

**DETERMINANTS OF LEVERAGE DECISION OF INDIAN FIRMS:
AN EMPIRICAL STUDY**

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ABSTRACT

This study focuses on the capital structure decisions of 107 non-financial listed companies in India. Based on panel data analysis of nine factors over 2006- 2015, this study sieves the important variables governing the levels of debt for Indian managers. It has been observed that profitability, size, growth opportunities and uniqueness, to an extent, are important determinants of capital structure for the firms. Solvency and liquidity are, however, not found to be affecting leverage decisions. Surprisingly, collateral capacity, observed by tangibility of assets, and corporate taxation were also not found to be significantly affecting the capital structure decisions.

KEYWORDS: Capital Structure, Listed Indian Companies, Leverage, Panel Data Analysis

INTRODUCTION

Finance managers today are grappling with various challenges on an on going basis. One such important issue is related to capital structure that involves decision regarding raising of funds from different sources of financing which mainly includes debt and equity. Managers also need to decide about the proportions of these long term sources of financing which will optimise the value of the firm.

There are different theories which may come to the rescue of finance managers in this regard. While Modigliani and Miller (1958) said that the proportion of financing from various sources will not affect the value of the firm under certain sets of assumptions, they later considered the implications of taxes on their earlier position and concluded that in the presence of corporate taxes, value of the levered firm would be higher than that of the equivalent unlevered firm. Later, Modigliani and Miller (1977) again modified the earlier stance by incorporating the effects of personal taxes in neutralizing the advantages of corporate taxes and identified the circumstances of their original proposition made in 1958.

Jensen and Meckling in 1976 proposed a trade-off between the net advantage of taxes under leveraged position of the firm with that of the agency costs of debts. Further, Jensen (1986) conjectured that such agency problem can be resolved by increasing the shareholding of the managers or by increasing the portion of debt in the capital structure.

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Copeland and Weston (1983) argued that the presence of bankruptcy costs leave an important mark on the capital structure decision of the firms. These costs should also be weighed while considering any trade-off pertaining to the debt based financing.

Myers and Majluf (1984) approached the corporate finance decision of financing from an empirical perspective prevalent in the corporate world. They proposed that there exists an order of preference for raising the funds sequentially from retained earnings to external financing and preferring debt over equity. These empirical results were assumed to be grounded in the prevalence of information asymmetry between the market participants contributed by various authors on this subject (Leland and Pyle (1977), etc.)

These theoretical prescriptions have remained guiding principles for finance managers throughout the world. The present paper explores the application of these guiding principles for Indian firms.

The present paper is organized as follows. Section 2 reports the rationale for the study after reviewing the selected literature. Section 3 describes the specific objectives, description of the data and the methodology adopted in this study. Section 4 produces the results and analyses the outcomes. Section 5 contains concluding observations and presents the managerial implications.

REVIEW OF LITERATURE

This section reviews selected literature picked up for this study and found pertinent in the context set herewith. Chen, Lensink and Sterken (1998) analysed 51 Dutch firms using balanced panel during 1984-95, investigating the explanation of their capital structure decisions. They concluded that the pecking order theory helps in explaining the financing choices of Dutch firms which implies the importance of asymmetric information models in explaining capital structure choices.

Bhaduri (2002) studied the capital structure choice of less developed countries through a case study of Indian corporate sector with a sample of 363 firms across 1989-95. She used partial adjustment model and factor analysis to conclude that five factors, namely, growth, cash flows, size, uniqueness and industry characteristics affect the capital structure choices of the firms. The results also confirmed existence of restructuring costs in attaining an optimal capital structure.

Huang and Song (2006) analysed the determinants of capital structure in Chinese listed companies and also investigated 1200 Chinese listed companies during 1994-2003. Using multivariate regression analysis, they concluded that the leverage in Chinese firms were positively related with firm size and fixed assets, and negatively related with the profitability, non-debt tax shields, growth opportunities, managerial shareholdings and correlate with the industries. State ownership or institutional ownership has been observed to have no impact on capital structure decisions but they consider tax effect in their long term debt financing.

Frank and Goyal (2009) analysed the relative importance of the various factors in the capital structure decisions of the American firms during 1950-2003 using multi-variate regression

analysis. They concluded that six factors viz. median size, higher market to book value ratio, tangible assets, profitability, large firm and inflation provides a significant impact on their capital structure decisions.

Chakraborty (2010) explored the determinants of capital structure of 1169 Indian non-financial firms listed in India during 1995-2008. He used panel data analysis and concluded little support for the agency cost theory but conjectured about the applicability of pecking order theory and static trade-off theory for Indian firms.

Mohanraj (2011) examined the important determinant of capital structure decision of the 9 private sector manufacturing industries in India during the period from 1991-92 to 2009-2010. By using regression technique, it has been concluded that profitability, size of the firm, cost of debt, debt service capacity and liquidity were the important factor that determines the capital structure.

Khare and Rizvi (2011) examined the applicability of trade off or pecking order theories with a sample of BSE-100 companies across 2000-2009 for cross sectional time series data. Using panel data analysis, they concluded that return on assets were the most significant factor followed by profit margin on sales and ratio of total depreciation to total sales. They have also found the applicability of pecking order theory for capital structure of BSE Index listed Companies.

Sheikh and Wang (2011) explores the factors affecting the capital structure of 160 manufacturing firms listed on Karachi Stock Exchange during 2003-07. Using panel data analysis, they concluded that the profitability, liquidity, earning volatility and tangibility were negatively related to capital structure. However, the firm size was positively related to the capital structure. Non-debt tax shields and growth opportunities were not significant to the capital structure decisions. Another study by Khan and Sharif (2015) examined the applicability of theories of capital structure viz. pecking order theory and trade-off theory using 293 non-financial firms listed on Karachi Stock Exchange during 2001-2013. Using panel data analysis, they found growth, profitability, size were negatively related with the firms' leverage and last year's dividend payout and the lending has a positive impact on the capital structure decisions. Furthermore, Inflation and market capitalisation to GDP found to be insignificant. Overall, Pakistani firms follows pecking order theory.

Pahuja and Sahi (2012) examined the factors that determines the capital structure of Indian companies based on agency theory and pecking order theory using a sample of BSE Sensex companies across 2008-2010. They found growth and liquidity were the two major determinant to capital structure decisions of Indian firms.

Tarus, Nehemiah and Geoffrey (2014) analysed the effect of profitability, firm size and liquidity on capital structure by using panel data of 34 firms (excluding commercial banks) listed on Nairobi Securities Exchange for a period 6 years (2006-2012). They concluded that profitability and liquidity were negatively and significantly related to the capital structure while firm size was positively correlated but not significant.

Sinha and Samanta (2014a) examined the impact of eight firm specific determinant of corporate capital structure or financial leverage using quantile regression technique on balanced panel data of 76 Indian Pharmaceutical companies listed on BSE across 2002- 2012. They have found the existence of marked nonlinear patterns in the relationship between the Capital structure and its determinant using quartile regression analysis. Similar study was also extended by the authors for Cement Industry in India and obtained similar results. (Sinha and Samanta (2014b)).

Handoo and Sharma (2014) explored the important determinants of capital structure of 870 listed Indian firms during 2001-2010. Using multi-variate regression analysis, they concluded that six factors, namely, profitability, growth, asset tangibility, size, cost of debt, tax rate and debt serving capacity have significant impact on the capital structure decisions of these firms. However, Yadav (2014) investigated the relationship between the financial leverage and the determinant of capital structure of 50 companies listed on the national stock exchange, Nifty Index using data across 2002–2012. He concluded that debt service capacity is the only significant determinant of capital structure where as non-debt tax shields profitability, collateral value of assets, growth, size, tax rate, uniqueness, liquidity and Business risk have no significant relation with leverage.

Khanna, Srivastava and Medury (2015) examined the impact of macroeconomic variables on capital structure decisions for Indian firms in context with the equity market timing theory using Vector error correction model or vector auto regression model. They have categorized the Indian firms into various sector and used data across 1992-2013. It has been found that macroeconomic variables affect the choice of finance both in long term as well as short run. They have also concluded that managers must identify the window of opportunity based on the different sectors.

Dhingra and Dev (2016) analysed the extent to which accounting variables, financial strength, long term profitability, Tangibility of assets, Business Risk and solvency affect the capital structure of Indian Oil companies listed on NSE using the panel data of 10 companies across 2006-2015. They have applied panel data analysis and concluded that financial strength was positively related with the capital structure and other variables were negatively related with the capital structure.

In summary, these studies open a renewed interest to explore the determinants of capital structure decisions particularly in the period covering post global financial crisis era. The literature is suggestive of the potential factors of capital structure decisions for Indian firms. These studies have thus been helpful in identifying the potential variables of interest. Some of the potential determinants identified are profitability, growth opportunities, size, asset tangibility, etc. The next section deals with the objectives of the paper in detail.

OBJECTIVES, DATA AND METHODOLOGY

The objective of the paper is to determine the important factors affecting the capital structure decisions of the firms in India. The factors considered are profitability, growth opportunities,

size, asset tangibility, solvency, liquidity, research and development expenditures, tax rate and non-debt tax shield.

The paper covers large Indian firms listed on Bombay Stock Exchange (BSE) forming part of BSE 200 Index, excluding the financial firms like banks, insurance companies, investment trusts, etc. for whom raising of debt is an operating decision rather than a financing one. There were 152 non-financial firms forming BSE 200 Index of the Bombay Stock Exchange. The paper is based on the study that covers the period of a decade starting from the end of the financial year of 2006 to that of the end of the latest financial year 2015. The study period covers the boom of the stock market from 2006-08 and also the global financial crisis of 2008-10. Hence, the study covers one entire business cycle of operations for most of the firms selected in the study.

Annual financial statements values of these 152 firms are taken from Centre for Monitoring Indian Economy (CMIE) corporate database PROWESS as available. To make the balanced panel, firms with missing observations during the sample period are dropped. The final data set, thus, has 107 firms with values of all the variables for the 10-year period.

The potential determining factors of capital structure decision of the Indian firms are proxied by the following variables as described in the table 1 below.

Table 1: List of Potential Factors Considered in the Study

Factor	Financial Variables	Symbols
Capital Structure	Debt-Equity ratio	DE
Profitability	Return on Equity	ROE
Size	Logarithm of Sales	LOGSALES
Asset Tangibility	Net Fixed Assets to Total Assets Ratio	TANGI
Tax Rate	Total Direct Taxes to Total Income Ratio	TAXRATE
Non-Debt Tax Shield	Depreciation (net of revaluation reserve transfers) & Amortisation to Total Assets Ratio	DEPAR
Growth Opportunities (Tobin's Q ratio)	Price to Book Value Ratio based on BSE Quotation	PBB
Solvency	Interest Cover	ICR
Uniqueness	R&D Current Account Expenditure as Percentage of Sales & Change in Stock	RANDD
Liquidity	Current Ratio	CR

The study considers the above mentioned factors as potential determinants of capital structure decisions for Indian firms.

Capital Structure = f (Profitability, Size, Asset Tangibility, Tax Rate, Non-Debt Tax Shield, Growth Opportunities, Solvency, Uniqueness, Liquidity) (1)

The factorial model is presented using the variables described above as follows:

$$DE_{it} = \alpha + \beta_1 ROE_{it} + \beta_2 LOGSALES_{it} + \beta_3 TANGI_{it} + \beta_4 TAXRATE_{it} + \beta_5 DEPAR_{it} + \beta_6 PBB_{it} + \beta_7 ICR_{it} + \beta_8 RANDD_{it} + \beta_9 CR_{it} + \varepsilon_{it} \quad (2)$$

The above regression equation is estimated for their parameters α and β s using panel regression analysis. We firstly test all these variables for stationarity of the panelled series using unit root test of Levin, Lin & Chu. Then we test the model for the applicability of the panel data analysis over pooled data analysis using Breusch-Pagan Lagrange Multiplier Test. Having confirmed for the applicability of panel data analysis, we further test for the choice of Fixed effects model vs. Random effects model using Hausman Test of Random effects. After being assured about the applicability of a particular model of panel data analysis, we estimate the parameters of the model using ordinary least square procedure and accordingly conduct the hypotheses testing.

RESULTS AND OUTCOME

Based on the methodology discussed in the previous section, this section reports the results and outcome of the study. Table 2 reports the descriptive statistics of the variables considered as potential determinants of capital structure for the non-financial firms in India.

Table 2: Descriptive Statistics of the variables

	DE	ROE	LOGSALES	TANGI	TAXRATE	DEPAR	PBB	ICR	RANDD	CR
Mean	0.71	24.8	10.9	0.26	4.1	0.03	5.4	316.4	1.0	1.14
Median	0.36	21.8	10.7	0.25	3.4	0.02	3.6	11.4	0.19	1.05
Maximum	120.5	791.7	15.4	0.78	24.2	0.22	54.5	84117	17.8	5.49
Minimum	0.00	-417.8	7.7	0	0	0	-48.1	-28.7	0	0.12
Std. Dev.	3.94	36.2	1.4	0.15	3.4	0.02	6.3	3498	2.26	0.65
Skewness	27	7	0.65	0.61	1.9	3.3	2.7	22	3	2.12
Kurtosis	809	218	3.35	3.06	8.3	24.5	24.1	498	15	11.36
Jarque-Bera	29090828	2068128	80	68	1889	22457	21030	11016476	8820	3916
Probability	0	0	0	0	0	0	0	0	0	0
Sum	759	26491	11686	279	4367	28	5765	338527	1117	1220
Counts	1070	1070	1070	1070	1070	1070	1070	1070	1070	1070

Table 2 describes all the variables of the study with respect to their primary moment structures. None of the variables are found to be normally distributed as per Jarque-Bera test of normality. However, the counts of the observation are assumed to be fairly large for application of large sample techniques. The study has used this entire data stream including extreme values of the variables, if any, so that any temporal impact can be studied which permeates over time. Further, the test of stationarity of the variables is conducted and has been reported in Table 3.

Table 3: Panel Unit Root Tests of the variables

Sample: 3/01/2006 3/01/2015		
Variable	Statistic	P-Value
DE	-29.37	0.00
ROE	-35.56	0.00
LOGSALES	-9.52	0.00
TANGI	-14.13	0.00
TAXRATE	-7.80	0.00
DEPAR	-12.57	0.00
PBB	-17.10	0.00
ICR	-92.78	0.00
RANDD	-12.20	0.00
CR	-11.19	0.00

Note: This table shows the results of Panel unit root test using Levin, Lin & Chu test under the assumption of common unit root process across cross-sections with balanced observations, first lag and individual effects as exogenous variables. The test computations use modified t^* statistic for asymptotic normality with Newey-West automatic bandwidth selection and Bartlett kernel.

It is evident (from Table 3) that all the variables are observed to exhibit stationarity at their level at 5% level of significance using Levin, Lin & Chu test which is considerably powerful test [Westerlund and Breitung (2009)]. Having rejected the null hypothesis of the test that all the panels contain a unit root, we cannot rule out the alternative of homogeneity implying stationarity in the data generating process. As a result, we may proceed for further analyses of the data. As the data was structured as a panel data, we tested for the applicability of the need for analysing the data in panel framework. Consequently, Breusch-Pagan Lagrange Multiplier Test is conducted to decide between a simple OLS regression and a random effects regression. Table 4 reports the results of applicability of the pooled data analysis.

Table 4: Breusch-Pagan Lagrange Multiplier Test

	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan Statistic	2.048401	1.834544	3.882944
p-value	(0.1524)	(0.1756)	(0.0488)

Note: This table shows two tailed Lagrange Multiplier Test for Random effects considering individual and joint hypotheses of no effects as Null.

The null hypothesis in Breusch-Pagan Lagrange Multiplier test is that the variance across entities is zero implying same intercept as justification of applying pooled regression. The test results clearly show that the null hypothesis of no difference across entities (i.e. no panel effect) is to be rejected at 5% level of significance based on statistical evidences. Hence, there is a case for analysing the data using panel framework. We, thus, proceed to check the applicability of the

fixed effects or random effects in the panel data analyses. This is done by conducting Hausman test where the null hypothesis is that the preferred model is the Random Effects Model against the alternative of Fixed Effects. Table 5 reports the results of the applicability of Random effects model for the data implying that the unobserved time invariant factors are not correlated with other time varying independent factors.

Table 5: Hausman Test for Random Effects

Test Summary	Chi-Sq. Statistic	d.o.f.	P-Value
Cross-section random	34.40282	9	0.0001

Note: This table shows the results of Hausman Test for correlated Random effect cross-section.

It is evident (refer to Table 5) that the Random Effects is not applicable for the data at 5% level of significance based on the statistical evidences. This further implies that there is an existence of some company specific characteristics which do not change over time and significantly affect the various independent factors like size of the company, growth opportunities, return on equity, etc.

Hence, with all the modalities checked for the proper specification of panel model, Table 6 below reports the regression results based on Fixed effect model of panel data analysis.

Table 6: Regression Results of Dynamic Panel Data Regression using Fixed Effects

Sample (adjusted): 3/01/2007 3/01/2015		
Dependent Variable: DE		
Independent Variables	Coefficient	Prob.
C	13.58754	0.0058
ROE	-0.04736	0.0000
LOGSALES	-1.27578	0.0063
TANGI	3.135209	0.2225
TAXRATE	0.113693	0.1096
DEPAR	0.178941	0.9899
PBB	0.214041	0.0000
ICR	-1.61E-06	0.9644
RANDD	-0.20846	0.0952
CR	-0.07511	0.8103
DE(-1)	0.379021	0.0003
R-squared		0.274718
Adjusted R-squared		0.167396
F-statistic		2.559773
Prob (F-statistic)		0.0000
Observations	9 periods x 107 Units = 963	

Note: This table shows the results of balanced panel regression using panel least squares method.

As is evident, the firms' capital structure is negatively affected by the returns to equity (ROE). The sign of the coefficient is in line with the accounting process involved in the definition of leverage as the ratio of the amount of debt and funds of the equity shareholders. A higher return earned for equity shareholders are added to the funds of equity shareholders, thereby increasing the denominator of the leverage ratio. An increase in this denominator result into a fall in the ratio, and hence, a negative relation appears in the regression equation.

The results also show that the capital structure is negatively affected by the size (logarithm of the sales) of the firm. Size Effect is a well-documented stylized fact of capital markets around the world. A large firm has better access to the capital markets, domestic as well as international, high bargaining power with the merchant bankers, underwriters and other intermediaries of the issue of securities of the firm. The legal documentation and other compliance costs become infinitesimal with the sheer increase in the issue size. The scale of operations of the firm also results in high level of diversification of the firm's activities, and thus, reducing the idiosyncratic risks of the firm. The increase in the size of the firm reduces the risk of bankruptcy in comparison to the smaller firms. This results into lower risk premia on the securities of the large firm. With relatively lower spread between the yields of debt instruments and equity ownership instruments of a large firm, it is considered economical by the finance manager of a large firm to tap more of equity sources of financing rather than loan based financing. This culminates into a negative relationship between the leverage ratio and the size of the firm.

The above results also exhibit a positive relationship between the leverage ratio and the growth opportunities (Tobin's Q ratio proxied by Price to Book value PBB) available with the firm. A firm with potentials of high growth is characterised by the shareholders who wish to preserve control of the firm and reap its future economic rents. As a results, they vote in favour of issue of debt who does not interfere in their rights to control the firm. Also, a growth opportunity financed by the loan based financing gives strong signals to the market about the consistency of the future benefits accruing to the firm. The managers choose the sources of financing the new projects based on their private information about the growth opportunities of the firm. This also results in lowering of systematic risks assigned to the firm's securities. Also, the preference of finance managers towards the debt source of financing new projects, after exhausting retained earnings in financing the organic growth of the firm, is proven by the pecking order theory of financing. Thus, this pecking order behaviour and the signalling mechanisms used by the managers accompanied by the preference for preservation of control by the shareholders culminates in the high debt ratio in the presence of growth opportunities present with the firm.

The results also show that the leverage ratio is dynamically related to their previous capital structure level (DE(-1)) at 5% level of significance. A leverage ratio is a stock concept. It is a cumulative level of debt amassed by the firm over the years divided by the accumulated wealth of equity shareholders retained by the firm over the years, after piecemeal appropriation in the form of dividends. The other factors found statistically significant in explaining this ratio have mostly been the flow variables. Thus, a change in the debt-equity ratio, during the accounting

year, is more apt to be explained by, let's say, profit accrued to the equity shareholders during that year. The size of the firm as measured here by the natural logarithm of the sales during the year is also such flow variable to be associated with the change debt-equity ratio. The growth factor is another such temporal phenomenon considered analytically in this paper. However, instead of evaluating the change in the debt-equity ratio, which already been observed to be a stationarity series with any further differencing, we have controlled for the previous level of debt in the regression equation, which is justifiably coming as a statistically significant variable.

The results report that other factors like tangibility (TANGI), effective Tax Rate (TAXRATE), non-debt Tax Shield (DEPAR), liquidity (CR) and solvency (ICR) are not found to be significantly explaining the capital structure decisions of non-financial firms in India. However, the uniqueness of the firms (proxied by research & development expenditures (RANDD)) has been observed to be marginally helpful in explaining the capital structure decisions. This expenditure is found to have a negative effect on the capital structure of the firms. The uniqueness of the firm pushes it towards firm-specific risk factors. Also, such innovative activities increase the chances of failure of project, even the bankruptcy of the firm. Given the emerging nature of Indian economy, proper diversification opportunities available in a complete market is not accessible to Indian investors in mitigating these risks. Thus, finance managers of such firms prefer to finance such risky projects using equity sources rather than loan capital. Thereby making Indian investors to diversify their risk in the equity market which is comparatively more developed than the corporate debt market ever existed in India.

SUMMARY AND CONCLUSIONS

Capital structure decision is an important decision for the finance managers having financing choices in their hands. This study attempts to find out various factors which finance managers of Indian non-financial firms can consider while deciding about the appropriate mix of debt and equity. This paper, based on 107 firms forming part of the BSE 200 Index studied over the decennial period of 2006-15, observes that as the profitability of the firm increases, leverage of the firm goes down by contributing more towards the equity base of the firm under constant payout regime. It is also noted that for a large size firm, leverage shall be lower because such firm can tap the equity market at a much competitive cost of raising the external financing, if need be. Further, it is also observed that the firms with growth opportunities have higher debt as they look to finance their growth using external debt when constrained by internally generated funds as per pecking order theory. The uniqueness of the firm is found to result into lower debt in firms due to the increase in the costs of bankruptcy as argued by Titman (1984). The level of leverage held by the firm is very well observed to carry the memory from the previous year. Other factors like tax shields from using debt as well as non-debt tax shields of corporate taxes does not seem to affect the financing choices of Indian firms. Sheikh and Wang (2011) have also reported similar results with regard to non-debt tax shields of corporate taxes and have argued for it (Also see Mohanraj (2011), Sinha & Samanta (2014b) and Yadav (2014)). The proportions of tangible assets held by the firms, which may be offered as collaterals to the lender, have also been appealing to the managers in altering their firms' leverage ratios. Similar to the results of

Mohanraj (2011), it has not been found to be affecting the capital structure decisions of Indian non-financial firms. Interestingly, solvency and liquidity aspects of the firms also do not seem to affect the capital structure decisions (in line with the conclusions of Sinha & Samanta (2014b) and Yadav (2014)). A closer scrutiny of the reasons is warranted on these aspects. Overall, this paper provides useful insights for the finance managers of Indian non-financial firms.

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