

Capital Structuring of Leading Companies - A Statistical Analysis

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Abstract

The determination of the ideal capital structure for a company involves a number of theoretical and practical considerations. The theoretical literature on the subject is widely divided as to the influencing factors that lead to a corporate decision on the matter. A number of empirical studies have been conducted the world over to test the applicability of various postulates and the conclusions on these have thrown light on many aspects of the leverage decision. In India there have been few studies which have highlighted the specific factors governing the decision. Also, most of these Indian studies have been highly theoretical in nature. This paper seeks to do an empirical analysis of leading Indian Companies and to test broad hypotheses on leverage. The Study finds that a combination of factors influences the leverage decision of companies. The relative importance of these factors varies from Company to Company. Also, the separate contribution of each of these factors to the leverage decision could also change from year to year. It would thus not be possible to draw a trend line of the contributions of these factors. However, the regression as a whole is significant in all the years and has high predictive power. The mean B coefficients of these factors when applied to the values of 2003 show a high level of accuracy in predicting the debt-equity ratio.

Companies have tended to move towards a target capital structure over a 3-year period. However, growth companies and highly profitable companies have moved away from high leverage to moderate and low leverage levels. The pecking order theory may be in vogue in the short run but this cannot be tested. The fact that debt-equity ratios move towards an average debt-equity ratio shows the prevalence of the target capital structure theory over the pecking order theory in the case of leading Indian companies.

Keywords : *Leverage, Capital Structure, Debt-equity Ratio, NIFTY*

Introduction

The determination of the ideal capital structure for a company involves a number of theoretical and practical considerations. Starting with the well-known Modigliani-Miller (MM) propositions, there have been theoretical advances on the ideal structure for a firm at various levels of growth. Among these, suggestions from Donaldson regarding the financial distress aspects and signaling, and Myers' postulates regarding pecking order of financing are noteworthy.

The widely debated concept of target capital structure is related in part to the inherent ability of the company to raise debt. Debt capacity depends not merely on the viability of new projects, but also on the ability of the company as a whole to service existing debt. Other

considerations like financial distress and agency costs, signaling effects and the pecking order theory also influence the determination of the target capital structure.

Harris and Raviv (1991) seek to summarize the studies on Capital Structure from various angles. For instance, the authors say that the evidence shows that leverage is positively associated with firm value. The summary of various findings of empirical studies as given in the paper shows that a great many factors have been shown to influence leverage. While most studies have shown complimentary factors, some can be interpreted to lead to diverse conclusions. The paper is a good compendium of all relevant studies on capital structure.

Financial distress relates to the dangers of not being able to meet debt obligations on time. The credit-worthiness and future debt-capacity will be affected in case the company defaults its payment dues. Allied to this is the question of agency costs. Lenders might desire to keep a surveillance of the activities of companies and for this they might appoint special auditors or trustees. This will not only cost the company in terms of fees, but also might become a source of interference with strategic corporate policy.

Rajan (1992) looks into the question of trade-off between bank debt and arm's length debt. Since the bank can monitor the firm and control its investment decisions, it would in effect alter the division of surplus between itself and the firm. So the firm might prefer debt from arm's length sources, which involve neither the benefits nor costs of bank debt.

The objective of **Shyam-Sunder and Myers** (1999) is to test static trade-off against pecking order models of capital structure. The study is aimed at checking the applicability of the simple trade-off model as against the pecking order hypothesis. The conclusions of the study are that the pecking order is an excellent first-order descriptor of corporate financing behavior. Overall the results would suggest a greater confidence in the pecking order theory than in target adjustment.

Frank and Goyal (2003) test the pecking order theory on a wide range of publicly traded securities in US for 1971 to 1978. They say "Contrary to the pecking order theory, net equity issues track the financing deficit more closely than do net debt issues. While large firms exhibit some aspects of pecking order behavior, the evidence is not robust to the inclusion of conventional leverage factors, or to the analysis of evidence from the 1990s. Financing deficit is less important in explaining net debt issues over time for firms of all sizes

The pecking order theory suggests that companies are governed by the convenience of first using accumulated reserves and short-term bonds in preference to long-term debt and fresh equity. Under the theory,

companies are believed to be following this order notwithstanding other considerations. Empirical studies have come to diverse conclusions as regards the applicability of these theories in practical decision-making. The considerations have varied from country to country and from time to time.

In India, various factors have contributed to fluctuations in capital structure patterns of companies. These factors include volatility in interest rates, changes in legislation on taxation of dividends and differences in planned retention ratios. The liberalization policy followed by the Government from early 1990s has resulted in considerable restructuring of major corporate houses and business interests in the country. Strategically, the fixation of a capital structure for these companies is vital from the angles of growth and profitability. The academic literature in India and abroad covers areas like the increase in expectations of shareholders corresponding with increased leverage, and the concept of unlevering and relevering. Further, the concept of Economic Value Added and Shareholder Value Creation are paramount considerations in corporate management in the modern era.

Gap in literature

The studies on Capital Structure the world over have looked into many diverse angles. The gist of the findings in the most recent and most path-breaking of these have been outlined in the study. Most papers have sought to test basic postulates like the Modigliani-Miller propositions, the Pecking Order theory, theory of Financial Distress and agency costs, and the theory of Asymmetric Information. A large number of these studies pertain to companies in the United States and Europe. Attempts at finding the applicability of these theories to the context of companies in other parts of the world have shown differences in parameters and conclusions.

Studies on Indian Capital Structure patterns have also sought to test specific theories. The contribution of these papers to the understanding of capital structure patterns in

India is very high. However, the studies have not so far specifically looked at patterns of diversified, larger companies in India and particularly in respect of the post-liberalization era. This study seeks to fill the gap in the literature by -

- analyzing leading market capitalized companies in India
- taking a long-term horizon of 9 years for study
- testing the predictive power of the regression on the latest accounting year
- performing regression and correlation analysis for understanding the significance of various specific postulates in the decision making platform.

Objectives and Scope of the Study

The objectives of the study are to:

- Analyze the patterns of leverage of selected leading Indian Companies over the last ten years in the light of growth and profitability
- Attempt to identify the factors that contribute to leverage
- Assess and test the influences of various operative variables in determining leverage.

In order to make the study more focused on the Indian scenario, only leading Indian companies (companies with the maximum market capitalization) have been considered. The choice of the companies has been based on the National Stock Exchange's criterion for deciding on the companies entitled to be included in the NIFTY and **JUNIOR NIFTY** category.

The study looks at and analyzes data in respect of selected 70 corporate entities for a period of ten years ending with the most recent financial year. It is widely acknowledged that corporate India has gone through major changes in structure and practices ever since the liberalization policy pursued by the

Government from early 1990s. A period of ten years is chosen as the study period so as to capture the effect of these changes effectively. First, an analysis is made for the period of 1994 to 2002 of the selected companies and these results are tested out on the figures for 2003.

70 Companies figuring in the NIFTY and JUNIOR NIFTY index as on the 1st of September, 2003 have been taken up for the study. These companies have been chosen by first taking the entire list of 100 companies in the NIFTY and JUNIOR NIFTY categories and eliminating therefrom banking companies, financial institutions and those companies who do not have full published results for the last 9 years. The criteria and the characteristics of selection of companies into the NIFTY and JUNIOR NIFTY category are given in detail in the study and follow a well-researched procedure. While a sample of 70 may not be fully representative of the entire corporate sector of the country, it would still be indicative of the way leading companies in the country take their capital structure decisions.

Methodology

Data for the study has been taken from both primary and secondary sources. Comprehensive data analysis is carried out on the secondary data. Primary data is used for filling up the subjective gaps and other strategic frameworks that seek to explain and corroborate the findings from the statistical data. The following sources for secondary data are used:

- Annual reports of the selected companies
- Recognized data bases and net-based services
- Published records of the National Stock Exchange
- Authenticated Securities Analysis reports
- Newspaper quotes
- Websites of the companies concerned

Data on the specific parameters giving rise to leverage has been collected and analyzed in respect of NIFTY and JUNIOR NIFTY companies. Details regarding specific changes in parameters over the years have been brought out in the analysis.

In addition, primary data has also been collected from experts experienced in the matter of corporate restructuring and consultancy. They have been asked questions on the strategic perspectives in arriving at leverage levels, as well as on other relevant factors they consider crucial in leverage decisions on the basis of their experience. For this purpose, a schedule has been drawn up to help in eliciting the necessary information from a sample of senior Company Secretaries, Stock Analysts and Chartered Accountants.

Hypotheses

The research tests the following broad hypotheses:

1. There is no predictable linear relationship between
 - a. leverage, and
 - b. profitability, size, growth, liquidity and tax factors in companies
2. Higher profitability in companies will not result in higher levels of leverage
3. Firms that grow substantially over a short span of time do not rely on leverage for financing their increased capital needs
4. Companies with high market capitalization do not work towards achieving an optimum Capital Structure over a 3-year period.

These hypotheses have been tested using statistical tools. For the purposes of testing, appropriate proxies have been identified for leverage, growth, profitability and liquidity and statistical analysis performed on these proxies.

The model for testing

Rajan and Zingales (1995) discuss about the whole gamut of capital structuring and seek to interpret international data. For their study, they have taken leverage to mean total liabilities in relation to total assets; or as a ratio of debt to total assets or as a ratio of total debt to net assets. They have sought to adjust leverage for changes in accounting methodology and institutional changes. The following factors that are theoretically correlated with leverage are specifically examined:

- The market to book ratio
- Firm size
- Ratio of fixed to total assets
- Profitability

Barclay, Smith and Watts (1995) look into the leverage and dividend choices of more than 6700 industrial corporations over a 30-year period. The aim is to find the relative importance of taxes, contracting costs and signaling effects in explaining the corporate behavior. The paper concludes that an important determinant of a company's leverage ratio would appear to be the extent of investment opportunities. Companies, whose values appear to be based on intangible parameters, (measured by high market-to-book ratio and high R&D to value ratio) have significantly lower leverage ratios. The authors explain the pattern of financing and dividend choices by concluding that high-growth firms the under investment problem makes both the policies costly. On the contrary, firms having limited growth opportunities can have substantial benefits from these policies. The authors also point to the need for greater attention to details regarding debt instruments, in the light of changes in practice.

An understanding of the situation in the study could be best achieved by a regression analysis taking a number of factors into account and then deciding upon their relative importance.

The regression analysis is done through both the ENTER and STEPWISE methods offered by SPSS as detailed below. This would reveal the relative significance of the variables and the overall significance of the relationship.

A multiple regression model based on the debt-equity ratio as the dependent variable has been used for data analysis, as follows:

Leverage Firm $=\alpha+\beta_1$ Profit Before Interest and Taxes/ Capital Employed (in %) (PAC) + β_2 Profit after Taxes/ Net Worth (in %) (PATNW) + β_3 Current Ratio (CR) + β_4 Solvency ratio (SOL) + β_5 Net Profit Before Interest and Taxes/ Sales (NPBITSA) + β_6 Net Profit After Taxes/Sales (NPATSA) + β_7 Log. Assets (LOGASSE) + β_8 Depreciation as a portion of profits (DEPR) + β_9 Tax as a portion of profits (TAXPR) + β_{10} Asset Growth (ASSETGR)

A multiple regression model based on the debt-equity ratio as the dependent variable has been used for data analysis. The identified independent variables used in the regression are as follows :

1. Profit Before Interest and Taxes/ Capital Employed (in %)
2. Profit after Taxes/ Net Worth (in %)
3. Current Ratio (Current Assets/ Current Liabilities)
4. Solvency ratio (calculated as the Total Assets excluding revalued assets/ (Total borrowings + Current liabilities and provisions - advanced tax))
5. Net Profit Before Interest and Taxes/ Sales
6. Net Profit After Taxes/Sales
7. Log. Assets (Logarithm to the base 10 of Total Assets)
8. Depreciation as a fraction of profits (Depreciation/Profit Before Interest and Taxes)
9. Tax as a fraction of profits (Tax Liability/Profit Before Interest and Taxes)
10. Asset Growth (Total Assets of current year/Total Assets of previous year)

The sources of data, important areas of analysis and the interpretation of the output are summarized below:

1. Data for the analysis has been used from the **CMIE - PROWESS** package and counter-checked for accuracy with the database of **INSIGHT-ASIANCERC**.

2. The analysis has been performed using the SPSS package and Microsoft Excel's statistical tools. First, the regression analysis is carried out using the **ENTER** method under which all the independent variables are considered in the regression equation. The analysis has also been made using the **STEPWISE** method of regression. SPSS includes the independent variables best correlated with the dependent in the equation as a first stage. Next, the remaining independent variables with the highest partial correlation with the dependent variable, controlling for the independent variables are entered and those having the lowest partial correlation are dropped. This process is repeated at each stage "partialling" for previously entered independent variables until the addition of a remaining Independent variable does not increase R^2 by a significant amount.

3. The strength of the linear relationship of the identified dependent variables with independent variables is measured by the Coefficient of Multiple Determination (R^2). This is the proportion of the variation of the dependent variable that is explained by the independent variable. R^2 lies between 0 and 1. So, a high R^2 , as in this study, will indicate that a high level of the total variation is explained by the independent variables, which in turn indicates a high level of significance in the regression equation.

4. An "F" test has been used to determine the overall significance of the regression. The F test is based on the null hypothesis that there is no linear relationship between the dependent variable and the independent variables. Thus, the null hypothesis is that the regression is not significant. When the F test rejects this null

hypothesis the regression as a whole is deemed significant. SPSS provides a p value for the F test, which is compared with desired level of significance, which for this study is 5% ie.0.05. If the p value is less than 0.05, then the null hypothesis is rejected and the regression as a whole is deemed significant.

5. "Predicted Values" in the output are the fitted values based on the regression equation. Residuals refer to the differences between observed valued and the values as predicted by the regression equation. To test the relative importance of each independent variable, t-tests have been conducted. t- tests are used to assess the significance of the individual coefficient, going by a null hypothesis that the value of any population coefficient is 0. The null hypothesis is that the coefficient of the independent variable is not significant and that it is not contributing to the regression. To reject the null hypothesis, the p value of the t-test must be less than the level of significance chosen. In this study, the t-test has been performed at the 5% level of significance. SPSS returns a p value for the t test, which if less than 0.05 (5%) would indicate that the null hypothesis is rejected and the coefficient of the variable is significant.

6. Beta coefficients in the output are the coefficients of the standardized variables in the regression. They represent the special contribution of each independent variable to the regression equation. B values represent the coefficients of the unstandardized variables in the regression.

7. **Correlation:** Pearson's correlation refers to the extent of relationship between an independent variable and the dependent variable when all other independent variables are allowed to vary. When we identify one of the variables as dependent and the other as independent, then, R^2 is the extent of variance in the dependent variable as explained by the given independent variable, when all other variables keep changing. R^2 value will be

inflated if sample size is small compared to the number of variables included in the regression. Usually an adjustment is made in the calculation of R^2 to take care of the relatively smaller sample size. This is called the Adjusted R^2 . This adjusts the R^2 by lowering it as the number of independent variables increases. The sample R squared tends to optimistically estimate how well the model fits the population. The model usually does not fit the population as well as it fits the sample from which it is derived. "Adjusted R squared attempts to correct R squared to more closely reflect the goodness of fit of the model in the population". Partial Correlation is the extent of variance in the dependent variable uniquely attributable to the given independent variable, when all the other variables in the equation are kept at their respective levels.

8. ANOVA tables in the regression output is used to assess the overall significance of the model, the sum of squares of regression, residuals and the degrees of freedom in the analysis. The hypotheses given above have been tested by first selecting appropriate proxies for the variables of leverage, profitability and growth. The tools used for testing the hypotheses include:

❖ **For Hypothesis 1** -Multiple regression analysis is carried out using the least squares method to ascertain the impact of profitability, growth and liquidity on capital structuring decisions of the companies. The multiple regression analysis tests the existence of a linear relationship between leverage and the parameters of profitability, growth, liquidity and size. In order to have greater scope of interpretation, the analysis is done separately for (a) all the companies taken up for study, (b) companies with a debt-equity ratio of greater than 0.75 and (c) companies with debt-equity ratio of less than or equal to 0.75. Also, separate statistical analysis of regression is made using the ENTER and STEPWISE methods of

regression. Additionally, “F” test is carried out for determining the significance of the regression equation, which also gives an indication of the predictive power of the regression equation. For the purpose, the debt-equity ratio of the companies is taken as the proxy for leverage and the following proxy independent variables are regressed against it.

- **Proxies for Profitability**
 - Profit on Capital Employed (PAC)
 - Profit on Net Worth (PATNW)
 - Profit after interest and tax on Sales (NPBITSA)
 - Profit before interest and tax on Sales (NPATSA)
- **Proxy for Size**
 - Log of Assets (LOGASSE)
- **Proxy for Growth**
 - Growth of Assets from year to year (ASSETGR)
- **Proxies for Liquidity**
 - Current Ratio (CR)
 - Solvency Ratio (SR)
- **Proxies for Tax factors**
 - Depreciation as a fraction of taxes (DEPR)
 - Taxes as a fraction of profits (TAXPR)

The justification for the inclusion of these variables is given hereunder:

Size

The size of the company has an influence on the leverage in that the social importance of the firm is reflected therein. As a result of this, a large firm may be provided with favorable treatment from Creditors due to implicit guarantees. In restructuring situations, the relative size of the organizations result in their having easier access to debt. **Rajan and Zingales** (1995) express inability to truly conclude on any direct influence that size might have on leverage. They say “We have to conclude that we do not really understand why

size is correlated with leverage”. In this study, the Total Assets of the companies under consideration are taken as a proxy for size and the measure taken is the natural logarithm of Total Assets.

Profitability

There are conflicting views on the impact of profitability on leverage. Myers (1984) relies on asymmetric information between managers and outsiders to predict a negative relationship between leverage and profitability. However, the static trade-off theory would suggest the opposite. More than profitability, it is the basic earning power that is critical to the decision on leverage. Higher this figure, higher the potential value to shareholders from leverage. In this study, we have taken Earnings before Interest and Taxes (EBDIT) as a fraction of Total Assets as one of the proxies for profitability. Further, we have added the Profit on Capital Employed and Profit on Net Sales as additional measures of profitability in this analysis of leverage patterns.

Growth

The outlook on growth has an influence on leverage in that signaling theory would suggest the ready use of debt for value-adding growth. Theories and empirical findings are divided as to the decipherable impact on debt of growth. Myers (1984) Williamson (1988) and Harris and Raviv (1991) would suggest that the expected bankruptcy costs for firms with higher growth opportunities will be higher. Growth has many dimensions

- growth, that is foreseeable beforehand, as a result of the Research & Development initiatives
- growth, the impact of which is known only to the managers because of asymmetric information and
- growth, that is factored in by the market in securities evaluation.

We are concerned here with asset expansion or more specifically outlay increase as a result of growth and as how we will finance the outlay-

by debt or equity. Therefore it is considered that the growth in assets (represented by change in the level of Total Assets) will truly reflect the growth factor. For the purpose, the Total Assets of the current year are divided by the corresponding figure in the previous year to get this growth rate.

Liquidity

The impact of liquidity on leverage has been debated in many papers, including Harris and Raviv (1991) and Bhaduri (2002). Highly liquid firms are seen to reduce the level of their short-term debt. Companies with low levels of liquidity would have a higher level of short-term borrowings. Because of the narrowing of the differences in interest rates in Indian between long-term and short-term debt we can infer that the level of leverage would be influenced by liquidity. In this study, we take the ratio of Current Assets to Current Liabilities, as the proxy for liquidity.

Solvency

Solvency ratio is also a measure of the liquidity of a company. But here we seek to make some adjustments to the book figures to make it reflect the essential parameters of long-term liquidity and keeping afloat. Here, the numerator consists of the Total Assets less the revaluation reserves, less the miscellaneous expenses not written off, less the advance tax paid DIVIDED BY Total Liabilities and current liabilities and provisions net of advance tax

Depreciation

is a non-interest tax shield. It has been taken into account in a number of studies. Firms with higher depreciation ratios are likely to have relatively fewer growth opportunities and relatively more tangible assets (Barclay and Smith, (1995) and Krishnaswami et al (1999) This should then suggest a positive relationship between depreciation ratio and growth. In this study we have taken the Depreciation as a percentage of profits as an independent variable

Taxes

The effect of taxes on leverage has been debated in academic circles for long. While some studies claim that taxes have no explanatory power, Rajan and Zingales (1995) assert that the possibility that taxes might influence the structure of debt cannot be dismissed. But for a comprehensive solution to this they suggest that we must find a way of including both the corporate and personal taxes. In this study the percentage of taxes on profits has been taken as a variable since it was felt that given the higher level of taxes in India, this might have some influence on the decision. Tax liability as a percentage of profits has been taken as an independent variable in this study.

❖ **For Hypothesis 2** - A "t" test is run to determine the significance of the coefficients of the independent variables relating to profitability in the regression equation. Then, (1) Pearson's Correlation and (2) pair-wise Correlation analysis controlling for the other independent variables, are made between measures of leverage and profitability to test the Hypothesis.

❖ **For Hypothesis 3** - A "t" test is run to determine the significance of the coefficients of the independent variables relating to growth in the regression equation. Further, a geometric mean growth rate is ascertained for the companies and compared with the geometric mean leverage levels. This analysis is done separately taking the horizon as 9 years (1994-2002), 5 years (1998-2002) and 3 years (1999-2002). Then, a Pearson's Correlation and a Partial Correlation analysis are made between measures of leverage and growth to test the Hypothesis.

❖ **For Hypothesis 4** - A moving average of the leverage ratios of the companies is compared with the actual leverage of a year to find the extent of convergence. This analysis is done for

a 3-year horizon, since the hypothesis relates to a 3-year period. Since the companies taken up for study are highly market capitalized, the hypothesis can be directly tested as above.

❖ Applying the derived regression from years 1994 to 2002 to the year 2003 and using “t” test to compare the predictions for year 2003 with the actual values

Findings And Conclusions with reference to the Hypotheses in the Study

Hypothesis 1 : *There is no predictable linear relationship between (1) leverage, and (2) profitability, size, growth, liquidity and tax factors in companies.*

Multiple regression analysis has been done separately in respect of the following categories:

- A. All the companies in the study using the ENTER method
- B. All the companies in the study using the STEPWISE method
- C. Companies with a debt-equity ratio of greater than 0.75 using the ENTER method
- D. Companies with a debt-equity ratio of greater than 0.75 using the STEPWISE method
- E. Companies with a debt-equity ratio of less than or equal to 0.75 using the ENTER method
- F. Companies with a debt-equity ratio of less than or equal to 0.75 using the STEPWISE method.

The F tests for significance of the regression as a whole shows high level of significance in all the categories. The significance has been slightly lower on a comparative scale in respect of category (E) and (F) above. Also, the R² and Adjusted R² are found to be significant. The hypothesis is rejected on the basis of these findings and we can conclude that there is a predictable linear relationship between debt-equity ratio and the independent variables together.

Table 1
Summary of Results of
Multiple Regression Analysis-
all companies ENTER method

YEAR	R ²	Adj. R ²	F test p value
1994	0.703	0.653	0
1995	0.718	0.671	0
1996	0.788	0.752	0
1997	0.78	0.743	0
1998	0.757	0.715	0
1999	0.766	0.727	0
2000	0.777	0.739	0
2001	0.675	0.619	0
2002	0.831	0.803	0

The p values of the F test and the high R² indicate a high level of significance in the regression. The p values of the t tests reveal differing levels of significance under the ENTER method.

Table 2
Summary of Independent Variables and t test p values - all companies ENTER method

YEAR	PAC	PATNW	CR	SOL	NPBITSA	NPATSA	LOGASSE	DEPPR	TAXPR	ASSETGR
1994	0.003	0.000	0.074	0.032	0.000	0.000	0.515	0.000	0.067	0.001
1995	0.000	0.001	0.084	0.780	0.000	0.000	0.200	0.242	0.024	0.051
1996	0.233	0.019	0.898	0.970	0.000	0.000	0.555	0.688	0.000	0.467
1997	0.650	0.287	0.332	0.738	0.000	0.000	0.674	0.065	0.000	0.716
1998	0.013	0.004	0.154	0.312	0.000	0.000	0.200	0.045	0.004	0.051
1999	0.559	0.608	0.872	0.038	0.000	0.000	0.869	0.026	0.003	0.000
2000	0.048	0.066	0.912	0.347	0.001	0.002	0.793	0.085	0.000	0.512
2001	0.014	0.078	0.433	0.207	0.004	0.020	0.487	0.188	0.000	0.244
2002	0.000	0.000	0.090	0.001	0.115	0.436	0.386	0.245	0.000	0.448

The slope of the standardized residuals indicates that the residuals follow a standard distribution. The normal plot of regression supports the conclusion that the multiple regression assumptions are valid.

Table 3
Multiple Regression Analysis Under Stepwise Method - all companies

YEAR	R ²	Adj R ²	F Sig.	D-W	Ind. Var	"t" test p value
1994	0.418	0.391	0	2.299	DEPPR SOL TAXPR	0 0.009 0.021
1995	0.367	0.348	0	2.418	SOL TAXPR	0 0
1996	0.778	0.764	0	1.838	TAXPR NPBITSA NPATSA PATNW	0 0 0 0.012
1997	0.761	0.747	0	1.675	TAXPR NPATSA NPBITSA CR	0 0 0 0.03
1998	0.602	0.584	0	2.022	TAXPR SOL CR	0 0.002 0.034
1999	0.689	0.665	0	2.366	TAXPR SOL DEPPR ASSETGR PATNW	0 0 0.019 0.001 0.028
2000	0.708	0.69	0	2.363	PATNW SOL TAXPR PAC	0 0 0 0
2001	0.48	0.457	0.002	2.378	DEPPR SOL TAXPR	0.026 0.001 0.002
2002	0.802	0.79	0	2.144	SOL PATNW PAC TAXPR	0 0 0 0

D-W refers to the Dubin Watson statistic, which ideally should be between 1.5 and 2.5. Ind. Var. refers to the independent variables left in the regression after due eliminations in the STEPWISE method. The regression as a whole has been significant in all the years. Further the independent variables in the STEPWISE method are found to be significant as evidenced by the p values of the "t" tests. Of the variables, it is observed that Solvency Ratio, Profit After Tax on Net Worth and Tax on Profits have been the principal explanatory variables under the "STEPWISE" method.

Table 4

Summary of Results of Multiple Regression Analysis - companies with D/E greater than 0.75, ENTER method

YEAR	Final R ²	Adj. R ²	"F" Test p value	No. of companies satisfying the criteria
1994	0.92	0.88	0	35
1995	0.83	0.75	0	31
1996	0.83	0.7	0	24
1997	0.82	0.72	0	28
1998	0.68	0.54	0	33
1999	0.83	0.71	0	26
2000	0.86	0.72	0	21
2001	0.83	0.54	0.1	17
2002	0.93	0.85	0	19

The results show that R² and the p value of F test reflect a high level of significance.

Table 5

Summary of Independent Variables and "t" test p values - companies with D/E greater than 0.75, ENTER method

YEAR	PAC	PATNW	CR	SOL	NPBITSA	NPATSA	LOGASSE	DEPPR	TAXPR	ASSETGR
1994	0.769	0.745	0.025	0.001	0.002	0.017	0.741	0.000	0.456	0.000
1995	0.199	0.070	0.877	0.004	0.000	0.028	0.291	0.813	0.153	0.850
1996	0.302	0.182	0.867	0.013	0.009	0.078	0.917	0.889	0.139	0.877
1997	0.490	0.357	0.433	0.002	0.001	0.031	0.519	0.238	0.106	0.162
1998	0.049	0.032	0.776	0.011	0.005	0.019	0.128	0.717	0.188	0.387
1999	0.792	0.915	0.513	0.001	0.038	0.128	0.084	0.012	0.230	0.135
2000	0.311	0.887	0.572	0.080	0.188	0.510	0.900	0.275	0.419	0.957
2001	0.256	0.283	0.797	0.184	0.423	0.912	0.833	0.669	0.647	0.530
2002	0.657	0.871	0.350	0.040	0.261	0.264	0.309	0.082	0.938	0.393

The t tests reveal that the B values are not individually significant in most cases.

Table 6

Multiple Regression Analysis under STEPWISE method- companies with D/E greater than 0.75

YEAR	R ²	Adj R ²	F Sig.	D-W	Ind.Var	"t" test p value
1994	0.910	0.890	0	1.745	SOL DEPR ASSETGR NPBITSA NPATSA CR	0 0 0 0.001 0.008 0.017
1995	0.813	0.775	0	2.579	SOL NPBITSA PATNW TAXPR NPATSA	0 0 0.004 0.003 0.044
1996	0.736	0.711	0	1.773	SOL NPBITSA	0 0
1997	0.775	0.735	0	1.243	SOL NBITSA TAXPR NPATSA	0 0.004 0.004 0.029
1998	0.461	0.425	0	1.767	SOL TAXPR	0.001 0.001
1999	0.702	0.645	0	2.450	DEPR SOL TAXPR LOGASSET	0.002 0 0.004 0.031
2000	0.795	0.759	0	1.873	SOL PATNW NPBITSA	0 0.001 0.021
2001	0.753	0.696	0	1.921	SOL PATNW NPBITSA	0 0.001 0.021
2002	0.876	0.851	0	1.343	PATNW SOL NPBITSA	0 0.001 0.034

The regression as a whole has been significant in all the years and the variables in the step - wise method are also uniformly significant, as evidenced by the p values of the "t" test

Hypothesis 2 : *Higher profitability in companies will not result in higher levels of leverage*

In the analysis of NIFTY and JUNIOR NIFTY companies, a demarcation is made between relatively higher leverage and lower leverage with a benchmark of 0.75 debt/equity ratio. The figure of 0.75 is arrived at taking into account a reasonable level of leverage for benchmarking and also the strength of companies in the sample that would satisfy the criteria. The following variables are taken as measures of value among the independent variables chosen:

- Profit Before Interest and Taxes on Average Capital

- Profit After Tax on Net Worth and
- Net Profit Before Interest and Taxes on Sales
- Net Profit After Tax on Sales

The pair-wise correlation between Debt/Equity ratio, and the profitability ratios controlling for the other independent variables, reveals a negative correlation between leverage and the parameters of profitability. This analysis has been done separately for (1) all the companies, (2) companies with debt-equity ratio of greater than 0.75, and (3) companies with debt-equity ratio of less than or equal to 0.75. In all these cases, the correlation is very low or negative. Hence, Hypothesis 2 is to be accepted, on the basis of this analysis.

Table 7
Pearson Correlation between D/E and Profitability parameters - all companies

YEAR	Correlation of D/E with -			
	PAC	PATNW	NPBITSA	NPATSA
1994	-0.38	-0.26	-0.22	-0.38
1995	-0.33	0.04	0.03	-0.2
1996	-0.42	-0.21	0.01	-0.22
1997	-0.48	-0.46	-0.09	-0.4
1998	-0.55	-0.45	-0.2	-0.46
1999	-0.56	-0.55	-0.27	-0.54
2000	-0.53	-0.65	-0.42	-0.61
2001	-0.38	-0.48	-0.32	-0.49
2002	-0.39	-0.67	-0.41	-0.6

The analysis shows an inverse relationship between parameters of leverage and profitability

Hypothesis 3: *Firms that grow substantially over a short span of time do not rely on leverage for financing their increased capital needs.*

The annualized geometric-mean growth rate of the 70 companies in the sample have been taken, and compared with the geometric-mean debt-equity ratio. The comparison results in poor correlation between the two. Further, geometric mean growth rates and geometric mean leverage ratios were compared in respect

of companies with a debt-equity ratio of greater than 0.75 and for companies with a debt-equity ratio of less than or equal to 0.75. This has been done first for the 9-year period (1994-2002) then for the 5-year period (1998-2002) and lastly for the 3-year period (2000-2002). In all these cases, the correlation has been not significant. Hence the null Hypothesis cannot be disproved and hence is accepted.

Table 8
Correlation between D/E and Asset Growth - all companies

9 year	5 year	3 year
-0.0832	-0.0861	-0.0336

The analysis was continued in respect of companies having a debt-equity ratio of greater than 0.75 in respect of the 9-year, 5-year and 3-year horizons respectively

Hypothesis 4: *Companies with high market capitalization do not work towards achieving an optimum Capital Structure over a 3-year period*

All the 70 companies in the sample are analyzed for their yearly debt-equity ratios. A 3-year moving simple average of their leverage ratios is taken by considering a given year and two previous years. This is compared with the actual leverage of the given year. An arithmetic mean of the differences between the moving average and the actual leverage of each year is taken in respect of each of the companies and analyzed. The analysis reveals that the mean difference between the moving average and the

actual debt-equity ratio is close to zero in a majority of the companies. This suggests that the debt-equity ratio converges to a 3-year moving average and indicates that most companies do adjust their capital structures to conform to a target structure. Since the sample of companies chosen for the analysis represent the highest market-capitalized companies in the country, Hypothesis 4 that companies with high market capitalization do not work towards achieving an optimum Capital Structure over a 3-year period, is rejected.

The multiple regression equation has been tried out on the data for year 2003. The following

procedure was followed:

1. Key data in respect of these 54 companies, whose figures were available in respect of 2003 as on the date of study was gathered. The data corresponds to the definitions of various independent variables as in the regression for years 1994 to 2002
2. A multiple regression was run for the year 2003 for these 54 companies, using the same model as the regression for years 1994 to 2002.

All the companies were taken up for analysis using the ENTER method and the STEPWISE METHOD. The results of this regression are summarized below:

Table 9
Summary of Results of Multiple Regression Analysis - ENTER method - 2003

	R ²	Adj. R ²	"F" test p value
All companies	0.60	0.50	0
Companies with Debt-Equity ratio of greater than 0.75	0.99	0.99	0.05
Companies with Debt-Equity ratio of less than or equal to 0.75	0.63	0.51	0

Table 10
Summary of Independent Variables and t test p values ENTER method - 2003

Ind. Variables	All Companies		Companies with Debt-Equity ratio greater than 0.75		Companies with Debt-Equity ratio less than or equal to 0.75	
	B value	"t" test p value	B value	"t" test p value	B value	"t" test p value
PAC	0.01	0.62	0.19	0.76	-0.02	0.02
PATNW	0.00	0.83	-0.05	0.83	0.03	0.00
CR	-0.01	0.95	-0.83	0.77	0.00	0.93
SOL	-0.01	0.81	-1.34	0.78	0.00	0.89
NPBITSA	0.06	0.07	0.08	0.80	0.03	0.03
NPATSA	-0.10	0.03	-0.05	0.87	-0.06	0.00
LOGASSETS	0.00	0.98	-1.62	0.75	0.12	0.13
DEPR	0.72	0.55	2.83	0.81	0.03	0.94
TAXPR	-3.01	0.02	-2.31	0.79	-0.67	0.26
ASSETGR	0.00	0.92	-0.08	0.80	-0.01	0.32

Conclusions

The conclusions from the responses in respect of the primary data analysis are that,

- There is a great deal of unanimity in respect of the following matters:

- Definition of Leverage Ratio
- Definition of Profitability
- Existence of Target Structure
- Role of Taxes in Leverage
- Role of Profitability in leverage
- Risk and profitability

- In respect of other aspects of capital structure including the factors that contribute to the decision, there is no unanimity among the respondents.

The conclusions from this analysis are in line with the inferences from the statistical analysis of the data for the last 10 years. The evidence on the hypotheses tested by statistical methods also conforms to the views given by the experts in the primary data analysis

The study finds that a combination of factors influences the leverage decision of companies. The relative importance of these factors varies from company to company. Also, the separate contribution of each of these factors to the leverage decision could also change from year to year. It would thus not be possible to draw a trend line of the contributions of these factors. However, the regression as a whole is significant in all the years and has high predictive power. The mean B coefficients of these factors when applied to the values of 2003 show a high level of accuracy in predicting the debt-equity ratio.

Companies have tended to move towards a target capital structure over a 3-year period. However, growth companies and highly profitable companies have moved away from high leverage to moderate and low leverage levels. The pecking order theory may be in vogue in the short run but this cannot be tested. The fact that debt-equity ratios move towards an average debt-equity ratio shows the prevalence of the target capital structure theory over the pecking order theory in the case of leading Indian companies.

In their analysis on influencing factors in the capital structuring decision, Harris and Raviv (1991) had concluded that "leverage increases

with fixed assets, non-debt tax shields, investment opportunities and firm size and decreases with volatility, advertising expenditure, the probability of bankruptcy, profitability and uniqueness of the product." Rajan and Zingales (1995), in their analysis of practices in various countries find that in the basic regression, tangible assets, market to book ratio, log of sales and return on assets all play a role. The present study also concludes in a similar way as regards the factors affecting leverage decisions. These factors include, size, liquidity and profitability. However, when it comes to financing new investment opportunities, this study finds that firms do not necessarily go in for increased leverage.

References

- Banerjee Sangeetha, Heshimati Almas and Wihlborg Cas (2000), 'The Dynamics of Capital Structure', *SSE/EFI Working Paper series in Economics and Finance*, 333
- Bhaduri Sumitra N(2001), 'Financial Liberalization and Managerial discretion in the Security Issue Decision: Evidence from an emerging economy', *Review of Pacific Basin Financial Markets and Policies* Vol4, No.2
- Bhaduri Sumitra N (2002), 'Determinants of Corporate Borrowing: some evidence from the Indian Corporate Structure', *Journal of Economics and Finance*, Vol.26, No.2
- Booth Lawrence, Aivazian Varonj, Demirguc-Kunt Asli and Maksinovic Vojslan(2001), 'Capital Structure in developing countries', *Journal of Finance*, Vol LVI, Feb.
- Carlsson Michael and Laseen Stefan, (2001), 'Capital Adjustment patterns in Swedish Manufacturing firms, What model do they suggest', *Working Paper*
- Casey Christopher(2001), 'Corporate Valuation, Capital Structure, Risk Management: A Stochastic DCF Approach', *European Journal of Operational Research*, 13
- de Jung Ade and Veld Chris(2001), 'An empirical analysis of Incremental Capital Structure Decisions under Managerial Entrenchment', *Journal of Banking & Finance*, 25
- Dittmar Amy K (2000), 'Why do firms repurchase stock', *Journal of Business*, Vol.73, No.3
- Ebrahim M Shahid and Mathur Ike (2001), 'The Pricing of Debt and Pareto-optimal Financing under Endogenous Bankruptcy', *International Journal of Theoretical and Applied Finance*, vol.4, No.3
- Fan Dennis KK and So Raymond W (2000), 'A Survey of Capital Structure Decisions of Hong Kong firms', *Review of Pacific Basin Financial Markets and Policies*, Vol.3, No.3
- Graflund Andreas (2000), 'Dynamic Capital Structure : the

Case of Hufvudstadin', *Working Papers*, 2000, Lund University

Hall Graham, Hutchinson Patrick and Michaelas Nicos (2000), 'Industry Effects on the Determinants of Unquoted SME's Capital Structure', *International Journal of Economics of Business*, Vol7, No.3

Khambata Dara and Reeb David M (2000), 'Financial aspects of the multinational firm', *Multinational Business Review*, Spring

Krishnaswamy Sudha and Subramaniam Venkat (2000), 'The impact of Capital Structure on Efficient Sourcing and Strategic Behaviour', *The Financial Review*, 35, 9-30

Mahrt-Smith Jan (2000), 'The Interaction of Capital Structure and Ownership Structure', *London School of Business, Working Paper*

Mohanty Pitabos (2000), 'Information Asymmetry and Capital Structure: an Empirical Investigation in to the Capital Structure of Indian Companies', *ICFAI Journal of Applied Finance*, Vol.6

Morellec Erwan (2001), 'Asset Liquidity, Capital Structure and Secured Debt', *Journal of Financial Economics*, 61

Myers Stewart C (2001), 'Capital Structure', *Journal of Economic Perspectives*, Vol.15, 2, Spring

Nivorzhinki Eugene (2000), 'The Dynamics of Capital Structure in Transition Economies', *Department of Economics, Gothenburg University*

Ozkan Ayudin (2001), 'Determinants of Capital Structure and Adjustments to Long Run Target: Evidence from UK Panel data', *Journal of Business Finance and Accounting*, Jan-Mar

Philosophos Leonid and Philosophos Vladimir (1999), 'Optimization of Corporate Capital Structure-a Probabilistic Bayesian Approach', *International Review of Financial Analysts*, 8:3

Romano Claudio A, Tanewski George A, Snyrnios Kosmos X (2000), 'Capital Structure Decision Making: A Model for Family Business', *Journal of Business Venturing*, 16

Shyam Sunder Lakshmi and Myers Stewart (1999), 'Testing Static Trade-off Against Pecking Order Models of Capital Structure', *Journal of Financial Economics*, 51

Singh Kuljot, Hodder James E (2000), 'Multinational Capital Structure and Financial Flexibility', *Journal of International Money*, 19

Stulz Rene M (1999), 'What's wrong with Modern Capital Budgeting', *Financial Practice and Education*, Fall/Winter

Wald K John (1999), 'How firm characteristics affect Capital Structure - an International Comparison', *Journal of Financial Research*, Summer

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