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An Empirical Study on the Capital Structure Decisions of Select Pharmaceutical Companies in India

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***Abstract**: This paper attempts to examine the firm specific factors which determine the capital structure decisions of publicly traded pharmaceutical companies of India. Based on the market capitalization, top ten companies listed in NSE and BSE are selected. Using multi regression model, accounting data of companies over a period of 5 years from 2011-12 to 2015-2016 is chosen and the empirical study is conducted. Firm specific factors such as tangibility, size of investment, liquidity, profitability and business risk have been analyzed to check their influence on the debt equity /leverage structure of the selected pharmaceutical companies in Indian context. Debt equity ratio of the companies is taken as dependent variables and firm specific factors are taken as independent variables. It has been found from the study that factors like tangibility and firm size are statistically significant determinants of capital structure of the select pharma companies.*
***Key words:** Capital structure, business risk, tangibility, size of investment, liquidity, profitability*

I. Introduction

In today's ever changing economic environment, capital structure decision is an important decision in the financial management function. Capital structure refers to the mix of different long term securities known as debt and equity i.e., the proportion of debt and equity in the total capitalization of a corporate firm. Capital structure decisions are considered to be one of the most crucial decisions of a company as it has a direct bearing on the success or failure of the company. Too much of debt poses the threat of bankruptcy and too much of equity reduces the profitability of the company. At this juncture, there arises a question as to what is the ideal capital structure? A number of theories have been proposed and lot of research has been done in the past few decades on the capital structure decisions. Neither the research nor the theory has been able to provide satisfactory explanation as to what factors affect the capital structure decisions (Brealey and Myers 1991) [1].

Several studies on capital structure have been conducted in developed countries. But in the developing countries like India the area of capital structure is not been fully explored. Hence it becomes important for us to understand the significance of capital structure decisions at the macro and micro level of financing. (Joy Pathak) [2]. There are several firm specific factors which influence the capital structure decisions of publicly traded firms in India. In this paper, one of the most booming sector of Indian economy, i.e., pharmaceutical sector has been chosen to study the capital structure decisions.

II. Pharmaceutical Sector In India

India's pharmaceutical industry has been growing at record levels in recent years (KPMG report).The Indian pharmaceuticals market is the third largest in terms of volume and thirteenth largest in terms of value, as per a report by Equity Master. India is the largest provider of generic drugs globally with the Indian generics accounting for 20 per cent of global exports in terms of volume. The Indian pharma industry is expected to grow over 15 per cent per annum between 2015 and 2020. India has also maintained its lead over China in pharmaceutical exports with a year-on-year growth of 11.44 per cent to US$ 12.91 billion in FY 2015-16, according to data from the Ministry of Commerce and Industry (ibef.org). Due to the above reasons, pharmaceutical sector has been chosen in this study.

III. Literature Review

Some of the studies published in the relevant literature on capital structure decisions concerning the developed and developing economies have been included.

N R Parasuraman and P Janaki Ramudu (2013) [3] demonstrated as to how Indian firms went about in designing their capital structure positions. Regression with ENTER & STEP method has been used. The analysis revealed that the capital structure decisions of Indian firms depended largely on profitability in general and ROCE and RONW in specific in most of the years.

Joy Pathak (2010) [2] examines the relative importance of six factors in the capital structure decisions of publicly traded Indian firms using two independent ordinary least square regression. The objective of this paper is to build on previous studies on the Indian capital market and model all the important factors affecting capital

structure decisions of Indian firms post liberalization policy by Government of India. It has been found that factors such as tangibility of assets, growth, firm size, business risk, liquidity, and profitability have significant influences on the leverage structure chosen by firms in the Indian context.

Frank and Goyal (2007) [4] In this paper trade-off, pecking order and market timing theory has been analyzed. Factors such as industry median, market to book asset ratio, tangibility, profitability, firm size and expected inflation has been considered for leverage decisions. The empirical evidence seems reasonably consistent with some versions of the tradeoff theory of capital structure.

Kakani & Reddy (1998)[5] This paper provides an empirical examination of the determinants of various capital structure theories. It attempts to develop and test a new theory on capital structure for large manufacturing firms in India. For different empirical and managerial implications short term and long term debt instruments have been measured. The results found are contrary to the classical financial theory.

Baral (2004) [6] has made an attempt to examine 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. Eight variable multiple regression model has be used to assess the influence of defined explanatory variables on capital structure. This study shows that size, growth rate and earning rate are statistically significant determinants of capital structure of the listed companies.

Harris & Raviv (1991)[7] This paper focuses on the theories of capital structure theories based on agency cost, asymmetric information, market interactions and corporate control considerations. This paper is developed on the modern theory of capital structure of Modigliani & Miller (1958) where the corporate tax is excluded. Hence the author has concentrated on the non-tax driven capital structure theories. .According to the author there are four determinants of capital structure and changes in the leverage is due to the changes in the stock prices.

Xiaoyan Niu (2008) [8] talks about the capital structure choice and determinants related to many different factors. This thesis firstly present several traditional theories discussed on capital structure, such as trade-off theory, agency cost theory and theory of pecking-order. It suggests seven determined factors influencing the capital structure decisions and the correlations among these factors and the choice of capital structure.

IV. Objectives & Methodology

This is a descriptive research and focuses on the empirical study of factors determining the capital structure decisions of select pharmaceutical companies in India. The sample includes top ten pharmaceutical companies listed in NSE and BSE. The top ten companies are chosen based on the market capitalization. They are Sun Pharmaceutical Industries, Lupin pharmaceuticals, Dr. Reddy's laboratories, Cipla ltd., Aurobindo Pharma, Cadila Pharma, GlaxoSmithkline pharmaceuticals ltd, Glenmark pharmaceuticals, Divis laboratories and Torrent Pharmaceuticals.

The data for the empirical analysis is derived from the financial statements of these firms during the period 2011-12 to 2015-16. Multi regression model is used to arrive at the empirical results with debt equity ratio as criterion variable and firm specific factors like profitability, tangibility, liquidity, size and business risk as predictor variables. Statistical Package for the Social Sciences (SPSS) and Ms Excel have been used wherever required.

V. Empirical Evidence On Capital Structure Determinants

In this study the firm specific factors like profitability, liquidity, tangibility, business risk and size of investment have been considered to see if these factors have any influence on the debt equity ratio of the select companies. In view, the following hypotheses have been formulated and tested.

H_{01}: There is no relationship between debt equity ratio as criterion variable and profitability, liquidity, size, tangibility and business risk as predictor variables.

For the purpose of testing hypotheses, multiple regression model has been used to test the results statistically. The following is the description of the model fit used in the study.

$$D/E = \alpha + \beta1\ (PROFTY) + \beta2\ (LQDTY) + \beta3\ (SIZE\ OF\ INVT) + \beta4\ (TNG) + \beta5\ (BUS\ RISK) + \mu$$

The definitions of the variables used in the above model (with their proxies in the model) are:

a) Debt equity ratio(D/E)

Debt to equity ratio is a capital structure ratio which evaluates the long-term financial stability of business using balance sheet data. Debt equity ratio is calculated using long term debt and shareholders' capital. It is often calculated to have an idea about the long term financial solvency of a business. A business is said to be financially solvent till it is able to honour its obligations viz. interest payments, daily expenses, salaries, taxes, loan instalments etc.

b) Tangibility (TNG)

Tangibility is the characteristic that an asset can be used as collateral to secure debt. Myers and Majluf (1984) [9] argued that firms with more collateral value in their assets tend to issue more debts to take the advantage of low cost. The higher tangibility of assets indicates lower risk for the lender as well as low bankruptcy costs. A good proxy for this is asset tangibility which is measured as the ratio of the net fixed assets to total assets.

c) Size of Investment (SIZE OF INVT)

Firm size has been suggested to be an important variable related to the leverage ratios of the firm. It is also argued that relatively large firms tend to be more diversified and thereby less prone to bankruptcy. Similarly, the cost of issuing debt and equity securities is also related to size, and as suggested by Smith (1977)[10] smaller firms pay many times more to issue new equity and even more in case of debt. The firm size can be measured either as a Log of total Sales or as the Log of total Assets. Titman & Wessels (1988)[11] suggested that logarithmic transformation of sales reflects the size effect and therefore we take the Log of Total Sales as our proxy.

d) Business risk(BUS RISK)

Business risk is affected by volatility in earnings and earnings become volatile when the environment is uncertain. It is allied with the promises related to debt obligation. Hence the firms working in highly risky environment should reduce their debt usage so that they can reduce business risk which will reduce their bankruptcy risk.

e) Profitability (PROFTY)

To take into account asymmetric information issues, it is common to use variables such as profitability. A study by Booth et al (2001) [12] suggested that profitable firms might be able to finance their growth internally by using retained earnings while maintaining a constant debt-equity ratio whereas, less profitable firms have no such choice and are forced to go for debt financing. Profitability is proxied as the ratio of the Operating income before depreciation to total assets.

f) Liquidity (LQDTY)

Consistent with De Jong et al (2008) [13] it is agreed that the liquidity is the accumulated cash and other liquid assets will serve as the internal source of fund and will be utilised first instead of debt. Liquidity was calculated by dividing the total current assets over the total current liabilities.

Apart from the above definitions, 'α' is the intercept and 'β's are the coefficients of the predictor variable concerned which indicate the variance in the criterion variable caused by predictor variables and 'μ' is the error term of the model concerned.

VI. Results And Discussions:

The analysis and interpretation has been carried out in the order of testing the impact of all predictor variables on debt equity ratio of the sample firms. Since it is space consuming activity, the researchers preferred to capture SPSS output and results in form of tables which are mostly self explanatory in nature. However, a few comments and observations are made out of the results for the purpose of better understanding and implications of regression results.

Table 1: Summary statistics of the regression model

YEAR	A	R	R2	Adj. R2	Std. Error	Sig. F	Durbin-Watson
2016	0.048	0.872	0.760	0.734	0.522	0.003	2.202
2015	0.734	0.683	0.466	0.409	0.417	0.000	1.859
2014	0.76	0.665	0.442	0.382	0.407	0.000	1.988
2013	0.569	0.564	0.318	0.26	0.954	0.000	1.979
2012	3.155	0.649	0.421	0.359	0.413	0.002	1.821
2012-16	1.476	0.687	0.472	0.428	0.546	0.000	1.943

Source: Researchers' calculation

The above table shows the details pertaining to regression model, through ENTER method that reveal if the value of the firms depended significantly on all predictor variable together. Apart from testing the significance of the model for each year, the regression model has also been tested for the period of five years i.e.2012-16. Significance 'F' in all the years was below 0.05 and hence reject the null hypothesis and we can say that debt equity would depend on profitability, liquidity, tangibility, size of investment and business risk factors wherever relevant. The table also shows that while 'R' is found to be reasonably high in all the years, 'R2' is

found to be low in most of the years. Durbin Watson's coefficient indicates the extent of auto correlation among the error terms of the models of various samples. Durbin Watson's coefficient closer to 2 indicates that there is no correlation among the error terms which is good sign to justify the model.

Table 2 Un-standardized beta Coefficients and't' statistic

YEAR	PROFTY	LQDTY	SIZE	TNG	B RISK
	'β1' and ('t' value)	'β1' and ('t' value)	'β1' and ('t' value)	'β1' and ('t' value)	'β1' and ('t' value)
2016	-0.218	-0.07	0.413*	-0.303	-0.0005
	(-.397)	(-.708)	(-4.24)	(-0.522)	(-.009)
2015	0.058	-0.14	0.463*	-0.502	-0.042
	(-0.098)	(-1.103)	(4.764)	(-.832)	(-0.231)
2014	-0.112	0.068	0.45*	-0.272	0.221*
	(-0.215)	(-0.587)	(4.46)	(-0.448)	(-1.074)
2013	0.406	-0.009	0.487*	-0.697*	0.526
	(0.606)	(-0.955)	(4.941)	(-1.245)	(-1.417)
2012	0.177	-0.027	0.26	-1.732	0.046
	(0.242)	(-1.377)	(3.146)	(-2.962)	(-0.979)
2012-16	0.012	-0.012	0.378*	-0.657*	-0.041
	(0.047)	(-1.564)	(9.365)	(-2.804)	(-1.209)

*Significant at 5% level
Source: Researchers' calculation

Table 2 contains un-standardized beta co-efficients and 't' values of predictor variables. The values indicate that the debt equity of the firms did not depend significantly on profitability, liquidity and business risk of the firms while it significantly depended on size and tangibility in most of the years. From the same table we also observe that of all the predictor variables, Size had very high influence on capital structure as revealed by its beta co-efficient (B) and 't' statistic while the other predictors' influence was relatively lower in almost all the years.

Table 3 ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	109.077	5	21.815	22.497	.000[b]
	Residual	310.302	320	.970		
	Total	419.378	325			
a. Dependent Variable: D/E						
b. Predictors: (Constant), BUS RISK, SIZE, PROFTY, LQDTY, TNG						

Table 3 reveals the details pertaining to ANOVA of debt equity of select pharma firms during the years 2012 through 2016. Since Sig. 'F' is lesser than 0.05, we reject the null hypothesis, H2 and conclude that the debt equity of select firms depend significantly on the factor 'time'. This in turn implies that the time period have significant impact on the debt equity of the firms.

Table 4 Descriptive Statistics

FACTORS/YEAR		2016	2015	2014	2013	2012	2012-16
D/E	Mean	4.7507	4.74635	4.69424	4.78376	4.78376	4.73999
	Std Dev	1.085904	1.084905	1.109294	1.163373	1.163373	1.135955
PROFTY	Mean	0.2254	0.22972	0.25368	0.22277	0.22277	0.23922
	Std Dev	0.222449	0.201243	0.245331	0.196477	0.196477	0.213859
LQDTY	Mean	1.8202	1.77767	2.18501	3.49036	3.49036	2.38803
	Std Dev	1.43853	1.146072	3.340035	13.83273	13.83273	7.223273
SIZE	Mean	9.82892	9.65515	9.46052	9.40471	9.40471	9.47656
	Std Dev	1.273808	1.233465	1.250162	1.281375	1.281375	1.378673
TNG	Mean	0.42959	0.42378	0.39929	0.40662	0.40662	0.413
	Std Dev	0.24909	0.247137	0.24953	0.240841	0.240841	0.248752
B RISK	Mean	0.18335	0.34062	0.40396	0.27737	0.27737	0.4836
	Std Dev	0.245422	0.677883	1.771966	0.333058	0.333058	1.645003

Table 5 shows that the mean and the standard deviation values of both criterion and predictor variables for each ear. On an average basis, the debt equity ratio did not vary much rather remained almost same over a period of 5 years. The mean values of predictor variables like PROFTY, Size and TNG did not vary much but remained almost same in all the years. However, other predictor variables like LQDTY, and B RISK decreased

over the years. The standard deviation of Size and TNG remained almost same in all the years and that of PROFTY and LQDITY decreased over the study period whereas B RISK factor varied significantly over the years. Of the standard deviations of all variables, LQDTY had exceptionally high volatility in all the years.

VII. Conclusion

The determinants of capital structure decisions have been one of the primary subject of research in corporate finance. The study shows that the debt equity of the pharma companies is not independent of capital structure decisions. Multiple regression model has been used to demonstrate that firm specific factors influenced the value of the firm during the years 2012 through 2016. The analysis revealed that the debt equity of the pharma companies depended significantly on the factors like size of investment and tangibility and not so significant on profitability, liquidity and business risk factors. While only five years data has been taken in this study, it is strongly felt that by taking a longer time span with more number of observations, the study might give meaning implications to the various stakeholders in capital structure decisions. It is recommended that there is scope for further improvement in the paper by extending the research on this topic with several other firm specific and country specific factors.

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