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Introduction

Ever since Franco Modigliani and Merton Miller's 1958 paper on the irrelevance of capital structure choice was published, the issue of debt-equity choice has become one of the most intensely debated topics in corporate finance research: an outcome contrary to the prescription of the paper itself. Alternative theories[i] that emerged in the ensuing period attempted to identify conditions under which capital structure 'irrelevance' did not hold and explored the issue of optimal debt-equity mix (when irrelevance is violated). While this yielded a set of (firm specific and institutional) factors that influenced capital structure choice, the issue of optimality remained a *holy grail*. Myers (1984) termed the issue of debt-equity choice a 'puzzle' and capital structure theories, to date, only remained directional rather than definitive. Empirical research in the said field have highlighted the problems of objectively estimating firm level attributes (Titman and Wessels (1988)) and the non-exclusivity of capital structure theories and (hence) their simultaneous validity (Barclay and Smith (1999)), as important stumbling blocks in the quest for optimality. This paper draws its motivation from these two issues and addresses the issue of firm-growth (prospects) and its impact on corporate borrowing behavior in India. Particularly, we revisit the measure of 'firm growth prospect' and its impact on long–term indebtedness, and highlight the interaction of the alternative theories in the observed relationship and their varied interpretation.

2. Theory and empirical evidence

Agency theory based explanation of capital structure choice focused on the costs arising out of the conflict of interest among stakeholders of a company and the role of debt in that regard. The asymmetric information theory on the other hand focused on financing choices when the information content of concerned parties to a contract are non-identical sets.

Jensen and Meckling (1976) identified two possible sets of conflict of interests: those between shareholders and managers, and between shareholders and lenders (debenture holders). Conflict of the later type, more important from the point of view of this research, arises primarily because of the asymmetry of claims that shareholders and lenders have on the outcome of an investment. Specifically, if an investment yielded

large returns, shareholders capture most of the gains. If however the investment failed, limited liability of equity shareholders ensured that debt holders incurred the loss. Consequently, shareholders stood a chance to benefit from a risky project that the firm undertook, even if it was value decreasing. Stated otherwise, the existence of debt financing in a company's balance sheet makes equity a call option, whose value appreciated with increasing variance of return on the firm's assets, and hence motivated managers acting in shareholders interest to take up increasingly risky projects at the expense of lenders. Myers (1977) brought to fore an additional problem when he showed that a firm financed with risky debt in some states of nature, rejected valuable investment opportunities – opportunities that added to the market value of the firm, because bondholders captured a larger pie of the benefits so that a profitable project did not offer stockholders a normal return. In these cases, stockholders had the incentives to reject positive net present value projects. These possibilities of risk shifting or the underinvestment problem, stated above, were highest for firms whose value derives primarily from intangible investment opportunities or growth options. Consequently, high growth firms tended to shy away from debt.

Myers and Majluf (1984) showed that, when a firm's shareholders and managers were not equally informed about company prospects the capital markets might not be able to correctly price company equity. Issuing equity shares for financing new investments, in a situation like this might result in further price decline and resulted in a situation where new investors captured a larger share of the net present value of new project at the cost of existing equity shareholders consequently resulting in rejection of positive NPV projects (underinvestment) and hence an opportunity loss. The firm could avoid this underinvestment problem if funds were available from accumulated profits or through debt issue where the problem of under pricing was less severe. Myers (1984) referred to this as the 'pecking order' theory of financing, which asserted that firms preferred internal finance to external sources of funds. In case when internally generated funds were insufficient for financing, the firm would use up its cash balance or other liquid assets. If even that remained insufficient, firms issued the safest (in terms of undervaluation problem) security first, i.e., they started with debt, then possibly hybrid securities such as convertible bonds, equity being the last resort.

While the pecking order theory does not *a priori* suggest a different hierarchy of financing choices for growth firms vis-à-vis stable or matured firms, the difficulty associated with dictating performance contractually *ex ante* and the high cost of enforcing compliance *ex post* in the case of the former, coupled with high direct and indirect costs of bankruptcy associated with these firms indicated an inverse relationship between growth and indebtedness based on asymmetry of information, in addition to asymmetry of claims.

Empirical evidences on the relationship between firm growth and corporate borrowing behavior in the post-liberalized period in India, is at best ambiguous. Different research papers have observed varied results on the interaction of firm growth with indebtedness. For instance, a positive and significant relation between firm growth and debt ratio has been observed in Bhaduri (2002, 2002a)[ii], a negative and significant relation was observed in Mahakud (2006), and Manos, Green and Murinde (2001), while Mahakud and Bhole (2003), Bhole and Mahakud (2004) and Kakani (1999) reported an insignificant relationship. In addition to the fact that the studies covered different time periods and employed different samples of dissimilar sizes as well as different methodologies, the variables used in defining growth and capturing the same in a regression equation have lacked uniformity. For instance, Kakani (1999) defined growth in terms of compound annual growth rate in sales, Bhaduri (2002, 2002a) defined growth in terms of growth of total assets and the ratio of capital expenditure to total assets, Mahakud and Bhole, (2003), Bhole and Mahakud (2004) used growth in total assets, Mahakud (2006) and Manos, Green and Murinde (2001) defined them in terms of market-to-book ratio.

Market-to-book, as a proxy for firm growth, has been extensively used in empirical research in the developed countries as well (Rajan and Zingales, 1995; Barclay et. al 1995[iii]; Beevan and Danbolt, 2002, 2004[iv]) and much like the Indian evidence, an inverse relationship has been observed between this variable and long term indebtedness. The genesis of this measure dates back to Myers's (1977) definition of market value of a firm as a composite of the value of assets already in place and the present value of future growth opportunities. This implies that growth in market value over successive periods of time includes an item of growth in tangible form (assets-in-place) and another component

from a futuristic perspective, in terms of growth of opportunities or options. Apart from being broader in scope (in terms of looking beyond growth in sales revenue or assets-in-place or capital employed), this component of growth qualifies better, the asymmetric information, (in terms of it potential to create information asymmetry) as also the agency theoretic (option or ex ante) perspective.

Off late however, the theory of market timing has been gaining ground. Equity market timing refers to the practice by corporate managers of issuing equity when market prices are high and carrying out a reverse process, that is, repurchase when prices are low. Taggart (1977) and Marsh (1982) provided evidence that firms tended to issue equity instead of debt when market values were high relative to book value and past market values. Ikenberry et.al (1995) provided evidence that firms tended to repurchase equity when market value was low. Rajan and Sarvaes (1997) observed that more firms complete IPOs when analysts are particularly optimistic about the growth prospects of recent IPOs. Graham and Harvey (2001) survey study of 392 CFOs revealed that an overwhelming 62.6% of them rated recent stock price performance (rise) was a very important factor determining the timing of equity issue and 66.94% felt that the amount by which a particular company stock was under or over valued by the market was an important factor affecting the decision. Baker and Wergler (2001), analyzing how market timing impacts capital structure using a sample of US firms observed that market timing has large, persistent effects on capital structure choice. The study observed that leverage was strongly negatively related to historical market valuation (measured by market-to-book ratio) and changes in market value had very long run impacts on capital structure. Refuting the existing theories of capital structure, Baker and Wergler asserts that 'leverage arises as the cumulative outcome of attempts to time the equity market' (p 28). Consequently it appears that the observed inverse relationship between market-to-book ratio and indebtedness may simultaneously be incorporating the impact of both the agency and above-mentioned theory of debt-equity choice.

Even though this paper focuses on market-to-book ratio (defined as total assets less book equity plus market value of equity all divided by total assets) and indebtedness, the later may also be affected by firm size, profitability or tangibility of assets. While these are not an exhaustive list of factors that affect leverage, we choose them given their consistent

correlation with leverage in several empirical research works as observed in Rajan and Zingales (1995). In incorporating these variables we assume that firms of larger size are less likely to default or move into financial distress, hence debt-bearing capacity of the firm increases with size; tangible assets may be used as collateral against borrowing, hence reducing perceived risk and consequently favorably influencing indebtedness. Given the over whelming evidence of an inverse relationship between profitability and indebtedness, we assume that the pecking order is valid for Indian firms and hence given the capacity of profitable firms to generate investible surplus, their extent of indebtedness would be lower compared to less profitable firms[v].

4. Methodology

Statistical Model

The statistical models we test are in the form of 2 linear regression equations. Equation 1 explains the debt-asset ratio of the *i*th firm in terms of firm profitability, size, tangibility and firm growth. Equation 2 has incremental debt-to-asset ratio of the *i*th firm as the dependent variable and incremental values of for all other independent variables along with equity return of the said firm over the preceding one year as an additional independent variable. We hypothesize that incremental debt to asset ratio is inversely related to the performance of equity share in the said period, as would be the case if the market-timing hypothesis influenced financing choices. Individual equity return is computed by annualizing monthly returns for each of the period under consideration. Based on our discussion earlier, the empirical model also incorporates proxies for firm size (natural log of sales), tangibility (ratio of fixed assets to total assets) and profitability (ratio of earnings before depreciation, interest and taxes to total assets).

$$\left(\frac{D}{TA}\right)_{i,t} = \alpha + \beta_1 \left(Size\right)_{i,t} + \beta_2 \left(Tangibility\right)_{i,t} + \beta_3 \left(\text{Pr}ofitability\right)_{i,t} + \beta_4 \left(Growth\ Opportunities\right)_{i,t} + \varepsilon \qquad \text{……eqn. 1}$$

$$\Delta\left(\frac{D}{TA}\right)_{i,t,t-1} = \alpha + \beta_1 \Delta\left(Size\right)_{i,t,t-1} + \beta_2 \Delta\left(Tangibility\right)_{i,t,t-1} + \beta_3 \Delta\left(\text{Pr}ofitability\right)_{i,t,t-1} + \beta_4 \Delta \left(Growth\ Opportunities\right)_{i,t,t-1} + \beta_5 R_{i,(t,\,t-1)} + \varepsilon \qquad \text{……eqn. 2}$$

Source of Data, Sampling and Variable Definition

The financial and qualitative data used in the study is obtained from the database *PROWESS* of the Centre for Monitoring the Indian Economy for a three-year period, 2006-2007 to 2008-2009. The choice of time period is made in such a manner that the impact of both high and low equity returns on indebtedness are factored in the analysis in equation 2; NIFTY returns over the period 2007-08 and 2008-09 stood at (approx) 24% and –34% respectively. Only non-governmental, non-financial firms included in the S&P CNX 500 that had raised/retired debt capital (through debentures or other forms of long-term borrowing) are eligible for inclusion in the sample. The final sample constituted firms for whom all relevant information is available as required in the model. Based on this criterion the total number of observations stood at 372 for equation 1 and 176 for equation 2.

Empirical Findings

Table I and II reports the summary statistics and the correlation matrix of the variables included in the model.

Table I: Descriptive statistics of independent and dependent variables (sample size 372) for the period 2007-08 to 2008-09

Variable	Debt Ratio	Firm Size	Tangibility	Profitability	Market to book
Mean	0.3031	7.228	0.3678	0.0577	1.5773
St.Dev	0.1995	1.3581	0.2138	0.0974	1.2776

Table II: Correlation Matrix of variables (n=372)

Variable	Debt Ratio	Firm Size	Tangibility	Profitability	Market-to-Book
Debt Ratio	1				
Firm Size	-0.2099*	1			
Tangibility	0.2755*	0.0482*	1		
Profitability	-0.1164*	0.1871*	0.3452*	1	
Market-to-book	-0.0897**	-0.0462**	-0.0356*	0.0209*	1

Note: *,** denotes significance at 1% and 5% level of significance respectively

Table II provides some valuable insights. Debt ratio is inversely related to firm size, positively related to the ratio of tangible assets to total assets, inversely related to profitability and inversely related to firm growth opportunities. These correlations are in line with empirical evidence observed in studies mentioned above in the context of Indian and international firms. The correlation between profitability and tangibility is also high; however the value is not large enough to warrant elimination of any one of them from the system.

Table III reports the findings of the regression analysis for regression equation 1 and 2. Results for equation 1 depicts that the signs of the coefficients are in the expected direction, except for the variable firm size. Result indicates that long–term borrowing increases with the proportion of tangible assets to total assets, and decreases with firm profitability and future growth opportunities. These findings are in line with the asymmetric information, the pecking order and agency theories of capital structure. The size variable indicates that firms, which have access to larger cash flows tend to borrow less, compared to other firms.

Table III: Results of Regression Eqn. 1 and 2 (with auto correlation correction)

Variable	Coefficient (Eqn. 1)	Coefficient (Eqn. 2)
Constant	0.4318 (0.0560)*	0.4131(0.5615)*
Firm Size	-0.0284(0.0071)*	-0.0283(0.0071)*
Tangibility	0.3273(0.0473)*	0.3265 (0.0470)*
Profitability	-0.4089(0.1056)*	-0.3715(0.1060)*
Market-to-Book ratio	-0.0128(0.0074)***	-0.0103(0.0075)
Security Returns	----------	-0.0377(0.0150)**
F – Statistic (4, 368)	F[4, 368] = 18.55*	F[5, 181] = 16.31*
R-squared	0.1587	0.1706

Note: (i) The figures in parenthesis alongside the coefficients show the standard errors
(ii) *, **, *** Represent the 1%, 5% and 10 % level of significance respectively

Regression result for equation 2 is in line with the results of equation 1 with regard to all but one variable included in the model. The coefficient associated with the variable growth opportunity is still negative, but statistically insignificant. Additionally, the new variable, equity return, included in the regression equation (2) assumes statistical significance with a negative coefficient. This implies that debt to asset ratio is inversely related to the concerned firm's equity return over the preceding period. The hypothesized statistical relation is significant in each case and including equity returns as an additional variable marginally enhances the explanatory power as seen from equation 2.

What is the implication of our findings? An inverse relation between indebtedness and equity returns have multiple interpretations: first, an expansionary (contractionary) phase of an economy is usually marked by rising (falling) interest rates, which influences the deployment of debt capital. Second, our findings suggest that company managers employ funds with fixed financing charges when equity performs poorly in the secondary market. Possibly they pay-out a larger part of earnings in terms of dividends to support equity prices and simultaneously borrow from the market/bank (at lower rates) to meet their fund requirement. Third, from a methodological stand point, in an expansionary (a contractionary) phase, if enhanced (decline in) assets of a firm is not financed by new borrowing (retiring debt), the ratio of debt to total asset decreases (increases) even when market value of the firm and hence its market-to-book value is increases (declines), consequently explaining the observed inverse relationship. The statistical insignificance of market-to-book ratio in equation 2, supports Baker and Wergler's (2001) observation that leverage was strongly negatively related to historical market valuation (measured by market-to-book ratio) as the market timing theory would suggest.

Conclusion

This paper develops an alternative interpretation of the observed inverse relation between market-to-book ratio and long term indebtedness based on the market timing theory of capital structure and provides empirical evidence to substantiate the same. Our findings suggest that in the presence of equity returns as an independent variable, market-to book ratio looses statistical significance in explaining incremental borrowing by the firm. Results in this paper reveal that long-term indebtedness is inversely related to market to

book ratio in expansionary as well as contractionary phases of an economy. Consequently, the use of market-to-book ratio as an estimate of firm growth in regression models appears contestable.

This paper suffers from certain limitations. The time period covered in our analysis is small and we take recourse to incremental debt issue in a bid to prove our hypothesis. Increasing coverage in terms of the number of years, and hence a larger sample size is expected to provide more robust results. Methodologically, this paper can be improved through the use of a balanced/unbalanced panel data model that is better equipped to handle problems of multicollinearity and the omitted variables problem. An analysis of incremental (year-on-year) debt to asset ratio may provide valuable insights into the relationship between corporate financing patterns and equity market performance. These are some of the tentative directions for future research in this area.

Notes

[i] Harris and Raviv (1991) reviews these alternative theories based on agency costs, asymmetric information, product/input market interactions and corporate control consideration. In addition to these, there also exist theories based on tax considerations (Kraus and Litzenberger, 1977), the neutral mutation hypothesis (Miller, 1977) as well as the theory of market timing (Baker and Wurgler, 2002).

[ii] In assessing factors that affected indebtedness, Bhaduri's (2002, 2002a) observed an insignificant relation between asset tangibility and long-term borrowing, and a positive relation between asset growth (or capital expenditure as a ratio of total asset) and long-term borrowing. The first observation may be interpreted as a finding to substantiate absence of maturity matching with regard to asset liability management by Indian corporates, but difficult to justify given the contrary findings of contemporary and later studies by Guha-Khasnobis and Bhaduri (2002), Mahakud and Bhole (2003), Bhole and Mahakud (2004) and Prasad and Ghosh (2005). Even more difficult to justify is the later finding of a positive relation between growth (in total assets, or capital employed as a ratio of total assets) and long-term borrowing and the possibility of growth adding value to a firm and hence enhancing borrowing capacity. Expected growth adds only intangible value, and the possibility of borrowing based on intangibles in a situation where the market for collateralized long-term borrowing is not developed enough to facilitate asset liability matching, seems highly improbable. The observed positive relation is more tenable as depicting the financing of incremental tangibility with long term borrowed funds.

[iii] (Book Value of Assets - Book Value of Equity + Market Value of Equity) / Book value of assets

[iv] (Total Assets (TA) – BV of Equity + MV of Equity)/ Total Assets (TA)

[v] On the contrary, the free cash flow hypothesis asserts that profitable firms facing large free cash flows benefit by taking in more leverage, given the monitoring that debt brings along with it.