Capital Structure Dynamics: Evidence from BSE Sensitivity Index

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ABSTRACT

This paper investigates the determinants of capital structure of BSE sensitivity index. For this purpose we applied a multiple regression model. On the data of the listed companies over the years 2001-2010, an empirical

study on determinants of capital structure in listed industry is conducted. The results show that profitability, firm size, non-debt tax shields, volatility are significant influence factors.

Moreover, firm size is positively related to the corporate leverage ratio.

Keywords: Capital structure. Leverage Ratio, Capital structure determinants.

INTRODUCTION

The optimum capital structure has been defined as a combination of both debt and equity that leads to the maximum value of the firm and where overall cost of capital is minimum. This is still one of the most debatable issue in the corporate finance research since Modigliani and Miller's (1985) irrelevance proposition. While this proposition has derived various conditions under which capital structure is irrelevance for investment, subsequent theoretical and empirical evidences have shown that a firm can influence its value and future investment by varying in capital structure. The capital structure decision can influence the value of the firm through the earning available to the share holders which maximizes the share holders' wealth. Capital structure can affect the value of company by affecting either its expected earnings or the cost of capital or both. While it is true that financing mix cannot affect the total earning of the firm as they are determined by the investment decisions, it can affect the share of earnings belonging to the ordinary shareholders. The mixing process depends upon the cost and benefits of debts and equity financing in that period (Fischer, Heinkel and Zechner,1989). The pecking order theory of capital structure can explain why the most profitable firms tend to borrow less. Less profitable firms first issue debt because it has lower flotation and information costs compared to equity is issued only as a last resort, when the debt capacity is fully exhausted. Tax benefits of debts are a second order effect. Therefore, the debt ratio changes when there is an imbalance between internal funds and real investment opportunities and there is information asymmetry in the market (Myers and Majluf, 1984). High degree of information asymmetry increases the leverage due to the absence of informational cost in the form of debt financing. The optimal capital structure is usually involve some debt, but not cent percent debt. Generally, some firms cannot identify this optimal point precisely, but they should attempt to find an optimum range for capital structure.

LITERATURE REVIEW

Rao (2001) made an attempt t o explain the variation of capital structure across industries in India during pre and post liberalization regime and also examine if there is any significant change in average industry level capital structure during post liberalization regime. The study is based on industry wise data of 85 industries in manufacturing sector the results shows that there has been significant decrease in leverage during post liberalization regime and there has been change in set of explanatory variables for capital structure. The most significant explanatory variables for capital structure during pre liberalization regime were the measure of profitability, risk and asset type. During post liberalization regime measure of profitability, growth and asset type were the most significant variables. Bhaduri (2002) studied the capital structure choice in developing countries through a case study of Indian corporate sector, for the period 1989-90 to 1994-95, based on a sample of 363 firms across nine industries. The author has reported optimal capital structure choice is influenced by factors such as growth, cash flow size and product industry and characteristics. Gupta (2004) conducted a study of a sample of 210 companies reporting the seventeen industrial sector in India for 1992-2000 period by using ANOVA and multiple linear regression model. The study found significant variation in debt-equity ratio in industrial sector. The cement sector showed the highest debt equity ratio. The size of the firm was not found to be significant for leverage tax shield and depreciation was found to be positive correlated between debt equity ratio and flexibility. Bhayani (2005) examined the capital structure of Indian private corporate sectors. The investigation has been performed using panel data procedure for a sample of 504 Indian companies listed on any stock exchange from 1995 to 2003-04. the hypothesis that has been tested was that the debt –equity ratio depends upon asset structure , size ROA and debt ratio. Multivariate regression analysis was used to find out the significant factors for determinants of capital structure. He conclude that the firms that maintains large proportion of fixed assets tends to maintain a higher debt ratio then smaller firms. Further more large firms employ more debt capital with

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comparison to smaller firms and firms with high profitability ratio tends to use less debts then firms do not generates high profit. His findings also suggest that the firms do follow a target capital structure during the examination period, these results are consistent with theoretical backgrounds. Madan (2007) examine the role of financing decision in the overall performance of the companies. It aims to analyze the debt equity structure of hotels and try to discover the industry benchmark and scrutinize how capital structure play a role in the overall growth of a company . this paper is based on financial data collected on leading hotel chain in India. His findings was the firms that have been moderately geared are able to generate good return on equity. Sinha and Ghosh (2008) test the modern capital structure theories view static relationship of leverage with specific characteristics and purpose of unique singes and magnitude for the coefficient of the firm's specific determinants. Apart from this static view, the dynamic tradeoff theories propose for change in both the singes and magnitude of the coefficients. The present study examines whether the nature of determinants of capital structure decision of Indian firms is dynamic or not. The study concludes that the determinants of corporate capital structure change there sine and magnitude with resects to orders of determinants, the time .periods, and the capital structure components. The study revels that the firm's size, profitability, growth rate and tangibility are the most prominent determinants of a firm's capital structure. Capital structure change is dynamic in nature and the static theoretical explanation is not a persisting behaviour. Xu (2009) made an attempt to study the impact of marketing timing on Canadian firms' capital structure and make a comparision with US firms. The results obtained by the author showed no evidence of market timing on capital structure of Canadian firms like US firms. The effect of past issue on Canadian firms' capital structure is transitory and the speed of adjustment of Canadian firms are more then US firms.

EMPIRICAL FRAME WORK

An empirical framework has been constructed to examin the relationship between leverage ratio and various determinants of capital structure in the context of BSE Sensex. This section is divided in to three subsections such as model specification, methodology and measurement of leverage ratio and determinants of capital structure.

OBJECTIVE AND HYPOTHESIS OF THE STUDY

1. To see the effect of growth on leverage ratio.
2. To look the influence of asset structure on leverage ratio.
3. To determine whether profitability has its impact on leverage ratio.
4. To look into the effect on debt service ratio on leverage ratio.
5. To determine whether agency cost has its effect on leverage ratio.
6. To examine whether size has its impact on leverage ratio.
7. To see whether business risk has its impact on leverage ratio.
8. To examine whether tangibility has its effect on leverage ratio.

9. To look the influence of bankruptcy on leverage ratio.
10. To examine whether non-debt tax has its impact on leverage ratio.

HYPOTHESIS

1. Leverage ratio is positively related influenced by growth.
2. Leverage ratio is positively related influenced by asset structure.
3. Leverage ratio is negatively related influenced by profitability.
4. Leverage ratio is positively related influenced by debt service ratio.
5. Leverage ratio is negatively related influenced by agency cost.
6. Leverage ratio is positively related influenced by size.
7. Leverage ratio is negatively related influenced by business risk.
8. Leverage ratio is positively related influenced by tangibility.
9. Leverage ratio is positively related influenced by bankruptcy cost.
10. Leverage ratio is negatively related influenced by non-debt-tax.

RESEARCH METHODOLOGY

Multiple regression model has been applied to study the impact of various variables on dependent variables i.e., leverage ratio.

In order to test the individual regression coefficient of the regression equation t- test is applied to observe whether the independent variables has been instrumental to define the dependent variable i.e. leverage ratio. In place of actual values of dependent and independent variables, logarithmic value has been considered.

THE MULTIPLE REGRESSION MODEL

pooled cross- sectioned time series regression model is used to analyzed the capital structure determinants

$\log Lev = \log A1 + x1 \log Gr + x2 \log As + x3 \log Pr + x4 \log Ds + x5 \log Ac +$

$x6 \log Sz + x7 \log Ri + x8 \log Tg + x9 \log Bk + x10 \log Dnt$

Where , Lev = Leverage ratio , which is linearly dependent upon

1. Gr = Growth
2. As = Asset structure
3. Pr = Profitability
4. Ds = Debt Service
5. Ac = Agency Cost
6. Sz = Size of the company
7. Ri = Business Risk
8. Tg = Tangibility
9. Bk = Bankruptcy
10. Dnt = Non debt - Tax

DEPENDENT VARIABLE

Doukas and Pantzalis (2003) defined capital structure as a long debt scaled by total debt + market value of equity. So by the following formula we can determine leverage ratio.

$$Leverage\ Ratio = \frac{Long\ term\ Debt}{(Long\ term\ Debt + market\ value\ of\ Equity)}$$

INDEPENDENT VARIABLES

Growth (Gr)

Under investment and asset substitution problems that debt is supported by assets-in-place rather then growth opportunity, Myers and Maglect (1984).

$$Gr = \left(\frac{(Total\ Assets)_n}{(Total\ Assets)_o} \right)^{1/n}$$

Asset Structure (As)

Asset Structure is calculated as ratio of fixed asset to total assets.

$$Asset\ Structure = \frac{Fixed\ Assets}{Total\ Assets}$$

Profitability (Pr)

Profitability can be calculated as

$$PBT\ /\ Total\ Assets$$

PBT = Profitability before Tax,

Total Assets = Fixed Assets + Current Assets

DEBT SERVICE CAPACITY (DS)

A high ratio is desirable, but a too high ratio indicates that the firm is very conservative in using debt debt, and is not using credit to the best advantage of share holders. A lower ratio indicates excessive use of debt.

$$Debt\ Service\ capacity = \frac{Total\ Interest\ Paid}{EBIT}$$

Agency Cost (Ac)

Higher agency cost is expected to result in lower debt levels , Doukas and Pantzalis (2003). It can be considered as

$$Agency\ Cost = \frac{Total\ Asset\ t - Total\ Assets\ t\text{-}1}{Total\ Assets}$$

Size of the company (Sz)

Rajan and Zingales (1995) argues that large firms tends to disclose more information to outside investors then the smaller ones overall , large firms with less asymmetric information problems should tend to have more equity then debt and thus , have lower leverage. However, large firms are often more diversified and have more stable cash flow. However, for the purpose of collecting the data **Natural Log of Total Asset** has been taken into consideration.

Business Risk (Ri)

Business risk is the risk associated with the future operations of the business. This is the risk that is inherent in the expected net operating income stream generated by the assets of the firm (Bishop, Fagg Oliver and Twite.2004)

Business Risk = Standard Deviation of EBIT

EBIT = Earning Before Interest and Taxes.

Tangibility (Tg)

The collateral value of asset, held by a firm has been found to be determinant of leverage, firm with higher tangible assets are expected to have higher leverage. Tangible assets are likely to have an impact on borrowing decisions of a firm because they are less subject to information asymmetries and usually have a greater value then intangible asset in case of bankruptcy. This can be calculated as

$$= \frac{Book\ Value\ of\ Tangible\ Assets}{Book\ Value\ of\ Total\ Assets}$$

Bankruptcy Ratio (Br)

Higher level of debt will increases the probability of bankruptcy , Eitemen, Stonehill and Moffett (2001).

It is calculated as

$$Bankruptcy\ Ratio = \frac{S.D.of\ first\ difference\ in\ PBIT}{Total\ interest\ Expenses}$$

Non – Debt Tax Shield (Dnt)

The Indicator for Non- Debt Tax shield can be considered as

$$No\ Tax\ Shield = \frac{EBDIT\text{-}i\text{-}t\ /\ 0.4}{Total\ Assets}$$

Where ,

t = Tax payments
EBDIT = operating Income
i = Interest payments
0.4 Assumed tax rate

Table -1
Determinants of corporate capital structure- BSE
Sensitivity Index

S.No.		Coefficient	Std. Error	t- Static	Prob.
	C	-0.061865	0.356953	-0.173314	0.8656
1	Agency Cost	-2.4E-05	2.51E-05	-0.986169	0.3452
2	Asset Structure	0.152799	0.10699	1.428164	0.181
3	Bankruptcy	0.006819	0.012452	0.547584	0.5949
4	Business Risk	0.000211	0.000137	1.544791	0.1507
5	Debt Service	-2.16E-05	2.62E-05	-0.824071	0.4274
6	Growth	0.029816	0.611292	0.048775	0.962
7	Non-debt Tex	-0.207436	0.298938	-0.693911	0.5021
8	Profitability	0.081925	0.088231	0.928527	0.3731
9	Size	5.05E-05	0.000155	0.326169	0.7504
10	Tangibility	-0.064889	0.071134	-0.912209	0.3812
R^2 = 0.429434				Adju. R^2 = - 0.089262	
F- Stat. = 0.613269				Mean dep. Var = 0.061551	
				S.D dep. Var = 0.087543	

EMPIRICAL ANALYSIS

The results in Table 1 evidence that the t-value of the coefficient of agency cost is significant at 1% and 5% level. The sign of the coefficient is negative which is as per our expectation. The t-value of asset structure variable is positively significant at 1% or 5% level. Therefore, null hypothesis of no relationship was rejected by agency cost. The bankruptcy is positively related with the leverage ratio but, insignificantly at 1% or 5% level. Hence, the null hypothesis of no relationship is accepted. The fourth independent variable is business risk which is hypothesized to have a negative association with leverage ratio.

The variable business risk has insignificant relationship; thereby the null hypothesis of no relationship was accepted. The next independent variable is debt service ratio which is expected to have a positive sign. But this variable has negatively insignificant association with the leverage ratio. Therefore, the null hypothesis of no relationship was accepted. The sixth variable is growth which is accepted to have a positive relationship with leverage ratio. It means the null hypothesis of no relationship is accepted. The seventh variable is non-debt tax. The non-debt tax shows a significant negative relationship with the leverage ratio at 1% or 5% level of significance. We also expected negative relationship. Therefore, the hypothesis of no relationship between non-debt tax and leverage ratio was rejected.

The profitability is positively and insignificantly associated with leverage ratio. We expected a negative relationship between profitability and leverage ratio, but our result shows a positive relationship. Therefore the null hypothesis of no relationship was accepted. The next independent variable is size which has a positive association with leverage ratio. The results show positive and significant association with the leverage ratio at 1% and 5% level of significance. It means the null hypothesis of no relationship between size and leverage ratio was accepted.

The coefficient of multiple determination r^2 implies that 43% of the fluctuations in debt-equity ratio are accounted for by the independent variables used in the model.

The P-value reference to all the independent variables at 1% or 5% level of significance is accepted. Hence, a conclusion is made that leverage ratio for all those companies in sample data are part and parcel of BSE sensex is not very much significant.

Most probable reason for this maybe blue chip companies use less debt in their capital structure.

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