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A COMPARATIVE STUDY OF PERFORMANCE OF PAPER MANUFACTURING COMPANIES USING DUPONT ANALYSIS TECHNIQUE

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ABSTRACT

DuPont analysis is the analysis done on the returns on investment or equity and return on assets. It analyses profit margin, total asset turnover and financial leverage. The DuPont Analysis throws light on companies' performance and shows the immediate situation of the company to investors. A study of DuPont analysis is based on the line items in the financial statements like Balance Sheet, Income Statement.

Keywords: Dupont Analysis, Investment, Equity, Return On Assets, Asset Turnover, Financial Leverage, Return on Equity, Financial Performance

I. INTRODUCTION TO THE STUDY

In early 1900, F. Donaldson Brown, a person who was working in DuPont's Treasury department, introduced the DuPont model of return on equity. Later it was developed by E. I. Dupont De Nemour in 1919. it was actually put into use by DuPont Corporation in the year 1920. DuPont analysis is a kind of analysis done on Financial Statement. DuPont is a mathematical model represented as a factorial analysis of profitability from financial return on equity.

II. NEED FOR THE STUDY

- The study is to evaluate the effectiveness of assets and to help the organization in making decision in purchasing the assets.
- The study is to measure the combined effects of profit margins & asset turnover.
- The study makes the financial statement simple and easy to understand.

III. SCOPE OF THE STUDY

- The study of DuPont analysis can be applied by the purchasing department or by the sales department to examine or explain why a calculated ROA was earned

- When ROA is poor, the company can go with DuPont analysis to find and to investigate parts of business and causes of harm.

IV. OBJECTIVES OF THE STUDY

- To study the effectiveness of assets.
- To measure the combined effects of profit margin and asset turnover.
- To examine how the DuPont analysis is useful for forecasting future operating profitability.
- To determine what is driving a company's ROE

V. LIMITATIONS OF DUPONT ANALYSIS

The study of DuPont analysis considers only ROE and ROA. It is restricted to these two aspects only. The study has some drawbacks and they are as follows;

1. It ignores the calculation of cost of capital
2. The study also neglects the preference share capital
3. The DuPont analysis is focused only on a part of Ratio analysis that is ROE and ROA
4. Economic Value Added method, Balance score card covers the study of Return on Capital Employed and these are the advanced and accurate tools to measure the company performance.
5. As the study is considered with calculation of ROE and ROA, only on these two criteria we cannot measure the company's performance.

VI. RESEARCH METHODOLOGY

This study is based on the secondary data published by companies in its annual reports. These annual reports were collected through the online sources either on the company websites or on the Stock Exchange websites. The information of 5 years financial statements was collected to do the necessary analysis for the study.

VII. LITERATURE REVIEW

Many researchers have studied the DuPont Analysis to know its components and its effect on the organization. DuPont analysis is the oldest analysis and it presents the easier way for better understanding of return ratios and its changing. It provides the beginning point for finding the internal strengths and weaknesses of a company. The model is built on three parts, which cover the areas of profit margin, operating efficiency and financial leverage. **Marianna Botika** a financial analyst at **Hewlett –Packward Company & PhD** student in Finance at **The Bucharest Academy of Economic Studies** in his article **"The use of DuPont analysis in abnormal returns evaluation: Empirical study of Romanian market"** published by Elsevier Ltd in the year 2012, said that DuPont analysis is highlighting the company's performances in three major areas: profitability, turnover and leverage. These are the key indicator which can immediately show investors the company situation. This article paper widely explores the DuPont Components that is asset turnover, profit margin, equity multiplier in order to demonstrate which of three areas influences stock's abnormal behavior most. In 2007 little before the beginning of financial crises, the strong dependence between cumulated abnormal returns and profitability and

turnover elements were founded. In 2008 investors paid all their attention to the leverage elements associated with stock's abnormal return evolution. Year 2009 was a middle year which made investors to be unpredictable and to secure themselves as possible. In this year all the investors took care about all the collected data are exceptionally similar with 2007 year. In conclusion, the research indicates the fact that DuPont components represent an important and viable form of stock's abnormal returns analysis which supports market participants in making their investment decisions.

The article written by **Vasile Burja** and **Radu Marginean** in their paper **"The study of factors that may influence the performance by the DuPont analysis in the furniture industry"** published in the year 2014 represents the factors that can influence the performance of the DuPont model. The paper provides useful leverage in separating the factors that make a model of profitability such as ROE. This rate of return is particular interest for investors and managers. Investors will watch particularly the maximization of interest for personal investment by achieving a ROE (Net Income/Equity) as high possible, top of other financial investments. For the purpose of attracting new business investment the managers are directly interested in increasing financial return. DuPont is a mathematical model represented as a factorial analysis of profitability from the financial return on equity, ROE. Decomposing ROE in factors is one way by which the influences of each model rate on financial performance for the analyzed company can be highlighted.

The article titled **"The Use of DuPont Analysis by Market Participants"** written by **Mark T. Soliman says** DuPont analysis is a form of analyzing the financial statements. DuPont analysis decomposes the return on assets into two components: profit margin and assets turnover. These two accounting ratios measure different constructs and accordingly have different properties.

VIII. DATA ANALYSIS AND INTERPRETATION

8.1 Calculation of Roe for West Cost Paper Mill Ltd

ROE = NI / Eq

Decomposed as;

ROE = Profit margin x Asset turnover x Equity multiplier……..(1)

ROE = (Net profit / Sales) X (Sales / Assets) X (Asset / Equity) = Net Profit / Equity

Net profit = Sales – operating expenses + non operating profit / loss

Return on Equity = Net Income / Equity

Return on Equity = 663.05 / 59, 665.89

= 0.0111 X 100

= 1.05%

When the decomposed equation of ROE ……(1)

ROE = Profit margin x Asset turnover x Equity multiplier

ROE = (Net profit / Sales) X (Sales / Assets) X (Asset / Equity)

ROE = (663.05/ 156,901.86) X (156,901.86/209,446.01) X (209.446.01/59,665.89)

= 0.004 X 0.7491 X 3.510

= 1.05%

INTERPRETATION

The ROE explains the return which a firm is generating on its investment. ROE is the tool of measuring the performance of the management.

In the year 2013-2014 the firm's ROE is 1.05% hence the WCPM is giving 1.05% of return on its equity funds which are collected from public. As we see the firm's return on its invested fund is very less, the firm is not earning sufficient amount profit nor it is earning the profit to meet its obligations.

8.1.1 Table Showing Calculation of roe for Five Years

Return on Equity (ROE) can be found out by dividing net profit with total equity and it expressed in terms of percentage. The ROE tells how effectively a company uses the shareholders money.

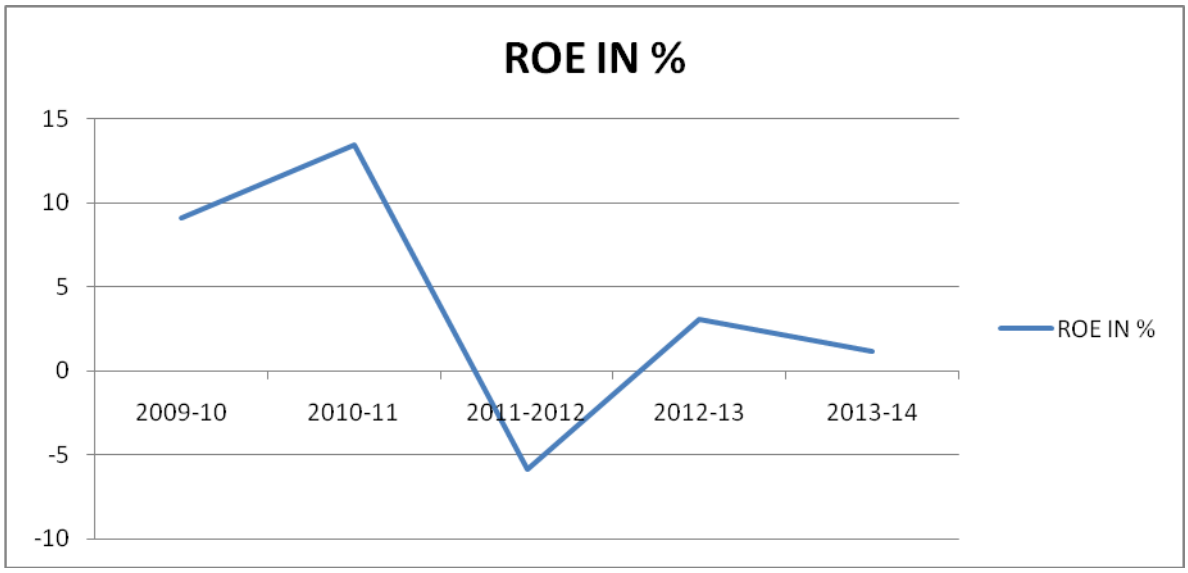
ROE = (Net profit/sales) X (Sales/Assets) X (Assets/Equity) X 100

ROE = Net Profit/equity

(Amounts in Lacs) Table NO.8.1.1

Year	Net Profit	Sales Turnover	Total Assets	Equity fund	ROE in %
2009-10	5470.21	62390.71	183605	60133.26	9.09
2010-11	9008.18	106473	188294	67047.73	13.43
2011-12	-3355.83	130517.85	162020	56952.8	-5.89
2012-13	1811.29	145942.77	148949	59775.58	3.03
2013-14	663.05	156901.86	209446.01	59665.89	1.11

Graph no 8.1.1



INTERPRETATION:

The ROE was13.43% in the year 2010-11, that means the company's performance was good and it has generated 9008.18 lakh of Net Profit. It went negative in the next year itself i.e. 5.89%.

CALCULATION OF ROA:

ROA = NI /TA

Decomposed as;

ROA = NI / ~~Sales~~ X ~~Sales~~/ TA

So remains

ROA = NI/TA

TA= Fixed assets + Current assets

Therefore

ROA = 663.05//209,446.01

ROA = 3.17%

INTERPRETATION

ROA tells about the efficiency of the assets. It measures the operating efficiency of assets which the firm is using to meet its production capacity.

Now the firms Return On Assets is 3.17%. The assets which are used by the firm are less efficient and the production capacity is very low.

8.1.2 Table Showing Calculation of Roa for Five Years

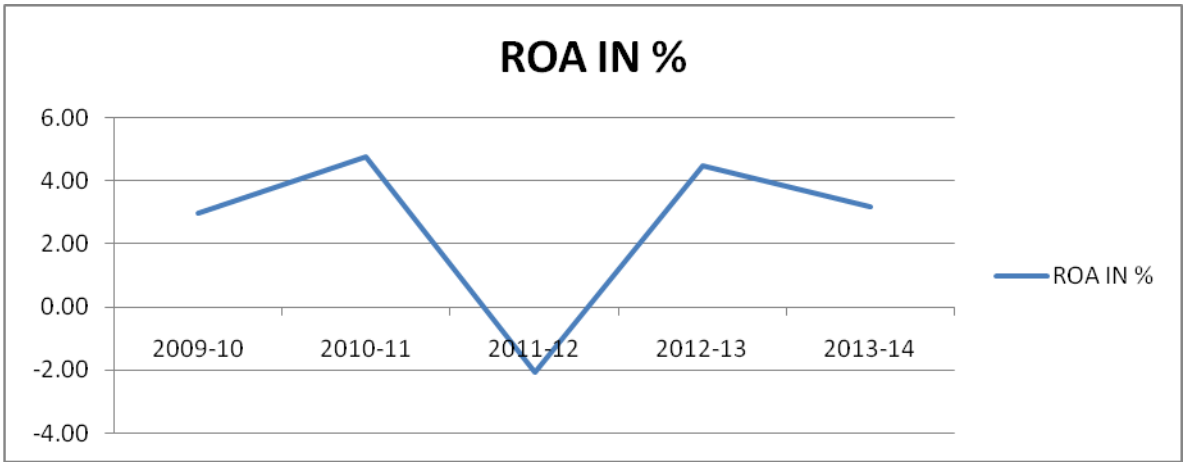
Return On Asset and here net profit is divided by total assets. It is a measure of how proficiently a company uses its assets for production. It is clear that higher the return better the performance. If the company is earning good returns, then obviously the company's assets are performing more efficiently.

ROA = NI / Sales X sales/ TA

(Amounts in lakh) Table No-8.1.2

Year	Net Profit	Sales	Total Assets	ROA in %
2009-10	5470.21	62390.71	183605	2.98
2010-11	9008.18	106473	188294	4.78
2011-12	-3355.83	130517.85	162020	-2.07
2012-13	1811.29	145942.77	148949	1.22
2013-14	663.05	156901.86	209446.01	3.17

Graph no-8.1.2



INTERPRETATION: The ROA of WCPM Ltd in the year 2010-11 was the highest that is 4.78% so we can say that the firm is using its assets efficiently. Ant in the year 2011-12 the firm has incurred a Net Loss of 3355.83 lacs so the effect of this ROA went negative.

CALCULATION OF ROI:

Return on Investment equals the net income from a business or a project divided by the money invested by the investors. While calculating ROI, the investment will not only include what the investor spent out of pocket, but also all borrowed funds.

Return on Investment= Net Profit / Investment

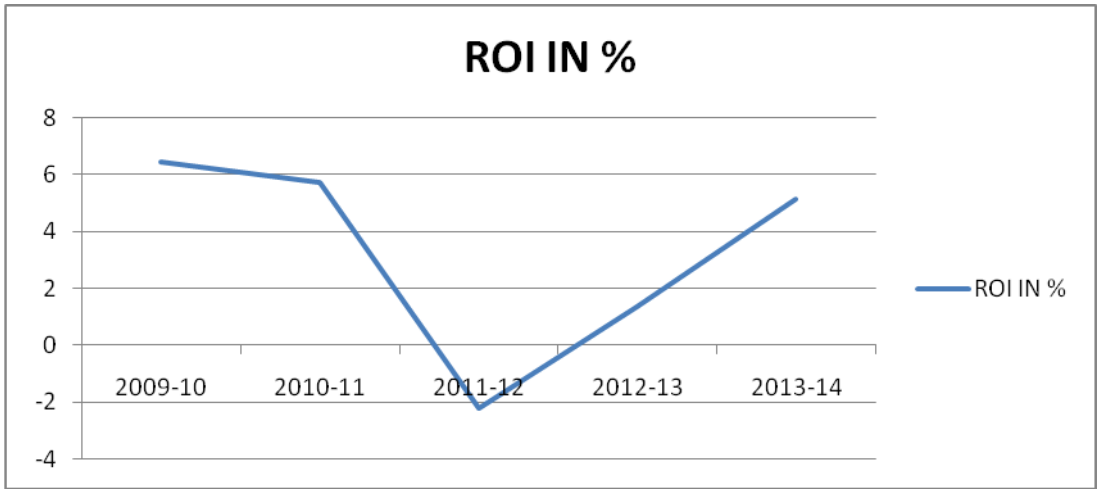
8.1.3 Table Showing Calculation of Roi for Five Years

(Amount in lakh) Table no **8.1.3**

Year	Net Profit	Total Investment	ROI in %
2009-10	5470.21	4605+80563=85069	6.43
2010-11	9008.18	4671.20+152832=157503.2	5.72
2011-12	-3355.83	4671.20+145679=150350.2	-2.23
2012-13	1811.29	4671.20+131767.30=136438.5	1.33
2013-14	663.05	4671.20+124274.07=128945.27	5.14

Note: Total investment includes non current investment made in the year and tangible assets after deducting its depreciation**.**

Graph no-8.1.3



INTERPRETATION: The firm has earned a good return on investment in the year 2009-10 that is 6.43 percent where as in year 2011-12 drastically came down n went negative to -2.23 percent as the firm has incurred a net loss.

IX. COMPARATIVE STUDY OF WCPM

9.1 ITC LTD

The firm's ROE shows the performance of the company as the ROE of the firm ITC is 33.45%. It means the firm is earning good amount of return on its equity so it can meet its equity shareholders obligation. ITC is generating good returns on capital which it has collected from its shareholder.

Profit Margin tells about the profitability of the company and Asset Turnover explains about efficiency of the assets which the ITC is using for production process and third part equity multiplier reflects the risk which a company is bearing.

ITC has a ROA of 21.48% and it is a good for the company. It is using its assets efficiently; the firm can further increase its efficiency rate. The ROA of WCPM Ltd is very low when we compare it with ITC. T firm has to improve a lot on its efficiency rate.

The ROI of the company is 6.5%. It means the firm is generating the return of 6.5 percent on its investment which it is making on various projects and on purchasing assets.

9.2 Rainbow

The firm Rainbow Papers Limited has the ROE of 10.04% in the year 2013-14, the firm is earning only to an extent. But when we compare with the WCPM Ltd the Rainbow Ltd is generating good returns.

The ROA of the firm is 34.12% when we compare it with WCPM Ltd it is much higher. The reason for this is the Net Profit of Rainbow Ltd is greater than WCPM Ltd.

The firms ROI is 6.16% in the year 2013-14 it means the firm is earning 6.16 percent of return on investment which the firm is made on assets. When compared to WCPM the ROI is little closers to this.

9.3 Star Paper Mills Ltd

The Star Paper Ltd of Kolkata is running under loss so it has the negative ROE of 67.38% in the year 2013-14. When we compare with WCPM Ltd this firm is incurring huge loss and has a very low rate of ROE.

As the firm is under the loss it would be having a negative return on asset of that is 13.02%, the utilization of assets to increase the productivity is went down so the firm has incurred a loss so the effect of this is negative ROE and negative ROA.

The firm is giving a return in negative that is -17.91 percent so we can say that the firm is underperforming. The firm has incurred a net loss so it results negative ROI . It means the firm has generated profit on its investments.

9.4 Malu Papers Ltd, Nagpur

The return on equity of the firm Malu Papers Ltd in the year 2013-14 is 12.75%. It means the firm's returns are moderate so that it can meet its shareholders obligation. When we compare with WCPM Ltd the ROE of Malu Papers limited is higher.

The firm's ROA is 0.91% which is not a good sign for the growth of a company. The firm is not using its assets efficiently. The firm has to improve its efficiency level. The ROA of WCPM Ltd is 3.07% so we can say that Malu Papers Ltd has to increase its efficiency rate.

The Malu Papers Ltd has a ROI of 1.49 percent when we compare it with the firms ROA and ROE, the ROI and ROA is comparatively very less. And when compared with firms ROI with WCPM's ROI it is low.

9.5 PUDUMJEE PULP & PAPER MILLS LTD, PUNE

ROE of the firm Pudumjee Pulp and Paper Mills Ltd is 8.83% and it is neither good nor bad. The reason for this is the firm has earned a net profit of 1437.73 lakh for the shareholders fund of 16290.03. So obviously the ROE will be low. But the ROE of WCPM Ltd is lower than Pudumjee Pulp & Paper Mills Ltd.

ROA of the firm is 4.19% for the financial year 2013-14 where as ROA of WCPM Ltd is 3.07%. We can say that the WCPM Ltd has the lower ROA and it has to improve on its using of assets.

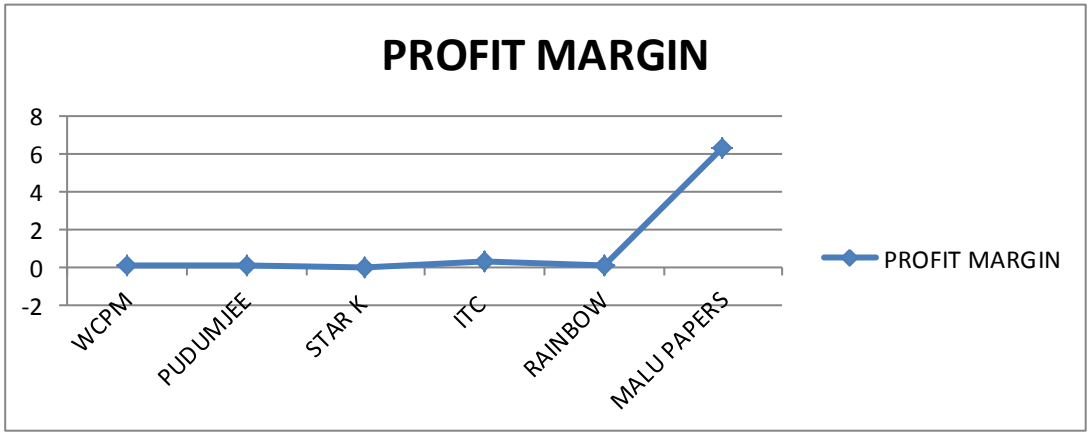
The ROI of the firm Pudumjee Pulp and Paper Mills Ltd is 12.65 percent. The net profit of the firm is 1437.73 lakh and their investments are 11362.4 lakh so it got a ROI of 12.65 percent. So we can say that firm is performing well and generating good returns on its investment.

Grapgh Showing the Comparision of Progitmargine of Five Companies With Wcpm Ltd

Table no-9.0

COMPANY NAME	PROFIT MARGINE
WCPM LTD	0.040
PUDUMJEE LTD	0.059
STAR K LTD	-0.079
ITC LTD	0.256
RAINBOW LTD	0.054
MALU PAPERS LTD	6.30

Graph no-9.0



INTERPRETATION:

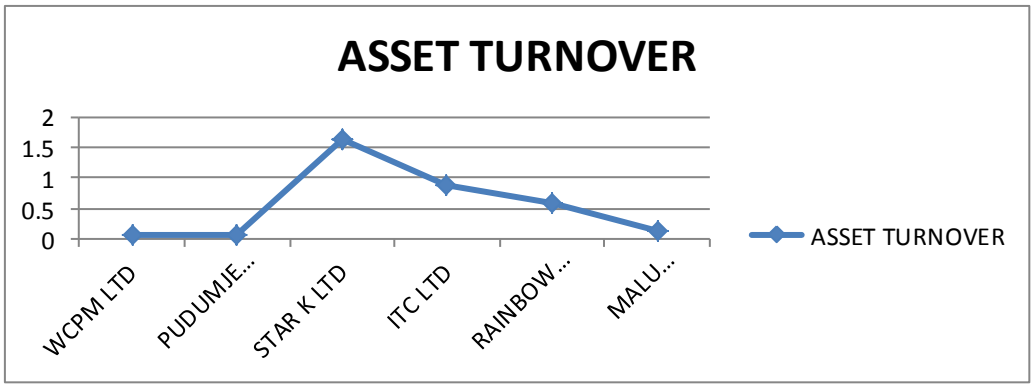
The graph shows that the profit margin of the firm Star k is negative 0.079 and the firm Malu Papers Ltd has the highest profit margin of 6.30. When compared to WCPM Ltd it has a very low amount of profit margin. So the firm has to work hard to gain a high profit.

Graph Showing the Comparison of Asset Turnover of Five Companies with Wcpm Ltd

Table no-9.1

COMPANY NAME	ASSET TURNOVER
WCPM LTD	0.075
PUDUMJEE LTD	0.071
STAR K LTD	1.63
ITC LTD	0.875
RAINBOW LTD	0.598
MALU PAPERS LTD	0.14

Graph no-9.1



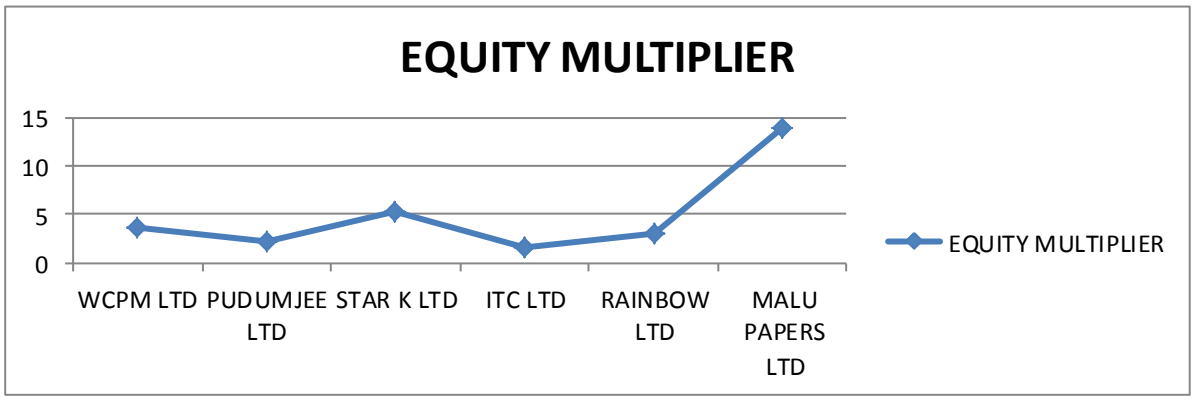
INTERPRETATION: Star K Ltd has the highest asset turnover of 1.63 and Padumjee ltd has the lowest asset turnover. And WCPM has to improve a lot to match it, it has to increase its operating efficiency find a rise in asset turnover.

Grapgh Showing the Comparision of Equity Multiplier of Five Companies with Wcpm Ltd

Table NO- 9.2

COMPANY NAME	EQUITY MULTIPLIER
WCPM LTD	3.51
PUDUMJEE LTD	2.10
STAR K LTD	5.18
ITC LTD	1.49
RAINBOW LTD	3.09
MALU PAPERS LTD	13.94

Graph N0-9.2



INTERPRETATION:

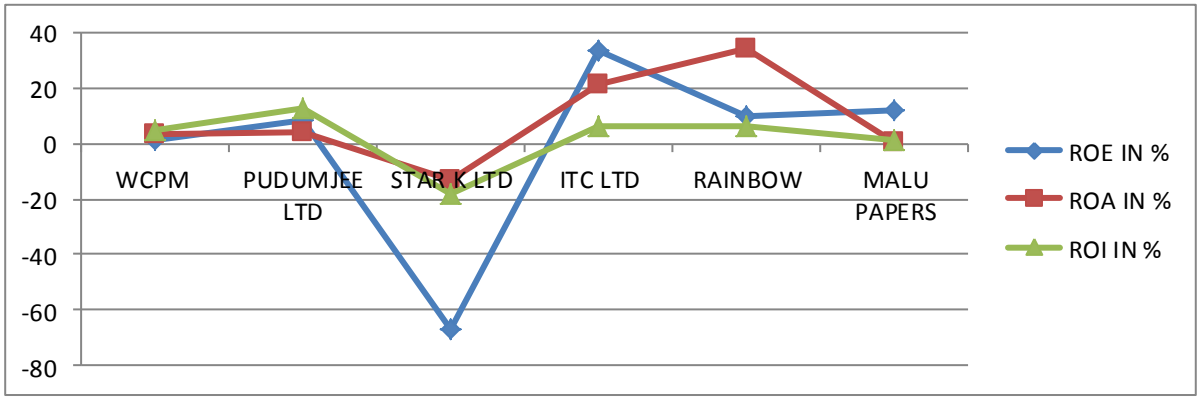
Malu papers ltd has the highest equity multiplier of 13.94 as against ITC ltd has the lowest equity multiplier of 1.49. It says that the firm is using its equity fund in an appropriate way.

COMPARATIVE GRAPH FOR THE YEAR 2013-14:

Table no-9.3

COMPANY	ROE IN %	ROA IN %	ROI IN %
WCPM	1.11	3.17	5.14
PUDUMJEE LTD	8.79	4.19	12.65
STAR K LTD	-67.38	-13.02	-17.91
ITC LTD	33.43	21.48	6.5
RAINBOW	10.04	34.12	6.5
MALU PAPERS	12.29	0.91	1.49

Graph No-**9.3**



INTERPRETATION:

An ITC stands first as it has the highest ROE and malu comes on 2nd place. WCPM LTD stands last in case of ROE. And on basis of ROA Rainbow Ltd comes in 1st place and Star K Ltd has the lowest and negative ROA. When the Padumjee Ltd comes to ROI it stands first and again Star K Ltd has a negative ROI of 17.91 percent.

X. FINDINGS

- During the coming year the firms ROE goes on decreasing because the net profit is coming down from 1811.29 lacs to 663.05 lack. In the year 2012-13 it was 3.03% and in the next year it came down to 1.11%
- The ROA of WCPM Ltd was highest in the year 2010-11 that is 4.78% and it has the net profit of 9008.18 lacs. So the firm should try to maintain at least this much of net profit to gain a stable return on equity and return on asset.
- In the year 2011-12 the ROA of the company was -2.07%. The reason for the negative ROA is net loss which the company has incurred in the year due to changes in the method of calculation of depreciation.
- The firms ROE was increased from 9.09% in the year 2009-10 to 13.43% in the year 2010-11 due to the capacity expansion.
- It is observed that in the year 20011-12 the firm has incurred a huge loss of 3355.83 lakh due to the change in calculation of depreciation and interest. So the ROE also went negative of -5.89 percent.
- The company's ROE was 2.98% and it was increased to 4.78% in the year 1009-10 and 2010-11 respectively. The ROA of the firm was increased in the year 2010-11 because of capacity expansion.
- From the year 2011-12 to 2013-14 ROA of the firm has started to recover and it is increased from -2.07% to 3.17%.
- The Return On Investment of the company in the year 2009-10 was 6.43% and in the year 2010-11 it came down to 5.72 and later it went negative that is -2.23 in the year 2011-12.
- ROI of the firm was begun to increase. It was -2.23%, 1.33% and 5.14% in year 2011-12 and 2012-13 and 2013-14 respectively because the firm has generating good returns on the investment made.

XI. CONCLUSION

DuPont analysis is also known as DuPont identity, DuPont equation which examines the Return on Equity (ROE). It splits the ROE in 3 parts and studies the each part. They are Profit Margin, Asset Turnover and Equity Multiplier. The profit margin can be calculated by dividing Net profit by sales. Asset turnover can be found by dividing sales with total assets of the firm both current and noncurrent assets. The end Equity multiplier which says that how much return is firm giving and is it earning revenue from the investment made by the shareholder. The firm is using its funds in a proper way or not. When we club these three and multiply them, then we get the actual ROE.

Return on Asset is also considered under DuPont analysis, it is the measurement of efficiency level of the assets which is used by the company. It says that the firm is using its assets in a proper way or not.ROA can be calculated by dividing net profit by total asset of the firm. The higher the return better is the firm's performance and better is the efficiency of assets.

Return on Investment is also calculated under the study conducted quite similar to the equity multiplier which we take in the calculation of ROE but here in ROI we take into consideration the tangible assets and noncurrent investment which the firm is made. In noncurrent also firm invests purchasing machines etc.

All together we can say that ROE ROA and ROI are the measuring tools of company's performance. Higher the firms ROE ROI and ROA better the firms performance.

In the study conducted we found that ROE says how effectively a company is using its share holder's fund. And ROA tells the efficiency of the company in using its assets. Whereas, the ROI explain the efficiency of an investment.

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