

## A COMPARATIVE STUDY ON IMPACT OF CAPITAL STRUCTURE ON FINANCIAL PERFORMANCE WRT BSE LISTED PHARMACEUTICAL COMPANIES

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### ABSTRACT

*Despite tons of research in the area of capital structure, the topic remains one of the favorite research candidates in the domain of finance. Regular development in the field, like buyback of shares has kept the subject vibrant and open for discussion and debate. A structured literature review of 30 articles on the impact of capital structure on financial performance showed conflicting results. While there is a clear majority in favor of an impact of capital structure on financial performance, the direction of the impact is not at all clear. Very interestingly, the analysis revealed exact 11 positive impact studies for 11 negative impact studies. Moreover studies in this area have been carried with limited sample sizes. Hence a research was undertaken investigating the relationship between capital structure and financial performance of 115 BSE listed Pharmaceutical Companies on the basis of data for 10 years. Before the main study was undertaken a pilot study with a sample size of 30 companies was carried. This article reports the key takeaways from the pilot study.*

**Keywords:** BSE Listed Companies, Capital Structure, Financial Performance, Pharmaceutical Companies

### Introduction

A structured literature review of 30 articles on the impact of capital structure on financial performance undertaken by the researcher showed conflicting results. While there is a clear majority in favor of an impact of capital structure on financial performance, the direction of the impact is not at all clear. Quite interestingly, the analysis revealed exact 11 positive impact studies for 11 negative impact studies. Moreover studies in this area have been carried with limited sample sizes. Hence a research was undertaken investigating the relationship between capital structure and financial performance of 115 BSE listed Pharmaceutical Companies on the basis of data for 10 years. Before the main study was undertaken a pilot study with a sample size of 30 companies was carried with the following objectives -

### Objectives for the study were set as under

- a. To gain experience of creating the data-set for the companies selected for the study
- b. To check for processing of the data-set basic values into variables required for inferential data analysis
- c. To test the hypotheses as per research methodology
- d. To test validity and reliability of questionnaire prepared for primary data collection

This article reports the key takeaways from the pilot study.

### Data-set

30 companies were selected for compiling the data-set as under –

**Table 1 Data-set of 30 BSE Listed Pharmaceutical Companies**

Sr. No.	Market Capitalization (M.Cap.)	No. of Companies (Sample)	Data Set Components
1	Large Cap. Companies	11	Return on Equity, Return on Assets, Earning per Share, Debt, Equity, Profitability, Liquidity & Solvency
2	Mid Cap Companies	10	
3	Small Cap Companies	09	
	<b>Total</b>	<b>30</b>	

Figures for 30 BSE listed Pharmaceutical companies from the year 2009-10 to 2018-19 were entered from the respective annual reports. The data entry was checked for its accuracy using random numbers for selection of companies.

### Basic processing

All the figures of the 30 companies were averaged for the 10-year period. Those were then processed for variables in line with requirements for the inferential analysis. For example Debt Equity ratio was calculated for all the 30 companies.

### Hypotheses testing – Results

#### Hypotheses 1-3

**Table 2 H1-H3 along with objectives**

Sr. No.	Objectives	Null Hypothesis (Ho)	Alternate Hypothesis (Ha)
1	To find out & compare the impact of capital structure on financial performance of selected Indian Pharmaceutical companies.	<p>Ho1 - There is no significant relationship between Capital Structure and Return on Equity.</p> <p>Ho2: There is no significant relationship between Capital Structure and Return on Assets.</p> <p>Ho3: There is no significant relationship between Capital Structure and Earning per share.</p>	<p>Ha1: There is significant relationship between Capital Structure and Return on Equity.</p> <p>Ha2: There is significant relationship between Capital Structure and Return on Assets.</p> <p>Ha3: There is significant relationship between Capital Structure and Earning per share.</p>

A regression analysis was performed to test the hypotheses and summary of the results obtained were as under –

a. *Capital structure (D/E ratio) and Return on Equity*

**Table 3 Summary of regression results for testing of H1-H3**

DV	Mean	SD	r	R <sup>2</sup>	F-value	P-value
ROE	0.159	0.076	-0.102	0.010	0.292	0.593
ROA	0.100	0.053	-0.433	0.188	6.479	0.017
EPS	306.161	249.083	-0.265	0.070	2.108	0.158

All the 3 financial performance variables have a negative relationship with D/E ratio. This means that for a higher D/E ratio, the financial performance variables decline and vice versa.

Out of the three financial performance variables, only one, RoA, exhibits a significant statistical association with D/E with the value

of R<sup>2</sup> of 19%. However, this is not the case with the other two variables, namely, ROE and EPS where the p-value is greater than the alpha of 0.05.

Thus, while Ho1 and Ho3 could not be rejected, Ho2 stands rejected.

## Hypotheses 4&amp;5

Table 4 H4 &amp; H5 along with objectives

Sr. No.	Objectives	Null Hypothesis (Ho)	Alternate Hypothesis (Ha)
2	To find out and analyze the determinants of capital structure of selected Indian Pharmaceutical Companies.	Ho4 - There is no significant impact of profitability on capital structure. Ho5: There is no significant impact of liquidity on capital structure.	Ha4: There is significant impact of profitability on capital structure. Ha5: There is significant impact of liquidity on capital structure.

To measure impact of profitability on capital structure, RoE was taken as the independent variable and the D/E ratio was taken as

dependent variable. Summarized result of the regression analysis were as under –

Table 5 Summary of regression results for testing of H4

DV	Mean	SD	r	R <sup>2</sup>	F-value	P-value
D/E	0.221	0.266	-0.102	0.010	0.292	0.593

Profitability as measured by RoE has an inverse relationship with D/E. Higher the profitability, lower is the D/E and vice versa. However, this relationship was not found statistically significant given the p-value of 0.593. The null hypotheses Ho4 could not be rejected.

To measure impact of liquidity on capital structure, product of current ratio and solvency ratio (to factor in both short-term and long-term liquidity) was taken as the independent variable and the D/E ratio was taken as dependent variable. Summarized result of the regression analysis were as under –

Table 6 Summary of regression results for testing of H5

DV	Mean	SD	r	R <sup>2</sup>	F-value	P-value
D/E	0.221	0.266	-0.422	0.178	6.074	0.020

Liquidity as measured by a combination of current and solvency ratio has an inverse relationship with D/E. Higher the liquidity, lower is the D/E and vice versa. Moreover, this relationship was found to be found statistically

significant given the p-value of 0.020. 18% of the variability of capital structure is explained by liquidity. The null hypothesis Ho5 was rejected.

## Hypotheses 6

Table 7 H6 along with objective

Sr. No.	Objectives	Null Hypothesis (Ho)	Alternate Hypothesis (Ha)
3	To find out different factors affecting the financial performance of selected Indian Pharmaceutical Companies.	Ho6: Financial performance of selected Pharmaceutical companies is not significantly different among different companies and among different years.	Ha6: Financial performance of selected Pharmaceutical companies is significantly different among different companies and among different years.

RoE of the 30 companies was plotted for the 10 years from 2009-10 to 2018-19 and two-way

ANOVA was used. Summarized results of the test were as under –

**Table 8 ANOVA Summary (H6)**

Source of Variation	SS	Df	MS	F	P-value	F crit
Rows	3.15622	29	0.1088	3.31745	0.0000	1.51107
Columns	0.31037	9	0.0344	1.05117	0.3997	1.91585
Error	8.56259	261	0.0328			
Total	12.0291	299				

For the group of 30 Companies the variance over a period of 10 years for RoE is significantly different as indicated by the p-value of <0.0001. The null hypothesis that the variance is same was rejected. But the RoE for the group of 30 companies does not vary significantly over the period of 10 years as indicated by p-value of 0.3997 which connotes

that the null hypothesis that the variance is same could not be rejected. In other words, in case of financial performance as measured by the RoE there is a significant variation among the companies but the variation is not significant for the period of 10 years under consideration.

#### Hypotheses 7

**Table 9 H7 along with objective**

Sr. No.	Objectives	Null Hypothesis (Ho)	Alternate Hypothesis (Ha)
4	To study the relevancy of capital structure theories in practice.	H <sub>0</sub> 7: Capital Structure of selected Pharmaceutical companies is not significantly different among different companies and among different years.	Ha7: Capital Structure of selected Pharmaceutical companies is significantly different among different companies and among different years.

D/E ratio of the 30 companies was plotted for the 10 years from 2009-10 to 2018-19 and two-

way ANOVA was used. Summarized results of the test were as under –

**Table 10 ANOVA Summary (H7)**

Source of Variation	SS	df	MS	F	P-value	F crit
Rows	22.408	29	0.772	18.7433	0.00000	1.511
Columns	1.346	9	0.149	3.630313	0.00027	1.915
Error	10.760	261	0.041			
Total	34.51602	299				

For the group of 30 Companies the variance over a period of 10 years for D/E is significantly different as indicated by the p-value of <0.0001. The null hypothesis that the variance is same was rejected. Also the D/E for the group of 30 companies does vary significantly over the period of 10 years as indicated by p-value of 0.00027 which leads to rejection of the null hypothesis that the variance is same. In other words, in case of

capital structure as measured by the D/E ratio there is a significant variation among the companies and also over the period of 10 years under consideration.

### Summary of analysis

Summary of the testing of all the seven hypotheses along with their interpretation is given below -

**Table 11 Summary of analysis**

Sr. No.	Null Hypotheses	p-value	Decision	Interpretation
1	There is no significant relationship between Capital Structure and Return on Equity	0.593	Fail to reject Null	There is no significant relationship between Capital Structure and Return on Equity
2	There is no significant relationship between Capital Structure and Return on Assets	0.017	Reject Null	There is a significant relationship between Capital Structure and Return on Assets
3	There is no significant relationship between Capital Structure and Earning per share	0.158	Fail to reject Null	There is no significant relationship between Capital Structure and Earning per share
4	There is no significant impact of profitability on capital structure	0.593	Fail to reject Null	There is no significant impact of profitability on capital structure
5	There is no significant impact of liquidity on capital structure	0.020	Reject Null	There is a significant impact of liquidity on capital structure
6	Financial performance of selected Pharmaceutical companies is not significantly different among different companies and among different years	0.0000/0.3997	Reject Null / Fail to reject Null	Financial performance of selected Pharmaceutical companies is significantly different among different companies but is not significantly different for the 10 years
7	Capital Structure of selected Pharmaceutical companies is not significantly different among different companies and among different years	0.0000/0.00027	Reject Null / Reject Null	Capital Structure of selected Pharmaceutical companies is significantly different among different companies and among different years

### Validity and reliability of questionnaire

#### Test of validity

The hypotheses, hypotheses testing method, questionnaire etc. were validated by the Guide and other experts in the field so as to ensure that the measurement was adequate and

accurate in terms of the desired direction. Internal checks like only entering the selected option from the pop-up options were built-in the questionnaire.

A check-list as prescribed by Collingridge et.al (2015) was applied for validation as under –

**Table 12 Application of Collingridge check-list for validation**

Step No.	Step	Action
1	Establish Face Validity	The questionnaire has been validated for face validity by guide and group of experts.
2	Clean Collected Data	Our mechanism of collecting data ensures that there is no invalid entry because there is no entry only. It is a selection for range of options.
3	Use Principal Components Analysis (PCA)	a. We don't have too many variables under consideration b. It is expected that the variables should be widely interpretable. Therefore PCA was not used.
4	Check Internal Consistency	This was done through Cronbach's Alpha

### Test of reliability

Cronbach's Alpha and other tests were applied on various parts of the questionnaire using "Siegle Reliability Calculator" an excel program and the results for the sample of 30 respondents are summarized as under –

A	B	C	D	E	F	G
Cronbach's Alpha	0.77458811	<b>Reliability Calculator</b>				
Split-Half (odd-even) Correlation	0.66142776	created by Del Siegle (del.siegle@uconn.edu) for EF				
Split-Half with Spearman-Brown Adjustment	0.79621609					
Mean for Test	139.7					
Standard Deviation for Test	12.7099698					
KR21 (use only 0 and 1 to enter data for this)	2.88397709		Questions	Subjects		
KR20 (use only 0 and 1 to enter data for this)	3.13013395		45	30		
	Question 1	Question 2	Question 3	Question 4	Question 5	Question 6
Subject1	4	5	4	4	1	
Subject2	4	5	3	5	3	
Subject3	5	5	5	5	2	
Subject4	5	1	5	4	2	
Subject5	4	5	4	4	1	
Subject6	3	3	4	3	5	

**Figure 2 Test of reliability for questionnaire**

As the Cronbach's Alpha was more than 0.70 (considered as standard), the questionnaire was considered as reliable.

### Conclusions

- The data-set for the companies selected for the study can be systematically created.
- Processing of the data-set basic values into variables required for inferential data analysis can be done.
- The hypotheses can be duly tested as per research methodology.

- The questionnaire prepared for primary data collection tests well for validity and reliability. However, respondents demanded confidentiality.

### Acknowledgement

Our earnest thanks to the Director, Research Center, Lotus Business School Research Centre, Savitribai Phule Pune University for giving opportunity to pursue research in the said area.

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