



## The capital structure-financial performance paradigm: An investigation of infrastructure companies in the Indian stock market

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### Abstract

Capital structure is a crucial component of financial management with enduring implications. This study investigates the impact of capital structure on the financial performance of infrastructure companies in India. Using nine top infrastructure companies for the period 2009-2019, we examine the relationship between debt-equity ratio and return on equity. Our results, based on ordinary least squares regression analysis, indicate that financial leverage has no significant impact on the firm's financial performance parameters of return on equity. This finding has implications for financial managers, policymakers, and investors seeking to optimize capital structure and enhance financial performance.

**Keywords:** Capital structure, financial leverage, return on equity, financial performance, infrastructure companies

### Introduction

Financing and Investment are two essential domains where a company makes decisions by the finance manager. All long-term financial resources, such as loans, reserves, shares, and bonds, are included in the capital structure, which is constituted of its capitalization. A significant unresolved issue in the subject of finance is the connection between a company's capital structure and financial performance, which has been thoroughly explored both theoretically and experimentally. Capital structure refers to the proportion of debt and equity that the firm uses for its finance. The Modigliani-Miller theorem (M&M) posits that a company's market value is determined by the present value of its anticipated earnings and intrinsic assets. At first, they proposed that the irrelevance of capital structure to firm performance and argued that in a perfect market situation there is no link between firm value and its financing mix. But the introduction of corporation income taxes and transaction costs (Miller 1963) showing that the value of a firm increases with more debt due to the tax shield.

Capital structure decisions are also vital for the financial soundness of the company. Inappropriate decisions about the capital structure may lead to financial distress and eventually to bankruptcy. The top level finance executive sets the capital structure of their companies keeping in mind the objective of wealth maximization. However, they do choose different financial leverage levels in their effort to attain an optimal capital structure. The key to sustaining India growth rate lies in developing India infrastructure which has shown a tremendous potential in the recent times. Observing the growing scenario, the infrastructure companies are aiming at their best performance at all level starting from acquiring capital for their long term and short term projects to market expansion so that they can take utmost advantage of the Industry peak time.

Jensen and Meckling (1976) claimed that capital structure might have an impact on business performance, a number of researchers have extended this argument and carried out a

large number of studies to investigate the connection between financial leverage and firm performance during the past few decades. The empirical data about the relationship is contradictory and inconsistent.

Financial leverage is the composition of debt in the capital structure of a firm. A firm that uses financial leverage is said to be trading on equity. The higher the amount of debt employed by a firm the higher its financial leverage. A higher degree of financial leverage means high interest payments which negatively affect the company's bottom line earnings per share. High financial leverage also increases financial risk to shareholders threatening the returns they expect from their investments. It is affected by various factors such as company size, company age, liquidity, tangibility of asset, non-debt tax shield, and growth opportunity among others. Financial leverage is an important area of interest since it has an effect on profitability of a business entity. The relationship between capital structure and business performance is still being investigated by many researchers; some have identified a negative relationship, while others have found a positive one. Conversely, a number of studies reported a strong relationship between capital structure and firm performance, while a smaller number reported a negligible relationship. The primary objective of this research paper is to examine the relationship between Indian infrastructure companies' capital structure and financial performance. For the purposes of achieving the objectives of this study, financial leverage will be considered in terms of liquidity, firm size and growth opportunity determining their effects on the profitability of infrastructure companies.

### Literature Review

The paper analyzes the effect of financial leverage on the firm's financial performance. Over the years, several theories on this topic have been established by researchers and different academic scholars. These theories include; the Theory of Modigliani & Miller (1958) <sup>[9]</sup> which proposed

that the cost of obtaining capital is not linked to the type of funds that a company uses and there isn't any existence of an optimal capital structure, hence the capital structure of a firm is not relevant or has no influence on the value of a firm. However, amendments were done by Modigliani & Miller (1963) on their earlier model of capital structure irrelevance theory in relation to their acceptance that corporate tax and the tax deductibility of interest payment exist (Al-Nasrawi & Thabit, 2020).

Salim and Yadav (2012) <sup>[1]</sup> looked at 237 Malaysian listed businesses between 1995 and 2011 to determine how capital structure and company performance related to each other. Tobin's Q, earnings per share, return on equity, and return on assets were used as performance metrics, and the ratios of short-, long-, and total debt were utilized as capital structure metrics. The findings indicated that short-term, long-term, and total debt were negatively correlated with business performance as determined by ROA, ROE, and EPS. On the other hand, both short-term and long-term debt had a positive relationship with Tobin's Q. In every sector examined, the study discovered a favorable correlation between growth and company performance. The authors pointed out that Malaysian businesses employed comparatively little debt finance, indicating the possibility of using more leverage to improve performance.

Hasan *et al.* (2014) <sup>[2]</sup> looked into how capital structure affected the performance of 36 Bangladeshi companies that were listed during 2007 and 2012 on the Dhaka Stock Exchange. They compared three capital structure ratios (short-term debt, long-term debt, and total debt) with four performance metrics (EPS, ROE, ROA, and Tobin's Q). They discovered that EPS had a substantial negative relationship with long-term debt but a significant positive correlation with short-term debt using pooling panel data regression. All debt metrics had a substantial negative correlation with ROA. However, neither ROE nor Tobin's Q revealed any statistically significant correlations between capital structure and performance. The authors came to their conclusion that capital structure usually had a negative effect on business performance, with the exception of the advantageous link between EPS and short-term debt.

Varian Foo *et al.* (2015) <sup>[3]</sup> conducted an empirical study to investigate the relationship between capital structure and corporate performance in the Malaysian oil and gas industry. The study used three accounting-based measures of corporate performance: Return on Assets (ROA), Return on Equity (ROE), and Gross Margin (GM). The researchers applied regression analysis using both short-term debt to total assets (STDTA), long-term debt to total assets (LTDTA), and total debt to total assets (TTDTA) as independent variables. The findings revealed a negative relationship between LTDTA and ROE, indicating that an increase in long-term debt correlates with decreased profitability. Nevertheless, there was no discernible correlation between capital structure factors and ROA or gross margin. The study draws focus on the intricate connection between debt levels and performance, emphasizing that debt financing may be more costly in Malaysia, which has a detrimental effect on profitability. The lack of agreement on the ideal capital structure and the scant attention paid to Malaysian industries other than oil and gas are two possible gaps in this research.

Al-Taani (2013) <sup>[4]</sup> investigated the relationship between capital structure and firm performance for 45 Jordanian

manufacturing companies listed on the Amman Stock Exchange from 2005-2009. The study examined performance measures including Return on Assets (ROA) and Profit Margin (PM) against capital structure variables of short-term debt to total assets, long-term debt to total assets, and total debt to equity. Multiple regression analysis showed a weak and negative correlation between ROA and PM and the short- and long-term debt ratios. Total debt to equity has a negative correlation with PM but a good correlation with ROA. The author arrived at the conclusion that, statistically speaking, capital structure had little bearing on the sample's company performance. The study recommended managers to use debt financing with prudence because, in the majority of situations, it proved to have a negative impact on performance.

Samarakoon (2014) <sup>[5]</sup> conducted a study investigating the impact of capital structure on the financial performance of listed manufacturing companies in Sri Lanka. The study utilized secondary data collected from the annual reports of these companies and employed statistical techniques such as descriptive statistics, correlation analysis, and regression analysis to analyse the relationship between capital structure (measured by the debt-to-equity ratio and debt-to-assets ratio) and financial performance (measured by gross profit, net profit, return on equity, and return on assets). However, there were no consistent relationships between capital structure and other performance indicators, suggesting that the impact of debt levels may vary depending on other factors. The research identifies a gap in terms of the generalizability of the findings across other industries and regions, indicating a need for broader studies. The results demonstrated a significant positive relationship between the debt-to-assets ratio and gross profit margin, and return on equity also shows a correlation with capital structure.

Nassar (2016) <sup>[6]</sup> examined the impact of capital structure on financial performance of industrial companies listed on the Istanbul Stock Exchange from 2005-2012. Using debt ratio as a measure of capital structure and ROA, ROE, and EPS as performance indicators, the study found a significant negative relationship between capital structure and firm performance. This is similar to the results of a number of other emerging market research that Nassar references, including Mumtaz *et al.* (2013) <sup>[7]</sup> in Pakistan and Le and Phung (2013) in Vietnam. Nassar points out that some research findings are incompatible, such as the finding by Badar and Saeed (2013) that there is a positive correlation in Pakistan's sugar industry. In order to have a more thorough knowledge of this relationship in emerging economies, future research across multiple markets and longer durations may be possible, as the study's focus on just one market and a very short time span presents limitation.

Mumtaz *et al.* (2013) <sup>[7]</sup> examined how capital structure affected the financial performance of companies that were listed on Pakistan's Karachi Stock Exchange 100 index. They discovered that company performance metrics like return on equity, return on assets, and earnings per share were significantly correlated negatively with capital structure. The study additionally showed that shifts in debt-to-equity ratios raised business risk and had a negative impact on firm market value. The authors pointed out the drawbacks of concentrating on just one emerging industry and utilizing a brief 4-year time frame, recommending that future studies compare various sectors or look at small versus large businesses.

Despite this, empirical research shows conflicting findings and can be divided into two schools of thought. According to the first point of view, the firm's profitability and capital structure are positively correlated. According to the second point of view, the amount of debt and the performance of the company are negatively correlated. It is evident from the literature analysis above that further empirical research is necessary to fully understand the relationship between capital structure and financial success, as current studies are contradictory.

**Statement of Problem**

The study seeks to investigate the validity of the Modigliani-Miller (MM) theory of capital structure irrelevance within the Indian infrastructure sector by examining the relationship between debt-equity ratio and financial performance across selected infrastructure companies. One of the most significant areas of corporate finance is capital structure decisions. Many of the firm faces bankruptcy due to the overburden of their debt or improper capital mix. For a growing economy like India, it becomes important for the Indian infrastructure firms to have an optimal capital structure. Thus, for proper financial planning and for the achievement of firm's financial goals, it becomes significant to study the relationship between the financial leverage and firm's financial performance parameters.

**Significance of the Study**

This study helps in gaining empirical insights into capital structure dynamics in Indian infrastructure companies. It also challenges theoretical assumptions about universal capital structure impact. Another advantage is that it offers practical guidance for financial decision-making in infrastructure sector and contributes to academic understanding of financial performance determinants.

**Objectives of the Study**

1. To analyse the impact of capital structure on financial performance.
2. To scrutinize the influence of debt level in the firm's capital structure on the financial performance.
3. To evaluate the interrelationship between capital structure and financial performance.

**Research Hypothesis**

Leverage does not affect the profitability of infrastructure companies in India.

**Research Methodology**

The study is mainly based on secondary data from the 2019-20 to 2023-24. Data gathered from the financial statements published by Companies. Based on the market capitalization, top nine infrastructure companies listed in NSE and BSE are selected. Debt Equity Ratio is taken as independent variable and Return on Equity is selected as dependent variable of the study. Regression Analysis was used to analyse the effect of capital structure on the financial performance of nine selected infrastructure companies in India.

**Specification of the Model**

The following linear regression model has been used to test the theoretical relation between stock return and inflation rate

$$RE = a + b1DE + \epsilon$$

Where,

RE = Return on Equity

a = Constant intercept term of the model

b1 = Coefficients of the estimated model

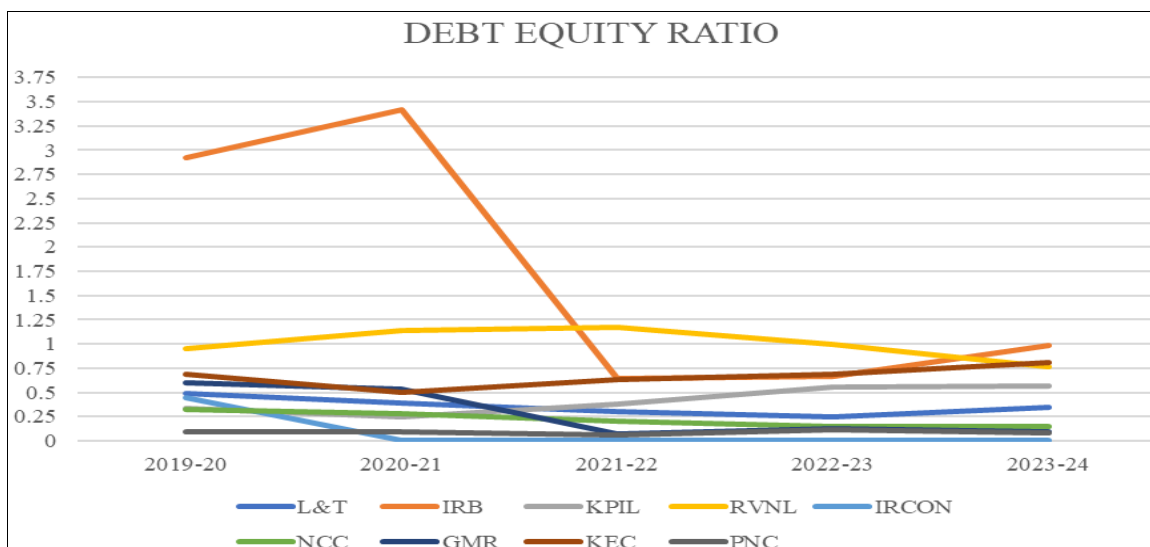
DE= Debt Equity Ratio

$\epsilon$  = Error component

**Discussion and Results**

**Debt-Equity Ratio**

Debt-to-Equity ratio (D/E) indicates the proportion of the company's assets that are being financed through debt. It is a long-term solvency ratio that indicates the soundness of long-term financial policies of the company. If the ratio is increasing, the company is being financed by creditors rather than from its own financial sources which may be a dangerous trend. Lenders and investors usually prefer low debt-to-equity ratios because their interests are better protected in the event of a business decline. A high debt/equity ratio generally means that a company has been aggressive in financing its growth with debt. This can result in volatile earnings as a result of the additional interest expense.



**Fig 1: Debt-Equity Ratio of Top 9 Infrastructure Companies in India**

**Table 1:** Average Performance of Debt Equity Ratio

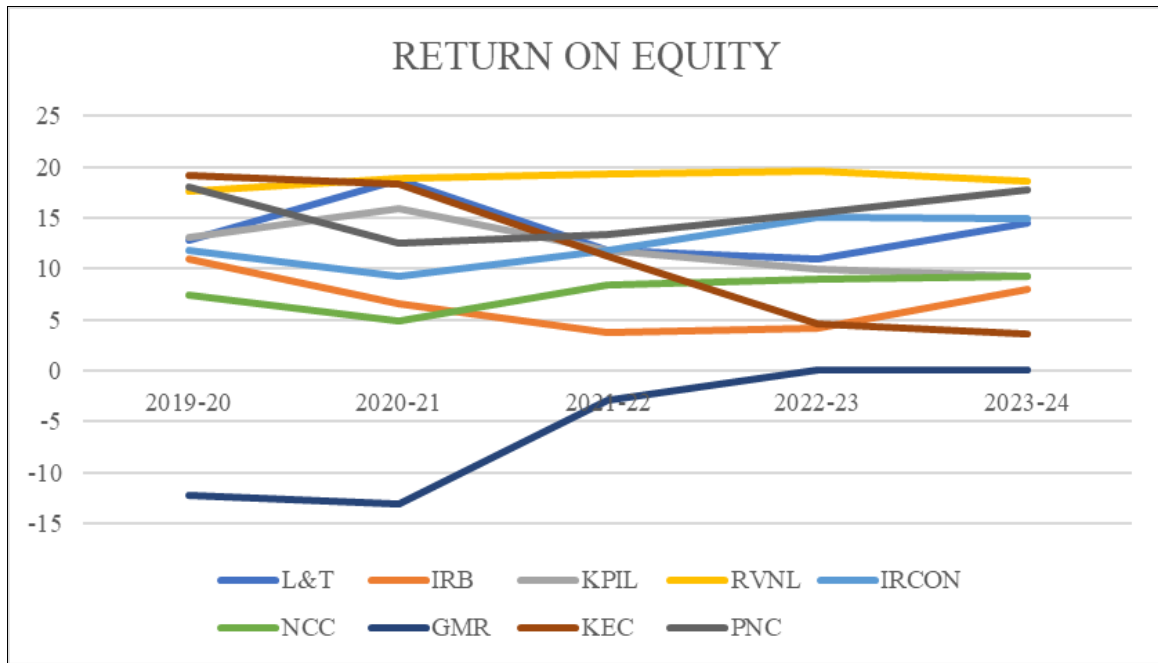
Companies	Mean
L&T	0.36
IRB	1.72
KPIL	0.42
RVNL	1.00
IRCON	0.09
NCC	0.22
GMR	0.28
KEC	0.66
PNC	0.09

(Source: Author’s Calculation)

Table 1 shows the mean of debt equity ratio of the 9 top infrastructure companies in India. This reveals that most of the infrastructure companies are using less debt and are relying on equity to finance their operations. Among these companies, IRB Ltd uses more debt and IRCON and PNC uses least debt.

**Return on Equity (ROE)**

Return on Equity (ROE) is a measurement of how effectively a business uses equity – or the money contributed by its stockholders and cumulative retained profits – to produce income. In other words, an ROE indicates a company’s ability to turn equity capital into net profit. A higher ROE suggests that a company’s management team is more efficient when it comes to utilizing investment financing to grow their business (and is more likely to provide better returns to investors). A low ROE, however, indicates that a company may be mismanaged and could be reinvesting earnings into unproductive assets. ROE is more than a measure of profit: It’s also a measure of efficiency. A rising ROE suggests that a company is increasing its profit generation without needing as much capital. It also indicates how well a company’s management deploys shareholder capital. Figure 3.2 represents the Return on Equity of various infrastructure companies in India.



**Table 2:** Average Performance of Return on Equity

Companies	Mean
L&T	13.74
IRB	6.68
KPIL	12.01
RVNL	18.79
IRCON	12.53
NCC	7.81
GMR	-5.66
KEC	11.40
PNC	15.44

(Source: Author’s Calculation)

Table 2 shows the mean of Return on Equity of top 9 infrastructure companies in India. Most of the companies provide an average 10 to 15% return on equity capital which is a favourable sign. GMR Infrastructure Ltd is in loss for several years and having a negative return on equity. RVNL has the highest return on equity

**Table 3:** Impact of Capital Structure on the Financial Performance of Larsen & Toubro Ltd Dependent Variable L&T\_ROE

Variable	Coefficient	Std Error	T Statistic	Probability
C	9.004	6.548	1.375	0.263
DE	13.310	17.925	0.743	0.512
R square	0.155			
Adjusted R square	-0.126			
S.E. of regression	3.28171			
Sum Square residual	32.309			

Based on the regression analysis, the relationship between Debt-to-Equity (DE) ratio and Return on Equity (ROE) is weak, as indicated by the low R-square value of 0.155, that means 15.5% of the variation in ROE is explained by DE. The regression model is not statistically significant since the p-value (0.512) is much higher than the conventional 0.05 significance level, suggesting that DE is not a reliable predictor of ROE for Larsen & Toubro

**Table 4:** Impact of Capital Structure on the Financial Performance of IRB Ltd Dependent Variable IRB\_ROE

Variable	Coefficient	Std Error	T Statistic	Probability
C	4.343	2.085	2.084	0.129
DE	1.357	0.993	1.366	0.265
R square	0.383			
Adjusted R square	0.178			
S.E. of regression	2.65878			
Sum Square residual	21.207			

The regression analysis shows a moderate relationship between Debt-to-Equity (DE) ratio and Return on Equity (ROE), with an R-square value of 0.383 indicating that 38.3% of the variation in ROE is explained by DE. The model is not statistically significant as evidenced by the p-value of 0.265, which is above the conventional 0.05 significance level, suggesting that DE is not a reliable predictor of ROE.

**Table 5:** Impact of Capital Structure on the Financial Performance of KPIL Dependent Variable Kalpatru\_ROE

Variable	Coefficient	Std Error	T Statistic	Probability
C	19.643	1.249	15.726	0.001
DE	-18.338	2.876	-6.377	0.008
R square	0.931			
Adjusted R square	0.908			
S.E. of regression	0.80278			
Sum Square residual	1.933			

The regression analysis reveals a very strong relationship between Debt-to-Equity (DE) ratio and Return on Equity (ROE), with an R-square value of 0.931 indicating that 93.1% of the variation in ROE is explained by DE. The model is highly statistically significant with a p-value of 0.008 (less than 0.05), suggesting that DE is a reliable predictor of ROE for Kalpataru Projects International Limited.

**Table 6:** Impact of Capital Structure on the Financial Performance of RVNL Dependent Variable RVNL\_ROE

Variable	Coefficient	Std Error	T Statistic	Probability
C	16.855	2.548	6.616	0.007
DE	1.931	2.516	0.768	0.499
R square	0.164			
Adjusted R square	-0.114			
S.E. of regression	0.82930			
Sum Square residual	2.063			

The regression analysis shows a weak relationship between Debt-to-Equity (DE) ratio and Return on Equity (ROE), as indicated by the low R-square value of 0.164, meaning only 16.4% of the variation in ROE is explained by DE. The model is not statistically significant with a p-value of 0.499 (much higher than 0.05), suggesting that DE is not a reliable predictor of ROE.

**Table 7:** Impact of Capital Structure on the Financial Performance of IRCON Ltd Dependent Variable IRCON\_ROE

Variable	Coefficient	Std Error	T Statistic	Probability
C	12.725	1.403	9.073	0.003
DE	-2.170	7.128	-0.305	0.781
R square	0.030			
Adjusted R square	-0.293			
S.E. of regression	2.80507			
Sum Square residual	23.605			

The regression analysis indicates a very weak relationship between Debt-to-Equity (DE) ratio and Return on Equity (ROE) for IRCON, as shown by the extremely low R-square value of 0.030, meaning only 3% of the variation in ROE is explained by DE. The model is not statistically significant with a p-value of 0.781 (much higher than 0.05), indicating that DE is not a reliable predictor of ROE.

**Table 8:** Impact of Capital Structure on the Financial Performance of NCC Ltd Dependent Variable NCC\_ROE

Variable	Coefficient	Std Error	T Statistic	Probability
C	11.574	2.070	5.592	0.011
DE	-17.118	8.976	-1.907	0.153
R square	0.548			
Adjusted R square	0.397			
S.E. of regression	1.38482			
Sum Square residual	5.753			

The regression analysis shows a moderately strong relationship between Debt-to-Equity (DE) ratio and Return on Equity (ROE), with an R-square value of 0.548 indicating that 54.8% of the variation in ROE is explained by DE. However, the model is not statistically significant as evidenced by the p-value of 0.153, which is above the conventional 0.05 significance level, suggesting that DE is not a reliable predictor of ROE.

**Table 9:** Impact of Capital Structure on the Financial Performance of GMR Infrastructure Ltd Dependent Variable GMR\_ROE

Variable	Coefficient	Std Error	T Statistic	Probability
C	1.257	1.567	0.802	0.481
DE	-24.349	4.279	-5.690	0.011
R square	0.915			
Adjusted R square	0.887			
S.E. of regression	2.21319			
Sum Square residual	14.695			

The regression analysis reveals a very strong relationship between Debt-to-Equity (DE) ratio and Return on Equity (ROE) for GMR, with a high R-square value of 0.915 indicating that 91.5% of the variation in ROE is explained by DE. The model is statistically significant with a p-value of 0.011 (less than 0.05), suggesting that DE is a reliable predictor of ROE.

**Table 10:** Impact of Capital Structure on the Financial Performance of KEC International Ltd Dependent Variable KEC\_ROE

Variable	Coefficient	Std Error	T Statistic	Probability
C	40.818	18.673	2.186	0.117
DE	-44.310	27.805	-1.594	0.209
R square	0.458			
Adjusted R square	0.278			
S.E. of regression	6.26190			
Sum Square residual	117.634			

The regression analysis shows a moderate relationship between Debt-to-Equity (DE) ratio and Return on Equity (ROE), with an R-square value of 0.458 indicating that 45.8% of the variation in ROE is explained by DE. The model is not statistically significant as evidenced by the p-value of 0.209, which is above the conventional 0.05 significance level, suggesting that DE is not a reliable predictor of ROE.

**Table 11:** Impact of Capital Structure on the Financial Performance of PNC Infratech Ltd Dependent Variable PNC\_ROE

Variable	Coefficient	Std Error	T Statistic	Probability
C	12.880	6.862	1.877	0.157
DE	29.742	78.407	0.379	0.730
R square	0.046			
Adjusted R square	-0.272			
S.E. of regression	2.84866			
Sum Square residual	24.345			

The regression analysis indicates a very weak relationship between Debt-to-Equity (DE) ratio and Return on Equity (ROE), as shown by the extremely low R-square value of 0.046, meaning only 4.6% of the variation in ROE is explained by DE. The model is not statistically significant with a p-value of 0.730 (much higher than 0.05), indicating that DE is not a reliable predictor of ROE.

### Conclusion

The Modigliani-Miller (MM) theory of capital structure irrelevance is contested in this study. The study found that the effects of capital structure vary greatly throughout companies. Financial performance is largely determined by company-specific characteristics and market defects. With the exception of two, all nine businesses adhere to the irrelevant capital structure. The degree to which changes in a company's debt-to-equity ratio affect its financial performance varies. Based to these results, infrastructure companies ought to abandon general capital structure methods in favour of advanced, business-specific plans that take into account their own operational traits and competitive positioning. The analysis shows that although MM theory offers a helpful theoretical framework, company-specific characteristics and market imperfections must be taken into account when making practical capital structure decisions in the Indian infrastructure industry. The varied results among companies imply that a more sophisticated approach to capital structure rather than rigorous adherence to MM theory would be more advantageous for optimizing financial performance.

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