Determinants of Capital Structure: Emprical Evidence from India

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ABSTRACT *Capital structure is fundamentally permanent long term financing of a firm. Although there has been abundance of research focusing on the most important determinants of capital structure, there is still deviation regarding which factors significantly affect a firm's capital structure. This study examines the determinants of capital structure in Indian large pharmaceutical companies for the period of 10 years from 2002-03 to 2011-12. Statistical measures average, standard deviation; maximum, minimum, range, multiple correlations and multiple regressions have been used for the analysis of collected data. Out of eight examined explanatory variables-size, business risk, earning rate, liquidity, tangibility, debt service capacity, non-debt tax shield and degree of operating leverage, four- size, earning rate, tangibility and debt service capacity -are statistically significant determinants of financial leverage. Beta coefficients associated with corporate size, earning rate, tangibility and debt service capacity are statistically significant at 1% and 5% level. These factors play a major role in the determination of the financial leverage in pharmaceutical companies and business risk, liquidity, non-debt-tax shield and degree of operating leverage do a dismal role. It is recommended that policy makers should focus on these determinants when making any decisions regarding capital structure.*

1. Introduction

In today's global recessionary economic environment, the sustainability of a firm heavily depends on   the ability and success of its financial management function. Traditionally corporate finance involves three important decisions. They are capital budgeting decisions, capital structure decisions and working capital management decisions. Among these three capital structure decisions are considering important and fundamentally permanent long term financing of a firm. Although there has been abundance of research focusing on the most important determinants of capital structure, there is still deviation regarding which factors significantly affect a firm's capital structure.

Capital structure refers to the different options used by a firm in financing its assets. The capital structure of a company is a particular combination of debt, equity and further sources of finance that it uses to fund its long-term asset. The key partition in capital structure is between debt and equity. The proportion of debt funding is measured by gearing or leverages. There are different factors that affect a firm's capital structure, and a firm should challenge to determine what its best, or best, mix of financing.

The capital structure of a firm is a mixture of different securities. In general, firms can choose among many alternative capital structures. For example, firms can arrange lease financing, use warrants, issue convertible bonds, sign forward contracts or trade bond swaps. Firms can also issue dozens of distinct securities in countless combinations to maximize overall market value (Abor, 2005).

2. Review of Literature

The effects of different explanatory variables on capital structure have been focused by much theoretical and empirical research for many years and in different environments. In this section, it is proposed to review existing literature in the field of capital structure. For this purpose, the research studies of different countries are reviewed below.

Modigliani and Miller (1958) have a theory of "capital structure irrelevance" where argue that financial leverage does not affect the firm's market value with assumptions related to homogenous expectations, perfect capital markets and no taxes.

Gay B. Hatfield, Louis T.W. Cheng, and Wallace N. Davidson, III (1994) determined the optimal capital structure and the effect of firm and industry debt ratios on market value. They examined the hypothesis by classifying firms' leverage ratios as being above or below their industry average prior to announcing a new debt issue. We then test whether this has an effect on market returns for shareholders. Our overall finding is that the relationship between a firm's debt level and that of its industry does not appear to be of concern to the market.

Keshar J. Baral (2004) has examined the determinants of capital structure -size, business risk, growth rate, earning rate, dividend payout, debt service capacity, and degree of operating leverage of the companies listed to Nepal Stock Exchange Ltd. as of July 16, 2003. Eight variables multiple regression model has been used to assess the influence of defined explanatory variables on capital structure. In the preliminary analysis, manufacturing companies, commercial banks, insurance companies, and finance companies were included. However, due to the unusual sign problem in the constant term of the model, manufacturing companies were excluded in final analysis. This study shows that size, growth rate and earning rate are statistically significant determinants of capital structure of the listed companies.

Han-Suck Song (2005) investigated the capital structure determinants of Swedish firms based on a panel data set from 1992 to 2000 comprising about 6000 companies. The study studies the determinants of total debt ratios as well as determinants of short-term and long-term debt ratios. The results indicate that most of the determinants of capital structure suggested by capital structure theories appear to be relevant for Swedish firms. The result also finds significant differences in the determinants of long and short-term forms of debt. Due to data limitations, it was not possible decompose short-term debt and long-term debt into its elements, but the results suggest that future analysis of capital choice decisions should be based on a more detailed level.

Zeitun. R and Tian, G. G (2007) investigated the effect which capital structure has had on corporate performance using a

panel data sample representing of 167 Jordanian companies during 1989-2003. The results showed that a firm's capital structure had a significantly negative impact on the firm's performance measures, in both the accounting and market's measures. They also found that the short-term debt to total assets (STDTA) level has a significantly positive effect on the market performance measure (Tobin's Q). The Gulf Crisis 1990-1991 was found to have a positive impact on Jordanian corporate performance while the outbreak of West Bank and Gaza in September 2000 had a negative impact on corporate performance.

Floriniţa Duca (2011) examined the relative importance of four factors in the capital structure decisions of Romanian listed firms. The existing empirical research on capital structure has been largely confined to developed countries. The Romanian Financial Market has been developing at an exponential rate and dedicated research in the field is required. They used 100 firms listed in 2010 at the Bucharest Stock Exchange. They found that the factors such as tangibility of assets, firm size, liquidity, and profitability have significant influences on the leverage structure chosen by firms. These results are believed to have significant implications for the theory of finance and to be of importance to the corporate treasure in choice of new financing and to the financial analyst.

Aurangzeb and Anwar Ul Haq (2012) have examined the determinants of capital structure in textile industry of Pakistan on a data for the period from 2004 to 2009. Multiple regression technique has been used to analyze the relationship between dependent variable (Leverage) and independent variables (Firm Size, Tangibility of Assets, Profitability, and Sales Growth). They concluded that all independent variables have significant impact on the balance of leverage. It is concludes that the firm size, tangibility of assets and profitability having positive relationship with leverage. On the other hand sales growth has negative relationship with leverage.

Md. Faruk Hossain and Md. Ayub Ali (2012) attempt to explore the impact of firm specific factors on capital structure decision for a sample of 39-firms listed on Dhaka Stock Exchange (DSE) during 2003-2007. Checking multi-collinearity and estimating regression analysis through Pearson correlation and autoregressive model respectively this study found that profitability, tangibility, liquidity, and managerial ownership have significant and negative impact on leverage. Positive and significant impact of growth opportunity and non-debt tax shield on leverage has been found in this study. On the other hand size, earnings volatility, and dividend payment were not found to be significant explanatory variables of leverage. Results also reveal that total debt to total assets ratios is significantly different across Bangladeshi industries.

OGBULU, Onyemachi Maxwell and EMENI, Francis Kehinde(2012) have made an attempt on the impact of capital structure on a firm's value. The analysis was implemented on a sample of 124 companies quoted on the Nigerian Stock Exchange (NSE) for the year ended 31st December 2007. The ordinary least squares method of regression was employed in carrying out this analysis. The result of the study reveals that in an emerging economy like Nigeria, equity capital as a component of capital structure is irrelevant to the value of a firm, while Long-term-debt was found to be the major determinant of a firm's value.

Faiza Saleem (2013) examined the determinants of capital structure in Oil and Gas firms listed on Karachi Stock Exchange of Pakistan on a data for the period of 2006 to 2011. Multiple regression technique is used to analyze the relationship between dependent variable (Leverage) and independent variables (Firm Size, Tangibility of Assets, Profitability, and Sales Growth). It is concluded that all the independent variables have significant impact on the balance of leverage. It is concludes that firm size, tangibility of assets and profitability

having positive relationship with leverage. On the other hand sales growth has negative relationship with leverage.

Winston Pontoh and,Ventje Ilat (2013) have conducted a research on determinant capital structure and profitability Impact on listed company in Indonesian Stock Exchange using debt equity and debt asset ratio as indicators for capital structure. Where growth, size, tangibility and degree of operating leverage are its determinants. For profitability, this research using returns on asset and return on equity. Samples of research are 247 companies in period 2009 to 2011. With path analysis, this research finds that the size is negatively significant to debt asset ratio , degree of operating leverage is negatively significant to debt equity ratio, degree of operating leverage is negatively significant to return on assets, and debt- equity ratio is negatively significant to return on equity.

3. Objectives of the study
Capital structure decision is the vital one since the profitability of an enterprise is directly affected by such decision. The successful selection and use of capital is one of the key elements of the firms' financial strategy. Hence, proper care and attention need to be given while determining capital structure decision. In this study, determinants of capital structure in Indian context are examined with reference to capital structure theories. So, the objective of this paper is to test the effect of different explanatory variables of capital structure.

4. Research Methodology
4.1 Sources of Data
The study is largely analytical in nature and focuses on the capital structure in the selected Indian pharmaceutical firms. In order to meet the objectives of the study data have been collected from the secondary sources. For the purpose of analysis, balance sheet and income statement data have been sourced from "CAPITALINE" data base. The study has also been made use of information from PROWESS database of CMIE. In addition, the background research articles have been collected from the Social Sciences Research Network (SSRN) and Ebsco websites.

4.2 Sample
The data have been collected for twenty one large pharmaceutical firms in India due to the availability of data for a period of ten years. Firms taken for the study are Alembic Ltd, Aurobindo Pharma, Cadila Healthcare, Cipla, Dr.Reddy's Lab, FDC Pharmaceuticals Ltd, Glenmark, Pharmaceuticals Ltd, IPCA Laboratories Ltd, JB Chemicals and Pharmaceuticals Ltd, KDL Biotech Ltd, Kopran, Lyka Laboratories, Morepan Laboratories Ltd, Natco Pharma Ltd, Piramal Healthcare Ltd, Ranbaxy, Sun Pharmaceuticals Industries Ltd, Torrent pharmaceuticals ltd, TTK Healthcare, Unichem Laboratories Ltd, and Wockhardt.

4.3 Period of Study
The study covers a period of ten years starting from 2002-03 to 2011-12.

4.4 Statement of Hypotheses
This study has tested the following null hypotheses on relationship between the defined variables and capital structure:

H_{01}:
There is no significant relationship between the size and financial leverage.

H_{02}:
There is no significant relationship between the business risk and financial leverage.

H_{03}:
There is no significant relationship between the earnings and financial leverage.

H_{04}:
There is no significant relationship between the Liquidity and financial leverage.

H_{05}:
There is no significant relationship between the tangibility and financial leverage.

H_{06}:
There is no significant relationship between the debt service capacity and financial leverage.

H_{07}:
There is no significant relationship between the Non-debt –

Tax Shield and financial   leverage.

H_{08}:
There is no significant relationship between the operating leverage and financial leverage.

4.5 Variables used in the Study
Following are the discreet variables used in this study to test the effect of different explanatory variables of capital structure of firms taken in the sample. Financial leverage (which is a dependent variable in the study) is tested by ratio of total debt to total assets.

Table -1   List of variables in the Study

Variables	Definition	Abbreviation	Type of variables
Financial Leverage	Total debt/ Total Assets	FL	Dependent
Size of the firm	Logarithm of Sale of the firms	SIZE	Independent
Business Risk	The expected EBIT/ Standard Deviation of EBIT	BR	Independent
Liquidity	Current Assets/Current Liabilities	LIQ	Independent
Earnings Rate	EBIT/Total Assets	ER	Independent
Tangibility	Net Fixed Assets/Total Assets	TANG	Independent
Debt Service Capacity	EBIT/Total Interest Charge	DSC	Independent
Non-Debt Tax Shield	Depreciation/Total Assets	NDTS	Independent
Degree of Operating Leverage	Percentage change in EBIT/ Percentage change in Sales	DOL	Independent

4.6 Tools of Data Analysis
This study makes use of the statistical tools for both its descriptive and quantitative analysis using the SPSS. The Mean, Maximum, Minimum, Range and Standard Deviation are used in the descriptive portion of the analyses to determine the mean values of each set of variables and their standard deviation. In the quantitative analysis portion, a statistical Karl Pearson's correlation analysis is made to determine the relationship between a selected independent variables and capital structure for the sample of the study. Similarly, the multiple regression analysis is also made to assess the impact of capital structure variables of the sample firms.

5. Analysis and Discussion of the Study
5.1 Descriptive Statistics of Capital Structure Variables
Table-2 shows the descriptive statistics of the dependent variable financial leverage and independent variables SIZE, BR, ER, LIQ, TANG, DSC, NDTS and DOL of selected firms. Rang, minimum, maximum, mean, standard deviation, variance, skewness and kurtosis of all the selected variables have been calculated.

Table-2 Descriptive Statistics

Variable	N	Range	Minimum	Maximum	Mean	Std. Dev	Variance	Skewness	Kurtosis
FL	21	.61	.03	.64	.36	.18	.03	-.20	-1.07
SIZE	21	1.57	2.01	3.58	2.75	.47	.21	-.04	-1.04
BR	21	2.68	.43	3.10	1.46	.65	.41	.69	1.27
ER	21	.27	.05	.31	.19	.08	.01	-.49	-.41
LIQ	21	3.65	1.71	5.37	3.12	1.14	1.30	.62	-.83
TANG	21	.52	.21	.73	.43	.14	.020	.296	-.68
DSC	21	363.63	.77	364.40	36.68	79.36	6297.59	3.88	16.20
NDTS	21	.05	.02	.07	.03	.012	.00	.98	.83
DOL	21	.31	.01	.32	.18	.079	.01	-.72	.27

Table-2 presents the descriptive statistics of the selected capital structure variables of the pharmaceutical firms. An average value of financial leverage is 0.36. Size of the firm, business risk, earnings rate and leverage are 2.75 crores, 1.46 crores, 0.19 crores, and 0.18 crores respectively. Average of Liquidity ratio is 3.12%. It shows the good liquidity position of the industry during the study period. Average tangibility is very low (0.43 crores) the non-debt tax shield also shows very low average value during the study period. The average value of DSC is very high (36.68) in the study period. Very high variations (variance) 6297.59 and (standard deviation) 79.36 is shown in debt service capacity. Whereas, there is no variations 0.00 shown in NDTS. Very low

variations 0.01, 0.01 and 0.03 are shown in DOL, ER and FL. Skewness and kurtosis values of the DSC is high in the period of study.

Table-3 Karl Pearson's Correlation Coefficients

5.2 Karl Pearson's Correlation Analysis
Correlation analysis has been applied to find the association between selected variables in the study. The table- 3 explains the positive and negative associations of capital structure variables.

Variables	FL	SIZE	BR	ER	LIQ	TANG	DSC	NDTS	DOL
FL	1	-.48(**)	-.364	-.82(***)	.085	.368(*)	-.474(**)	.279	-.580(***)
		.027	.105	.000	.715	.100	.030	.221	.006
SIZE	-.48(**)	1	.099	.563(***)	.110	-.523(**)	.291	-.288	.512(**)
	.027		.668	.008	.636	.015	.201	.205	.018
BR	-.364	.099	1	.569(***)	.040	-.046	.053	.003	.367
	.105	.668		.007	.863	.842	.819	.990	.102
ER	-.825(**)	.56(***)	.57(***)	1	-.110	-.312	.38(*)	-.317	.72(***)
	.000	.008	.007		.635	.168	.087	.162	.000
LIQ	.085	.110	.040	-.110	1	-.317	.143	-.261	.253
	.715	.636	.863	.635		.161	.536	.253	.268
TANG	.368(*)	-.52(**)	-.046	-.312	-.317	1	-.39(*)	.858(***)	-.542(**)
	.100	.015	.842	.168	.161		.081	.000	.011
DSC	-.474(**)	.291	.053	.383	.143	-.389(*)	1	-.340	.515(**)
	.030	.201	.819	.087	.536	.081		.131	.017
NDTS	.279	-.288	.003	-.317	-.261	.858(***)	-.340	1	-.545(**)
	.221	.205	.990	.162	.253	.000	.131		.011
DOL	-.580(***)	.512(**)	.367	.724(***)	.253	-.542(**)	.515(**)	-.545(**)	1
	.006	.018	.102	.000	.268	.011	.017	.011	

* Correlation is significant at the 0.10 level (2-tailed).
** Correlation is significant at the 0.05 level (2-tailed).
*** Correlation is significant at the 0.01 level (2-tailed).

The above table shows the relationship between dependent and independent variables of the study. Financial leverage has negative and significant relationship with size of the firm (-0.48). This is significant at 5% level. Financial leverage also has negative and significant association with earnings rate (-0.82), debt service capacity (-0.474) and operating leverage (-0.580). it reveals that there is an increase of the percentage in these variables reduce the percentage in the values of financial leverage. Financial leverage has positive and significant association with tangibility (0.368). It shows that there is an increasing rate of fixed assets, increases the financial leverage in the firm.

5.3 Multiple Regression Analysis
Multiple regression techniques have been applied to study the joint influence of all the selected variables indicating the capital structure. The regression coefficients have been tested with the help of the most popular't' test. In this study, sizes of the firm, business risk, earnings rate, liquidity, tangibility, debt service capacity, non-debt tax shield and operating leverage have been taken as the explanatory variables and financial leverage has been used as the dependent variable.

The regression model used in the analysis is
FL t = a + β_1 SIZEt + β_2BRt + β_3ERt + β_4 LIQt + β_5TANGt + β_6DSCt + β_7NDTSt + β_8DOLt + ε

Where:
FL t = Financial Average
a   =intercept term
β_1… β_9=Regression coefficients
t   = Time Period
SIZE   =Size of the firm
BR   = Business Risk
ER = Earnings Rate
LIQ   =   Liquidity
TANG = Tangibility
DSC = Debt Service Capacity
NDTS   = Non-Debt Tax Shield
DOL = Degree of Operating Leverage
ε = Error Term

Table -4(a) Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.314	.281	-	1.117	.286
	SIZE	.117	.090	.303(**)	1.302	.017
	BR	.073	.055	.260	1.319	.212
	ER	-2.666	.688	-1.187(***)	-3.875	.002
	LIQ	-.007	.026	-.046	-.284	.782
	TANG	.836	.452	.657(*)	1.848	.089
	DSC	.000	.000	-.130(**)	-.798	.040
	NDTS	-7.843	4.816	-.538	-1.629	.129
	DOL	.387	.568	.169	.681	.509

a Dependent Variable: FL

Table-4(b) ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.515	8	.064	5.625	.004(a)
	Residual	.137	12	.011		
	Total	.652	20			

a Predictors: (Constant), DOL, LIQ, BR, SIZE, DSC, NDTS, ER, TANG
b Dependent Variable: FL

Table(c) Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.889(a)	.789	.649	.10696	2.238

a Predictors: (Constant), DOL, LIQ, BR, SIZE, DSC, NDTS, ER, TANG
b Dependent Variable: FL

Above tables 4(a), (b) and (c) shows results of regression co-efficients, ANOVA, R, R-Square, and Durbin -Watson test of selected capital structure variable and its independent variables.

B-Coefficient X_1 tests the first hypothesis. The relationship between the size of the firm and financial leverage is positive and significant (0.303*). Thus, the first hypothesis is rejected. It shows that there is a positive relationship maintained between size and financial leverage of the firm. It reveals that there is an increase of one unit in size, increases the financial leverage of the firm during the study period.

Beta coefficient of X_2 tests the second hypothesis. The relation between the business risk and financial leverage is positive but it is insignificant. Thus, the second hypothesis is accepted. Business risk contributes just 0.4 % to the variation in the leverage ratio. This is inconsistent with the theoretical relation stated by bankruptcy cost theory.

Beta coefficient of X_3 has rejected in the third hypothesis at .01 levels. In other words, Earnings rate has turned out as a highly significant determinant of the leverage ratio of the financial institutions. The highly significant coefficient of X_3 holds the relation postulated by pecking order theory. The regression coefficient of X_4 has accepted in the fourth hypothesis. It is negative and statistically insignificant (-0.046). It reveals that the liquidity is not significantly related with financial leverage. There is no changes have been seen in the financial leverage when there is a change in the liquidity.

The relationship between tangibility and financial leverage is positive and significant (0.657*). It means that there is an increase of one unit in net fixed assets increases the values in financial leverage. So the fifth hypothesis is rejected in the study. The regression coefficient of debt service capacity and financial leverage is negative and significant (-0.13**) at 5% level. It means that there is an increase of values in DSC, decreases the values in FL. Hypothesis six is rejected.

Both seventh and eighth hypotheses are accepted in the study. Non-debt tax shield and operating leverage are not significantly related with financial leverage.

ANOVA test indicates that the possibility of predicting financial leverage. R-Square value is 78.9%. Calculated value of ANOVA is 5.625(0.004), highly significant at 1% level. It means that there is a significant relationship jointly shown between all independent variables and financial leverage of the firms during the study period. Durbin-Watson test is indicating (2.238) the auto correlation between the independent variables. Hence it is concluded that all the independent variables jointly affect the financial leverage of the firm.

6. Conclusion

Out of eight examined explanatory variables-size, business risk, earning rate, liquidity, tangibility, debt service capacity, non-debt tax shield and degree of operating leverage, four–size, earning rate, tangibility and debt service capacity -are statistically significant determinants of financial leverage. Beta coefficients associated with corporate size, earning rate, tangibility and debt service capacity are statistically significant at .01 and 5% level. These variables explain around 77% of variation in financial leverage. The remaining variables incorporated in the model explain less percentage of the variation. These facts conclude that corporate size, profitability, tangibility and debt service capacity play a major role in the determination of the financial leverage in pharmaceutical companies; and business risk, liquidity, non-debt-tax shield and degree of operating leverage do a dismal role. Further, statistically insignificant coefficients associated with business risk, and debt service capacity; and significant coefficient associated with size, and profitability imply that companies do not care of their liquidity and non debt tax shield but do care of the expansion of their business and risk.

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