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ORIGINAL RESEARCH PAPER

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EFFECT OF DEBT AND EQUITY FINANCING ON PROFITABILITY: A STUDY OF SELECTED AUTOMOBILE FIRMS IN INDIA

KEY WORDS: Capital structure, Profitability, Debt to equity ratio, Correlation and Regression analysis

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ABSTRACT

Indian automobile industry is one of the growing industries in India which provide significant role in Indian GDP. Many automobile companies are working in India as well as in foreign countries. Profitability is one of the important measurements to determine financial performance of a company. It is required for company to generate sufficient profit for their stakeholders. Present study focused on profitability and capital structure and its effect on each variable. Correlation and regression are statistical tool which researcher has applied in this data of five years from 2024-25 to 2020-21. In this present study debt to equity ratio is measurement of capital structure and it is independent variables while profitability ratios are dependent variable. To determine relationship and impact correlation and regression tool are used among the all variables.

INTRODUCTION

Capital Structure is now a day essential component to measure strength of company. Now a days various funds are available for company to obtain from market but main things are utilization and maintain proper balance between equity and borrowings. Effective capital structure is an important financial decision for company's growth and success for future aspects. Mainly capital structure is a mixture of internal and external fund with equity and borrowed fundings. Primary aim of any organization or businesses is profits maximization, generate sufficient profit and provide sufficient return to their shareholders. Stakeholders invest their money to get return and utilize their fund in proper manner. Capital structure and profitability one of the important aspects to measure financial performance of a company. In this study researcher tried to determine impact of profitability on capital structure through ratios.

Review of Literatures

Various researchers have significantly worked on the same research topics. Researcher has reviewed books, articles and other online materials that used to study the topic.

Reddy & Tabassum (2024), examined overall impact of capital structure on financial peformance of selected commercial bank and measure capital structure by using debt to equity ratio. For finaical perfromance ratios such as net profit margin, return on capital employed, return on equity and net interest margin ratios are used for selected samples. Statistical tool, regression anlaysis and ANOVA used for study. As per the results positive correlation between debt to equity and other financial performance measure ratios.

Mondal, Kurmi, & Mitra (2024), observed impact of capital structure on profitability: an empirical search. Dynamic panel data regression method is used to determine relationship between capital structure and profitability. For profitability ROIC is dependent variable while leverage as independent variable. As per the result profitability is affected by capital structure.

Sarkar (2024), evaluated impact of capital structure on profitability of companies listed in Indian stock exchange with respect ot steel industry. Study mainly focused on various facts and decisions related with capital structure on Indian stock exchange. Study focused on various capital structure internal and external fund used by firm in day to day business operations.

Mehta (2021), analyzed impact of capital structure on profitability of companies listed on Nifty 50 Index in India with ten year data from 2011 to 2020. Mainly correlation and regression analysis used to find impact of variables of selected samples. Debt to equity ratio, long term debt to total asset ratio and return on equity ratio represents capital structure while to measure profitability return on capital employed, return in equity and return on asset was used.

Pandey (2021), book is most popular in the field of financial management. Various chapters are used to study capital structure, theories and approaches in business decision. It aid to take various financial decisions in research field and practical world.

Sunita (2018), examined effect of capital structure on overall profitability: a study of Indian Bank. This paper focused on how capital structure impacted on selected banking companies for the study. Researcher used multivariate regression analysis of selected twenty samples and tenure of 2012 to 2017. The results showed that capital structure is negatively correlation with overall profitability of selected samples.

Mathur & Kalyani (2017), determined impact of capital structure on overall profitability of oil and natural gas industry. Seven listed firms are taken as samples. Profitability measured by return on asset and net profit ratio while capital structure determine through financial leverage and operating leverages. Result shows significant impact among the variables.

Movalia (2015), research paper analyzes capital structure and profitability analysis of Indian tyres industry. The results of the study reveals that there is significant relationship between capital structure and profitability in selected tyre companies.

Research Gap

After reviewing various literatures, it was found that a lot of work was done on different industries, including Information Technology industries, cement industries, textiles industries and many more. There are few studies founded that focused on capital structure and profitability analysis and determine impact of both variables of automobile companies. This research study tried to determine how capital structure affect the profitability of selected automobile companies in India.

Objectives of Study

1. To determine relationship between debt to equity and profitability of selected automobile companies in India.
2. To determine impact of debt to equity on profitability of selected automobile companies in India.

Research Methodology

Data Collection

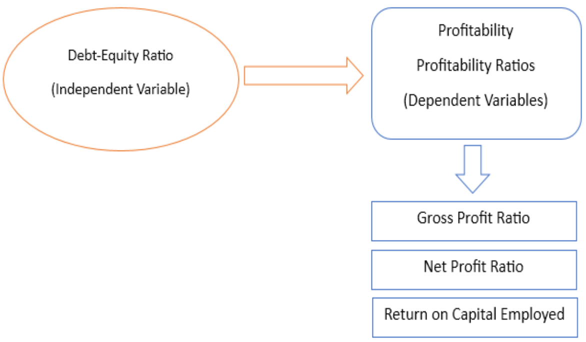
In this research study, researcher has collected data based on secondary data collection method. Data are basically already collected and calculated by other. The basic data of secondary data were annual reports and various authenticate websites. Study considered five years from March-2025 to March-2021 for research aspect.

Data Sampling Methods

Researcher used convenience sampling method to determine sample of the study and focused on higher market capitalization of samples.

Tools and Techniques

Various statistical tools are available for research aspects. Present study is mainly focused to determine impact for that reason ratio analysis and regression were used. To compare both variables ratio analysis is used to determine impact between variables. Correlation and Regression analysis are used to determine relationship and impact between variables. In this study Microsoft excel is used for analysis aspects. In this study profitability ratios are dependent variables while capital structure ratio is independent variable of selected automobile companies. The following chart shows dependent variable and independent variable:



Hypothesis Framing

1. H_0: There is no significant impact of debt to equity on gross profit margin of selected automobile companies in India.
2. H_0: There is no significant impact of debt to equity on net profit margin of selected automobile companies in India.
3. H_0: There is no significant impact of debt to equity on return on capital employed of selected automobile companies in India.

Samples

Researcher has selected four automobile companies based on market capitalization from listed companies in Bombay Stock Exchange.

Sr. No.	Name of company	Market Capitalization (Cr)
1	Ashok Leyland Ltd.	1,16,708
2	Tata Motors Passengers Vehicles Ltd.	1,27,777
3	Mahindra and Mahindra Ltd.	4,44,002
4	Force Motors Ltd.	26,827

(Source: moneycontroll.com)

Overview of Variables

Sr. No.	Name of variables	Description	Formula
1	Debt to Equity Ratio	Debt to equity ratio used to determine relationship between borrowed capital and owner's capital. It will used to take decision regarding capital structure. It indicates times.	$D/E = \frac{Total\ Debt}{Total\ Shareholder's\ equity}$
2	Gross Profit Margin Ratio	It is profitability ratio which used to determine relationship between gross profit and sales. It indicates percentage.	$GP\ (\%) = \frac{Gross\ Profit}{Net\ Sales} \times 100$
3	Net Profit Margin Ratio	It is profitability ratio which used to determine relationship between profitability and sales.	$NP\ (\%) = \frac{Net\ Profit}{Net\ Sales} \times 100$
4	Return on Capital Employed	Return on capital employed is ascertained through earnings before interest and tax with total asset and current liabilities.	$ROCE = \frac{Earning\ Befrore\ interest\ and\ tax}{Capital\ Employed}$

Data Analysis

Name of ratios	Ashok Leyland Ltd.				
	March 2025	March 2024	March 2023	March 2022	March 2021
Debt to Equity Ratio (Times)	0.12	0.26	0.38	0.48	0.53
Gross Profit Margin Ratio (%)	13.36	12.64	8.42	4.93	4.27
Net Profit Margin Ratio (%)	8.52	6.82	3.81	2.49	-2.05
Return on Capital Employed (%)	31.65	35.78	20.09	2.94	-0.91

(Source: moneycontrol.com)

Above table shows ratios of Ashok Leyland ltd. Debt to equity ratio continuously shows downwards trend that shows company gets more funds from equities. Gross profit rapidly increasing that indicates day by day company generate more profit than previous years. Similarly, in the year march 2021 company's net profit is negative i.e. -2.05 but after that year company continuously rais its profit. Return on capital employed almost negative in march 2021 -0.91 after wards it will rais constantly. Above all ratios indicates that company continuously growing and utilize their fund in proper manner to generate profit and returns.

Name of ratios	Tata Motors Passengers Vehicles Ltd.				
	March 2025	March 2024	March 2023	March 2022	March 2021
Debt to Equity Ratio (Times)	0.26	0.46	0.84	1.17	1.14
Gross Profit Margin Ratio (%)	15.56	11.95	8.13	4.56	6.21
Net Profit Margin Ratio (%)	7.85	10.78	4.14	-2.94	-7.93
Return on Capital Employed (%)	21.46	17.41	9.96	1.07	0.37

(Source: moneycontrol.com)

Above table shows ratios of Tata Motors Passengers Vehicles Ltd. Debt to equity ratio continuously shows downwards, it indicates company focuses more funds from equities. Gross profit rapidly increasing that indicates day by day company generate more profit than previous years except in march 2022. Similarly, in the year march 2021 company's net profit is negative i.e. -7.93 and in march 2022 -2.94 remain all year company's profit shows upward trend. Return on capital employed continuously increasing from march 2021 to march 2025.

Name of ratios	Mahindra and Mahindra Ltd.				
	March 2025	March 2024	March 2023	March 2022	March 2021
Debt to Equity Ratio (Times)	0.02	0.03	0.11	0.17	0.21
Gross Profit Margin Ratio (%)	17.27	17.27	15.28	15.87	17.15
Net Profit Margin Ratio (%)	10.17	10.85	7.70	8.59	0.59
Return on Capital Employed (%)	23.53	23.55	19.76	13.80	12.35

(Source: moneycontrol.com)

Above table shows ratios of Mahindra and Mahindra ltd. Debt to equity ratio continuously shows downwards, it indicates company focuses more in internal funds. Gross profit is fluctuating from march 2021 to march 2025. Similarly, in the year march 2021 company's net profit is positive in all selected years, this is only company in which not a single ratio shows negative. Return on capital employed continuously increasing from march 2021 to march 2025. Overall company generate sufficient profit and also it is growing trends that shows overall financial performance of company is strong.

Name of ratios	Force Motors Ltd.				
	March 2025	March 2024	March 2023	March 2022	March 2021
Debt to Equity Ratio (Times)	0.01	0.23	0.49	0.60	0.28
Gross Profit Margin Ratio (%)	14.23	13.54	7.78	3.66	1.89
Net Profit Margin Ratio (%)	9.91	5.47	3.02	-2.30	-5.62
Return on Capital Employed (%)	24.98	23.9	5.88	-2.99	-5.70

(Source: moneycontrol.com)

Above table shows ratios of Force Motors ltd. Debt to equity ratio continuously shows downwards, it indicates company focuses more in internal funds. Gross profit is continuously increasing which means company's sales is increasing year by year. fluctuating from march 2021 to march 2025. Similarly, in the year march 2021 company's net profit is negative i.e. -5.62 and in march 2022 -2.30 remain all year company's profit shows upward trend. Return on capital employed continuously increasing from march 2021 to march 2025 except march 2021 and march 2022 remain all year ratio is increasing trend.

Regression Models

Regression models describe dependent and independent variables. Below mentioned model is used to determine impact of capital structure on profitability of selected automobile companies in India.

Model-1	Model-2	Model-3
GPR = a + b D/E	NPR = a + b D/E	ROCE = a + b D/E

Table-1: Model-1 Regression Results of debt to equity on gross profit margin ratio

Regression Statistics	Ashok Leyland Ltd.	Tata Motors Passengers Vehicles Ltd.	Mahindra and Mahindra Ltd.	Force Motors Ltd.
Multiple R	0.968325	0.985976	0.330011	0.665335
R Square	0.937654	0.972148	0.108907	0.44267
Adjusted R Square	0.916872	0.962864	-0.18812	0.256894
Standard Error	1.216015	0.859622	1.015303	4.828145
Observations	5	5	5	5

Name of Company		Coefficients	Standard Error	t Stat	P-value
Ashok Leyland Ltd.	Intercept	17.39808	1.401192	12.41663	0.001126
	Debt to Equity	-24.5031	3.6479	-6.71703	0.006735
Tata Motors Passengers Vehicles Ltd.	Intercept	17.67579	0.905897	19.51193	0.000294
	Debt to Equity	-10.8447	1.059793	-10.2328	0.00199
Mahindra and Mahindra Ltd.	Intercept	16.96423	0.796469	21.2993	0.000226
	Debt to Equity	-3.6688	6.058946	-0.60552	0.587574
Force Motors Ltd.	Intercept	13.41888	4.000656	3.354169	0.043923
	Debt to Equity	-16.1456	10.45945	-1.54364	0.220367

(Source: Calculated in EXCEL)

Table-2: Model-2 Regression Results of debt to equity on net profit margin ratio

Regression Statistics	Ashok Leyland Ltd.	Tata Motors Passengers Vehicles Ltd.	Mahindra and Mahindra Ltd.	Force Motors Ltd.
Multiple R	0.944679	0.895763	0.154562	0.613128
R Square	0.892418	0.802391	0.023889	0.375926
Adjusted R Square	0.856557	0.736522	-0.30148	0.167902
Standard Error	1.553152	3.960885	5.574175	5.626059
Observations	5	5	5	5

Name of Company		Coefficients	Standard Error	t Stat	P-value
Ashok Leyland Ltd.	Intercept	12.14602	1.789669	6.78674	0.006539
	Debt to Equity	-23.243	4.659268	-4.98855	0.015489
Tata Motors Passengers Vehicles Ltd.	Intercept	15.5716	4.174105	3.730524	0.033563
	Debt to Equity	-17.0434	4.883214	-3.4902	0.039761
Mahindra and Mahindra Ltd.	Intercept	6.553462	4.372742	1.498707	0.230894
	Debt to Equity	-9.01353	33.26458	-0.27096	0.803992
Force Motors Ltd.	Intercept	7.371735	4.661816	1.581301	0.21195
	Debt to Equity	-16.3843	12.18801	-1.34429	0.271468

(Source: Calculated in EXCEL)

Table-3: Model-3 Regression Results of debt-equity on return on capital employed

Regression Statistics	Ashok Leyland Ltd.	Tata Motors Passengers Vehicles Ltd.	Mahindra and Mahindra Ltd.	Force Motors Ltd.
Multiple R	0.911492	0.994684	0.987212	0.71445
R Square	0.830818	0.989397	0.974587	0.510439
Adjusted R Square	0.774424	0.985863	0.966115	0.347252

Standard Error	7.844457	1.125965	0.975157	11.75477
Observations	5	5	5	5

Name of Company		Coefficients	Standard Error	t Stat	P-value
Ashok Leyland Ltd.	Intercept	49.88469	9.039027	5.518812	0.011718
	Debt to Equity	-90.324	23.53243	-3.83828	0.031186
Tata Motors Passengers Vehicles Ltd.	Intercept	28.03072	1.186577	23.62317	0.000166
	Debt to Equity	-23.2257	1.388156	-16.7314	0.000465
Mahindra and Mahindra Ltd.	Intercept	25.33923	0.764976	33.12421	6.05E-05
	Debt to Equity	-62.4188	5.819372	-10.726	0.001733
Force Motors Ltd.	Intercept	23.716	9.740137	2.434873	0.092925
	Debt to Equity	-45.0373	25.46495	-1.7686	0.175113

(Source: Calculated in EXCEL)

Findings Based on Hypothesis

H_0: There is no significant impact of debt to equity on gross profit margin of selected automobile companies in India.

Correlation of Ashok Leyland ltd. of debt to equity on gross profit margin ratio is 0.96 while regression indicated 0.93, correlation of Tata motors passenger vehicle ltd of debt to equity on gross profit margin ratio is 0.98 while regression is 0.97, correlation of Mahindra and Mahindra ltd of debt to equity on gross profit margin ratio is 0.33 while regression is 0.10 and correlation of Force ltd. of debt to equity on gross profit ratio is 0.66 and regression is 0.44. The result showed that there is very strong relation between debt to equity and gross profit margin in Ashok ltd and tata motor passenger vehicle ltd while Mahindra & Mahindra ltd shows week relationship and impact of variables. In force ltd moderate relationship and impact between variables.

It is observed that the P value of Ashok ltd. is 0.0006, which is lower than 0.05. So, there is significant impact of debt to equity on gross profit margin ratio and for Tata passenger vehicle ltd. the P value is 0.001, which is less than 0.05. So, it has significant impact of debt to equity on gross profit margin ratio. It is observed that the P value of Mahindra and Mahindra ltd. is 0.58, which is higher than 0.05. So, there is insignificant impact of debt to equity on gross profit margin ratio and for Force motors ltd. the P value is 0.22, which is more than 0.05. So, it has insignificant impact of debt to equity on gross profit margin ratio.

H_0: There is no significant impact of debt to equity on net profit margin of selected automobile companies in India.

Correlation of Ashok Leyland ltd. of debt to equity on net profit margin ratio is 0.94 while regression indicated 0.89, correlation of Tata motors passenger vehicle ltd of debt to equity on net profit margin ratio is 0.89 while regression is 0.80, correlation of Mahindra and Mahindra ltd of debt to equity on net profit margin ratio is 0.15 while regression is 0.02 and correlation of Force ltd. of debt to equity on net profit ratio is 0.61 and regression is 0.37. The result showed that there is very strong relation between debt to equity and net profit margin in Ashok ltd and tata motor passenger vehicle ltd while Mahindra & Mahindra ltd shows week relationship and impact of variables. In force ltd as per the result moderate relation and impact between variables.

It is observed that the P value of Ashok ltd. is 0.015, which is lower than 0.05. So, there is significant impact of debt to equity on net profit margin ratio and for Tata passenger vehicle ltd. the P value is 0.03, which is less than 0.05. So, it has significant impact of debt to equity on net profit margin ratio. It is observed that the P value of Mahindra and Mahindra ltd. is 0.80, which is higher than 0.05. So, there is insignificant impact of debt to equity on net profit margin ratio and for Force motors ltd. the P value is 0.27, which is more than 0.05. So, it has insignificant impact of debt to equity on net profit margin ratio.

H_0: There is no significant impact of debt to equity on return on capital employed of selected automobile companies in India.

Correlation of Ashok Leyland ltd. of debt to equity on return on capital employed ratio is 0.91 while regression indicated 0.83, correlation of Tata motors passenger vehicle ltd of debt to equity on return on capital employed is 0.99 while regression is 0.98, correlation of Mahindra and Mahindra ltd of debt to equity on return on capital employed is 0.98 while regression is 0.97 and correlation of Force ltd. of debt to equity on return on capital employed is 0.71 and regression is 0.51. The result showed that there is very strong relation between debt to equity and return on capital employed in Ashok ltd, tata motor passenger vehicle ltd and Mahindra & Mahindra ltd while force motors show week relationship and impact of variables.

It is observed that the P value of Ashok ltd. is 0.031, which is lower than 0.05. So, there is significant impact of debt to equity on return on capital employed ratio and for Tata passenger vehicle ltd. the P value is 0.0004, which is less than 0.05. So, it has significant impact of debt to equity on return on capital employed ratio. It is observed that the P value of Mahindra and Mahindra ltd. is 0.01, which is higher than 0.05. So, there is significant impact of debt to equity on return on capital employed ratio and for Force motors ltd. the P value is 0.17, which is more than 0.05. So, it has insignificant impact of debt to equity on return on capital employed ratio.

CONCLUSION

Deb to equity and profitability are wide concept in the field of finance and accounting. In business world company's utilization of fund is more important decisions. This result study focused to determine impact of debt to equity on profitability of selected four automobile listed public limited companies. As per the result, we can say that overall positive relationship among variables while two companies have significant impact among variables and other two companies have insignificant impact of variables. Study is used for further reference for other research work as well as for other industries.

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