Capital Structure Determinants - An Empirical Analysis of Pharmaceutical Companies in NIFTY

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ABSTRACT

Capital structure of the firm is decided by various factors, and its decisions are crucial for every business organization as maximization of firm value is a difficult process that requires a balanced mix of debt and equity, taking into consideration the costs and benefits related with these securities. Capital structure helps in ensuring that the organizations operations are sustainable, even though the factors that contribute to the performance of an organization are large in number, still capital structure determinants play an important role. It is therefore necessary to take into account the factors that put up the capital structure mix in its operations. Therefore, present study aims to explore the factors that impact the capital structure pharmaceutical companies in NIFTY. Using multiple regression analysis, the leverage behavior of pharmaceutical companies in NIFTY was examined for the period of ten years starting from 2011 to 2020. The variables used are short-term debt, long-term debt and total debt and are dependent, and Profitability, size, growth, tangibility, business risk, NDTS and liquidity are taken as independent variables. The results suggest that variables like profitability, firm-size, growth rate and liquidity are key determinants of capital structure and short-term debt is found to be an important financing source of Indian pharmaceutical companies.

Key words: Capital structure, leverage, debt, NIFTY, determinants of capital structure

Introduction

Capital structure is a vital decision that a finance manager makes when a company starts its operations. These decisions determine the overall cost of capital and ultimately the market value of firm. Capital structure of a firm is to be decided whenever it starts its operations or needs more funds to finance its operations. The finance manager has to evaluate the various merits and demerits of different sources of long-term finance and then select the one which helps in achieving the optimal capital mix or the one that minimizes overall cost of capital. A firm's capital structure can be used to determine the optimal mix of capital and minimize overall cost of capital. Finally, the financial perspective of every firm is to maximize market value and, in the meantime minimizing its cost of capital while determining its capital structure.

The leverage/capital structure of a company mostly consists of various forms of debt, including common and preferred stock required to finance various long-term projects of the firm. In other words, capital structure of a company is basically the composition of debt and equity, equity holders are the owners and have a long-term bearing on the functioning of the firm, whereas debt holders are creditors and have no long-term obligation to the firm as they are more intended in the timely repayment of their principal and interest amount. Equity holders want regular dividend

payments and the firm ought to have more retained earnings to finance their cash outflows. therefore, the firm's decision on capital structure has a significant impact on the financial structure of the firm.

Financial leverage is a measure of a firm's debt to equity ratio. It shows the proportion of the firm's total assets and debt to its total income. A firm that has both debt and equity is referred to as levered firm. Unlevered firm refers to a firm that has only equity. The key difference is that, while a firm with both debt and equity can raise capital, it cannot do so without incurring the associated costs of financial distress. Equity financing is a type of loan that gives a firm more flexibility and higher returns on its assets. It influences a firm's decision making and therefore affects the cost of debt. Thus, an optimal capital mix is one of the significant factors of firm's success.

Literature Review

The review of literature comprises key modern theories of capital structure and examples of empirical evidence from all over the globe.

Modigliani and Miller (1958) state that the firm's value is independent of its capital structure under perfect capital markets with no corporate taxes, no transaction, and agency cost, and there is a perfect disclosure of all the credible information. Kraus and Litzenberger (1973) state that the optimal capital structure reveals a trade-off between the tax benefits of debt and the cost of financial distress associated with the debt. In other words, as per the trade-off theory, the optimal leverage is attained by developing a balance between the tax-free benefit of debt and the distress cost of debt. Myers and Majluf (1984) explained the pecking order priority of firms: funding starts from internal financing or retained earnings to debt issuance and finally, equity as a last resort to meet their funding needs. Jensen and Meckling (1976) explained the agency cost that includes monitoring expenditures by the principal, bonding expenditure by the agent, and residual loss. This theory assumes that agents may not always act in the best interest of the principals; this leads to a conflict of interest between agents and principals, resulting in a loss in return to the principals.

Donaldson (1985) argues that the dependence on debt or equity changes as the firm's stock ownership changes and results in changes in firm's financial goals. Harris and Raviv (1991) and Rajan and Zingales (1995) summarized many studies and suggested that most studies are sharing the following variables for determination of capital structure: tangibility of assets, non-debt tax shields (NDTSs), investment opportunities, firm size, volatility, advertisement expenses, R&D expenses, probability of bankruptcy, profitability, uniqueness, etc. Graham and Harvey (2001) argue that firms consider price increase before issuing stock and credit rating before issuing debt. Cook and Tang (2010) state that firms adjust their capital structure to their target structure quickly in good macroeconomic conditions.

Mishra (2011) argues that leverage is affected by profitability, asset structure and tax. Bhayani (2006) studies the impact of leverage on shareholders' return in the Indian cement industry. De Wet (2006) studies the relationship between firm value and optimal gearing level. Fama and French (2002) find a positive relationship between leverage and profitability. Leland and Toft (1996) find a positive relationship between leverage and debt maturity. Mukherjee and Mahakud (2012) find market to book ratio as a proxy for growth prospects and a significant factor for determining the capital structure of Indian manufacturing companies. Bhaduri (2002) argues that optimal capital

structure is determined by variables such as cash flow, growth, size, restructuring costs, products and industry characteristics.

Rasoolpur (2012) argues that uniqueness and liquidity determine the capital structure of the Indian corporate sector. Adhegaonkar and Indi (2012) find that tangibility, NDTS, and interest coverage ratio are significant determinants of capital structure. Majumdar (2012) argues that tangibility, growth, profitability, and risk are significant determinants of capital structure. Mukherjee and Mahakud (2010) find that market to book ratio, size, profitability and tangibility are significant determinants. Sinha and Ghosh (2010) argue that default spread, growth, size and profitability are significant determinants. Rajagopal (2009) argues that fixed asset ratio, size, profitability, market-to-book ratio, NDTSs, and earnings volatility are determinants of capital structure. Bhole and Mahakud (2004) argue that debt cost, equity cost, size, the collateral value of assets, liquidity and NDTS are significant determinants of capital structure in India. Bayrakdaroglu et al. (2013) find that size, profitability, tangibility, NDTS, inflation and tax are significant determinants of the Turkish capital structure

Purohit and Khanna (2012) argue that growth, collateral value of assets and R&D expenditure are significant determinants of capital structure. Akhtar (2005) argues that growth, profitability, size, collateral value of assets, bankruptcy cost and level of geographical diversification are determinants of capital structure in Australia. Chen and Strange (2005) argue that profitability, size and risk are determinants of capital structure for Chinese listed companies. Lim (2012) finds that profitability, size, NDTSs, earnings volatility and noncirculating shares are major determinants of capital structure. According to Cortez and Susanto (2012), tangibility, profitability and NDTS are significant factors that affect the capital structure, while, Kouki and Said (2012) find that size, profitability, growth opportunities and NDTS are important capital structure determinants.

To sum up, empirical evidence provides varied and contradictory results regarding the determinants of capital structure and their statistical significance and relationship. Also, there are very few studies that empirically study this relationship in developing economies like India. The present study extends the literature on the determinants of capital structure by empirically evaluating the determinants of capital structure in pharmaceutical companies listed on the National Stock Exchange.

Rationale of the Study

One of the most significant factors that influences a firm's success is its capital structure. A large number of firms become bankrupt due to the overburden of their debt or improper capital structure. In order to have an optimal capital structure, firms need to analyse their various factors that will help them to achieve their goals and ultimately increases the market value of firm. This becomes imperative since it will help them minimize their cost of capital and maximize their market value. In addition, the factors that determine a fir m's leverage level may not be within the firm's control. This means that a comprehensive study is needed to analyse the various factors that affect a firm's leverage levels.

Objectives of the study

The main objectives of the study are:

- To study the determinants of capital structure of pharmaceutical companies listed in NIFTY.
- The evaluate the trend of determinants of the capital structure during the last ten years of pharmaceutical companies in NIFTY.

4.0 Methodology

This section provides information about the sources of data, sample size, measurement of the variables, hypothesis formulation and model selection and discussion of different measures of the variables.

4.1 Source of Data

This study is based on the financial data of sample companies taken from Prowess- Centre for Monitoring Indian Economy (CMIE) – database.

4.2 Sample

The sample used in the study consists of the data from the year 2011 to 2020 of pharmaceutical companies listed in NIFTY.

Table 1: Definition of Variables			
S. No.	Variables	Code	Measurement
1.	Capital Structure	*STD/LTD/TD*	(Short-term Debt/Total Assets) (Long-term Debt/Total Assets) (Total Debt/ Total Assets)
2.	Profitability	*PROF*	Return on Assets
3.	Size	*SIZE*	Log of Total Assets
4.	Growth Opportunity	*GROW*	Percentage Change in Total Assets
5.	Tangibility	*TANG*	Fixed Assets/Total Assets
6.	Risk	*RISK*	(SD of EBIT)/Total Assets
7.	Non-Debt Tax Shield	*NDTS*	Depreciation/Total Assets
8	Liquidity	*LIQ*	Current Assets/Current Liabilities

Variables

Dependent Variables

Total-Debt Ratio: Total debt ratio is a financial ratio that measures the percentage of a company's assets that are provided in comparison to debt.

Long-Term Debt Ratio: The Long-term debt to total assets ratio measures the portion of the company's total assets that is financed from long-term debt. The value differs from industry to industry and company to company. Comparing the ratio with industry peers is a better benchmark.

Short-Term Debt Ratio: Short-term debt is shown in the current liabilities of a company's balance sheet. This account comprises may debt or repayments incurred by a company that is due within one year. The debt in this account is usually made up of short-term bank loans taken by a company. The ratio indicates whether a firm will be able to satisfy its immediate financial obligations.

3.0 Empirical Determinants of Capital Structure

Theoretical constructs of any empirical research are proxied indirectly through the use of firm characteristics. The links between the theoretical determinants and the variables chosen in the empirical studies are complex. In the following, profitability, firm size, growth opportunities, tangibility of assets, risk, non-debt tax shield and liquidity are discussed.

3.1 Profitability

Profitability is the financial benefit that is realized when the amount of revenue gained from a business activity exceeds the expenditure, costs, and taxes needed to sustain the activity. Any profit that is gained goes to the owners of the business, who may or may not decide to spend it on the business. There are conflicting theoretical predictions on the effects of profitability on leverage. Following the pecking-order theory, profitable firms, which have access to retained profits, can use these for firm financing rather than accessing outside sources. Jensen (1986) predicts a positive relationship between profitability and financial leverage if the market for corporate control is effective because debt reduces the free cash flow generated by profitability.

3.2 Firm Size

There are two conflicting viewpoints about the relationship of size to leverage of a firm. First, large firms don't consider the direct bankruptcy costs as an active variable in deciding the level of leverage as these costs are fixed by constitution and constitute a smaller proportion of the total firm's value. And also, larger firms being more diversified have lesser chances of bankruptcy (Titman and Wessels 1988). Following this, one may expect a positive relationship between size and leverage of a firm. Second, contrary to first view, Rajan and Zingales (1995) argue that there is less asymmetrical information about the larger firms. This reduces the chances of undervaluation of the new equity issue and thus encourages the large firms to use equity financing. This means that there is negative relationship between size and leverage of a firm. Following Rajan and Zingales (1995), a negative relationship between size and leverage of the firm is expected.

3.2 Growth Opportunities

Many studies proved that growth opportunities play important role in determining the capital structure. Myer (1977) discussed that the role of growth opportunity in effect of the nature and the composition of capital structure, which high growth opportunities firms most likely will suffer from appearing the debt problem and this will lead to arise risks accompanying with debt of which the firm gives up the profitable investment opportunities. In addition, the firm will be relying on the equity sources more than debt source to face the risks and to finance expected growth opportunities, thus it will reflect positively on firm performance (Hovakimian, Opler and Titman, 2001). It is used by many scholars in their studies and for the purpose of this research; it is defined in term of percentage change in total assets.

3.3 Tangibility of Assets

As Booth et al. (2001) state: "The more tangible the firm's assets, the greater its ability to issue secured debt." A firm with large amount of fixed asset can borrow at relatively lower rate of interest by providing the security of these assets to creditors. Having the incentive of getting debt at lower interest rate, a firm with higher percentage of fixed asset is expected to borrow more as compared to a firm whose cost of borrowing is higher because of having less fixed assets. Thus a positive relationship between tangibility of assets and leverage is expected.

3.4 Business Risk

This variable 'Business Risk' has been used as the proxy for the chances of financial distress. Financial distress is a condition where a company has difficulty paying off its financial obligations to its creditors

3.5 Non- Debt Tax Shield

The tax deduction in the firm's income on account of depreciation, expenditure on research and development is called Non-Debt Tax Shields (NDTS) as it is allowed on non-debt items. Firm issues debt so as to get a tax shield on interest. The tax shield motive of issuing debt is weakened by the tax shield availed by the non-debt items. So the firms with larger NDTS are expected to use less debt in their capital structure.

3.6 Liquidity

Maintaining adequate liquidity is much more than a corporate goal and is a condition without which a firm cannot ensure the continuity of a business. According to the previous studies, higher levels of liquidity in a firm could lead to agent-principal conflict. It is stated that managers would exploit the resources to increase their individual benefits rather than allocating resources in investment opportunities which enhances the firm's profitability. Conversely, states that companies with greater levels of liquidity are more flexible in terms of providing short-term financing which could lead to a higher profitability.

4.3 Model of Study

The study examines the determinants of capital structure of pharmaceutical companies in NIFTY. Three linear multiple regression model is used in this study, the study uses three different measures of capital structure. They are long-term debt ratio (LTDR), short-term debt ratio (STDR) and total debt ratio (TDR). The independent variables used in the study include profitability (PROF), size (SIZE), growth opportunity (GROW), risk (RISK), non-debt tax shield (NDTS) and liquidity (LIQ). Based on the dependent variables three multiple regression models have been used to estimate the determinants of capital structure. The models are as follows.

Model 1 : $TD_{i,t} = \alpha + \beta_1 PROF_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 GROW_{i,t} + \beta_4 TANG_{i,t} + \beta_5 RISK_{i,e} + \beta_6 NDTS_{i,t} + \beta_7 LIQ_{i,t} + \varepsilon_{i,t}$

Model 2 : $LTD_{i,t} = \alpha + \beta_1 PROF_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 GROW_{i,t} + \beta_4 TANG_{i,t} + \beta_5 RISK_{i,e} + \beta_6 NDTS_{i,t} + \beta_7 LIQ_{i,t} + \varepsilon_{i,t}$

Model 3 : $STD_{i,t} = \alpha + \beta_1 PROF_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 GROW_{i,t} + \beta_4 TANG_{i,t} + \beta_5 RISK_{i,e} + \beta_6 NDTS_{i,t} + \beta_7 LIQ_{i,t} + \varepsilon_{i,t}$

Where **i** represent the company; **t** represents the time: **α** stands for model constant; **β** states the coefficient of independent variables and **$\alpha_{i,t}$** represent the error term, which is assumed to have normal distribution.

Results and Discussions

Descriptive Statistics

Table 3 presents the descriptive statistics of the various variables used in the study. It can be seen from the value of the standard deviation that there is considerable variation in the sample which is manageable for this analysis.

Table 3: Descriptive Statistics					
Variables	N	Mean	Std. Deviation	Minimum	Maximum
TD	40	5.38	8.02	0.26	25.80
LTD	40	0.04	0.07	0.00	0.37
STD	40	0.17	0.18	0.01	0.58
PROF	40	0.12	1.13	0.19	0.27
SIZE	40	10.20	1.56	7.32	12.20
Growth	40	78.83	29.63	0.00	109.06
TANG	40	0.97	.64	0.16	3.99
RISK	40	0.19	0.32	-0.04	1.21
NDTS	40	0.04	0.02	0.00	0.16
LIQ	40	0.35	0.49	0.06	1.12

The brief description of major variables employed in the present study is as;

Profitability

The average value of profitability (PRO) is 0.12. This figure indicates that around 12% of EBITD accounts for total assets in the profitability ratio (PRO), the results show a decent performance during the reference period by pharmaceutical companies. However, their standard deviation value of (1.312) reveals higher level of dispersion, indicating that the spread of data is not normal. The minimum and maximum value of profitability is 0.19 and 0.28 respectively and the value of standard deviation (1.13) which is above the mean (0.12), indicates that the profitability is highly volatile.

Firm Size

The mean value of size proxy as measured by natural logarithm of total assets (SIZE) is (10.20). The mean figure of size shows the relative importance of tangible assets in a firm's balance sheet. Moreover, variability in data is low as its mean is quite higher than the respective standard deviation. These findings reveal that pharmaceutical companies in nifty are larger and likely to be more diversified

Growth Opportunities

The average value of growth opportunities (GROWTH) as calculated by the annual percentage change in total assets is (78.83), growth is non-volatile, because the value of standard deviation is less than its mean value. Fluctuation in growth opportunities of pharmaceutical companies is significant with a maximum of (109.06) and a minimum of (0.00). this reflects relatively a higher dispersion in data, thus indicating greater variability in data.

Tangibility

On average the fixed assets of sample companies accounted for 97% of their total assets with a standard deviation of 64%. Minimum and maximum tangibility ratio across pharmaceutical companies ranges from mere (0.16) to as much as (3.99). this indicates that tangibility is not volatile, because standard deviation is below mean, therefore the spread of data is normal. Mean value of tangibility shows that companies can enhance their borrowing capacity by using fixed assets as collateral.

Risk

The mean value of business risk as measured by (SD of EBIT/TA) is 0.19. risk is volatile because value of standard deviation is more than mean value. Fluctuation in business risk of pharmaceutical companies is significant with maximum as 1.21 and minimum as 0.04. this reflects relatively higher dispersion in data, thus indicating variability in data.

Liquidity

The average value of liquidity as measured by ratio of current assets to current liabilities is 35%. Liquidity is highly volatile as standard deviation is above mean.

Non-Debt Tax Shield

Firms favour debt because they benefit from the tax shield due to interest deductibility. However, non-debt tax shield such as tax deductions from depreciation and

investment tax credits are treated as substitutes for the tax benefits of debt financing. It has been argued in the literature that firms do not favour debt if non-debt tax shield is large enough to provide a shield from tax liability. Nevertheless, the ratio of depreciation to total assets is used as a measure of NDTS in this study. On average depreciation accounted for 4% of the total fixed assets with a minimum value of zero and a maximum value of 0.16. The standard deviation is 2%. It shows that NDTS is not volatile because the standard deviation is less than the mean value.

Table 4 represents the correlation matrix of all the independent variables. It was found that there is no statistically high degree of correlation between any of the explanatory variables and hence the regression models were free from the problem of multicollinearity.

Table 4: Matrix of Correlation										
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) TD	1									
(2) LTD	0.0391	1								
(3) STD	0.587	-0.134	1							
(4) PROF	-0.032	-0.807	-0.739	1						
(5) SIZE	-0.879	-0.16	-0.354	0.008	1					
(6) GROW	-0.061	-0.023	0.045	-0.078	0.228	1				
(7) TANG	-0.057	0.309	-0.282	0.017	-0.088	-0.167	1			
(8)RISK	0.96	-0.057	0.176	0.107	-0.846	-0.065	0.956	1		
(9) NDTS	-0.087	-0.02	0.241	-0.011	-0.863	-0.066	0.954	0.937	1	
(10) LIQ	0.942	-0.166	0.054	0.139	-0.755	-0.078	0.971	0.957	0.941	1

Results of Model 1

R^2-value of (0.409) shows the combined effect of Model 1, and indicates that 41% of variation of dependent variables being analysed is explained by variance of independent variables.

In this model, it is found that the estimated coefficient of PROF turns out to be negative and statistically significant with TD, thus associating high debt levels with lower profitability.

Regression Analysis			
Variables	Model 1 (TD)	Model 2 (LTD)	Model 3 (STD)
PROF	-0.00775***	-0.00253***	-0.0043***
	0.003	0	0.032
SIZE	0.0291***	0.00062***	-0.029***
	0.061	0.006	0.373
GROW	0.00221***	0.00229***	0
	0.372	0.781	0.715
TANG	-0.0931**	0.238***	-0.032
	0.175	0.13	-0.667***
RISK	6.37	0.038***	0.463

	0.011	0.658	0.088
NDTS	73.079	1.291	0.977***
	0	0.015	0.532
LIQ	-0.0387***	-0.0075***	-0.0531***
	0.89	0.459***	0.094
(Constant)	6.433	0.452	0.691
	0.027	0	0.032
observation	40	40	40
R^2	0.409	0.339	0.331

SIZE and *GROW* turns out to be positive and statistically significant. It suggests that pharmaceutical companies enjoy higher profits. Next *LIQ* and *TANG* turn out to be negative and statistically significant. The remaining variables, viz., *RISK* and *NDTS* have no influence on *TD.*

Results of Model 2

R^2 value (0.339) shows the combined effect of Model 2 and explains that around 34% of variation of dependent variable is being analysed by variance of independent variables.

In this model, it is found that the coefficient of PROF turns out to be negative and statistically significant with LTD, thus indicating that high debt levels are proportional with lower profitability. SIZE GROW RISK and TANG turns out to be positive and statistically significant and it suggests that pharmaceutical companies enjoy higher profits. Next, LIQ turn out to be negative and statistically significant. The remaining variable i.e., NDTS have no influence on LTD.

Results of Model 3

R^2 value of (0.331) shows the combined effect of Model 3 and explains that 33% of variation of dependent variables being analysed is explained by variance of independent variables.

In this Model, it is found that the PROF is negatively and statistically significant with STD, thus showing that STD is negatively associated with profitability in pharmaceutical companies. NDTS turns out to be positive and statistically significant. Next LIQ*,* TANG and SIZE turn out to be negative and statistically significant. The remaining variables i.e., RISK and GROW have no influence on STD

To sum up from the empirical findings of the above three models, it is found that profitability, size, liquidity and growth are key determinants of capital structure in pharmaceutical companies.

Conclusion

This paper studies the key determinants of capital structure for pharmaceutical companies listed NIFTY. It was empirically found that size, profitability, tangibility, risk, liquidity and NDTS are statistically significantly correlated with firm leverage or key determinants of capital structure in the Indian companies. The results suggest that variables as profitability, firm-size, growth rate and liquidity are key determinants of capital structure and short-term debt is found to be an essential

financing source of Indian pharmaceutical companies. Pecking order theory explains the nature of capital structure in the Indian Pharmaceutical companies. The findings of the study would enhance the literature on capital structure and are useful for the Indian company's finance managers.

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