

DETERMINANTS OF CAPITAL STRUCTURE WITH SPECIAL REFERENCE TO INDIAN PHARMACEUTICAL SECTOR: PANEL DATA ANALYSIS

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Abstract *Capital structure decision is one of the most crucial decisions for any firm. In the light of the above fact the determinants of capital structure were discussed in this paper by way of taking 24 companies from Indian pharmaceutical sector. In this study the influence of independent variables such as tangibility ratio, return on total assets, net profit margin, and accumulated depreciation to total assets were analyzed with respect to the dependent variable of leverage ratio. From the analysis the relationship between the independent variable and dependent variable has been exhibited.*

Keyword: *Capital Structure, Leverage, Correlation, Multiple Regressions*

INTRODUCTION

An optimum mix of ingredients of any substance will always yield better result. The same logic can be extended to the concept of capital structure of the firm where the right proportion of different types of capital in the capital structure of the firm would definitely lead to maximize the wealth of share holders. The basic objective of the firm has to cater the needs of the shareholders so as to enhance the value of the firm with the help of optimum aggregate cost of capital. In order to obtain the above objective, the determination of optimum capital structure is one of the basic criteria to facilitate in terms of policy decision making with respect to the components of capital to be occupied in the capital structure by finance managers. As the wealth maximization of the shareholders is the basic objective of firm, the relevance of capital structure policy of the firm has become more attractive as well as has gained momentum among the academicians, researchers, and financial practitioners. As per the definition of capital structure is concerned, the inference can be made in such a way that the optimum mix of long term capital so as to enhance the value of the firm. The choice of appropriate capital structure depends on number of factors such as nature of business, purpose of financing, period of financing, market sentiments, control aspect, attitude of the investors, and so on. It is generally believed that the capital structure of any firm can be built with debt,

equity, and preference shares. Since the preference shares are not the major source of capital of Indian companies, the study is restricted to analyse the firm's capital structure with respect to debt equity mix. A firm is said to be trading on equity when the firm has the ability to maximize the return to the share holders by way of employing the adequate debt in the capital structure. By way of adopting the optimum mix of debt and equity in the structure, wealth maximization can be achieved through the generation of tax shield benefits from debt financing. Now the question is whether such an optimal capital structure exists in reality or not and what are the key factors that affect such optimal capital structure. These are the questions to be answered by the researcher. Hence the objective of the paper is about to make an attempt in determining potential factors which have an impact on capital structure so that the financial manager can benefit from this to make up an optimal mix of debt and equity to maximize the wealth of shareholders.

LITERATURE REVIEW

Harris M. and Raviv A. (1990) identified the variables like size, tangibility, growth, bankruptcy, and assets had an influence on determining capital structure or leverage ratio.

Shah A and Hijazi T. (2004) found that the usage of debt was more with respect to the larger firms in composition with smaller firms. The reason was attributed as such the

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larger firm would have the tendency to bear higher amount of risk over the firm had the curse to go for bankruptcy but for the smaller firm, they may not have in the position to bear the risk of bankruptcy so that the firms tend to be use larger amount of debt.

Song A (2005) tested the variables with capital structure decision to identify the relationship between the variables and the capital structure formation. He found that tangibility and size showed different direction of relationship when compared with long term debt and short term debt. Tangibility and size were positively correlated with long term debt whereas the same variable was negatively correlated short term debt.

Lima (2009) found that size, value of asset, and financial cost have significant influence on financial decision of the company which in term has an impact on capital structure of the firm. As far as the key finding is concerned, the larger firms would go for more borrowing in comparison with smaller firms.

Dewaelheyns and Hulle (2009) analysed that a firm's finance decision was not only influenced by external financing but also by internal financing. The firms are willing to continue to expand the business across the world for want of generating internal finance and there by the firms with less dependent on external source of borrowing.

M.A. Suresh Kumar, R. Himachalapathy and R. Saravanan (2012) found that the variables agency cost of equity, operating leverage, growth rate, bankruptcy risk, tangibility, and debt service capacity proved to be statistically significant determinants of capital structure. Most of the determinants have shown the desire sign as warranted by different theories.

RESEARCH DESIGN-METHODOLOGY

The study was based on secondary data. The data collected from the annual report of companies concerned listed in the stock exchange. The study has undertaken with sample of 24 companies from the pharmaceutical sector. Among the listed companies, the above sample was collected on the basis of their consistency of performance, data availability and favorable accounting figures. The companies showing inconsistent observations on the balance sheet and profit and loss account were excluded to avoid the complication in terms of statistical analysis.

Sample (Study Units)

The companies shown in Table 1 have been taken as sample for the study purpose.

Table 1: List of Companies taken for the Study

S. No	Name of the Company
1	Piramal Health
2	Dr Reddys Labs
3	Cipla
4	Sterling Bio
5	Sun Pharma
6	Lupin
7	Cadila Health
8	Orchid Chemical
9	Strides Arcolab
10	Glenmark
11	Wockhardt
12	Divis Labs
13	Biocon
14	GlaxoSmithKline
15	Ipca Labs
16	Torrent Pharma
17	Nectar Life
18	Ind-Swift Labs
19	Elder Pharma
20	Pfizer
21	Dishman Pharma
22	Jupiter Bio
23	Sanofi India
24	JB Chemicals

STATEMENT OF HYPOTHESIS

The following hypotheses were tested between the independent variable and the capital structure of listed pharmaceutical companies.

H0₁: There is no significant relation between the return on total assets and leverage ratio.

H0₂: There is no significant relation between the net profit margin and leverage ratio.

H0₃: There is no significant relation between the tangibility ratio and leverage ratio.

H0₄: There is no significant relation between accumulated depreciation to total assets ratio and leverage ratio.

MODEL SPECIFICATION

The sample of the study was applied into multiple regression analysis using least square estimation method and the

methodology adopted in this study was similar to the model adopted by Dodd (1986) and Chowdhry (2004) to test the determinants of capital structure. The estimation method has the following assumption:

- There is a linear relationship between the dependent and independent variable.
- There is no correlation between the residual term and independent variable.

According to the above model, the capital structure is determined with the help of following equation:

$$LR = a + \alpha_1 \beta_1 + \alpha_2 \beta_2 + \alpha_3 \beta_3 + \alpha_4 \beta_4$$

where

LR → Dependent variable (Leverage Ratio)

β_1 → Independent variable 1 (Tangibility Ratio)

β_2 → Independent variable 2 (Return on Total Assets)

β_3 → Independent variable 3 (Accumulated depreciation to total assets ratio)

β_4 → Independent variable 4 (Net profit Margin)

a → Constant term

α → Co-efficient of the model

MEASUREMENT OF VARIABLES

Leverage Ratio

The leverage ratio is measured as ratio of total debt to total assets. The ratio indicates the contribution of long term debt towards the total assets. The significance of the ratio implies that the employability of debt in the capital structure to finance the total assets. When the debt is more than equity in financing the total assets, the firm is said to be levered firm and the ratio of this kind will help to identify whether firm is levered or unlevered.

Return on Total Assets

This ratio is measured as ratio of profit after tax to total assets. The ratio indicates the profitability of the firm in terms of its investment. This ratio indicates the percentage of return earned on the total assets. Higher the ratio indicates higher the efficiency of the firm in generating profit out of its total assets.

Net Profit Margin

The ratio is measured as the ratio of net profit to total sales. This ratio indicates the profitability of the firm in terms of its sales. The ratio indicates the percentage of return earned on

the sales. Higher the ratio indicates the efficiency of the firm in generating profit out of sales.

Total Depreciation to Total Assets

The ratio is measured as the ratio of accumulated depreciation to total assets. The ratio indicates the percentage of total depreciation occupied towards total assets. Since the depreciation is not real cash out flow, provision of depreciation acts as a tax shield so that the profit available to the shareholder would be larger as and when the depreciation or accumulated provision is high, the portion of funds available in terms of Profit before Interest and Tax (PBIT) will be low. Financial leverage is measured as the change in earnings before interest and tax to earnings after tax (EAT). Higher depreciation leads to lower EBIT which will result in lower profit after tax.

Tangibility Ratio

Capital structure theory generally state that the tangibility has positive impact of leverage. If the firm's tangible asset is high, then the asset can be used as collateral and thereby the risk of the lenders will become lesser hence high rate of tangible assets is expected to give rise to higher leverage ratio. Williamson (1988), Harris and Ravir (1990) have come out with the result that the leverage is positively correlated in the tangibility. Normally tangibility ratio indicates the proportion of fixed assets to total assets. As fixed assets are high, then the assets could have been pumped through more of debt and hence the leverage ratio would be high. The indication is that there is a positive relationship between tangibility ratio and capital structure.

EMPIRICAL ANALYSIS

Dependent Variable: Leverage

Since the study undergoes the analysis of relationship between the dependent variable and independent variables, the techniques of correlation and multiple regressions are used. As far as correlation is concerned, it investigates the relationship if any between the dependent variable and independent variable in terms of +ve relation and –ve relation where as the regression analysis estimates the extent to which the independent variable has an impact on dependent variable.

Before testing the regression analysis the study has made an attempt in analyzing correlation between the variable to verify multicollinearity problem. In order to identify the existence of multicollinearity among the variables, Pearson correlation co-efficient is used as an indicator and it is believed that if any

Table 2: Showing the Correlation between the Select Variables of Pharmaceutical Companies

	Leverage	Tangibility Ratio	Return on Total Assets	Accumulated Depreciation/ Total Assets	Net Profit Margin
Leverage	1.000	.324	-.575	.015	-.242
Tangibility Ratio	.324	1.000	-.139	.448	-.204
Return on Total Assets	-.575	-.139	1.000	-.055	.737
Accumulated Depreciation/ Total Assets	.015	.448	-.055	1.000	-.099
Net Profit Margin	-.242	-.204	.737	-.099	1.000

*Source: Computed Data

Table 3: Showing the Model Summary

Model	R	R Square	Adjusted R Square	Change Statistics						Durbin-Watson
				Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	
1	.712a	.506	.489	.17081	.506	29.507	4	115	.000	1.645

*Source: Computed Data

a. Predictors: (Constant), net profit margin, accumulated depreciation/ total assets, tangibility ratio, return on total assets

b. Dependent Variable: leverage

Table 4: Showing the ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	3.444	4	.861	29.507	.000a
Residual	3.355	115	.029		
Total	6.799	119			

*Source: computed data

a. Predictors: (Constant), net profit margin, accumulated depreciation/ total assets, tangibility ratio, return on total assets

b. Dependent Variable: leverage

Table 5: Showing the Regression Co-Efficient

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.328	.046		7.143	.000
	Tangibility Ratio	.451	.092	.365	4.894	.000
	Return on Total Assets	-.015	.002	-.873	-8.998	.000
	Accumulated Depreciation/ Total Assets	-.275	.134	-.151	-2.060	.042
	Net Profit Margin	.002	.000	.461	4.702	.000

*Source: Computed Data

two variables have a positive correlation greater than 0.80 i.e. 80% then the variables have multicollinearity problem. As far as the study analysis is concerned, none of the pair wise co-efficient of correlation is .80 or large. Almost all the pair wise correlation matrix is less than 0.50 except the pair of Return on Total Assets and Net profit Margin (Table 2), which indicates the variables are not strongly correlated to one another. Since multicollinearity affects the validity of the model, the study is cautious enough to eliminate the multicollinearity problem as much as possible.

After checking the multicollinearity problem, the study investigates to what extent the dependent variable is explained by independent variable. Explanatory power of the model is indicated by R^2 (Co-efficient of determination). The model explains around 51% (Table 3) of the variation in the dependent variable. The F value is a measure of overall significance of the estimated regression and also test of significance. Since the F value is significant at 1% level (Table 3), it is proved that the relationship between the capital structure and determinants are linear.

The following equation shows through empirical model of impact of independent variables on capital structure:

$$Y = a + \alpha_1 \beta_1 + \alpha_2 \beta_2 + \alpha_3 \beta_3 + \alpha_4 \beta_4$$

$$\text{Leverage} = 0.328 + 0.451 \text{ TR} - 0.015 \text{ ROT} - .275 \text{ ADTA} + .02 \text{ NPM (Table 4)}$$

Table 5 shows the result of summary of regression. From Table 5 it is observed that all four variables are found to be significant in terms of determining the capital structure. As far as the analysis of impact is concerned, tangibility ratio, and net profit margin show the positive relationship with capital structure whereas return on total assets and accumulated depreciation to total assets ratio depict the negative relationship with capital structure.

Tangibility Ratio

The t-statistic is used to examine the relationship between the tangibility ratio and leverage. By rule, when the calculated value t is greater than t-critic value the hypothesis is rejected and if not the case, the hypothesis is accepted. As far as the result (Table 5) is concerned, the t value is 4.894 which is

greater than t-critic and hence the null hypothesis is rejected in such a way to prove that there is a significant relation between tangibility ratio and leverage.

The relationship between the ratios is positive which indicates that when tangibility ratio is increased, there is a probability of increment in terms of leverage. In the equation, the co-efficient of tangibility ratio is 0.451 means the leverage increases by 0.45% as the tangibility ratio is increased by 1%. This is because; higher percentage of fixed assets in the total assets may warrant the firm to borrow more in order to finance the fixed assets.

Return on Total Assets

The relationship between return on total assets and leverage is negative indicating that when return on total assets increases the chances of leverage to get lower. The co-efficient of return on total assets is -0.015 (Table 5) indicating that the leverage decreases by 0.015% as the return on total assets is increased by 1%. The reason may be attributed to this change is that the profitable firm can rely on internal source of finance rather than external source of financing so that the firm will have less amount of leverage. As far as the relationship is concerned, it is found to be significant even at 1% level of significant indicating the value of 0.000

Non-Debt Tax Shield (NDTS)

Depreciation is regarded as non-debt tax shield. Since debt is used as tax shield in terms of interest payment, the provision of depreciation for fixed assets occupies an important place as the substitute for interest payment. As long as the provision of depreciation is more, then the firm may have hesitation in procuring debt for its operation to utilize the interest payment out of the debt as tax shield. Hence there is negative relationship between the depreciation and leverage. The summary of regression (Table 5) shows that the beta co-efficient of total depreciation to total assets is -0.275 indicating that the leverage decreases by 0.275% as the total depreciation is increased by 1%. Since the p value is 0.042 (Table 5) which is significant at 5% level of significance, the relationship between the total depreciation to total assets and leverage is found to be significant.

Table 6: Showing the Impact of Select Independent Variables on Dependent Variable Leverage

Dependent Variable	Independent Variable	Status of Hypothesis	Level of significance
Leverage	Tangibility Ratio	Rejected	1% level of significance
	Return on Total Assets	Rejected	1% level of significance
	Accumulated Depreciation/ Total Assets	Rejected	1% level of significance
	Net Profit Margin	Rejected	1% level of significance

Net Profit Margin

The beta co-efficient of net profit margin is 0.002 (Table 5) indicating that the leverage increases by 0.002% as the net profit margin is increased by 1%. The reason is that as long as the firm enjoys profit, the firm is said to have stability income and the stable income may instigate the firm to procure debt for its operation in the future so that the net profit margin is directly proportionate to leverage. The positive relationship of the ratio is said to be significant at 1% level of significance because the p value is 0.000 (Table 5).

CONCLUSION

The determinants of capital structure have been taken for analysis in this study. Since the study tests the influence of determinants on capital structure, multiple regression analysis is carried out for the selected pharmaceutical companies. The independent variables like tangibility ratio, return on total assets, total depreciation to total assets, and net profit margin are found to be statically significant determinants of capital structure. The beta co-efficient associated with the variable are statistically significant at 1% level. The above fact concludes that the above said variables play a significant role in determining the capital structure of the pharmaceutical companies in India. Hence it is concluded that the financial variables like tangibility ratio, return on total assets, total depreciation to total assets, and net profit margin are the major determinants of the capital structure of the Indian pharmaceutical sector.

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