

A STUDY ON FINANCIAL PERFORMANCE EVALUATION USING DUPONT ANALYSIS IN SELECT AUTOMOBILE COMPANIES

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Abstract

The purpose of research is to study the performance evaluation using DuPont analysis in selected automobile companies through measuring Return on Common Stockholder's Equity (ROE). The present analysis evaluates how well a company is operating and how profit is earned relative to sales, total assets etc. The study was conducted on 10 Automobile companies listed in the NSE and period of the study was 2013 to 2017. This study is mainly based on secondary data. Data was obtained from published annual financial statements. The present study was analyzed using equity multiplier, net profit margin, asset turnover ratio to calculate return on equity. ROE, ROA, ROCE is the most comprehensive measure of profitability of a firm. Correlation and regression analysis is done to know whether the relationship among the above variables exists or not and to know the impact of ROA and EM on ROE. Results revealed that there is a positive relationship among all the variables except EM and there is significance difference exists in the financial performance of selected companies with respect to Return on equity and Return on Assets.

Keywords - ROE, ROA, ROCE, Dupont analysis, Netprofit margin, Asset turnover ratio, Equity multiplier.

1. Introduction

The DuPont display was made in the mid 1900s to evaluate the productivity of a business [1]. Altered twice after its underlying origination, the first DuPont technique for budgetary proportion investigation was produced in 1918 by F. Donaldson Brown, a specialist at DuPont incharge of understanding the accounts of an organization that DuPont was getting, who perceived a scientific connection among benefit and profit for value (ROE) that was controlled by profit for resources (ROA). There are different ratios which can measure the financial performance of the companies like performance ratios, liquidity ratios, profitability ratios and leverage ratios. Later on to the earlier studies the measurement of financial performance and profitability is determined by Dupont Analysis

Saunders [2] in his study used DuPont model of financial analysis based on Return on Equity. In this model there are three elements of return on equity: net profit margin, asset turnover ratio and equity multiplier. Net revenue demonstrates the last picture of how beneficial an organization is after all costs including interest and expenses have been considered. A high net profit margin means a company is able to control its costs that buy goods and services at prices significantly higher than it costs to produce or provide them. Total Asset Turnover is a measure of a company's efficiency in utilizing assets to generate sales. This gives financial specialists and creditors a thought of how a company is managed and uses its resources to produce products and sales. The higher the ratio, the company is better performing. Equity multiplier is a financial ratio which measures how the assets are financed by its share holders. This ratio explains the level of debt financing to acquire assets. Higher this ratio more the company is relying on high debt to get funds.

A Dupont Analysis of Return on Common Stockholder's Equity in Pharmaceutical Industry of Bangladesh' was conducted [3]. Five ways Dupont decomposition of pharmaceutical companies from 2011 to 2015 was used. This model evaluates better how well a company is operating and how profit is earned relative to sales, total assets etc. An analysis of the study presents the best one among selected pharmaceutical companies. MeriBoshkoskaand & MilchoPrisagjanec [4] studied planning and analysis of the Company's Financial Performances by Using a Software Simulation, used DuPont profitability analysis model to determine the financial performances of the company through integration of the analysis of financial indicators and DuPont profitability analysis model. This model enables managers to identify the best ways to improve the financial performance of the company.

According to Rogova [5] DuPont analysis effectively proved that factors of efficiency which had, in turn, impacted the investment appeal of Russian oil-extracting companies. It was found that a strong advantage of ROE was the possibility of its disaggregation into different profitability ratios, with ROE indicating profitability and efficiency from the shareholders' point of view. T. Vanniarajan and C. Samuel Joseph [6] in their study 'An Application of DuPont Control chart in Analyzing the financial performance of Banks' analyzed performance of the banks on three dimensions namely structural, operational and efficiency factors. Prendergast [7] and Milbourn & Haight [8] in their study Prendergast illustrates how a "modified DuPont approach to ratio analysis can be used to drill down to the true cause of financial performance problems" in a small manufacturing business. M. Soliman [9] in his study on Du Pont analysis, a decomposes return on net operating assets into two main multiplicative components. The ratios gross margin and asset turnover are totally different construct, possessing totally different properties. According to S. Ross, R. Westerfield, J. Jaffe, B. Jordan [10] in their study of Dupont Analysis considered three indicators to measure firm profitability: ROA, ROE and ROI and analysed that ROE reflects the profitability of the firm by measuring the investors return

1.1 Relationship between Financial variables in Dupont Analysis:

Return on equity is calculated from NPM ATR and EM, which measure profitability, signifying how much profit is being generated with investors' money .By using the above ratio researchers are able to construct proforma of financial statements.

Return on equity is calculated by multiplying return on assets by the equity multiplier.

Return on assets is calculated by multiplying net profit margin by total asset turnover

2. Objectives of the Study

The aim of the study is to make an objective assessment of the financial performance of companies using DUPONT MODEL under this study. The following are the broad objectives of the study:

1. To study the financial performance of select companies using Dupont model.
2. To examine profitability of the automobile companies using ROE and ROA in Dupont model.
3. To study the impact of Return on assets and Equity Multiplier on Return on Equity.
4. To study the impact of Net profit margin and total Asset turnover ratio on Return on Asset.

2.1 Research Hypothesis

H₀₁: No significant difference exists in the financial performance of selected companies with reference to Return on equity

H₀₂: No significant difference exists in the financial performance of selected companies with reference to Return on Assets.

3. Research Methodology

The present study employed simple random sampling techniques to select 10 sample Automobile companies. Data is collected for a period of five years between 2013 and 2017. Secondary data was gathered from Annual financial statements. The data was collected, edited, coded and fed into excel before being imported to SPSS version 16.0 for analysis. Descriptive statistics was used in terms of mean, standard deviation, frequency, and percentages. The study on impact of ROA and EM on ROE was done through simple linear regression analysis. In order to examine the influence of independent variable on the dependent variable of the firm, regression was used. The model summary below was generated through SPSS. Following are the interpretation of results:

3.1 DUPONT ANALYSIS A THREE STEP CALCULATION

ROE=Net income /Equity

ROE = (NPM)*(TAT)*(EM) where as

ROE = (ROA)*(EM)

ROE=Net Income/sales*Sales/Assets*Asset/Equity

ROA = (NPM)*(TAT)

Financial variables		Formulae
Independent variable	Net Profit Margin	$NPM = \text{Net Profit} / \text{Total Revenue}$
	Total Asset Turnover Ratio	$TAT = \text{Total Revenue} / \text{Total Assets}$
	Equity Multiplier	$EM = \text{Total Assets} / \text{Total stockholders' Equity}$
Dependent variable	Return on equity	$ROE = NI * TAT$
	Return on Asset	$NPM * TAT$

ROE = Return on Equity, ROA = Return on Assets, EM = Equity Multiplier, NPM = Net Profit Margin, TAT = Total Asset Turnover, NI = Net Income, TR = Total Revenue, TA = Total Assets and TSE = Total Stockholders' Equity

Model Specification

Multiple regression models are used to find out the association between return on equity and net profit margin, Asset turnover ratio and equity multiplier. Independent variables are net profit margin,, Asset turnover ratio and equity multiplier. While dependent variable are Return on Equity (ROE), Return on Assets (ROA).

Two regression models are formulated to check the relationship between ROE, ROA and EM

Our base models take the following form:

Return on equity

$$ROE_{it} = \beta_0 + \beta_1 NPM_{it} + \beta_2 ATR_{it} + \beta_3 EM_{it} + \mu_{it}$$

Return on Asset:

$$ROA_{it} = \beta_0 + \beta_1 NPM_{it} + \beta_2 ATR_{it} + \mu_{it}$$

4. Empirical Results and discussions

Table 4.1 Results of Descriptive Statistics

	NET PROFIT MARGIN	ASSET TURN OVER RATIO	EQUITY MULTIPLIER	ROA	ROE	ROCE
Number of Observations	50	50	50	50	50	50
Mean	7.30	2.41	1.90	18.59	32.555	25.27

Minimum	-3.42	1.16	1.41	-3.98	-7.48	1.27
Maximum	18.12	4.35	2.62	42.43	70.78	55.05
Std. Deviation	6.25	0.99	0.49	15.30	23.94	18.17

Table 4.1 describe that Automobile companies have an average mean of return on equity 32.55.i.e. that indicates high returns available to equity shareholders. This can enhance the growth of company. Maximum is on ROCE which is 70.78 and minimum is ROE i.e. -7.48 percent in any of the year in the study. The average mean of NPM is 7.30 and maximum is 18.12 while minimum is -3.42. ATR mean is 2.41 percent and maximum is 4.35 percent and Minimum is 1.16 percent. Average EM is 1.90 and maximum EM is 2.62 where as minimum is 1.41. Average ROA mean is 18.59 and maximum ROA is 42.43 while minimum is -3.98. Mean of Average ROE is 32.55 and maximum ROE is 70.78 while minimum is -7.48. Mean of Average ROCE is 25.27 and maximum ROE is 55.05 while minimum is 1.27.

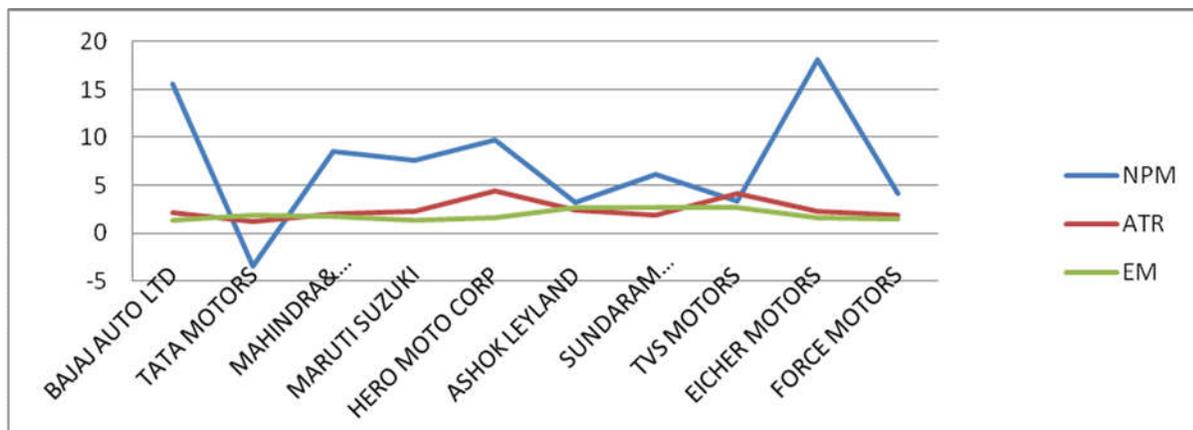


Fig 4.1 Financial variables in DuPont Analysis of Automobile companies

From the fig 4.1, it indicates that the Net profit margin for Eicher motors is high 18.122 where Bajaj auto limited is 15.596 which explain how net interest rate reflects the relationship of net profit and sales income, and it depends on the sales revenue and total cost. Eicher motors and Bajaj motors are able to generate higher sales while maintaining a lower cost of goods which can be seen from its high-profit margin, while TVS Motors on the other hand is selling its products at a lower margin but having high

Asset Turnover Ratio indicating that the company is making a large number of sales. But it is more risky since its Financial Leverage is very high

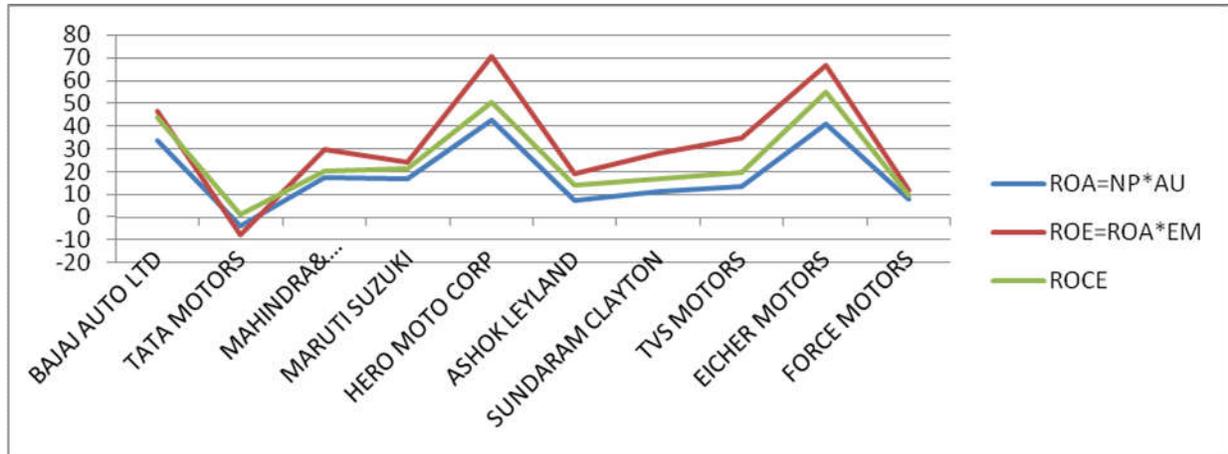


Fig 4.2 DuPont Analysis of Analysis of Automobile companies using ROE,ROA and ROCE

From the present fig 4.2 indicates that ROE of Hero motors and Eicher motors is high that means high returns available to equity shareholders This can enhance the growth of company while Tata motors is very less that indicates there no returns available to equity shareholders. And it shows the firm is of financial distress. ROA of Hero motors and Eichers motors is high which indicates highest return are generated from better utilization of assets by these companies. ROCE of Eicher motors and Hero motors is high which indicates that high efficiency and profitability of a company's capital investments. It shows high returns from capital employed. It is a measure which states an income on the shareholders' or proprietor's investments. It facilitates in determining efficiently handling of owner's investment.

Table 4.2 Correlation among the Financial Variables in Dupont Analysis Correlations

CORRELATION		NPM	ATR	EM	ROA	ROE	ROCE
NPM	Pearson Correlation	1	.055	-.485	.858**	.784**	.888**
	Sig. (2-tailed)		.880	.155	.001	.007	.001
ATR	Pearson Correlation	.055	1	.188	.521	.610	.477
	Sig. (2-tailed)	.880		.603	.122	.061	.163
EM	Pearson Correlation	-.485	.188	1	-.375	-.209	-.334
	Sig. (2-tailed)	.155	.603		.286	.562	.346
ROA	Pearson Correlation	.858**	.521	-.375	1	.965**	.991**

	Sig. (2-tailed)	.001	.122	.286		.000	.000
ROE	Pearson Correlation	.784**	.610	-.209	.965**	1	.970**
	Sig. (2-tailed)	.007	.061	.562	.000		.000
ROCE	Pearson Correlation	.888**	.477	-.334	.991**	.970**	1
	Sig. (2-tailed)	.001	.163	.346	.000	.000	

** . Correlation is significant at the 0.01 level (2-tailed).

Table 4.2 revealed the result of the Pearson correlation of coefficient between Net profit margin (NPM) and ATR, ROE, ROA and ROCE is good which explain that there is a significant positive relationship between all these variables. There are strong relationships among three variables such as NPM, ROA, ROE and ROCE which states that high level of management effectiveness and efficiency of investor's money can predict high level of profit margin .We can also find from above table that there is negative correlation exists between EM and ROA, ROE and ROCE

MULTIPLE REGRESSIONS ANALYSIS

Table 4.3 : Summary of the Result of Multiple Regressions

MODEL	R	R Square	Adjusted R Square	Std. Error of the Estimate	F	Sig.	Durbin-Watson
1	.969 ^a	.940	.909	6.452	31.069	0.00	2.849

a. Predictors: (Constant), EM, ATR, NPM

b. Dependent Variable: ROE

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	-23.836	9.708		-2.455	.049
NPM	3.254	.482	.786	6.747	.001
ATR	11.820	2.214	.554	5.338	.002
EM	3.021	5.254	.068	.575	.586

a. Dependent Variable:
ROE

Table 4.3 summarized the SPSS output of multiple regression analysis. ANOVA table of this model indicate that the overall model is significant since the p-value is (0.000) which is less than the p value= 0.05, which indicates that the model applied can statistically predict the outcome variable of ROE and also all the linear variables are stationary. Model summary of the multiple regression analysis describes the R square value of 0.940, which indicates that 94.0 percent of the observed variability in ROE is explained by the independent variable of EM, ATR, NPM. Further result reveals that other factors have 6.0 variations in ROE remains unexplained by the independent variables of the study. F statistic for ROE is 31.06. NPM, ATR and EM are found to have a strong favorable impact on profitability as measured by ROE. The coefficient value of NPM is 3.254. This means that 1 unit of NPM increase, so ROE will increase 3.254. The coefficient value of ATR is 11.820. This means that 1 unit of ATR increase, so ROE will increase 11.820. The coefficient value of EM is 3.021 this means that 1 unit of EM increase, ROE will increase 3.021. $p=0.00$ which is less than (0.05) indicates strong evidence against the null hypothesis, so reject the null hypothesis. There is significant difference exists in the financial performance of selected companies with respect to Return on equity.

Table 4.4 Summary of the Result of Multiple Regressions

MODEL	R	R Square	Adjusted R Square	Std. Error of the Estimate	F	Sig	Durbin-Watson
1	.981 ^a	.962	.951	3.330	88.372	0.000	1.652

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-17.473	3.208		-5.446	.001
NPM	2.419	.215	.832	11.262	.000
ATR	7.126	1.108	.475	6.433	.000

a. Dependent Variable: ROA

Table 4.4 summarized the SPSS output of multiple regression analysis. ANOVA table of this model indicates that the overall model is significant since the p-value is (0.000) which is less than the p value = 0.05, which indicates that the model applied can statistically predict the outcome variable of ROA. And also all the linear variables are stationary. Model summary of the multiple regression analysis describes the R square value of 0.962, which indicates that 96.2 percent of the observed Variability in ROA is explained by the independent variable of NPM and ATR. F statistic for ROA is 88.372. NPM and ATR are found to have a strong favorable impact on profitability as measured by ROA. and also durbin Watson is also less than 2 then there exists auto correlation. The coefficient value of NPM is 2.419. This means that 1 unit of NPM increase, so ROA will increase 2.419. The coefficient value of ATR is 7.126. This means that 1 unit of ATR increase, so ROA will increase 7.126. $p=0.00$ which is less than (0.05)

indicates strong evidence against the null hypothesis, so reject the null hypothesis. There is significant difference exists in the financial performance of selected companies' with reference to Return on Assets.

5 Conclusions

The present paper tried to focus on measurement of financial performance using Dupont analysis using profitability ratios like ROE ,ROA and ROCE. In DuPont analysis, ROE has been decomposing into its three components of NPM TAT and EM. From the study it was identified that there is strong relationship among three variables such as NPM, ROA, ROE and ROCE which states that high level of management effectiveness and efficiency of investor's money can predict high level of profit margin and also analyzed that there is negative correlation exists between EM and ROA, ROE and ROCE. It was found that Automobile companies using DuPont analysis shows that the higher return on equity for these companies is mostly due to higher asset turnover ratios, indicating higher operating efficiency with low debt . Multiple regression model was carried on to find out the association between return on equity and net profit margin, Asset turnover ratio and equity multiplier and analyzed that there is significance difference exists in the financial performance of selected companies with reference to Return on equity and Return on Assets. Analysts and investors following the Automobile sector should focus on changes in profit margin, rather than changes in asset turnover, ROE, ROA to improve the accuracy of future profitability forecasts

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