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Review Article

Comparative Analysis of Automobile Companies in India Through Du Pont Model

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Abstract *- The study is an attempt to examine the DuPont equation in the Automobile sector in India. Du Pont Analysis distributes the Return on Equity (ROE) into two components –Return on Assets (ROA) and Equity Multiplier (EM). The major concern of Investors, which is reflected by ROE, is examined by comparing the major automobile companies in the sector. The impact of independent variables-Return on Assets (ROA) and Equity Multiplier (EM) is examined on Return on Equity (ROE) through Multiple Regression Analysis in the study. Top three Automobiles companies in India, on the basis of their market capitalization as of 31st March 2019, are taken into study. The financial data for ten years ranging from 2010 to 2019, is used for the research purpose. From customers investment perspective Tata Motors Ltd. is found to be less risky than the other two companies Eicher Motors and Mahindra & MahindraLtd.*

Keywords *- Du Pont, Return on Equity, Return on Assets, Equity Multiplier.*

I. INTRODUCTION

The Indian automobile industry, which constitutes almost 50% of the nation's manufacturing GDP, is expected to reach Rs 16.16-18.18 trillion by 2026 (IBEF Report).It is one of the key growth drivers of the economy. The automobile industry in India is the world's fourth-largest manufacturerof cars and 7th largest manufacturer of commercial vehicles in 2018.The sales of Domestic automobiles have increased at 6.71 percent CAGR between FY13-18, with 26.27 million vehicles being sold in FY19. According to data released by the Department for Promotion of Industry and Internal

Trade (DPIIT) the sector has attracted Foreign Direct Investment (FDI) worth US$ 21.38 billion during the period April 2000 to March 2019.

The transition of BSIV to BSVI (Bharat Standard) emission standards set by the Supreme Court to be implemented from April 1, 2020, has led to the turmoil in the sector. The decrease in the domestic CV (Commercial Vehicle) sales by the country's largest commercial vehicle maker, Tata Motors, by 17 % in November 2019 to 27,657 units from 33,488 units in the corresponding month a year ago depicts the recent scenario of the industry. The major companies in the sector-Ashok Leyland's, Mahindra and Mahindra, and Eicher Motors, are facing the similar kind of Challenges. In such a Scenario, the investors are looking for the companies providing maximum Return on equity, taking into account the inherent risk of the company, while the managers are concerned with the ROA as it indicates the Profit of the company relative to its total assets. The idea of the research paper is to identify the companies in the automobile sector, which is beneficial for theinvestors.

Du Pont's analysis provides a comprehensive picture of the performance of the firm by decomposing the different drivers of ROE. It assists the investors in focusing on the keymatrices of the financial performance of the company and also support in identifying its strength and weaknesses. It provides a better insight to the financial analyst into the areas which need more attention and focus. The founder of theDuPontEquationDonaldsonBrownusedthismodelin1914to clearthefinancesofGeneralMotors.
Turnover are accounting signals measuring the firm's operating efficiency. The equity Multiplier reflects the financial leverage of the firm, which is represented as a proportion of average assets to that of shareholders fund. . The main purpose of the study is to analyze the factors that influence the Du Pont Model in four large Automobile companies in India. The main interest of the investors is the maximization of ROE, while on the other hand, the managers are interested in directreturn.

II. LITERATURE REVIEW

In the view of the ever-evolving economy worldwide where the companies are in tough competition for their survival, the financial analysis is playing is a crucial role in assessing the performance of the firm. V. Burja et al. (2014) describe Du Pont Analysis as a tool to determine the factors

which affect the performance of the enterprise by breaking down ROE into components, and each component or factor interprets the rationale behind the variation in the performance. Nissim& Penman (2001) utilized Du Pont analysis for mapping financial ratios to equity Valuation. By decomposing the Return on Assets into Profit Margin (PM) and Asset Turnover (AT), the author emphasized the major indicators of a firm's operations. The Profit Margin reflects the pricing power of the firm, which is a combination of brand image, product positioning, and innovation in product and market share. The efficient utilization of available resources is measured by Asset Turnover, which signals the efficient use of plants, machineries, inventories, and other working capital requirements. Fairfield and Yohn (2001) contend that Profit Margin is less persistent than Asset Turnover. The entry of new participants in the market due to high-Profit margin leads to volatility, whereas imitating the Asset turnover components for increasing the Profit margin is likely to be the result. Penman and Zhang (2003) conclude in the research paper "*Modeling sustainable earnings and P/E ratios using financial statement information"* that Asset turnover is more consistent than Profit margin and the changes in Asset turnover affect the future changes in Return on Assets. The author Moss Charles B.(2009), in the work "Decomposing Agricultural Profitability Using DuPont Expansion," states that the Asset turnover is less important than the Profit Margin as compared to the influence on ROE. Prendergast and Milbourn &Haight(2006) emphasized the study of modified Du Pont Analysis to determine the main factors responsible for the financial performance of a small manufacturing concern. The approach of Holthausen and Larcker (1992) was to predict the future returns of the stock using the Du Pont ratios. The study by Mark. T. Soliman (2008) contributed towards the explanatory power of asset turnover to the prediction of ROA and assessed the stock market returns in association with the DuPont components. The study states the Du Pont model is an important tool for the financial analysis and provides viable information about the operations of thefirm.

III. RESEARCH AND METHODOLOGY

Du Pont's model analyses the fundamental performance by fragmenting the causes of Return on equity (ROE). It provides vital information to the stakeholders in making decisions related to investments that can be made

ROE= Net Income/ Shareholder's Equity

The Du Pont Analysis modifies ROE into three components-Profit Margin, Asset Turnover, and Equity Multiplier. The Du Pont Analysis method renders a higher ROE. If the ROE increases due to an increase in Profit Margin and Asset Turnover, it may be considered as a sign of sound Company management, while if the reason is the rise in financial leverage, the increase in ROE may not be considered a good sign for the company.

For summarizing the performance of the automobile companies in India, the effect of each three components, NPM, AT, and EM, on ROE by multiple regression analysis was studied in the paper. Secondary data from the financial statements of the companies were collected for the study. The equation can be written as:

$$ROE = \alpha + \beta_1 (ROA) + \beta_2 (EM) + \varepsilon$$

IV. DATA INTERPRETATION AND ANALYSIS

Tata Motors: Tata Motors Group (Tata Motors) is a $45 billion organization. It is a leading global automobile manufacturing company. Its diverse portfolio includes an extensive range of cars, sports utility vehicles, trucks, buses, and defense vehicles. Tata Motors is India's largest and the only original equipment manufacturer (OEM), offering an extensive range of integrated, smart, and e-mobilitysolutions. Otherwise maybe misleading if the components of ROE are not disintegrated. The financial activities which contribute the most to ROE can also be determined through the du Pont model. The formula for ROE is:

ROE = Net Income/Sales X

Sales/Total Assets X

Total assets / Shareholder's Equity

Net Profit Margin (NPM)= Net Income/Sales

Asset Turnover (AT)= Sales/ Total Assets

Equity Multiplier (EM) =Total Assets/ Shareholder's Equity

Thus, ROE can be disintegrated into:

ROE= NPM X AT X EM

Where,

Return on Assets (ROA) = NPM X AT

ROE= ROA X EM

A. TATA MOTORS

Tata Motors Group (Tata Motors) is a $45 billion organization. It is a leading global automobile manufacturing company. Its diverse portfolio includes an extensive range of cars, sports utility vehicles, trucks, buses, and defense vehicles. Tata Motors is India's largest and the only original equipment manufacturer (OEM), offering an extensive range of integrated, smart, and e-mobilitysolutions.

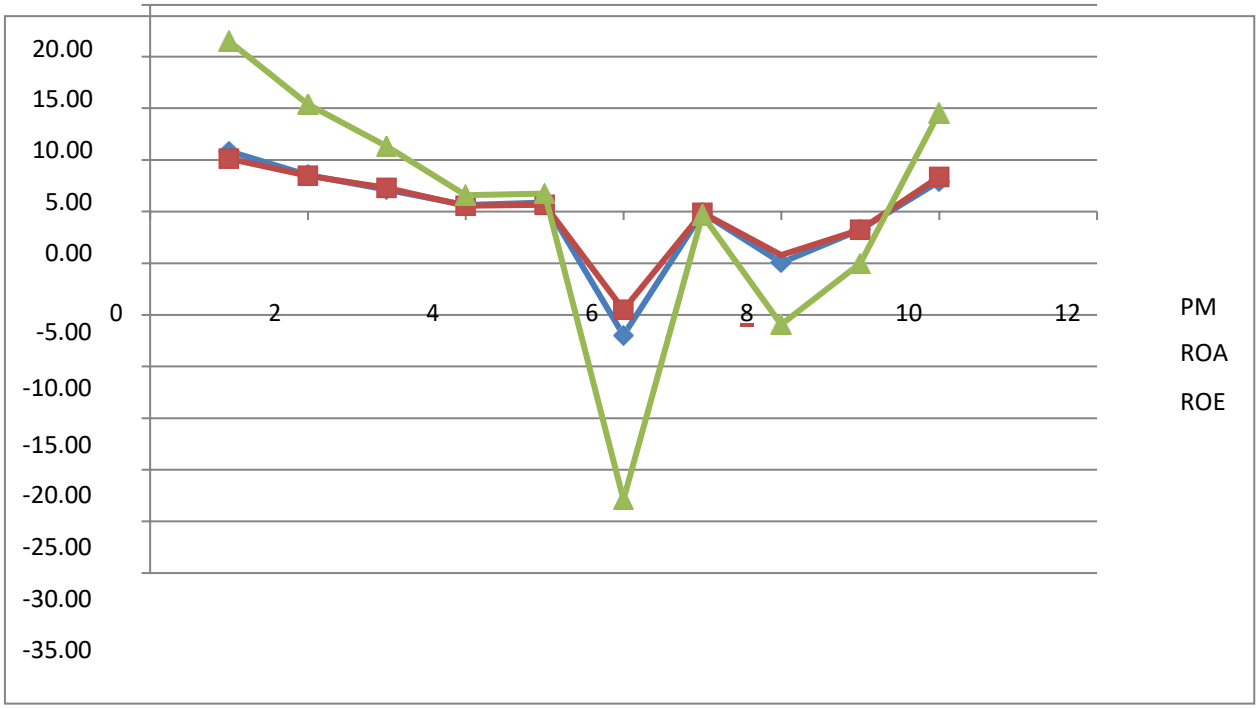

Fig. 1 ROE, ROA & PM graph of Tata Motors (2010 – 2019)

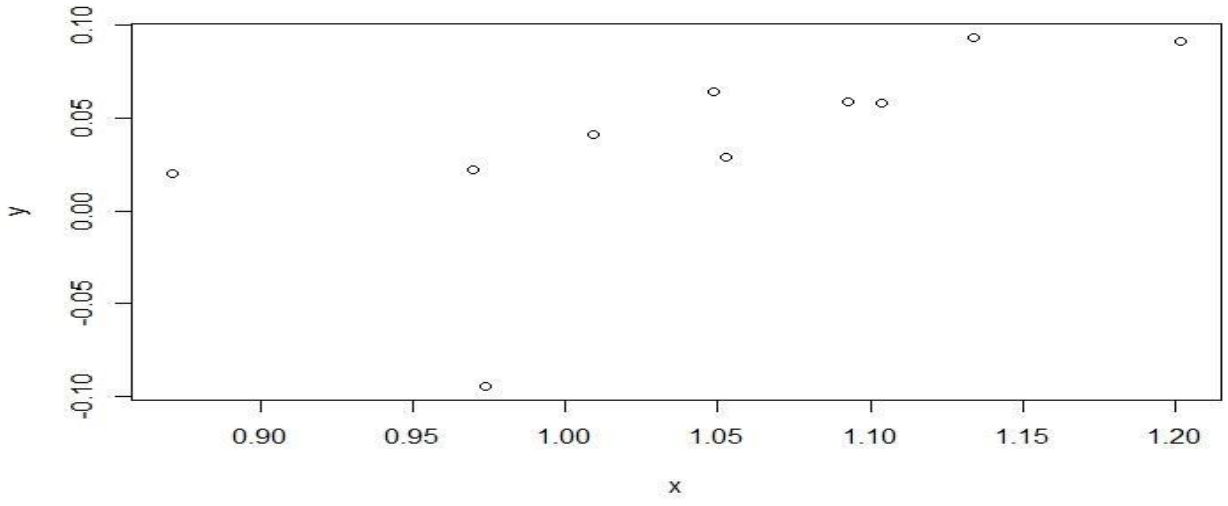

Fig. 2 Scatter plot of TATA Motors Ltd (x = ROA, y = ROE)

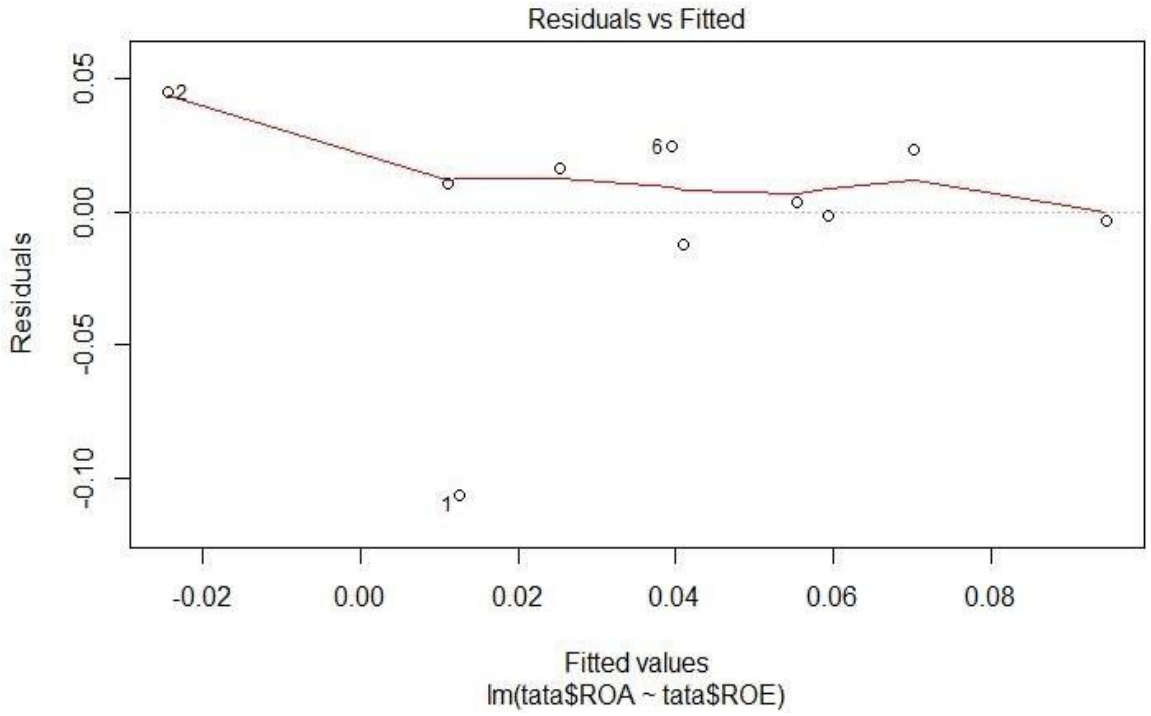

Fig. 3 Residual vs. Fitted of TATA Motors Ltd.

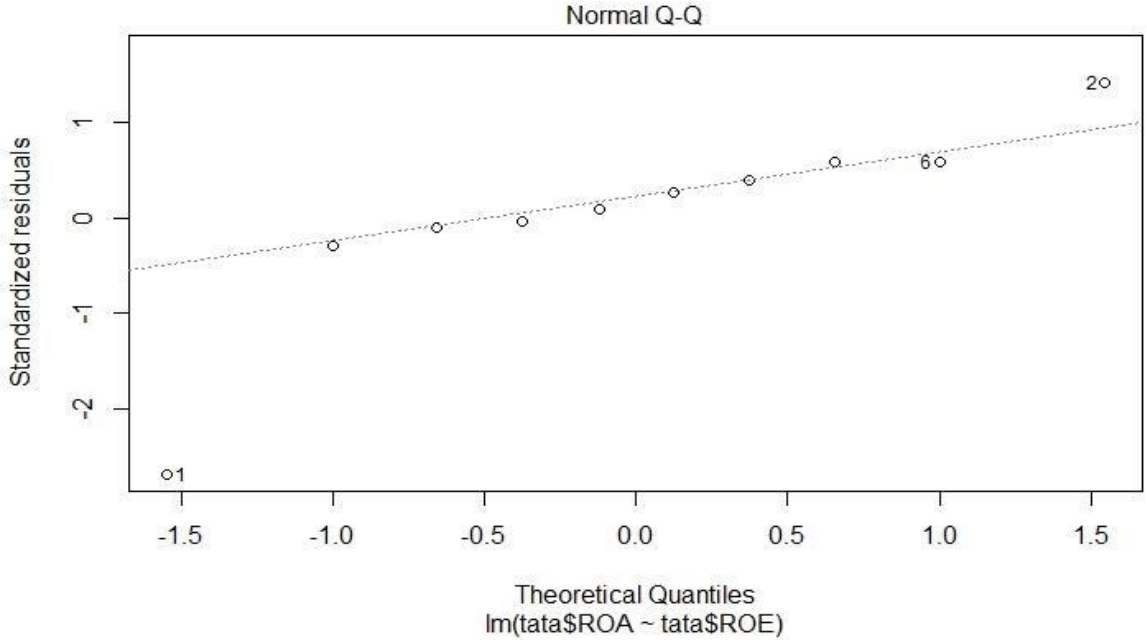

Fig 4. Normal Q-Q graph of TATA Motors Ltd.

From Fig 2 : scatter plot, it is observed that ROA and ROE are positively related to each other, which satisfies one of the conditions for regression analysis. Fig 2 shows the residuals versus fits plot, which suggests the appropriateness of the regression model. As the residuals are roughly forming a horizontal band around the 0 lines, it suggests that the variance of the error terms isequal as they tend to cluster towards the middle of the lot. The normal Q-Q plot of fig 3 depicts that the residuals are normally distributed.

Table 1. Coefficients

	Standard Coefficients	**t**	**Sig**
	β		
Constant (1.068)			
ROA	1.439	4.224	0.00392
EM	-0.0036	-3.232	0.01441

Table 2. Model Summary

R Square	**Adjusted R Square**	**Standard Error of Estimate**	**p-value**
0.7623	0.6944	0.05232	0.00655

The value of R-square is 0.7623, which means that about 76.23% of the variation in the Return on Equity (ROE) is explained jointly by ROA & EM. The p-value (0.0065) is less than 0.05, which implies that there is a significant relationship between ROE, ROA & EM. The equation for ROE thus can be written as:

$$ROE = 1.068 + 1.439\ ROA - 0.0036\ EM + \varepsilon \quad \ldots\ldots\ldots (1)$$

From eq. 1, it is observed that the coefficients of EM are negative, which implies that EM has a negative impact on ROE.

B. EICHER MOTORS LTD

Incorporated in 1982, Eicher Motors Limited is the flagship company of the Eicher Group in India and a leading player in the Indian automobile industry. The oldest motorcycle brand in continuous production, Royal Enfield made its first motorcycle in 1901. A division of Eicher Motors Limited, Royal Enfield has created the mid-size motorcycle segment in India with its unique and distinctive modern classic motorcycles. VE Commercial Vehicles Limited (VECV) is a joint venture between the Volvo Group and Eicher Motors Limited. In operation since July 2008, the company includes the complete range of Eicher branded trucks and buses, VE Powertrain, Eicher's components, and engineering design services businesses, the sales and distribution business of Volvo Trucks as well as aftermarket support to Volvo Buses in India.

The value of R-square is 0.9629, which means that about 95.29% of the variation in the Return on Equity (ROE) for Eicher Motors is explained jointly by ROA & EM. The p-value (9.84E-06) is less than 0.05, which implies that there is a significant relationship between ROE, ROA &EM.

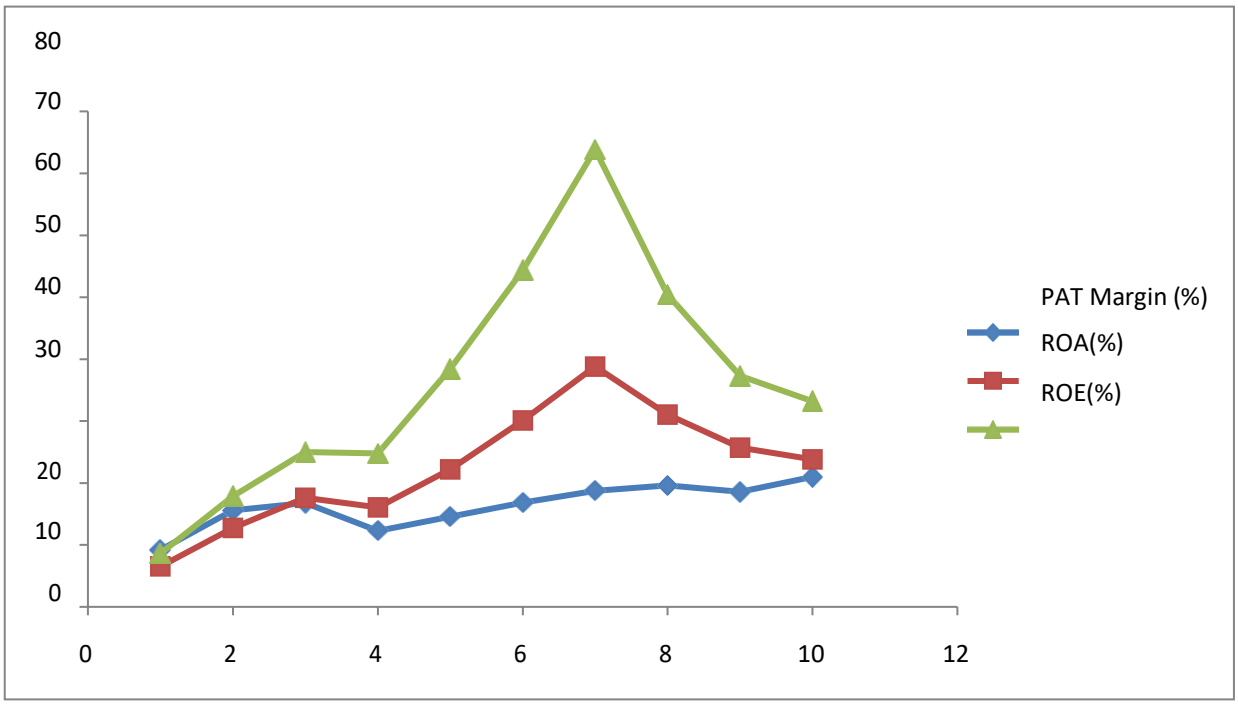

Fig. 5 ROE, ROA & PM graph of Eicher Motors (2010 – 2019)

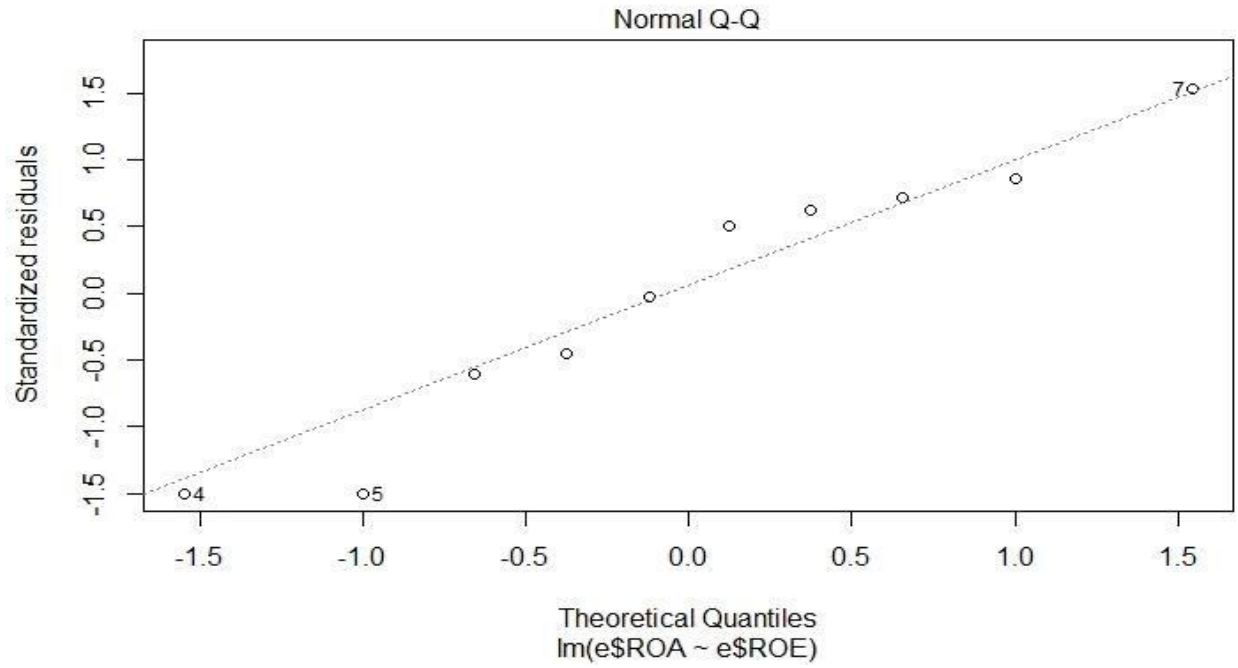

Fig. 6 Residual vs. Fitted of Eicher Motors Ltd.

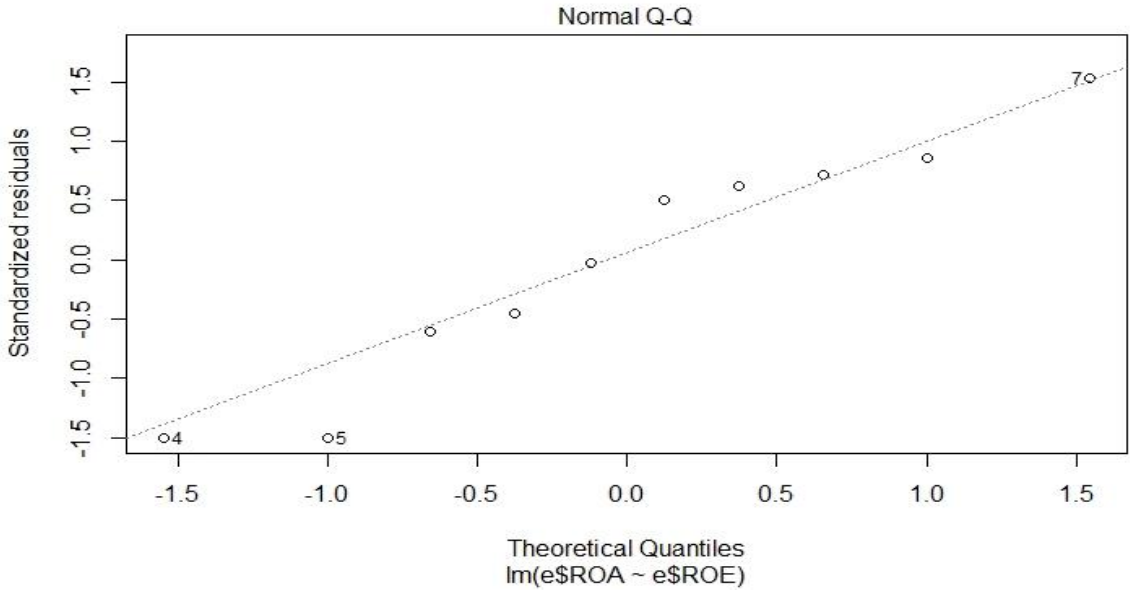

Fig. 7 Normal Q-QGrapfof Eicher Motors Ltd.

Table 3. Coefficients

	Standard Coefficients	**t**	**Sig**
	β		
Constant (5.0817)			
ROA	6.2402	7.801	0.000107
EM(Equity Multiplier)	-30.007	-10.462	1.59E-05

Table 4. Model Summary

R Square	**Adjusted R Square**	**Standard Error of Estimate**	**p-value**
0.9629	0.9523	0.542	9.84E-06

The equation for ROE thus can be written as:

ROE = 5.0817 + 6.2402ROA – 30.007 EM +ε……(2)

From eq. 2, it is observed that the coefficients of EM are showing high negative value which implies that EM is highly affecting ROE as compared to ROA.

C. MAHINDRA & MAHINDRA LTD.

Mahindra & Mahindra Ltd, one of the largest vehicle manufacturers in India by production, was incorporated as Mahindra and Mohammed Ltd on October 2, 1945, which was later named as Mahindra & Mahindra Ltd in 1948. It started with the steel trading business in association with UK suppliers and established Mahindra Owen in 1953.The major breakthrough came in 1965 with the manufacturing of the light commercial vehicle segment, and the tractor division of the company started functioning in 1977.The tractor division of Mahindra & Mahindra Ltd, thereafter, launched various variants in response to consumer needs and became the market leader. World-class utility vehicle was introduced in the market in the name of Scorpio in 2002, and later on, with the launch of Bolero and other utility vehicles around the world,they became the leader in the segment.

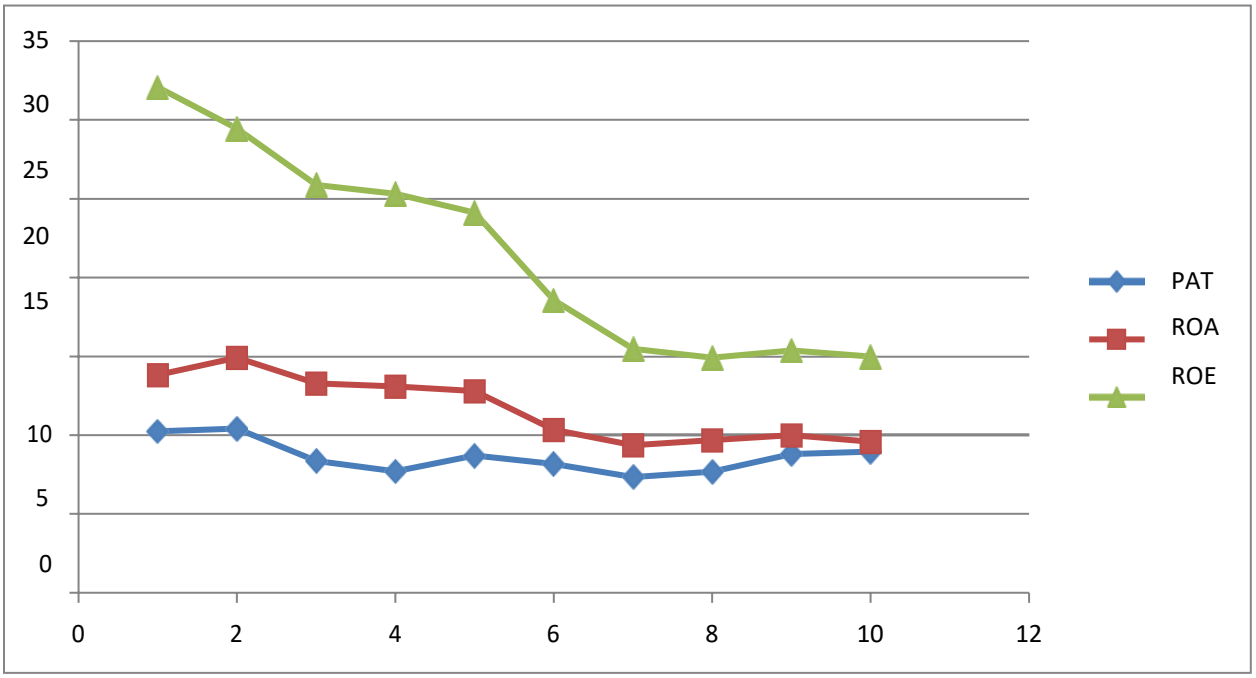

Fig. 8 ROE, ROA & PM graph of Mahindra & Mahindra Ltd. (2010 – 2019)

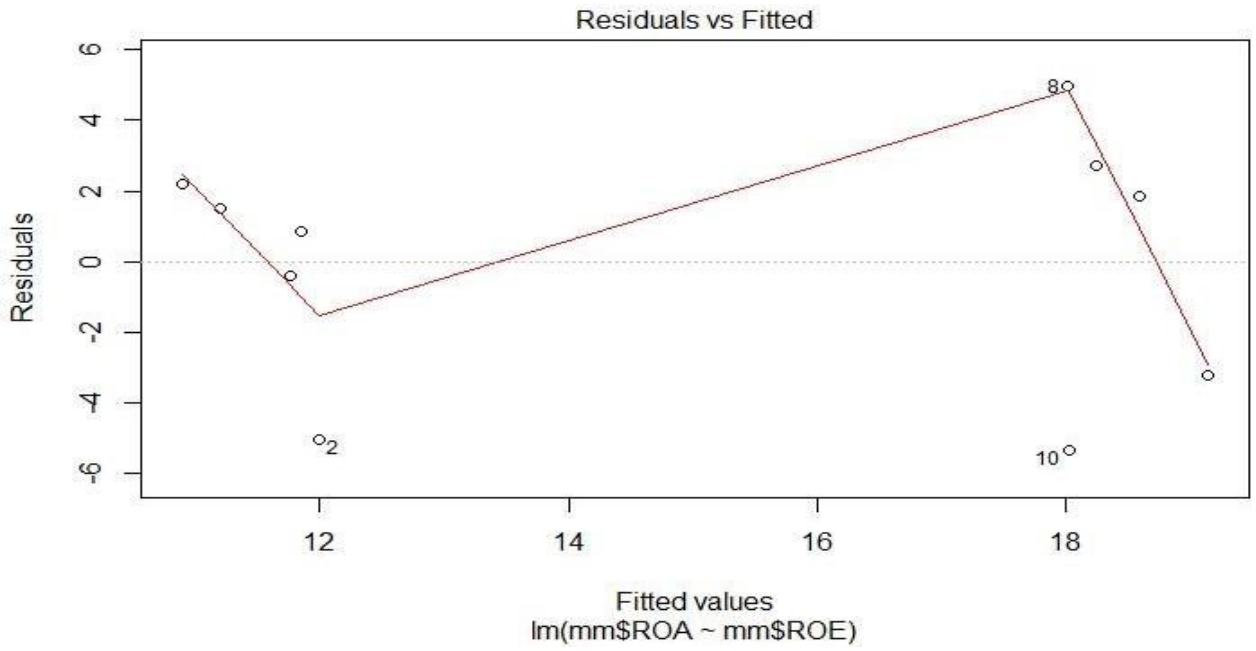

Fig. 9 Graph of Residual vs. Fitted of Mahindra & Mahindra Ltd between ROA & FL.

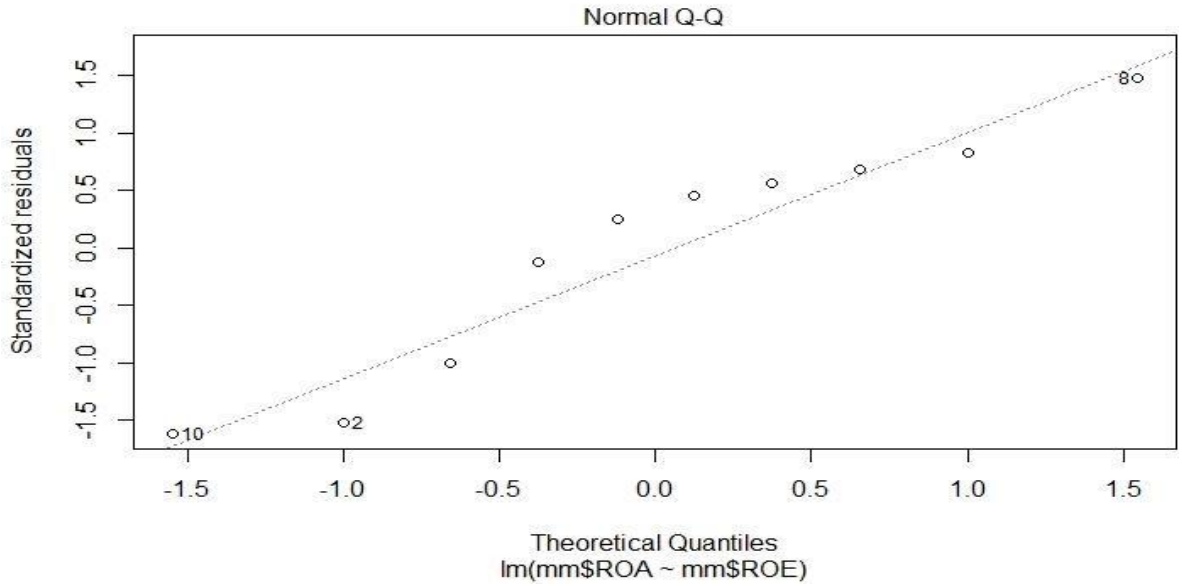

Fig. 10 Graph of Normal Q-Q of Mahindra & Mahindra Ltd between ROA & FL.

Table 5. Coefficients for Mahindra & Mahindra Ltd.

	Standard Coefficients	**t**	**Sig**
	β		
Constant (20.204)			
ROA	1.502	0.505	0.6288
EM(Equity Multiplier)	-63.868	-2.761	0.0281

Table 6. Model Summary for Mahindra & Mahindra Ltd

R Square	**Adjusted R Square**	**Standard Error of Estimate**	**p-value**
0.7722	0.7072	2.724	0.005639

ROE = 20.204 + 1.502 ROA-63.868 FL+ε……..(3)

The value of R-square is 0.7072, which implies that about 77.22% of the variation in the Return on Equity (ROE) is explained jointly by ROA & FL. The p-value (0.0056) is less than 0.05, which indicates a significant relationship between ROE, ROA & FL. From eq. 3, it is observed that the coefficient of FL is the highest among all the three companies indicating a high negative impact on ROE. The p-value of the Company is found to be less than 0.05, which indicates a significant relationship between ROE, ROA & EM.

From Table 7, it is observed that the coefficients of EM(-63.868) are the highest in terms of Mahindra & Mahindra, and also the constant (20.204) is high, which implies that along with Equity Multiplier ,the other variables which are not taken in the study may affect the ROE. In the case of ROA, it is observed that the coefficient for Eicher Motors Ltd (6.2402) has the highestvalue, whereas the value of Mahindra & Mahindra Ltd (1.502) and Tata Motors Ltd (1.439) is very low, indicating less influence on ROE .

Table 7. Comparison of three Automobile companies.

	Standard Coefficients				
	β	**ROA**	**EM (Equity Multiplier)**	**p-value**	**R Square**
Tata Motors Ltd	1.068	1.439	-0.0036	0.00655	0.7623
Mahindra & Mahindra Ltd	20.204	1.502	-63.868	0.005639	0.7722
Eicher Motors Ltd	5.0817	6.2402	-30.007	9.84E-06	0.9629

V. CONCLUSION

The ROE is greatly influenced by ROA and EM, though the influence of the individual variables differs from company to company. EM affects the ROE the most in the case of Mahindra & Mahindra, indicating high dependency on Debt which signifies a high leverage. This indicates that to improve the ROE,the share capital in the total assets needsto be decreased as a proportion of Debt. The Equity Multiplier coefficient of Tata Motors is the least, indicating low leverage value, which makes it a favorable investment for investors when taking ROE into toaccount.

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