

# THE EFFECT OF CAPITAL STRUCTURE ON PROFITABILITY: A STUDY ON INDIAN PAPER INDUSTRY

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## Abstract

Financing decision is very important decision for all the firm as it has its direct impact on the profitability of the firm. Every firm try to design a perfect capital structure with an ideal debt-equity ratio, which can maximize value of the firm as well as profitability and minimize the overall cost of capital. The main aim of this work is to examine and analyse the effect of capital structure decision on profitability of the selected companies for the duration of 10 years from 2013-14 to 2022-23. 10 Indian paper companies are taken as a sample of this study based on higher market capitalisation. In this paper, capital structure is used as independent variable and measured by debt-to-equity ratio. Whereas, profitability is used as dependent variable and measured by gross profit margin, net profit margin, return on net worth, return on capital employed and return on assets. The collected data has been analysed by ratio analysis, descriptive statistics, regression analysis and correlation analysis. Finding of the study revealed that in correlation analysis, the relationship is found negative correlated between capital structure and profitability. While, the result of regression analysis indicates that there is no significant impact of debt to equity on gross profit margin, net profit margin & return on net worth and there is a significant impact of debt to equity on return on assets and return on capital employed.

**Keywords:** Capital Structure, Debt - Equity, Profitability, Paper Industry

## INTRODUCTION

The very essence of the existence of any business is to make profit by maximising its shareholders' value. Firms can maximise shareholder's value by reducing overall cost of capital or increasing the market price of shares. To minimise the cost of capital, one of the best ways is to finance the capital of firm through an optimum mix of equity and debt capital. Firms naturally finance their investment needs through debt or equity. Capital structure refers to the composition of a firm's capital in terms of equity and debt and is usually measured by debt-to-equity ratio. **(Atif Ghayas, 2018)** Many factors are involved in deciding whether to use equity or debt to finance operations, and it is a challenge task to balance this two and find optimal equilibrium.

The topic of capital structure and its relationship with value of firm has gained more attention after Modigliani and Miller's irrelevant approach (1958). They anticipated that choice capital structure has no impact on firm's value under certain norms. These norms were: no transaction cost, absence of corporate tax, free access of market information to investors. According to them, firms would be able to increase their value by increasing borrowings, as long as they could do this at suitably low interest rates. Obviously, this approach holds true only if all the norms given by them are met. However, this is hardly happened in reality, and it is acknowledged by the authors themselves. After that, several studies have demonstrated, by relaxing some of the Modigliani and Miller norms, that capital structure is indeed relevant to the firm's value and that excessive levels of debt could lead to a reduction in such value.

Therefore, even though the theoretical rationale behind Modigliani and Miller's approach is sound and still commonly accepted over time, research scholars have demonstrated that capital structure is important for profitability and value of the firms. However, finding the ideal balance between equity and debt is not an easy task. In this research work attempt is done to check the effect and relationship between capital structure and profitability in Indian paper industry.

Paper is one of the core industries and is related with the human's basic requirements. Paper is important for education and literacy as well as for the overall wellbeing of the society. **(Dey, 2014)** The Indian paper industry is the 15<sup>th</sup> largest paper industry in the whole world and its accounts for about 1.6% of the world's paper production. The estimated turnover of the industry is Rs. 35,000 crores around. This industry provides employment to nearly 15 lakh peoples and contributes Rs. 2.5 billion to the Indian government. Currently in

India, there are 515 paper companies involved in the manufacturing of paper, paperboards and newsprint. (Ambati, 2017)

Paper has been an unavoidable part of not only for the education but also for the other things, because of its various uses in our routine life. Now, paper and its products have gained more demand due to discouraging the use of plastic bags. Though, the industry is also facing challenges due to rising digitalization. It has motivated to select the paper industry for the purpose of research work.

## LITERATURE REVIEWS

Capital structure has received substantial attention in finance literature as factor affecting the profitability as well as value of firms. The effect of capital structure on the profitability of firm has been a topic of discussion and analysis for many researchers. Many of literature has investigated the effects of capital structure choice on a firm's value and profitability after Modigliani and Miller approach. Different studies have been done to shown how capital structure is relevant or irrelevant to the financial performance of companies under different conditions. The aim of all these studies is to find the better capital structure which generates maximum profit.

(Muhammad Nauman Sadiq, 2016) have done a study on "Impact of Capital Structure on the Profitability of Firm's Evidence from Automobile sector of Pakistan". The main purpose of this paper was to contributes to literature on capital structure and evaluate its impact and relationship with the profitability of selected automobile companies listed in Karachi stock exchange. As sample of the study, 19 companies were taken and the study period was from 2006-2012. Data was collected from the publications of the selected companies. Regression analysis and correlation analysis were used with the help of statistical SPSS in order to predict the result. The result of the study concludes that capital structure was negatively associated with the profitability, which indicates that a decrease in debt capital caused an increase in the profitability of the firms and vice versa.

(Assad Naim Nasimi, 2018) have examine "Effect of Capital Structure on Firms' Profitability: An Empirical Evidence from Pakistan Stock Exchange (PSX)". The aim of this research work was to check the impact of capital structure on profitability of firms. For this work, 20 non-financial firms listed in Pakistan Stock Exchange was taken as sample for the duration of 2009 to 2015. To find the effect of capital structure on profitability multivariate regression model was used. The findings of the study revealed that debt-equity ratio has no significant impact on net profit margin and return on asset while it has significant impact on return on equity. However, debt to asset ratio has no significant impact on return on equity and it has significant impact on net profit margin and return on asset.

(Atif Ghayas, 2018) have done a research work on "Impact of Capital Structure on Profitability: An empirical analysis of listed firms in India". The objective of this research work was to empirically examine and analyse the impact of capital structure decision on the profitability of firms. For this work, 35 Indian pharmaceutical companies, who's listed on Bombay Stock Exchange were taken as a sample of this research work and 5 years from 2012 to 2016 were taken as a study period. To measure the impact of capital structure on profitability regression analysis was used. Ratios like total debt to total assets (DA), long-term debt to total assets (LDA) and short-term debt to total assets (SDA) were used as capital structure variables. Whereas, profitability was measured by Return on Equity (ROE) ratio. Sales growth and firm size were also used as control variables. The results of this work disclosed that a positive impact of DA and SDA on ROE. Whereas a weak-to-no impact was found of LDA on ROE.

(Houshang Habibniya, 2022) have analyse the "Impact of Capital Structure on Profitability: Panel Data Evidence of the Telecom Industry in the United States". This research work was done to examine the impact of capital structure on firms' profitability in telecom industry of United States for duration of 2012 to 2020. Unbalanced cross-sectional data (panel data) covering 72 firms were studied by using descriptive statistics models, pooled panel regression, univariate analysis and correlation. For capital structure, Total Liabilities to Total Assets (TLsTAs) and Total Equity to Total Assets (TETAs) ratios were used and For profitability, Return on Assets (ROA) and Return on Equity (ROE) ratios were used. The results of this study revealed that the ratio of TLsTAs and TETAs have significant effect on ROA. whereas, TLsTAs and TETAs have no effect on ROE.

## RESEARCH METHODOLOGY

Research methodology is a scientific and a systematic approach to solve research problems. The methodology employed for various types of research problem are different from each other. It communicates about different methods to be followed during the research process starting from its investigation to reach its conclusion.

## OBJECTIVES OF THE STUDY

- To analyse capital structure of selected paper companies during the selected study period.
- To measure profitability performance of selected paper companies during the selected study period.
- To know the association between capital structure and profitability of selected paper companies during the selected study period.
- To find the effect of capital structure on profitability of selected paper companies during the selected study period.

## RESEARCH HYPOTHESIS

Following hypotheses are developed to know the association between capital structure and profitability & to check the effect of capital structure on profitability of selected paper companies during the study period.

H<sub>0</sub>: There is no significant association between capital structure and profitability in selected paper companies during the study period.

H<sub>1</sub>: There is a significant association between capital structure and profitability in selected paper companies during the study period.

H<sub>0</sub>: There is no significant effect of capital structure on profitability in selected paper companies during the study period.

H<sub>1</sub>: There is a significant effect of capital structure on profitability in selected paper companies during the study period.

### Period of the Study:

This work is done for the duration of the 10 financial years from 2013-14 to 2022-23.

### Sampling Design:

All the paper companies listed on NSE as on are considered as population of the research work. Out of the population, 10 companies are selected on the basis of higher market capitalisation. And the purposive sampling method of non-probability sampling technique is used. The selected companies for the work are as follows:

**Table No. 1.1: Selected Paper Companies**

Sr. No.	Name of the Company
1.	JK Paper Ltd.
2.	West Coast Paper Mills Ltd.
3.	Seshasayee Paper and Board Ltd.
4.	Tamil Nadu Newsprint and Papers Ltd.
5.	Andhra Paper Ltd.
6.	Satia Industries Ltd.
7.	Kuantum Papers Ltd.
8.	Orient Paper & Industries Ltd.
9.	Emami Paper Mills Ltd.
10.	NR Agarwal Industries Ltd.

### Scope of the Study:

Functional scope of this work is to analyse capital structure and profitability performance & to know the effect and association between capital structure and profitability of selected paper companies. In this work 10 paper companies are selected which provides various paper products in India. So, all India is considered as geographical criteria for this work.

### Data Collection:

This work is mainly based on secondary sources data. Financial data is collected from published annual reports of selected companies and other information used is collected from various articles, Journals, websites and books.

### Tools and Techniques of Data Analysis:

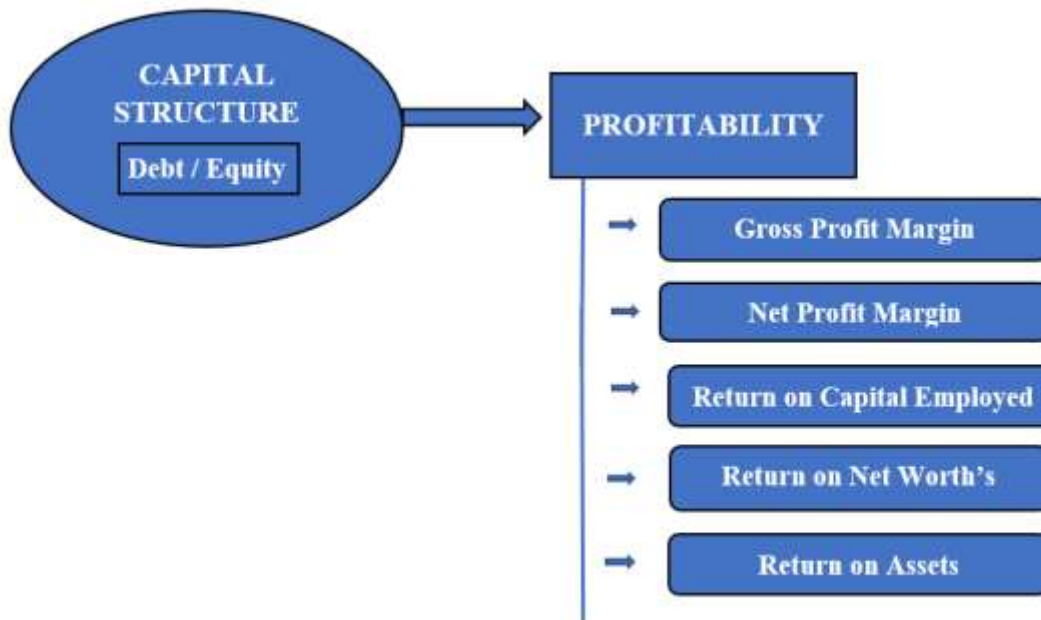
In this work tools and techniques used for data analysis are as under:

- Tabulation and Classification of Data
- Accounting Tool – Ratio Analysis

- Statistical Tool –Regression Analysis and Correlation Analysis

## RESULTS AND ANALYSIS

This work includes six variables to know the association and to find the effect of capital structure on profitability which are as under:



The above figure shows the framework of this research work, in which capital structure is taken as independent variable and measured by Debt-Equity Ratio. Whereas, Profitability is taken as dependent variable and measured by Gross Profit Margin, Net Profit Margin, Return on Capital Employed, Return on Net Worth's and Return on Assets.

Variables	Symbols	Measurements
Debt to Equity Ratio	DE	Total Debt / Total Shareholder's Equity
Gross Profit Margin	GPM	Gross Profit / Net Sales *100
Net Profit Margin	NPM	Net Profit / Net Sales*100
Return on Capital Employed	RCE	EBIT / Capital Employed*100
Return on Net Worth's	RNW's	Net Profit / Shareholders Funds*100
Return on Assets	RA	Net Profit / Total Assets*100

**Debt to Equity Ratio:**  
**Table No. 1.2: Debt to Equity Ratio**

Years	JK Paper	West Coast	Seshasayee	Tamil Nadu	Andhra	Satia	Kuantum	Orient	Emami	NR Agarwal
2013-14	1.84	1.49	1.03	1.11	0.82	1.15	2.12	0.71	1.61	1.98
2014-15	2.40	1.45	0.93	0.95	1.20	1.20	1.01	0.77	1.56	2.65
2015-16	2.38	1.17	0.72	1.53	0.79	1.82	1.28	0.90	2.10	4.32
2016-17	1.39	1.24	0.61	1.70	0.99	1.82	1.22	1.01	2.51	3.33
2017-18	1.08	0.50	0.20	1.40	0.49	1.04	0.33	0.14	5.18	1.99
2018-19	0.64	0.30	0.13	1.22	0.32	0.71	0.37	0.05	4.47	1.10
2019-20	0.54	0.28	0.06	0.93	0.02	0.52	0.42	0.02	4.17	0.77

2020-21	0.48	0.47	0.01	1.04	0.01	0.55	0.60	0.02	4.27	0.41
2021-22	0.80	0.37	0.00	1.43	0.03	0.66	0.79	0.05	2.38	0.23
2022-23	0.86	0.26	0.00	1.40	0.05	0.57	0.92	0.13	1.92	0.27
AVG.	1.24	0.75	0.37	1.27	0.47	1.00	0.91	0.38	3.02	1.71
MAX.	2.4	1.49	1.03	1.7	1.2	1.82	2.12	1.01	5.18	4.32
MIN.	0.48	0.26	0.00	0.93	0.01	0.52	0.33	0.02	1.56	0.23

(Source: Calculated from annual reports of selected paper companies)

The above table reveals debt to equity ratio for the time span of 10 years in all the selected Indian paper companies. A minimum ratio was 0.00 in Seshasayee Paper and Board Ltd. and a maximum ratio was 5.18 in Emami Paper Mills Ltd. In context to average ratio of sample companies during the 10 years, lowest ratio 0.37 showed in Seshasayee Paper and Board Ltd. and highest ratio 3.02 showed by Emami Paper Mills Ltd. Whereas, average ratio in NR Agarwal Industries Ltd., Tamil Nadu Newsprint and Papers Ltd., JK paper Ltd. and Satia Industries Ltd. were 1.71, 1.27, 1.24 and 1.00 respectively, which was close to average highest ratio. Average ratio in remaining companies i.e. Kuantum Papers Ltd., West Coast Paper Mills Ltd., Andhra Paper Ltd. and Orient Paper & Industries Ltd. were 0.91, 0.75, 0.47 and 0.38 respectively, which was close to the lowest average ratio.

**Gross Profit Margin:**  
**Table No. 1.3: Gross Profit Margin**

(In Percentage)

Years	JK Paper	West Coast	Seshasayee	Tamil Nadu	Andhra	Satia	Kuantum	Orient	Emami	NR Agarwal
2013-14	9.89	18.79	13.2	22.67	11.27	15.97	14.34	0.83	14.4	4.89
2014-15	7.97	13.72	12.72	22.89	6.77	13.87	16.16	5.41	13.5	4.16
2015-16	12.34	14.9	9.38	24.45	9.35	17.65	12.97	2.71	11.32	4.97
2016-17	16.48	15.12	10.79	24.65	11.82	16.14	12.47	6.41	9.95	8.29
2017-18	20.5	19.24	20.02	25.89	15.01	20.66	19.71	10.07	13.34	13.81
2018-19	22.46	22.28	19.6	14.15	17.93	23.99	21.46	18.61	12.67	13.29
2019-20	28.43	26.75	24.06	16.86	27.54	24.18	20.71	24.17	15.85	14.61
2020-21	32.24	26.67	24.55	18.59	24.96	23.51	17.09	9.78	14.01	16.25
2021-22	25.58	14.69	16.22	11.24	8.58	24.27	9.73	-5.36	16.24	12.3
2022-23	25.7	21.94	13.45	10.12	19.25	23.24	14.78	-1.32	16.12	9.54
AVG.	20.20	19.41	16.40	19.15	15.25	20.35	15.94	7.13	13.74	10.21
MAX.	32.24	26.75	24.55	25.89	27.54	24.27	21.46	24.17	16.24	16.25
MIN.	7.97	13.72	9.38	10.12	6.77	13.87	9.73	-5.36	9.95	4.16

(Source: Calculated from annual reports of selected paper companies)

The above table indicates gross profit ratio with fluctuating trend in all the selected paper companies during the study period of 2013-14 to 2022-23. A minimum ratio was -5.36 % in Orient Paper & Industries Ltd. in the year 2021-22 and a maximum ratio was 32.24 % in JK Paper Ltd. in the year 2020-21. In context to the average ratio of selected companies during the time span of 10 years, a highest ratio i.e. 20.35 % showed by Satia Industries Ltd. and a lowest ratio i.e. 7.13 % showed by Orient Paper & Industries Ltd. Average ratio in JK Paper Ltd., West Coast Paper Mills Ltd. and Tamil Nadu Newsprint and Papers Ltd. were 20.20 %, 19.41 % and 19.15 % respectively, which was near to the highest average ratio. Average ratio in NR Agarwal Industries Ltd. was 10.21 %, which was near to the lowest average ratio. Average ratio in remaining companies i.e. Seshasayee Paper and Board Ltd., Kuantum Papers Ltd., Andhra Paper Ltd. and Emami Paper Mills Ltd. were 16.40 %, 15.94 %, 15.25 % and 13.74% respectively, which were in between the highest average ratio and lowest average ratio.



**Net Profit Margin:**  
**Table No. 1.4: Net Profit Margin**

(In Percentage)

Years	JK Paper	West Coast	Seshasayee	Tamil Nadu	Andhra	Satia	Kuantum	Orient	Emami	NR Agarwal
2013-14	2.58	1.24	2.46	4.91	-1.92	4.98	3.03	-2.53	2.26	0.89
2014-15	-4.44	0.42	2.64	7.05	-3.81	3.51	7.00	0.26	3.4	0.08
2015-16	-0.59	0.06	1.71	7.80	0.02	1.99	5.01	-1.71	2.33	-4.61
2016-17	2.49	-0.02	3.44	10.5	3.18	3.02	4.66	1.15	5.18	2.01
2017-18	6.19	7.26	11.56	8.94	2.76	8.40	9.76	7.41	1.67	4.76
2018-19	9.14	13.05	11.12	-1.36	6.57	10.82	10.35	7.45	1.20	7.43
2019-20	13.42	14.95	14.33	2.31	14.01	11.88	9.82	14.31	2.87	7.17
2020-21	16.13	13.94	14.74	3.74	16.76	11.35	9.64	3.28	-0.68	8.30
2021-22	11.75	0.14	12.82	-2.35	-0.51	8.42	-3.15	-10.5	4.19	4.99
2022-23	12.83	10.98	7.60	0.35	10.12	11.29	1.61	-4.93	5.86	3.77
<b>AVG.</b>	<b>6.95</b>	<b>6.20</b>	<b>8.24</b>	<b>4.19</b>	<b>4.72</b>	<b>7.57</b>	<b>5.77</b>	<b>1.42</b>	<b>2.83</b>	<b>3.48</b>
<b>MAX.</b>	<b>16.13</b>	<b>14.95</b>	<b>14.74</b>	<b>10.5</b>	<b>16.76</b>	<b>11.88</b>	<b>10.35</b>	<b>14.31</b>	<b>5.86</b>	<b>8.30</b>
<b>MIN.</b>	<b>-4.44</b>	<b>-0.02</b>	<b>1.71</b>	<b>-2.35</b>	<b>-3.81</b>	<b>1.99</b>	<b>-3.15</b>	<b>-10.5</b>	<b>-0.68</b>	<b>-4.61</b>

(Source: Calculated from annual reports of selected paper companies)

The above table reveals net profit ratio for the time span of 10 years in all the selected Indian paper companies. A minimum ratio was -10.5 % in Orient Paper & Industries Ltd. in year 2021-22 and a maximum ratio was 16.76 % in Andhra Paper Ltd. in year 2020.-21. In context to average ratio of sample companies during the 10 years, lowest ratio 1.42 % showed in Orient Paper & Industries Ltd. and highest ratio 8.24 % showed by Seshasayee Paper and Board Ltd. Whereas, average ratio in Satia Industries Ltd., JK Paper Ltd. and West Coast Paper Mills Ltd. were 7.57 %, 6.95 % and 6.20 % respectively, which was close to average highest ratio. In NR Agarwal Industries Ltd. and Emami Paper Mills Ltd. In both the company's ratio was 3.48 % and 2.83 % respectively, which was close to average lowest ratio. Average ratio in remaining companies i.e. Kuantum Papers Ltd., Andhra Paper Ltd. and Tamil Nadu Newsprint and Papers Ltd. were 5.77 %, 4.72 % and 4.19 % respectively, which were in between the lowest and highest average ratio.

**Return on Capital Employed:**  
**Table No. 1.5: Return on Capital Employed**

(In Percentage)

Years	JK Paper	West Coast	Seshasayee	Tamil Nadu	Andhra	Satia	Kuantum	Orient	Emami	NR Agarwal
2013-14	1.50	1.40	3.09	4.42	-2.62	6.78	5.20	-6.47	2.06	1.56
2014-15	-2.97	0.51	3.83	7.35	-4.54	5.74	13.53	0.79	2.4	0.12
2015-16	-0.51	0.10	2.56	5.49	0.03	2.66	3.35	-5.30	1.06	-9.11
2016-17	2.29	-0.04	4.95	6.57	4.19	4.30	3.08	3.39	2.34	4.11
2017-18	5.86	21.26	15.74	15.21	4.52	21.26	6.85	2.48	7.80	25.54
2018-19	18.41	18.49	13.24	6.39	11.27	26.46	13.35	3.04	8.39	27.06
2019-20	23.42	25.24	26.42	14.27	35.26	26.00	12.28	8.45	13.98	28.68
2020-21	22.12	18.50	21.41	12.47	21.95	20.67	7.08	1.72	13.02	29.47
2021-22	10.98	2.59	7.09	1.93	0.25	10.42	0.30	-3.15	11.94	17.09
2022-23	14.45	15.67	10.36	4.97	16.23	14.76	5.10	-2.06	21.13	17.64
<b>AVG.</b>	<b>9.56</b>	<b>10.37</b>	<b>10.87</b>	<b>7.91</b>	<b>8.65</b>	<b>13.91</b>	<b>7.01</b>	<b>0.29</b>	<b>8.41</b>	<b>14.22</b>
<b>MAX.</b>	<b>23.42</b>	<b>25.24</b>	<b>26.42</b>	<b>15.21</b>	<b>35.26</b>	<b>26.46</b>	<b>13.53</b>	<b>8.45</b>	<b>21.13</b>	<b>29.47</b>

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MIN.	-2.97	-0.04	2.56	1.93	-4.54	2.66	0.30	-6.47	1.06	-9.11
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(Source: Calculated from annual reports of selected paper companies)

The above table presents return on capital employed ratio with mixed trend for the time span of 10 years in all the selected companies. A minimum ratio was -9.11 % in NR Agarwal Industries Ltd. in year 2015-16 and a maximum ratio was 35.26 % in Andhra Paper Ltd. in year 2019-20. In context to the average ratio of selected paper companies for the time span of 10 years, a highest ratio i.e. 14.22 % showed by NR Agarwal Industries Ltd. and a lowest ratio i.e. 0.29 % showed by Orient Paper & Industries Ltd. Whereas, average ratio in Satia Industries Ltd., Seshasayee Paper and Board Ltd. and West Coast Paper Mills Ltd. were 13.91 %, 10.87 %, 10.37 % respectively, that was near to the highest average ratio. While, average ratio in JK Paper Ltd., Andhra Paper Ltd., Emami Paper Mills Ltd., Tamil Nadu Newsprint and Papers Ltd. and Kuantum Papers Ltd. were 9.56 %, 8.65 %, 8.41 %, 7.91 % and 7.01 % respectively, that were in between the highest and lowest average ratio.

**Return on Net Worth's:**  
**Table No. 1.6: Return on Net Worth's**

(In Percentage)

Years	JK Paper	West Coast	Seshasayee	Tamil Nadu	Andhra	Satia	Kuantum	Orient	Emami	NR Agarwal
2013-14	4.32	3.03	5.66	8.83	-5.18	19.48	16.71	-7.46	4.95	4.16
2014-15	-9.71	1.11	6.97	14.06	-10.0	15.92	30.97	0.99	5.96	0.40
2015-16	-1.64	0.18	4.41	13.87	0.05	8.58	19.54	-7.28	3.33	-43.8
2016-17	5.47	-0.09	8.45	17.56	8.18	12.55	16.56	5.14	7.19	18.94
2017-18	12.32	20.10	22.00	15.52	6.77	28.77	9.55	3.13	8.13	37.34
2018-19	15.8	26.6	17.51	-2.62	14.72	30.84	10.54	3.74	6.73	41.13
2019-20	21.41	26.82	21.89	5.71	26.19	28.53	10.16	7.33	17.04	30.3
2020-21	20.8	21.33	17.48	7.59	21.81	23.22	8.63	1.57	-4.77	27.87
2021-22	12.39	0.15	9.10	-4.07	-0.47	11.12	-1.55	-3.17	17.25	12.01
2022-23	16.78	14.46	8.55	0.90	12.77	18.47	1.61	-1.85	28.03	11.38
AVG.	9.79	11.37	12.20	7.74	7.48	19.75	12.27	0.21	9.38	13.97
MAX.	21.41	26.82	22.00	17.56	26.19	30.84	30.97	7.33	28.03	41.13
MIN.	-9.71	-0.09	4.41	-4.07	-10.0	8.58	-1.55	-7.46	-4.77	-43.8

(Source: Calculated from annual reports of selected paper companies)

The above table indicates return on net worth ratio with high fluctuating trend in all the selected paper companies during the study period of 10 years from 2013-14 to 2022-23. NR Agarwal Industries Ltd. shows both a maximum ratio of 41.13 % in the year 2018-19 and a minimum ratio of -43.8 % in the year 2015-16. About the average ratio of selected paper companies for study period of 10 years a highest ratio was 19.75 % in Satia Industries Ltd. and a lowest ratio was 0.21 % in Orient Paper & Industries Ltd. While the average ratio in all the remaining companies i.e. NR Agarwal Industries Ltd., Kuantum Papers Ltd., Seshasayee Paper and Board Ltd., West Coast Paper Mills Ltd., JK Paper Ltd., Emami Paper Mills Ltd., Astron Paper & Board Mill Ltd., Tamil Nadu Newsprint and Papers Ltd. and Andhra Paper Ltd. were 13.97 %, 12.27 %, 12.20 %, 11.37 %, 9.79 %, 9.38 %, 8.10 %, 7.74 % and 7.48 % respectively, which were in between the lowest and highest average ratio.

**Return on Assets:**  
**Table No. 1.7: Return on Assets**

(In Percentage)

Years	JK Paper	West Coast	Seshasayee	Tamil Nadu	Andhra	Satia	Kuantum	Orient	Emami	NR Agarwal
2013-14	1.23	0.92	1.83	2.62	-1.96	5.03	3.43	-2.91	1.44	0.99
2014-15	-2.22	0.31	2.44	4.34	-3.15	4.24	8.84	0.34	1.86	0.08
2015-16	-0.38	0.05	1.57	3.54	0.01	1.92	2.92	-2.34	0.86	-5.04

<https://www.gapgyan.org/>

2016-17	1.74	-0.02	3.19	4.62	2.91	2.84	2.71	1.61	1.68	2.67
2017-18	4.53	8.39	11.69	4.69	2.8	9.18	5.86	2.1	1.05	7.54
2018-19	7.21	14.03	9.77	-0.76	7.57	11.8	6.49	2.72	0.83	12.82
2019-20	10.32	15.45	13.47	1.70	16.86	13.29	6.06	5.63	2.08	11.75
2020-21	10.38	11.52	12.23	2.33	16.11	10.86	4.63	1.17	-0.54	13.49
2021-22	5.33	0.08	6.79	-1.08	-0.34	4.94	-0.78	-2.37	2.85	6.13
2022-23	7.18	9.35	6.40	0.24	9.32	8.13	0.80	-1.32	6.45	6.09
AVG.	4.53	6.01	6.94	2.22	5.01	7.22	4.10	0.46	1.86	5.65
MAX.	10.38	15.45	13.47	4.69	16.86	13.29	8.84	5.63	6.45	13.49
MIN.	-2.22	-0.02	1.57	-1.08	-3.15	1.92	-0.78	-2.91	-0.54	-5.04

(Source: Calculated from annual reports of selected paper companies)

The above table reveals return on assets ratio for the time span of 10 years in selected Indian paper companies. A minimum ratio was -5.04 % in NR Agarwal Industries Ltd. in year 2015-16 and a maximum ratio was 16.8 % in Andhra Paper Ltd. in year 2019-20. About the average ratio of selected paper companies for time span of 10 years a highest ratio was 7.22 % in Satia Industries Ltd. and a lowest ratio was 0.46 % in Orient Paper & Industries Ltd. While, the average ratio in Seshasayee Paper and Board Ltd., West Coast Paper Mills Ltd., NR Agarwal Industries Ltd. and Andhra Paper Ltd. were 6.94 %, 6.01 %, 5.65 % and 5.01 % respectively, which was near to the highest average ratio. In Emami Paper Mills Ltd. and Tamil Nadu Newsprint and Papers Ltd. average ratio were 1.86 % and 2.22 % respectively, in both the companies the ratio was near to the lowest average ratio. Whereas the average ratio in JK Paper Ltd., Kuantum Papers Ltd. and Astron Paper & Board Mill Ltd. were 4.53 %, 4.10 % and 3.80 % respectively, which were in between the highest and lowest average ratio.

#### Descriptive Statistics:

**Table No. 1.8: Descriptive Statistics**

Variables	DE	GPM	NPM	RCE	RA	RNW
Minimum	0	-5.36	-10.5	-9.11	-5.04	-43.8
Maximum	5.18	32.24	16.76	35.26	16.86	41.13
Mean	1.1118	15.7739	5.1366	9.1191	4.4005	10.4175
S.D.	1.048474	6.974436	5.52909	9.367372	4.85931	12.01473
Range	5.18	37.6	27.26	44.37	21.9	84.93
Count	100	100	100	100	100	100

The above table shows descriptive statistics for the duration of 10 years. The profitability ratio measured by Gross Profit Margin, Net Profit Margin, Return on Capital Employed, Return on Assets and Return on Net Worth's averaged 15.77 %, 5.14 %, 9.12 %, 4.40 % and 10.42 % respectively. The Debt-to-Equity ratio stood at 1.11:1. The maximum and minimum values of Debt-to-Equity ratio indicate that the debt/equity composition varies substantially among the paper companies in India.

#### Correlation Analysis:

**Table No. 1.9: Correlation Analysis**

Variables	DE	GPM	NPM	RCE	RA	RNW
DE	1					
GPM	-0.26304	1				
NPM	-0.42543	0.859039	1			
RCE	-0.26751	0.672764	0.751607	1		
RA	-0.44385	0.719241	0.882582	0.908871	1	
RNW	-0.25633	0.593641	0.708117	0.828293	0.841708	1

The above table shows association between independent variable and various dependent variables used in this research work. From, the above table it is crystal clear that association is found to be negative associated between capital structure and profitability. Negative association shows decrease in independent variable leads to increase in dependent variables and increase in independent variable leads to decrease in dependent variables. So, decrease in debt-to-equity ratio leads to increase in selected profitability ratios and increase in debt-to-equity ratio leads to decrease in selected profitability ratios.

#### Regression Analysis:

**Table No. 1.10: Regression Statistics**

Multiple R	0.571146
R Square	0.326207



<b>Adjusted R Square</b>	0.290367
<b>Standard Error</b>	0.883231

Above table displays summary of regression statistics which include the value of multiple R, R Square and Adjusted R Square. The value of R square is 0.3262 denotes that capital structure has combined impact of 32.62% on all selected profitability variables. The value of multiple R 0.5711, indicates that there is no strong effect of capital structure on selected profitability variables.

**Table No. 1.11: Regression Model**

Variables	Coefficients	Standard Error	t Stat	P-value
<b>Intercept</b>	1.159278	0.292166	3.967867	0.000142
<b>GPM</b>	0.023391	0.026849	0.871204	0.385863
<b>NPM</b>	-0.02369	0.051739	-0.4578	0.648149
<b>RCE</b>	0.071047	0.02583	2.750579	0.007137
<b>RA</b>	-0.26706	0.07167	-3.72627	0.000332
<b>RNW</b>	0.022323	0.014293	1.561827	0.121689

Above table shows regression model for the selected independent variable and dependent variables. The P-value of RA and RCE are 0.0003 and 0.0071 respectively, which is less than 0.05 that means there is a significant effect of DE on RA and RCE. The p-value of GPM, NPM and RNW are 0.3858, 0.6481 and 0.1216 respectively, which is more than 0.05 that means there is no significant impact of DE on GPM, NPM and RNW.

## CONCLUSION

Optimal capital structure is one of the major issues of modern finance. Every firm tries to increase its profitability by minimizing its various costs. It is hypothesized by many researchers that, debt being a cheaper source of capital leads to decrease in overall cost of the capital and thus increase in the profitability. However, results of the various empirical studies undertaken all over the world are contradicting in nature. Some report a positive association between debt level and profitability, others report a negative association between them, while some studies report no association at all. In this research paper attempted to examine the association between capital structure on profitability and effect of capital structure on profitability in selected 10 paper companies for the duration of ten years from 2013-14 to 2022-23. The result of this work reveals that the association is found negative associated between capital structure and profitability and there is a significant effect of DE on RA and RCE & there is no significant effect of DE on GPM, NPM and RNW.

## REFERENCES

- [1] Ambati, Y. (2017, July). Paper Industry in India - An Analytical Study. *International Journal of Research in Management, Economics and Commerce*, 7(7), 13-18.
- [2] Assad Naim Nasimi, R. N. (2018). Effect of Capital Structure on Firms' Profitability: An Empirical Evidence from Pakistan Stock Exchange (PSX). *Research Journal of Finance and Accounting*, 9(11), 57-68. Retrieved 12 30, 2022
- [3] Atif Ghayas, J. A. (2018, August ). Impact of Capital Structure on Profitability: An empirical analysis of listed firms in India. *Asian Journal of Managerial Science*, 7(2), 1-6. doi:http://dx.doi.org/10.51983/ajms-2018.7.2.1310
- [4] Dey, D. S. (2014). Paper Industry in India: A Comparative Study. *European Journal of Business and Management*, 6(31), 251-260.
- [5] Houshang Habibniya, S. D. (2022). Impact of Capital Structure on Profitability: Panel Data Evidence of the Telecom Industry in the United States. *Risks*, 1-19. doi: https://doi.org/10.3390/risks10080157
- [6] Muhammad Nauman Sadiq, F. S. (2016). Impact of Capital Structure on the Profitability of Firm's Evidence from Automobilesector of Pakistan. *Global Journal of Management and Business Research: C*, 16(1), 61-67. Retrieved 30 12, 2022, from https://globaljournals.org/GJMBR\_Volume16/5-Impact-of-Capital-Structure.pdf
- [7] Thirunavukkarasu Velnampy, J. A. (2012). The Relationship between Capital Structure & Profitability. *Global Journal of Management and Business Research* , 12(13), 66-73. Retrieved 12 26, 2022, from https://www.researchgate.net/publication/231589896\_The\_Relationship\_between\_Capital\_Structure\_Profitability
- [8] Tripathi, J. G. (2014, May). Study of India's Paper Industry - Potential and Growth in 21ST Century. *Indian Journal of Applied Research*, 4(5), 112-115.