Factors Affecting The Capital Structure Of BSE-100 Indian Firms: A Panel Data Analysis

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INTRODUCTION

Capital structure decision is perhaps the key strategic decision that has occupied the attention of academicians and managers. Capital structure is basically the proportion of debt and equity and finding out whether there is a capital structure that can be defined as optimum for the shareholders of the firms. To examine such issues, many theories have been developed in the literature and they generally focus upon the factors that are likely to impact the leverage decisions of the firms. The capital structure should be examined from the viewpoint of its impact on the value of the firm. It can be legitimately expected that if the capital structure decision affects the total value of the firm, a firm should select such a financing mix as will maximize the shareholder's wealth. Such a capital structure is referred to as the optimum capital structure. Capital structure can affect the value of a company by affecting either its expected earnings or cost of capital or both. While it is true that financing mix cannot affect the total operating earnings of a firm, as they are determined by the investment decisions, it can affect the share of earnings available to the shareholder. But the leverage can influence the value of firm through cost of capital.

The roots of modern capital structure theory can be assumed to have evolved from **Modigliani and Miller (MM)** theory dating back to the late 50's as one of the most influential papers in the finance literature. Capital structure decisions assumes **i)** Replacement of one form of capital with another **ii)** Would be optimum when cost of capital is minimized. Yet another factor is the target capital structure, which is debt equity ratio deemed most appropriate by the management. Each firm works towards achieving the target capital structure. If it has a lower proportion of debt, it raises the debt to finance the investment opportunities. And if the debt is too large, the firm raises its equity capital. Firms may not be maintaining the target capital structure all the time and the deviations are not so large. Target capital structure is determined by taking several factors into account. These factors range from pure financial issues like taxes, interest to practical issues like market practices, lender's perspective and industry norms.

Modigliani and Miller made a classic contribution to explain capital structure. Their theory of capital structure substantiates the view of net operating income approach and provides behavioral explanation of the theory that capital structure is immaterial to the value of the firm. The **First** proposition of MM theory says that the market value of the firm is independent of its capital structure and is given by capitalizing its expected return at a rate appropriate to its class. The proposition **Second** (without taxes) of MM theory says that with increasing leverage, the cost of equity rises exactly to offset the advantage of reduced cost of debt to keep the value of the firm constant. The proposition **Third** of MM theory says that with no taxes, the cost of capital for levered firm and unlevered firm would be the same and equal to the capitalization rate of an all equity financed firm. MM propositions of irrelevance of capital structure is based on the principle of arbitrage, i.e. the discrepancy in the valuation of levered firm and unlevered firm would be set right by investors by selling overvalued and buying the undervalued asset. There are other approaches to capital structure such as Net Income Approach and Traditional Approach. Net Income Approach assumes that capitalization of the firm is based on the net income derived by each supplier of capital discounted at fixed rates irrespective of levels of debt.

On the other hand, net operating income approach assumes that value of the firm remains constant because overall capitalization rate remains constant. Traditional approach recognizes assumptions of both the approaches not wholly, but in parts only. This approach recognizes the advantage of debt up to a certain level. Any increase in debt beyond a point causes cost of equity to rise.

The importance of an appropriate capital structure is, thus obvious. There is a viewpoint that strongly supports the close relationship between leverage and value of a firm. There is an equally strong body of opinion which believes that

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financing mix has no impact on the shareholder's wealth and the decision on financial structure is irrelevant. But in real world taxes are very much there and thus MM's propositions should be acceptable, which suggests 100 percent leverage to maximize shareholder's value and minimize the cost of capital. This in turn means that shareholders must favor high debt firms compared to low debt firms. Contrary to the theoretical positions, the practice has been exactly opposite. The most successful firms have little or no debt. Also, most of the firms that have failed had high amount of debt. For instance, the merchant banks in US which collapsed in wake of recession were highly leveraged. One of the factors that seem to dominate the tax advantage is the financial distress the firm undergoes when it assumes debt. Financial distress is the difficulty a firm may face in fulfilling its commitments, including the interest to be paid to the lenders of the funds. It may range from minor liquidity crisis to total insolvency. When financial distress becomes severe and the firm actually makes a default in the commitments, the cost associated with debt increases significantly. Financial distress is dependent upon many factors - such as cost structure of products, levels of competition, technological innovations, stability of demand etc. In a levered firm, one can also encounter conflict of interest between shareholders and debt holders. The conflict of interest is not very apparent but becomes exaggerated under conditions of high debt with mounting costs of financial distress. These conflicts are visible when firms are on the verge of bankruptcy. With the introduction of cost of financial distress and cost of agency with increasing debt, the tax advantages of debt reduces. This gives rise to a tradeoff between the advantage and disadvantage of debt. It is a perceived balance between the advantage and disadvantage of debt and the cost of financial distress and agency that will determine the optimum level of debt in a firm. The tradeoff theory suggested that the profitable firms in high tax brackets may borrow more as they have larger amount of tax shield that will benefit them. The most successful firms have given preference for equity over debt. **Gordon Donaldson (1961)** conducted a study to examine the capital structure pattern of the industry. The study suggests the pecking order of financing which specifies that firms **i)** Will finance from internal accruals, then **ii)** Raise debt or convertible debt and finally **iii)** Resort to issue equity. The deployment of internally generated funds for projects is viewed rather positively and as a healthy sign by the capital markets. On the other hand, raising equity issue may cause a doubt and some concern that stocks of the firm may be overpriced and hence, it wants to raise capital by equity route. Moreover, debt does not let the control dilute or curtail benefits of existing equity shareholders.

OBJECTIVES OF THE STUDY

This paper deals with examining the important variables that impact debt-equity choice of a company and test the variables for their applicability by means of panel data analysis in the context of BSE-index listed companies. Variables found theoretical affecting the leverage of a firm were considered for the analysis. Also, the paper aims to identify which of the two theories- tradeoff or pecking order is suitable for these companies.

DETERMINANTS OF CAPITAL STRUCTURE

Although the MM theory assumes that investors have the same financial information about a firm as with the managers, which is referred to as asymmetric information, in practice, however, managers have access to insider information. This viewpoint was not supported by **Myer and Majluf (1984)** who accept that managers have superior information about the actual value of the company. The information costs associated with debt and equity issues led **Myer (1984)** to argue that a firm's capital structure reflects the accumulation of past requirements. According to the Pecking Order Theory of Myer (1984), companies prioritize their sources of financing-from internal financing to equity issues-according to law of least effort or of least resistance, preferring to raise equity as a financing means of last resort. Hence, internal funds are likely to be utilized first, and only when they are exhausted will the firms apply to the new debt issues. Even if they rely on external financing, the firms issue cheapest security, starting with debt to hybrid securities such as convertible bonds and issue of equity only as a last resort. Tax benefits are assumed to have second order effect. The debt ratio varies when there is an imbalance between internal funds and investment opportunities. The dependent variable measuring debt equity was considered as Leverage. Figure 1 shows the trend in leverage over the last 10 years. It increases about 2.85 % from year 2000 to 2001. After that, it shows a decreasing trend up to the year 2005. To find the factors behind this trend, the leverage considered in this paper is defined as;

$$Leverage = \frac{Total\ Liabilities}{Total\ assets}$$

❀ **Tangibility:** Tangibility and leverage ratios have positive correlation. This has been supported in the studies of **Rajan and Zingales (1995) and Frank and Goyal (2002)**. Tangibility is the ratio between fixed to total assets. The rationale underlying this factor is that tangible assets are easy to collaterize and thus, they reduce agency cost of debt. Also, the tradeoff theory predicts a positive relationship between measures of leverage and the proportion of tangible assets. Among the various reliable factors for explaining market leverage, tangibility is one that maintains a positive correlation with the leverage.

❀ **Size:** Larger companies tend to have higher level of indebtness. This fact was supported by **Shapiro and Titman (1985)** in their study, in which they discussed that because of insolvency risks, firms would avoid debt. Since larger firms have a chance to be more diversified, they have little bankruptcy risk. **Castanias (1983)** also supported this relationship between size and leverage. Data consisting of many small and non publicly traded firms had been selected. An increase in size may lead to-less business risk per rupee of assets invested, easier access to borrowing markets, more tax offsets per rupee of assets or different marginal tax rates and lower cost of default per rupee of assets. **Warner (1977)** also suggested that bankruptcy costs would be higher for smaller firms. Evidence was drawn from a number of rail road firms which were in bankruptcy proceedings between 1933 and 1955. Net sales can be considered a better measure of size. Alternatively, **Kakani (1999)**, following **Weston and Brigham (1981)** argued that larger firms, in case of financial requirements, may go for additional issue of external equity, which will have very little impact on its control. **Myers and Majluf (1984)** suggested that information asymmetries are less in case of larger firms and, therefore, they have the advantage to issue equity instead of debt. Thus, negative relation is expected under pecking order theory between debt and firm size.

❀ **Growth Opportunities:** Companies with high market value in relation to book value have lower indebtness level. **Myer (1984)** states a negative relationship between growth and financial leverage due to high interest rates or restrictive covenants that discourage debt taking. Therefore, Pecking Order theory given by Myer starts from asymmetry of information, in which managers know more about the opportunities, risks and values of the company than agents outside the company.

According to Myer (1984):

❀ Firms prefer internal financing resources.

❀ Firms adjust their dividend policies to their investment opportunities, with the objective of avoiding unexpected changes in payment of dividends.

❀ The cash flow generated, formed by a rigid dividend policy, variable profitability and investment opportunities can be higher or lower than the capital expenditure. If it is higher, the firm settles debt or invests in the bond market. If lower, the firm resorts to cash or sells bonds.

❀ If external financial resources are required, the firm issues bonds, that is, the firm resorts to debt than to hybrid securities and finally, if necessary, issues shares.

Titman and Wessels (1988) also attributed a negative relationship due to reluctance of the bondholders to lend equity controlled firms as the latter tend to invest sub-optimally to expropriate wealth from bondholders. The cost associated with this agency relationship is likely to be higher for firms in growing industry, which have more flexibility in their choice of future investments. Expected future growth should thus be negatively related to long term debt levels. Growth in this paper is defined as book value to market value.

❀ **Profitability:** A profitable firm has the potential to absorb a large amount of interest payments and thus derive tax shield arising out of a high debt ratio, which is not the case with a less profitable firm. Thus, a positive relation can be expected between profitability and debt ratio according to trade-off theory. On the other hand, pecking order theory suggests a negative relation as high profits mean a larger amount of retained earnings, given the dividend policy which is usually sticky and lesser reliance on external finance. Profitability plays an important role in leverage decisions. There are two measures of profitability such as Return on Asset (RoA) and Profit Margin on Sales (PMS). RoA represents the contribution of firm's assets on profitability creation. RoA may also be called profit to asset ratio. RoA is thus the ratio between Net profit after taxes and average total assets. Profit margin on sales (PMS) is the ratio of operating income over total sales. **Salawu, R.O. and Agboola, A.A. (2008)** in their paper analyzed the determinants of non financial firms in Nigeria using a panel of 33 firms. Statistical tests were performed for a period 1990-2004. The results revealed that profitability is positively associated to total debt and long term debt. However, **Jensen (1986)**

advocated a negative relationship in case of an ineffective market for corporate control. The rationale is that under an ineffective market for corporate control, even if a firm has high profits, lenders may be reluctant to lend, as debt no longer serves as effective monitoring device. Conversely, in case of an effective market to corporate control, a positive relationship is expected to prevail.

❈ **Non debt tax shield:** Two measures of tax shield opportunities exist. One is the ratio of total depreciation to total assets (DA) and the other is the ratio of depreciation over operating profit (DoP).

SAMPLE AND METHODOLOGY

❈**Data :** The period of study is from year 2000 to 2009. Time wise averages of study variables were taken to smooth year to year fluctuations. Firms listed under BSE 100 index are taken up for the present study. Data was taken from financial reports of the firms listed under BSE 100 index through Prowess source. Due to non-availability of data, certain firms have to be removed, thereby leading towards 69 firms for the analysis. Moreover, since banks and insurance firms have been subject to specific rules, we exclude these institutions from the database.

❈**Methodology :** The statistical models combining both the cross-section data, that record at a point in time the way an economic variable differs across different individuals and groups, and the time series data, as a sequence of measurements of a variable at different points in time, have become highly popular in the recent empirical papers of researchers and policy makers. Therefore, using panel data is a safe way of forcing ourselves to look for new insights of the economic systems in a macroeconomic sense and of the behavioral assumptions of the individual decisions in a microeconomic sense, and so provide us with the knowledge of controlling individual specific unobservable effects in a panel framework, which may be correlated with other explanatory variables **(Hausman and Taylor, 1981)**.We compute the conventional random effects models from the specification below **(Asteriou and Hall, 2007)**:

$$yit = \beta'x_{it} + \alpha_i + v_{it} \quad \text{where } \alpha_i = \alpha + \mu_i.$$

Since the data was taken for 69 companies from 2000-2009, there would be a similarity between the observations. Hence, a random effect model is fitted.

Kim and Maddala (1992) proposed a random effect model of the form

$$y_{it} = \beta'x_{it} + \varepsilon_{it}$$

where $\varepsilon_{it} = v_{it} + \omega_{it}$ with, v_{it} and ω_{it} independent normal, $\text{var}(v_{it}) = \sigma_i^2$ $\text{var}(\omega_{it}) = \theta_i^2$

That is, errors are assumed to be heteroskedastic, with firm- and time-specific components, but uncorrelated. Under the usual specification of the random-effects model, errors are homoskedastic and equicorrelated.
That is,

$\varepsilon_{it} = v_i + \omega_{it}$, and $\text{E}(\varepsilon_{it}\varepsilon_{js}) = \sigma_v^2 + \theta_i^2$ for $i=j, t=s$,

$\text{E}(\varepsilon_{it}\varepsilon_{js}) = \sigma_v^2$ for $i=j$, $t \neq s$, and $\text{E}(\varepsilon_{it}\varepsilon_{js}) = 0$ otherwise

ANALYSIS OF DATA

Table 1: Correlation Between The Leverage And Determinants

	DA	DoP	GO	PMS	ROA	Size	Tan	LEV
DA	1.000							
DoP	0.055	1.000						
GO	0.112*	0.026	1.000					
PMS	0.062	0.001	0.023	1.000				
ROA	0.073	0.030	-0.188	0.071	1.000			
Size	0.040	0.019	0.171	0.010	-0.028	1.000		
Tan	-0.097	0.002	-0.037	0.012	-0.019	-0.024	1.000	
LEV	0.055	-0.043	0.120**	0.073	-0.476**	-0.014	-0.012	1.000

**Correlation is significant at 1% level of significance
* Correlation is significant at 5% level of significance

✿**Pair Wise Correlation :** Table 1 provides pair wise correlations for all the study variables, both dependent and independent with a view to find their degree of linear relationships. Growth opportunities and ROA are correlated with leverage as depicted from Table 1, both are significant at 1 % level of significance. Weak correlation is observed between other variables included in the study.

✿**Random Effect Model Results :** A random effect model is fitted, taking leverage as a dependent variable and DA, DoP, GO, PMS, ROA, Size and Tan as independent variables. These variables are defined earlier in determinants section.

Table 2: Random Effect Model Results

Parameter	Estimate	Std. Error	t	Sig.
Intercept	0.3918	0.0140	28.0510	0.0000
DA	0.7439	0.3231	2.3024	0.0216
DoP	-0.0002	0.0002	-0.9997	0.3210
GO	0.0139	0.0202	0.6910	0.4898
PMS	0.0059	0.0019	3.1030	0.0028
ROA	-0.8697	0.0603	-14.4285	0.0000
Size	0.0000	0.0000	-1.0146	0.3110
Tan	-0.0001	0.0001	-0.6846	0.4947

Table 2 gives random effect model results. It can be seen that coefficients of DA (ratio of total depreciation to total assets) and profitability are significant for leverage. Both measures of profitability, return on assets and profit margin on sales are found significant for leverage at 1 percent level of significance. Return on assets is found to be most significant variable at one percent level of significance with a negative sign. This result is contradicting the Trade-Off theory as well as the signaling explanations of capital structure, but is in line with the Pecking Order Theory proposed by **Myers and Majluf (1984)** as well as the Agency perspective. It means high profits mean a larger amount of retained earning, given the dividend policy which is usually sticky and has lesser reliance on external finance. The ratio of total depreciation to total assets (DA) is found to be significant with a positive sign at 5 percent level of significance, whereas the ratio of depreciation over operating profit (DoP) is found to be insignificant with a zero value. Other factors such as GO and tangibility are insignificant for capital structure for BSE-100 listed firms. Growth opportunities, although insignificant, show a positive coefficient with leverage. This is in accordance with pecking order theory that high growth firms have greater need for funds and are, therefore, expected to borrow more. Finally the coefficient of size is found to be statistically insignificant and also its coefficient takes a value about zero. It suggests that size of a firm is not affecting the capital structure of BSE-100 firms. While size variable tends to be significant for almost any leverage proxy used, yet, its signs violates the theoretically consistent one under the trade off theory.
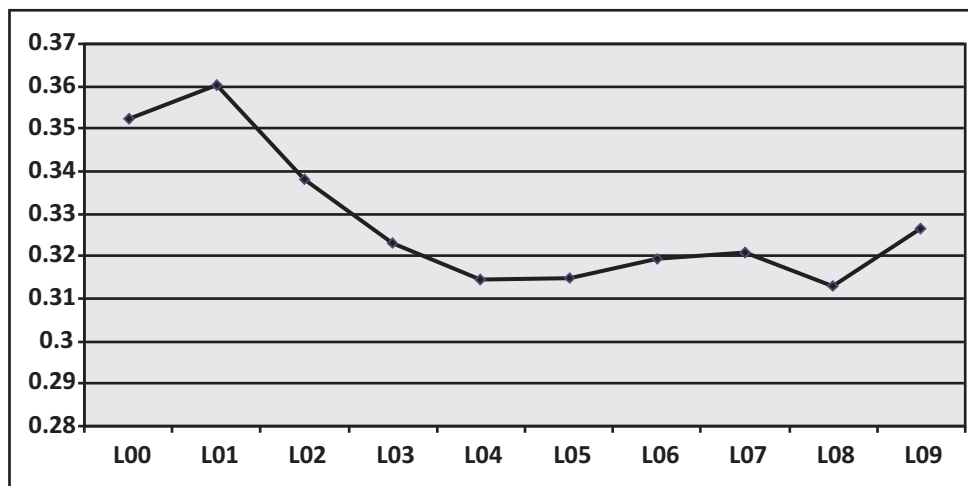
CONCLUSION AND SUGGESTIONS

This study focuses on capital structure characteristics for BSE 100 index companies in India. The capital structure of a company consists of a particular combination of debt and equity issues to relieve potential pressures on its long-term financing. These results are interesting, since they do provide a comprehensive picture of the determinants of capital structure in a developing country. The panel data methodology, which incorporates both time series and cross-sectional data has been applied to the actual data to find significant determinants of leverage ratios for each firm within the period - 2000-2009. Our empirical findings reveal that returns on assets and profit margin on sales significantly affects firm's leverage value. Therefore, profitability is one of the most important determinants for leverage as in **Sahoo and Omkarnath (2005).**

Results show that depreciation over operating profit, growth opportunities, size and tangibility do not explain leverage needs. Also, tangibility is found to be negatively affecting the leverage value and is insignificant as compared to the results of **Ramlall. I (2009)**.

Going by the signs of independent variables, pecking theory seems to be applicable, not so much trade-off theory.

While the present study lends support to pecking theory, we cannot conclusively refute applicability of trade-off theory. For drawing any such conclusion, the study may have to be extended by including more variables. Another important contribution of this study pertains to the need for a modified Pecking Order Theory pertinent to the local context.

Figure 1: Pattern of Leverage Over 10 Years (2000-2009)

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