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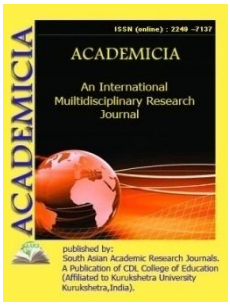

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PROFITABILITY COMPARISON FOR AUTOMOBILE COMPANIES IN INDIA USING DUPONT ANALYSIS

Dr. Pravin Narayan Mahamuni*; Dr. Anand Ganpatrao Jumle**

*Assistant Professor
ZES's Dnyanganga Institute of Career Empowerment & Research,
Narhe, Pune, INDIA
Email Id: pravinmahamuni@gmail.com

**Professor
ZES's Dnyanganga Institute of Career Empowerment & Research,
Narhe, Pune, INDIA
Email id: a_g_j@rediffmail.com

ABSTRACT

*This research paper is all about to measure and compare the profitability performance of the Automobile companies in India with respect to Tata Motors Ltd. and Mahindra & Mahindra Ltd. by using DuPont. In this paper, researcher uses DuPont analysis, is a method for assessing a company's return on equity (ROE) breaking it into three parts i.e. Profit Margin (Profit/Sales), Total Asset Turnover (Sales/Assets) and Equity Multiplier (Assets/Equity). To satisefy the objectives of this research paper; researcher measured the ratios of ROE and ROI applying DuPont analysis which is demonstrated with the aid of tables to show change periodically. DuPont analysis (ROI and ROE)) is an important tool for judging the operating financial performance. It is an indication of the earning power of the firm. The return on equity disaggregates performance into three components: Net Profit Margin, Total Asset Turnover, and the Equity Multiplier. Return on Investment consists of Assets Turnover and Profit Margin. The return on investment consists of Assets Turnover (Operating Income * Total Assets) and Profit Margin (EBIT * Operating Income). The researcher used't' test for anlaysing and comapnaring previous 5 years financial data to find out level of significant change.*

KEYWORDS: *Dupont Analysis, Return On Equity, Return On Investment, Financial Performance*

INTRODUCTION

For any business in the private sector there are numerous of models to describe how well the business is running. Among these the DuPont model was created in the early 1900s but is still a model valid to use for assessment of the profitability. Using the DuPont model for risk analysis is not very common but if you as a risk analysis specialist want to talk the language of the business, it can be valuable to you.

The model was created by F. Donaldson Brown who came up with the model when he was assigned to clean up the finances in General Motors and has ever since been an important model for financial analysis. Remarkably it has not been used in the security community for risk prioritization or impact analysis. The original DuPont method of financial ratio analysis was developed in 1918 by an engineer at DuPont who was charged with understanding the finances of a company that DuPont was acquiring. He noticed that the product of two often-computed ratios, net profit margin and total asset turnover, equals return on assets (ROA). The elegance of ROA being affected by a profitability measure and an efficiency measure led to the DuPont method becoming a widely-used tool of financial analysis Liesz, (2002). In the 1970's, emphasis in financial analysis shifted from ROA to return on equity (ROE), and the DuPont model was modified to include the ratio of total assets to equity.

Before discussing the mechanics and usefulness of Du Pont, it may be of some interest to learn about its development. The maturation of the Du Pont model parallels the progress made in the field of financial analysis itself. Three distinct versions of Du Pont have been created and used to help unravel the underlying drivers of profitability and return over time, beginning nearly 90 years ago.

In 1918, four years after he was hired by the E. I. du Pont Corporation of Wilmington, Delaware, to work in its treasury department, electrical engineer F. Donaldson Brown was given the task of untangling the finances of a company of which Du Pont had just purchased 23 percent of its stock. (This company was General Motors!) Brown recognized a mathematical relationship that existed between two commonly computed ratios, namely net profit margin (obviously a profitability measure) and total asset turnover (an efficiency measure), and ROA.

SIGNIFICANCE OF THE STUDY

Investors use return on equity (ROE) to measure the earnings a company generates from its assets. With it, they can determine whether a firm is a profit-creator or a profit-burner and management's profit-generating efficiency. Why is this important to investors? Companies that are good at coaxing profits from their operations tend to have competitive advantages, which can translate into superior investment returns. The DuPont Model is a useful tool in providing both an overview and a focus for such analysis. It can be used as a compass in the process by directing the analyst toward significant areas of strength and weakness evident in the financial statements. Hence, this research effort is taken for comparing previous 5 years profitability performance of the top two Automobile companies in India with respect to Tata Motors Ltd. and Mahindra & Mahindra Ltd. by using DuPont.

LITERATURE REVIEW

Kasilingam, R.; Jayabal, G.(July 2012): ***Profitability and Solvency Analysis of A Manufacturing Company using Dupont and Altman Model*** - Performance appraisal is very essential to take right decision. Profitability and solvency analysis are the two important factors in the performance appraisal of any organisation. The profitability analysis will not complete with just computing ROE. It is very essential to find out the factors which are having impact on ROE. For this purpose much published DuPont model is considered. To estimate the level of solvency Altman Z score is used. The study results indicate that the company is in poor shape both in profitability as well as in solvency. The correlation and regression analysis reveals that both profitability and solvency can be improved by increasing the sales volume.

Dr Ahmed Arif Almazari (February 2012): ***Financial Performance Analysis of the Jordanian Arab Bank by Using the DuPont System of Financial Analysis*** **-** This study attempts basically to measure the financial performance of the Jordanian Arab commercial bank for the period 2000-2009 by using the DuPont system of financial analysis which is based on analysis of return on equity model. From the study, it was found that the financial performance of Arab Bank is relatively steady and reflects minimal volatility in the return on equity. Net profit margin and total asset turnover exhibit relative stability for the period from 2001 to 2009.The equity multiplier also show almost stable indicators for the period from2001-2005 and the ratios declined from 2006-2009 which indicates that the Arab bank had less financial leverage in the recent years, which means the bank is relying less on debt to finance its assets.

Nihar Kiran Nanavati (March 2013): ***Dupont Analysis to Measure Return on Equity of Satyam Computer Services Limited (Now Known As Mahindra Satyam Limited)*** - Return on equity can be measured by traditional method as well as using DuPont chart. Here is an attempt to calculate the Return on Equity Satyam Computer Services Limited (now known as Mahindra Satyam Limited) hereinafter refer to as Satyam using 3 step and 5 step DuPont model for the financial year 2010- 2011 and 2011-2012 to measure efficiency of the Company in respect of profit earning capacity as well as managerial effectiveness. The data analysis is made on the basis of annual report of the Company for the financial year 2011 – 2012. Conclusion is drawn by comparing the ROE of peer group (Average of TCS, INFOSYS & WIPRO) with The Company's Return to measure the efficiency.

Christina Sheela & Dr. K. Karthikeyan (2012): ***Financial Performance of Pharmaceutical Industry in India using DuPont Analysis*** - This study attempts basically to measure the financial performance of the Pharmaceutical Industry taking top three companies like Cipla, Dr. Reddy's Laboratories, Ranbaxy for the period 2003-2012. From the study it if found that Cipla pharmaceutical Financial performance is high followed by Dr.Reddy's Laboratories and then Ranbaxy Pharmaceutical. The three companies are significant at their level. In conclusion, ROE & ROI is the most comprehensive measure of profitability of a firm. It considers the operating and investing decisions made as well as the financing and tax-related decisions.

Brigham and Houston, (2001): The modified model was a powerful tool to illustrate the interconnectedness of a firm's income statement and its balance sheet, and to develop straight-forward strategies for improving the firm'sROE.

Sundararajan, et al (2002): Various measures of rates of return are used mainly for that purpose. We fully agree with the opinion that "Relaying too heavily on just a few indicators of bank profitability can be misleading. While ROI, ROE, and interest margin (and non interest expenses) to gross income remain the key measures, they should ideally be supplemented by the analysis of other operating ratios".

Debasish Sur and kaushik Chakraborty (2006) In this study of financial performance of Indian Pharmaceutical Industry, the comparative analysis the financial performance of Indian pharmaceutical industry for the period 1993 to 2002 by selecting six notable companies of the industry. The comparison has been made from almost all points of view regarding financial performance using relevant statistical tools.

T. Vanniarajan and C. Samuel Joseph (2007) in his study An Application of DuPont Control chart in analyzing the financial performance of Banks. The liberlization of the finance sector in India is exposing Indian banks to a new economic environment it is characterized by increased competition and new regulatory requirements. Indian and foreign banks are exploring growth opportunities in India by introducing new products for different customer segments, many of which were not conventionally viewed as customer for the Banks have, in the last ten years, witnessed new shareholders. All banks are in a position to evaluate its performance compared to others. In general, the performance of the banks may be viewed on three dimensions namely structural, operational and efficiency factors are suggested by India Bank Association.

Mihaela Herciu, Claudia Ogrean & Lucian Belascu (2011): This study aims to demonstrate that in most cases the most profitable companies are not the most attractive for investors – through Du Pont Analysis method. In order to do this, we take into account the top 20 most profitable companies in the world in 2009 (according to Fortune). By using Du Pont analysis we came to the results that the ranking is not preserved when indicators (ratios) such as ROA (return on assets) or ROI (return on Investment), ROE (return on equity) or ROS (return on sales) are taken into consideration.

Dr Ahmed Arif Almazari (2012): This study attempts basically to measure the financial performance of the Jordanian Arab commercial bank for the period 2000-2009 by using the DuPont system of financial analysis which is based on analysis of return on equity model and return on investment model. The return on equity model disaggregates performance into three components: net profit margin, total asset turnover, and the equity multiplier. It was found that the financial performance of Arab Bank is relatively steady and reflects minimal volatility in the return on equity. Net profit margin and total asset turnover exhibit relative stability for the period from 2001 to 2009.The equity multiplier also show almost stable indicators for the period from 2001-2005 and the ratios declined from 2006-2009 which indicates that the Arab bank had less financial leverage in the recent years, which means the bank is relying less on debt to finance its assets.

OBJECTIVES OF THE STUDY

1) To overview the financial performance of the Tata Motors Ltd. and Mahindra & Mahindra Ltd in terms of profitability by using DuPont Model.
2) To compare the ROE & ROI of Tata Motors Ltd. and Mahindra & Mahindra Ltd for past 5 years.

TECHNIQUE FOR DATA COLLECTION AND ANALYSIS

The present study is mainly based on secondary data. The availability of secondary data is collected from ACEEQUITY Software of the Tata Motors Ltd. and Mahindra & Mahindra Ltd. *(Top two Indian Automobile Companies),* for a period of 5 years. The data have been analyzed using financial ratios, as well as statistical tools and techniques like 't'-test. Also researchers have used as base to our conclusions the DuPont analysis known as the DuPont formula, DuPont method, DuPont Model or DuPont equation, is a method for assessing a company's return on equity (ROE) breaking its into three parts. This formula is used to discover if there are significant differences between how the performance of the company is assessed. Being perhaps one of the most important indicators of performance, DuPont formula measures operating efficiency, asset use efficiency and financial leverage.

Formula:

ROE = Profit Margin (Profit/Sales) * Total Asset Turnover (Sales/Assets) * Equity Multiplier (Assets/Equity)

ROI = Asset Turnover * Profit Margin (EBIT/Operating Income)

DATA ANALYSIS AND INTERPRETATION

Tata Motors Ltd.

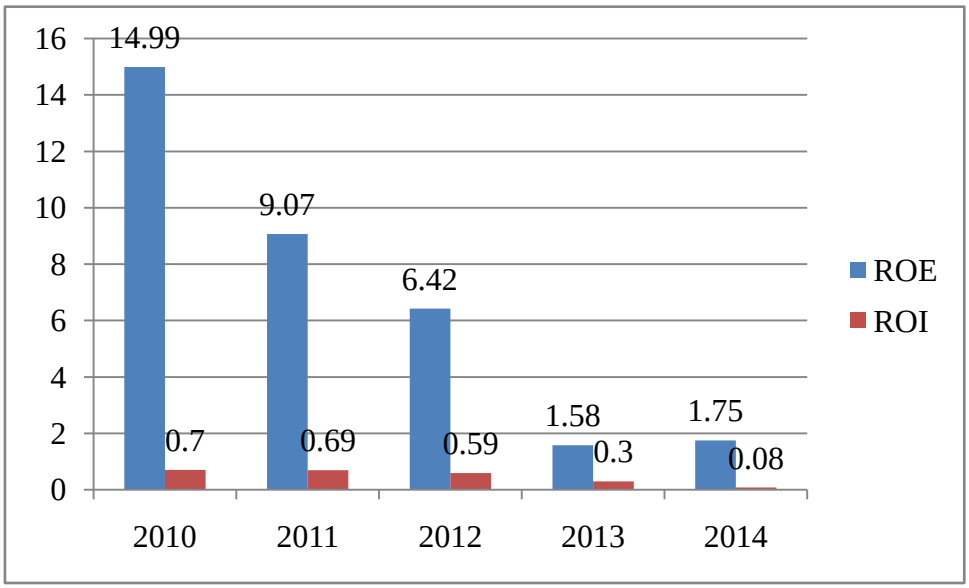

Figure 01: Tata Motors Ltd – ROE & R

TABLE NO. 01. – RETURN ON EQUITY

Year	**PAT** *(A) (Rs.in Crores)*	**NS** *(B)(Rs.in Crores)*	**PM** *(A/B) =C%*	**TA** (D)*(Rs.in Crores)*	**TAT** (B/D)= ***E***	**Eq** (F)*(Rs.in Crores)*	**EM** (D/F)= ***G***	**ROE** ***(C*E*G) %***
2014	334.52	34288.11	0.98	49734.42	0.69	19153.73	2.60	1.75
2013	301.81	44765.72	0.67	52184.77	0.86	19111.48	2.73	1.58
2012	1242.23	54306.56	2.29	54260.93	1.00	19343.86	2.81	6.42

2011	1811.82	47088.44	3.85	54190.45	0.87	19986.00	2.71	9.07
2010	2240.08	35593.05	6.29	50441.24	0.71	14940.79	3.38	14.99
Mean	1186.09	43208.38	2.82	52162.36	0.82	18507.17	2.84	7.76
t value	3.06	11.58	2.72	55.96	14.29	20.44	20.73	2.70
p value	0.038	0.000	0.053	0.000	0.000	0.000	0.000	0.054

From the above table it is inferred that, the profit margin averaged 2.82%, the minimum value bening 0.67% in the year 2013 and maximum is 6.29% in 2010. The net profit margin ratio was showing decreasing trend since 2010 due to profit after tax has declined year by year but t-test show there is no significant decrease in profit margin (t value = 55.66 & $p > 0.05$).

Total Assets Turnover averaged 0.82 times, minimum is 0.69 in 2014 and maximum in 1.00 in 2012. It suggests that the efficency of total assets is fluctuating every year and management of company not using assets more effectively to drive sales. This is because of may be company can only do a certain amount of business without incurring additional costs that would adversely impact the profit margin.

Equity multiplier measures the financial leverage of the company, averaged 2.84, minimum is 2.60 in 2014 and maximum is 3.38 in 2010. As like Total Assets Turnover, equity multiplier is fluctuating every year and significantly declined (t value = 20.73 & $p < 0.05$). Also it is cleared that, in 2010 company has higher financial leverage, which means they are relying more on debts to finance its assets but afterwards their portion of debts to finance its assets was decreased and equity portion was increased. Therefore, ROE has decreased due to lower financial leverage in 2011, 2012, 2013 & 2014 as compared to in 2010.

TABLE NO. 02. – RETURN ON INVESTMENT

Year	**AT(A)**	**EBIT***(B)* *(Rs. in Crores)*	**OI** *(C)* *(Rs .in Crores)*	**PM** *(B/C)* **=D**	**ROI (A*D) %**
2014	0.74	311.72	2921.88	0.11	0.08
2013	0.74	1562.69	3796.51	0.41	0.30
2012	1.09	2559.65	4751.63	0.54	0.59
2011	0.98	3580.22	5088.11	0.70	0.69
2010	0.88	4075.77	5109.64	0.80	0.70
Mean	0.89	2418.01	4333.55	0.51	0.47
t value	12.98	3.55	10.18	4.22	3.89
p value	0.000	0.023	0.000	0.013	0.017

From the above Table, it is observed that the ROI of Tata Motors avergaed 0.47%, the highest in the year 2010 (0.70%) & lowest in 2014 (0.08%). It is cleared that ROI has significantly declined (t value = 3.89 & $p < 0.05$) every year since 2010. It is because of the profit margin, operating income has been also significantly decreased.

Mahindra & Mahindra Ltd.

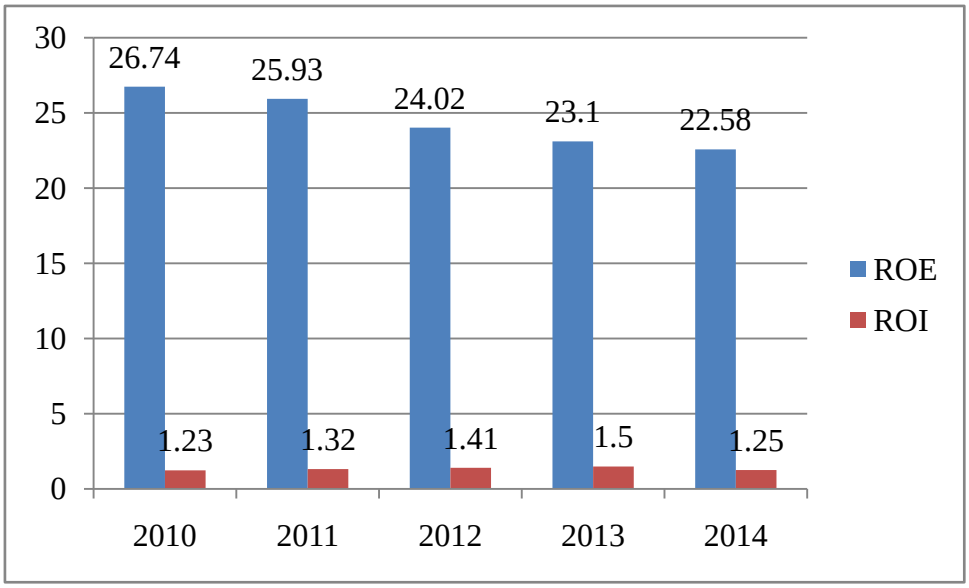

Figure 02: Mahindra & Mahindra Ltd. – ROE & ROI

TABLE NO. 03. – RETURN ON EQUITY

Year	**PAT** *(A)(Rs. in Crores)*	**NS** *(B)(Rs. in Crores)*	**PM** *(A/B)* = ***C*** *%*	**TA** (D) *(Rs.in Crores)*	**TAT** (B/D) = ***E***	**Eq** (F) *(Rs.in Crores)*	**EM** (D/F) = ***G***	**ROE** ***(C*E*G)*** *%*
2014	3758.35	40508.50	9.28	31288.65	1.29	16641.70	1.88	22.58
2013	3352.82	40441.16	8.29	27453.59	1.47	14516.62	1.89	23.10
2012	2878.89	31847.19	9.04	23769.96	1.34	11983.08	1.98	24.02
2011	2662.10	23460.26	11.35	19539.78	1.20	10268.24	1.90	25.93
2010	2087.75	18602.11	11.22	16147.25	1.15	7807.09	2.07	26.74
Mean	2947.98	30971.84	9.84	23639.85	1.29	12243.35	1.95	24.47
t value	10.27	7.01	16.02	8.75	23.02	7.89	54.41	30.45
p value	0.001	0.002	0.000	0.001	0.000	0.001	0.000	0.000

Above Table indicates that, the net sales (t value = 7.01 & $p < 0.05$) and profit after tax (t value = 10.27 & $p < 0.05$) has shown significant increased but company unable to generate higher profit margin, averaged 9.84%.

Total Assets Turnover averaged 1.29 times, minimum is 1.15 in 2010 and maximum in 1.47 in 2013. It indicates that, the company is able to use its assets are more effectively to generate the cash from sales. Also it shwon significant growth in Total Assets Turnover ratio (t value = 23.02 & $p < 0.05$).

Financial leverage of the company is significantly declined (t value = 54.41 & $p < 0.05$), it indicates management of company has decided to use its debts to finance its assest rather than on equity capital.

TABLE NO. 04. – RETURN ON INVESTMENT

Year	**AT (A)**	**EBIT***(B)(Rs.in Crores)*	**OI** *(C) (Rs.in Crores)*	**PM** *(B/C)*=**D**	**ROI (A*D) %**
2014	1.47	4628.65	5439.20	0.85	1.25
2013	1.70	4638.28	5258.47	0.88	1.50
2012	1.59	3768.64	4236.51	0.89	1.41
2011	1.43	3592.1	3888.48	0.92	1.32
2010	1.35	3003.6	3283.63	0.91	1.23
Mean	1.51	3926.25	4421.26	0.89	1.34
t value	24.45	12.45	10.80	69.32	26.82
p value	0.000	0.000	0.000	0.000	0.000

It is observed from the above Table that, the ROI of M&M avergaed 1.34%, the highest in the year 2013 i.e. 1.50 & lowest in 2010 i.e. 1.23%. The operating income has significantly increased (t value = 10.80 & $p < 0.05$), that leads to maintain the profit margin ratio.

Comparisons of Tata Motors Ltd and Mahindra & Mahindra Ltd

ROE:

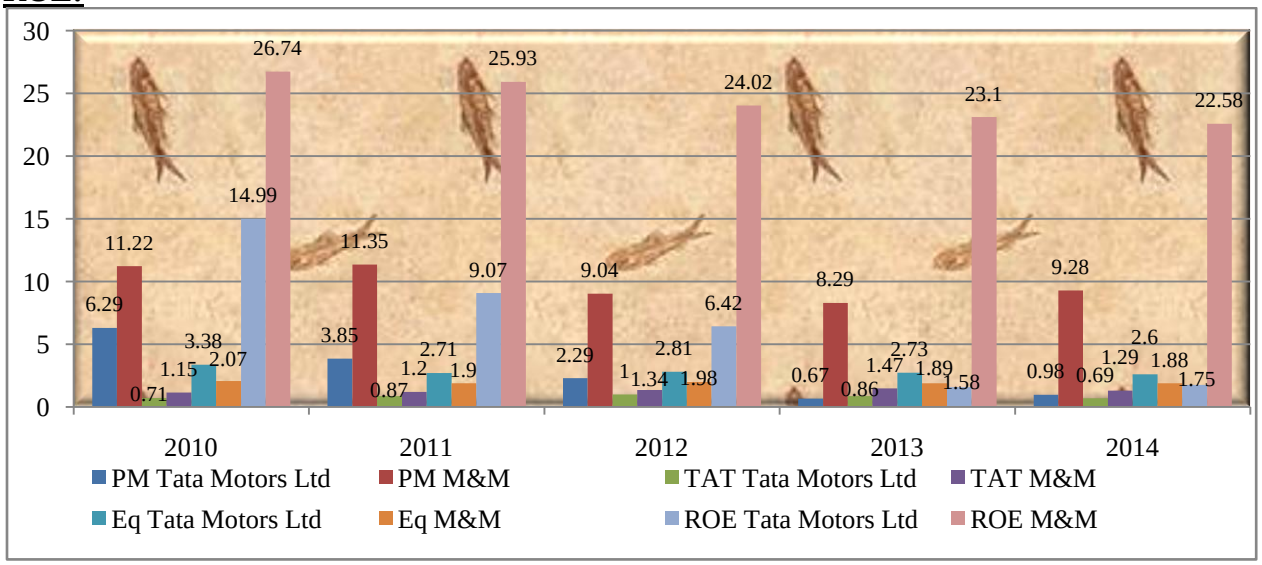

Figure 03: ROE

From the fig.03 it has been obsvered that, ROE (2010 to 2014) of Mahindra & Mahindra Ltd is much higher than the Tata Motors Ltd. due to following reasons:

- ✓ Net sales of the M&M Ltd have been continuouly inreasing year by year & that have reflected in increase in net profit. It shows that due to operating effiency they were able to maintain their profit margin ratio.

- ✓ Management of M&M Ltd have effectively utilised their total assests to generate the cash from net sales as compared to Tata Motors Ltd.
- ✓ Also management of M&M Ltd used its debts to finance its assets rather than equity capital. It reflected to maininained their financial leverage.

ROI: From the Fig.04 it is cleared that, ROI of M&M Ltd is greator than that of Tata Motors Ltd due to increased in operating income of the M&M Ltd from 2010 to 2014, resultant in increase in net profit of the company. On the other side, operating income of the Tata Motors Ltd is decreased every year which impacted on declined in ROI of the Tata Motors Ltd.

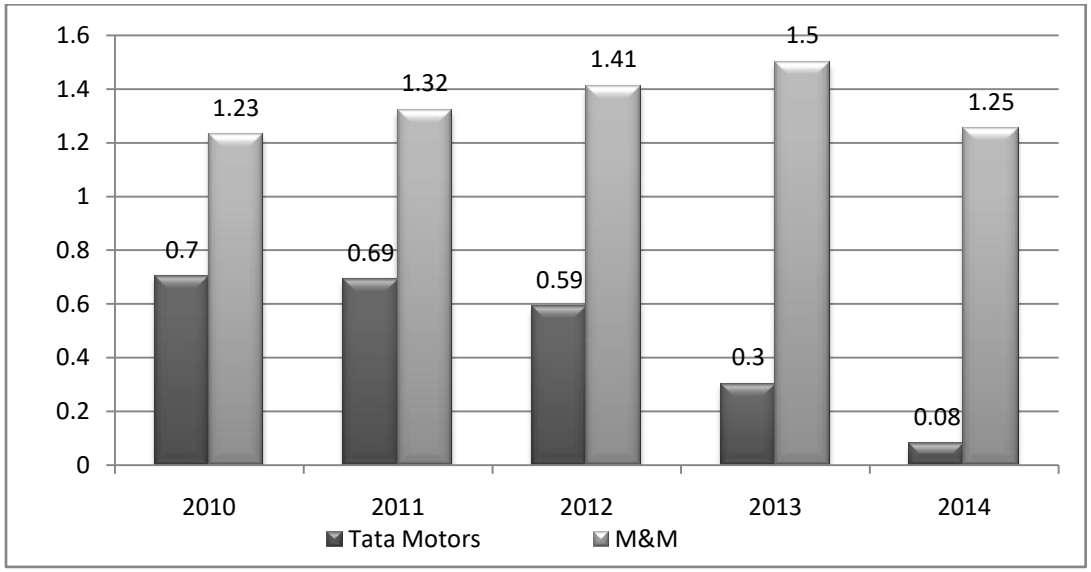

Figure 04: ROI

CONCLUSION

In this research, reseachers have attempted to measure ROE & ROI to find out the profitability and made comparison against its compititors by using DU Pont Model of the Tata Motors Ltd. and Mahindra & Mahindra Ltd. At the end, it is concluded that the DuPont analysis made by calculating ROE and ROI for top two Indian automobile companies (the Tata Motors Ltd and Mahindra & Mahindra Ltd.) and result portrays that Mahindra & Mahindra Ltd. have better profitability performance rather than its compititors Tata Motors Ltd..

Abbrevations

PAT – Profit after Tax

NS – Net Sales

PM – Profit Margin

TA – Total Asset

EBIT – Earnig Before Interest & Tax

OI – Operating Income

ROE – Return on Equity

TAT – Total Asset Turnover

AT – Asset Turnover

Eq – Equity

EM – Equity Multiplier

ROI – Return on Investment

SD – Standard Deviation

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