, and to find out a suitable panel data method for the estimation of the model. Table4.1 shows that the null hypothesis H_0^1: $\sigma_\mu^2=0$ and H_0^2; $\sigma_\mu^2 = \sigma_\lambda^2$ =0 are rejected. Clearly, the LR test result shows that both the firm and time effects are present in the data. Lagrange Multiplier test statistics presented in the table indicate that either the fixed effect or random effect panel data models are to be preferred to the classical regression model, implying that the use of panel data model is justified. The Hausman specification test results presented in the table infer to focus on the fixed effect estimates, so that both the fixed effects firm and fixed effects firm and time models are preferred to other models to determine the factors that affect borrowing for manufacturing firms.

Table 4.1

Likelihood ratio(LR) test, Lagrange Multiplier (LM)and Hausman test results for the period of 2000-01 to 2010-11

Tests	Test statistic	P value	Test statistic	P-value
LR Test	$\chi^2(264)=2566.77$	0.000	$\chi^2(274)=2590.53$	0.000
LM Test	$\chi^2(1)=1541.68$	0.000	$\chi^2(2)= 1546.37$	0.000
Hausman Test	$\chi^2(9)= 114.29$	0.000	$\chi^2(9)= 101.94$	0.000

Table 4.2

Variables	Fixed Effect firm model results	Fixed effect firm and time model results
Constant	----------	0.0611(0.0450)
Size	0.0149(0.0061)**	0.0112(0.0071)**
Profitability	-0.1307(0.0134)	-0.1327(0.0163)
COVA	0.2178(0.0320)	0.2123(0.0319)*
Growth	-0.0096(0.0045)**	-0.0093(0.0045)**
Uniqueness	-0.2789(0.1185)**	-0.2813(0.1181)**
NDTS	0.0007(0.0009)	0.0009(0.0009)
Liquidity	0.0064(0.0014)*	0.0064(0.0014)*
Stock Liquidity	-0.0455(0.0188)**	-0.0240(0.0213)**
Degree of International activity	0.0897(0.0330)*	0.0920(0.0329)*
N	1835	1835
Adjusted R^2	.786	.788
F-test Result	18.97*	18.97*

Note- 1) The fixed effect does not have a n intercept term

2) The figures in parenthesis alongside the coefficients shows the standard errors

3) *,**, represent the 1% and 5% level of significance respectively

With regard to long term borrowing in the context of manufacturing firms the regression coefficients associated with size, profitability, COVA, growth, uniqueness and stock liquidity have the expected sign. There is however no evidence to substantiate the negative relationship between availability of depreciation tax shield and long term borrowing. Findings also suggest a positive and significant association between long term borrowing and firm liquidity, which might be indicative of the fact that more liquid firms have better debt service capacity and consequently borrow more in the long term. Findings on the association between degree of international activity and long term borrowing however provide evidence contrary to findings elsewhere. Here it is observed that long term borrowing is positively associated with degree of international activity implying that in the context of Indian manufacturing firms diversified revenue base might in fact result in enhanced debt capacity.

5.Conclusion

Panel data method: Is the most reliable method in comparison to traditional models as it considers stationality in the data and uses fixed effect and time effect models avoiding autocorrelation, multicollinearity& heteroskedasticity. This model determines that size, COVA, Liquidity of firm & degree of international activity

has a significant positive relationship with firm leverage, while growth, uniqueness and stock liquidity has a negative significant relationship with firm leverage. Matching with results obtained by previous studies, the model finds no control of profitability and non depreciation tax shield in determination of debt equity ratio of a firm.

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