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"A RELATIVE STUDY OF ROA AND ROE OF SELECTED PAPER COMPANIES BY APPLYING DU PONT ANALYSIS MODEL"

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ABSTRACT

This study attempts to measure the ROE and ROA of the paper companies in India with respect to JK Paper Ltd and Andhra paper Ltd. In this research paper 2 companies are selected on the basis of market capitalization. In this paper, researcher uses DuPont analysis for data-analysis and, it is method of assessing a company's return on equity (ROE) breaking into three parts. In order to achieve the result, this study has measured the ratios of ROE, ROA applying the DuPont analysis. correlation and t-test technique was used for the Period of March 2019 to March 2023 for the analysis, The calculated value is -1.03 and table value was 1.86 so it is conclude that calculated value is less than table value so H_0 is accepted. It is said that there is no significant difference in Return on Assets by using du Pont model of selected paper companies during study period.

Keywords:

- **Du Pont Analysis,**
- **Return on Equity,**
- **Return on Assets,**
- **Correlation**

INTRODUCTON:

The Indian Paper Industry accounts for about 1.6% of the world's production of paper and paperboard. The estimated turnover of the industry is Rs. 35,000 crore (USD 7 billion) approximately and its contribution to the exchequer is around Rs. 3000 crore (USD 0.6 billion). The industry provides employment to more than 0.37 million people directly and 1.3 million people indirectly. The Indian Paper Industry is among the top 12 Global players today, with an output of more than 13.5 Million tons annual with an estimated turnover of Rs. 35000 Crores. The mills use a variety of raw material viz. wood, bamboo, recycled fiber, bagasse, wheat straw, rice husk, etc.; approximately 35% are based on chemical pulp, 44% on recycled fiber and 21% on agro-residues.

The paper industry in India is more than a century old. At present there are over 850 paper mills manufacturing a wide variety of items required by the consumers. In last 60-65 years, the number of paper mills has increased from just 17 mills in 1951 to more than 666 units engaged in the manufacture of paper and paperboard, out of which nearly 568 are in operation by 2006 and around 850 mills. The paper industry in India could be classified into 3 categories according to the raw material consumed. 1.Wood based 2.Agro based & 3.Waste paper based While the number of wood based mills are around 14 and balance 836 mills are based on non- conventional raw materials.

DU PONT ANAYSIS

DuPont Analysis, also known as DuPont Model, is based on return on equity ratio which determines a company's ability to increase its Return on Equity. DuPont analysis was created by Mr. Donaldson Brown in 1920, while he was working at DuPont Corporation (hence the name). DuPont analysis, in its early stage was used for measuring the management efficiency and performance.

DuPont analysis breaks down the Return on Equity (ROE) part into smaller portions in order to investigate the root cause of Return on Equity (ROE).

As per DuPont Analysis, ROE is affected by three things:

- Operating efficiency, which is measured by profit margin

- Asset use efficiency, which is measured by total asset turnover

- Financial leverage, which is measured by the equity multiplier

The Formula for Return on Equity is as follows:

ROE= Net Income / Shareholders Equity

As mentioned earlier, DuPont Analysis uses three factors to analyze the quality of a business, Profit Margins, Asset Turnover and Financial Leverage.

The formula is as follows:

ROE= Profit Margin * Asset Turnover * Financial Leverage

$$\begin{array}{cccccc} & \textbf{Profit Margin} & \times & \textbf{Asset Turnover} & \times & \textbf{Financial Leverage} \\ \textbf{ROE} = & \dfrac{\textbf{Net Income}}{\textbf{Net Sales}} & & \dfrac{\textbf{Net Sales}}{\textbf{Total Assets}} & & \dfrac{\textbf{Total Assets}}{\textbf{Total Equity}} \end{array}$$

As it is clear from the formula above, DuPont Analysis is simply an expansion of the ROE formula. If you cancel the Net sales and Total Assets, you will get back the formula for ROE.

The ROE tells how effectively a company uses the shareholders money.

Return on assets (ROA) is a financial ratio that shows the percentage of profit that a company earns in relation to its overall resources (total assets). It shows the company's ability to generate profits before leverage, rather than by using leverage. 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 = Net Income after tax / Total assets (or Average Total assets)

REVIEW OF LITERATURE:

Bhagya Lakshmi (2019) Conducted research in which DuPont analysis was used to evaluate the performance of selected automobile companies, assessed by ROCE (ROE). The study was designed to assess the performance of a company and the value it produces relative to total assets, sales, and other key variables. A team of researchers from IIM, Bangalore, conducted their study on 10 automotive companies listed on the National Stock Exchange (NSE), from 2013 to 2017. The author states that the correlation and regression analysis is performed to identify if a relationship exists between the aforementioned variables and to determine the ROE and EM effects. As the author discovered, all of the variables except EM were linked together, and selected companies had significantly different financial performances when compared on return on equity and return on assets.

Mrs.K.Bhagyalakshmi, Dr.S.Saraswathi (2019) Studied A Study on Financial Performance Evaluation Using Dupont Analysis In Select Automobile Companies 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.

Dr. Pravin Narayan Mahamuni, Dr. Anil Arun Poman (2019) Analyzed evaluating profitability performance of bajaj auto ltd & hero motocorp by using dupont model This study attempts to measure the financial performance of the Auto-mobile companies in India with respect to Bajaj Auto Ltd and Hero Motocorp. In order to achieve the goal, this study has measured the ratios of ROE, ROA applying the DuPont analysis, which have been demonstrated with tables and graphs to show the change periodically. The researcher used T-test for analyzing and comparing previous 5 years financial data to find out level of significant change.

Dr. Vani Kamath, Dr. Roopali Patil (2017) Examined Du Pont Analysis On Select Firms Of Information Technology Sector The study has been undertaken mainly to understand the Return on equity on the investment based on three factors, which influence the decision of the investors. The study mainly concludes that the economic and political conditions of other nations have a significant influence on the financial statements of the firm. The Return on equity of 2015-16 and 2016-17 show that the operating efficiency, asset use efficiency and leverage are mainly responsible for ROE variations.

Mr.Ahsanuddin Haider (2016) Analyzed Comparative Analysis of Financial Efficiency of Bank of Baroda and HDFC Bank Using DuPont Model This paper is focused to banks which are having large assets base are not efficient in performance in regards to financial efficiency (profitability) parameter. To justify my argument a comparative study of Bank of Baroda and HDFC Bank which are selected to be largest banks in Public sector and private sector respectively, is done to analyze the financial (Profitability) efficiency by using Du Pont model. And also I have tried to get insight the significant relationship amongst different variables considered. Finally result of analysis and its interpretation concludes that HDFC bank is comparatively more efficient in managing its financial resources than Bank of Baroda.

Geethalakshmi, Dr. K Jothi (2016) Examined Financial Performance of select Pharmaceutical Companies in India using DuPont Analysis This study attempts basically to measure the financial performance of the Pharmaceutical companies taking Cipla, Dr. Reddy's Laboratories, for the period 2006- 2007 to 2015-2016. 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.

Ahmad Aref Almazari (2012) Studied A Comparison of Financial Performance between Samba and AlRajhi Banks by Using DuPont Model The results of the study discover that, the financial performance of the two banks as regards to net profit margin is relatively steady and reflects minimal volatility. Asset utilization has declined for both banks over the years under study. Equity multiplier was higher for Samba than AlRajhi, but volatility was almost low for both banks. Also, AlRajhi had less financial leverage to fund its assets. Furthermore, return on equity has sloped down for both banks over the period of this study.

Dr. Karthikeyan and S. Christina Sheela (2012) examined the financial performance of the pharmaceutical sector between 2003 and 2012, focusing on three significant participants: Cipla, Ranbaxy Pharmaceuticals and Dr. Reddy's Laboratories. To determine the company's earning potential (ROI and ROE), the author employed DuPont analysis. The author claims that it is an essential instrument for evaluating the financial performance of a business. The author came to the conclusion that the DuPont study, which determined ROI and ROE for the top three pharmaceutical businesses in India, demonstrated that absolute measures aren't always suitable in every situation. Therefore, when calculating the ratio, it is crucial to establish a consistent basis of comparison for different organizations and to construct rankings of relative sizes in order to evaluate efficiency.

RESERCH METHODOLOGY

1 SIGNIFICANCE OF THE STUDY

Investor's uses return on equity (ROE) and Return on Assets to measure the earnings of a company generates from its assets. With it, they can determine whether a firm is profit-creator or a profit-burner and management‟s profit-generating efficiency. The DuPont model is a useful technique 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 towards significant areas of strength and weakness evident in the financial statements. Hence, this research has taken for comparing previous 5 years performance of the top two paper companies in India with respect to JK Paper Ltd. and Andhra Paper Ltd by using DuPont.

2 OBJECTIVES OF THE STUDY

1 To study the effectiveness of assets.

2. To examine profitability of the selected paper companies using ROE and ROA with Dupont model.

3. To compare the ROE & ROA of JK Paper Ltd. & Andhra Paper Ltd for last 5 years.

4 To determine the ROE and also to study the correlation of various performance indicators which are the determinants of JK Paper Ltd. & Andhra Paper Ltd

OBJECTIVES OF THE STUDY

- To study the effectiveness of assets.
- To examine profitability of the selected paper companies using ROE and ROA with Dupont model.
- To compare the ROE & ROA of JK Paper Ltd. & Andhra Paper Ltd for 5 years.
- To determine the ROE and also to study the correlation of various performance indicators which are the determinants of JK Paper Ltd. & Andhra Paper Ltd.

HYPOTHESES

- H_0: There is no significant difference in Return on Equity by using du Pont model of selected paper companies during study period.
- H_1: There is significant difference in Return on Equity by using du Pont model of selected paper companies during study period.

- H_0: There is no significant difference in Return on Assets by using du Pont model of selected paper companies during study period.
- H_1: There is no significant difference in Return on Assets by using du Pont model of selected paper companies during study period.

RESERCH METHODOLOGY

PERIOD OF THE STUDY:

Data is collected for a period of five years that is from March 2019 to March 2023 for the analysis and interpretation.

UNIVERSE OF THE STUDY:

All paper companies which are listed in BSE and NSE.

SAMPLE SIZE:

This study is purely based on secondary data which was collected from Annual Reports of selected firms from their respective websites. The Top 02 Indian Paper companies have been selected based on Market Capitalization for the study. Here sample is

- **JK Paper Ltd.**
- **Andhra Paper Ltd.**

TOOLS & TECHNIQUES:

Ratio analysis is a technique used for evaluating ROA and ROE performance of an organization. The researcher has computed with the help of all secondary data NP Margin, Assets Turnover, Equity Multiplier and Return on Assets. These computed ratios were further analyzed by computing averages (Mean) Standard Deviation and correlation. For the comparison of ROA and ROE Analysis t- test are used.

DATA ANALYSIS AND INTERPRETATION

Calculation of ROE

ROE = NP / EQ Decomposed as

ROE = Profit margin x Asset turnover x Equity multiplier

ROE = (Net profit / Sales) X (Sales / Assets) X (Asset / Equity) = Net Profit / Equity*100

Table No: 1 Calculation of ROE of JK Paper LTD

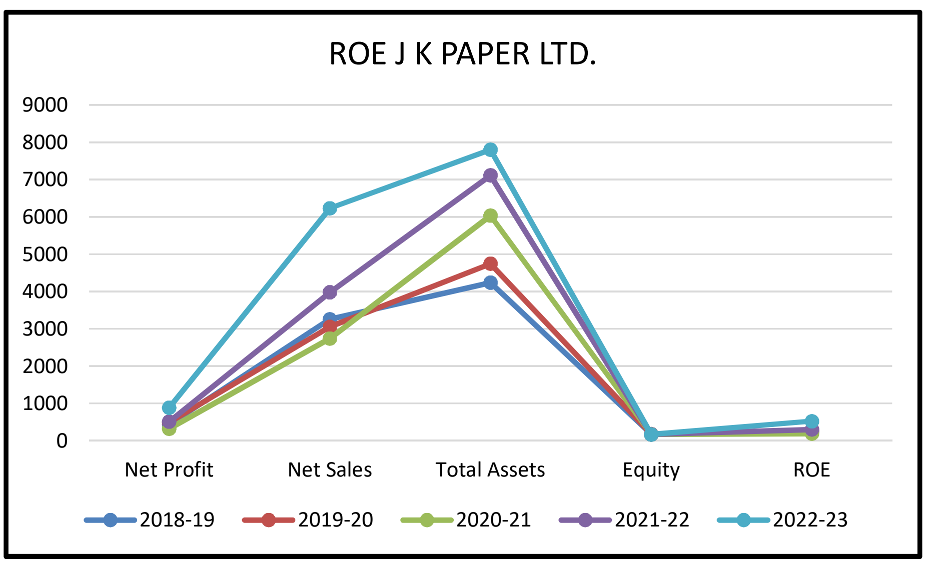
Year	Net Profit(Cr)	Total Sales(Cr)	Total Assets(Cr)	Equity fund(Cr)	ROE in %
2018-19	437.2	3,256.30	4,235.64	178.24	245.29
2019-20	492.71	3,054.30	4,743.37	178.24	276.43
2020-21	322.19	2,741.60	6,034.59	169.4	190.19
2021-22	511.09	3,980.67	7,116.52	169.4	301.71
2022-23	885.33	6,232.06	7,801.24	169.4	522.63
MEAN	529.704	3852.986	5986.272	172.936	306.30

[Source: moneycontrol.com]

Interpretation:

The above table no 1 showing calculation of ROE of **JK Paper LTD**. ROE of JK paper company ltd. is 245.29%, 276.43%, 190.19%, 301.71% and 522.63% during 2018-19 to 2022-23 respectively.

Chart: 1 ROE J.K.PAPER LTD



[Source: moneycontrol.com]

Table No: 2 Calculations of ROE of ANDHRA PAPER LTD

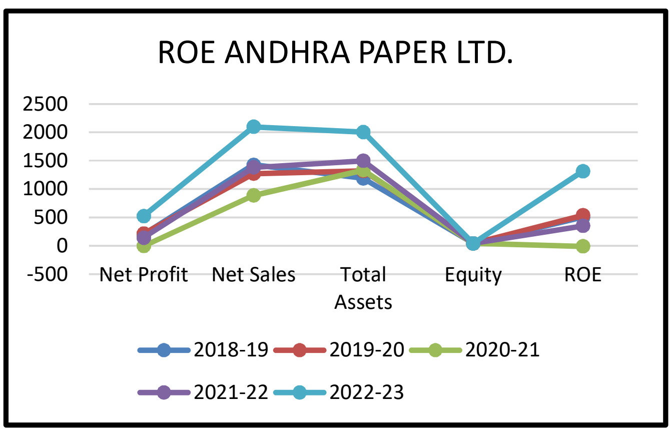
Year	Net Profit(Cr)	Total Sales(Cr)	Total Assets(Cr)	Equity fund(Cr)	ROE in %
2018-19	200.08	1,427.33	1,186.10	39.77	503.092
2019-20	212.92	1,269.70	1,321.14	39.77	535.378
2020-21	-4.6	886.75	1,332.59	39.77	-11.566
2021-22	139.73	1,380.23	1,497.92	39.77	351.345
2022-23	522.46	2,097.66	2,004.70	39.77	1313.703
MEAN	214.118	1412.334	1468.49	39.77	538.390

[Source: moneycontrol.com]

Interpretation:

The above table no 2 showing calculation of ROE of **ANDHRA PAPER LTD.** ROE of ANDHRA PAPER LTD. is 503.092%, 535.378%, -11.566%, 351.345% and 1313.703% during 2018-19 to 2022-23 respectively.

Chart: 2 ROE Andhra paper LTD



[Source: moneycontrol.com]

CALCULATION OF ROA:

ROA = NP /TA Decomposed as;

ROA = NP / Sales X Sales/ TA

So remains NP/TA*100

Table No: 3 Calculation of ROA of JK Paper LTD

Year	Net Profit (NP) (Cr)	Total Sales (Cr)	Total Assets (TA) (Cr)	ROAin %
2018-19	437.2	3,256.30	4,235.64	10.32
2019-20	492.71	3,054.30	4,743.37	10.39
2020-21	322.19	2,741.60	6,034.59	5.34
2021-22	511.09	3,980.67	7,116.52	7.18
2022-23	885.33	6,232.06	7,801.24	11.35
MEAN	529.704	3852.986	5986.272	8.85

[Source: moneycontrol.com]

Interpretation:

The above table no 3 showing calculation of ROA of **JK Paper LTD.** ROA of JK paper company ltd. is 10.32%, 10.39%, 5.34%, 7.18% and 11.35% during 2018-19 to 2022-23 respectively.

Chart: 3 ROA J.K. paper LTD

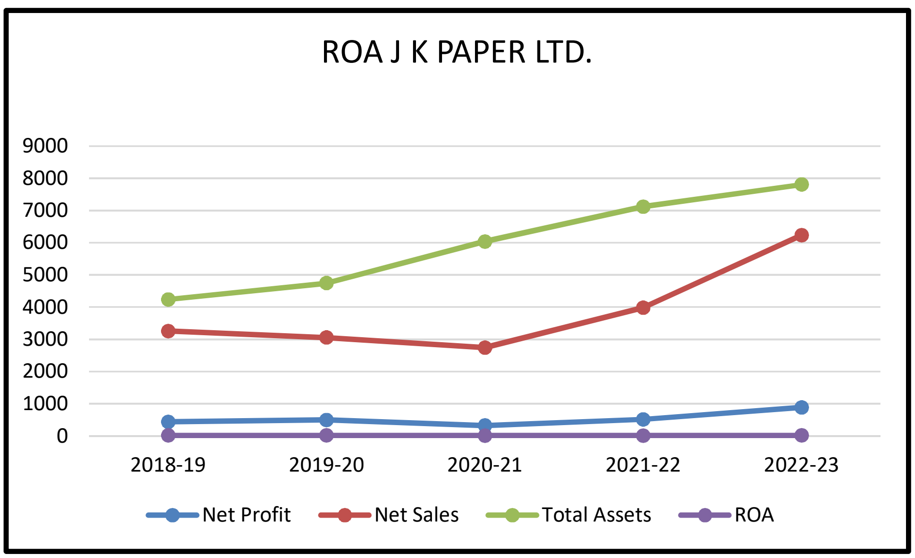


Table No: 4 Calculation of ROA of ANDHRA PAPER LTD.

Year	Net Profit (NP) (Cr)	Total Sales (Cr)	Total Assets (TA) (Cr)	ROA in %
2018-19	200.08	1,427.33	1,186.10	16.87
2019-20	212.92	1,269.70	1,321.14	16.12

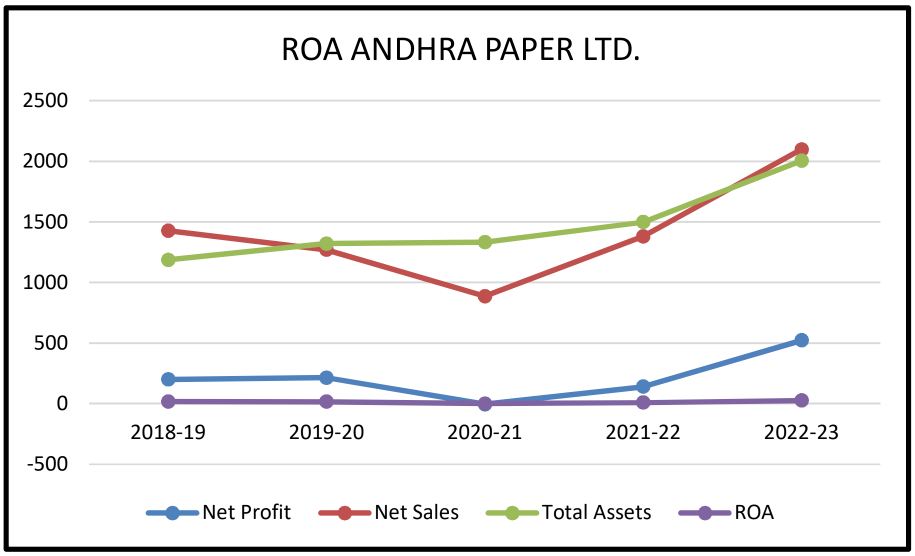
2020-21	-4.6	886.75	1,332.59	-0.35
2021-22	139.73	1,380.23	1,497.92	9.33
2022-23	522.46	2,097.66	2,004.70	26.06
MEAN	214.118	1412.334	1468.49	14.58

[Source: moneycontrol.com]

Interpretation:

The above table no 4 showing calculation of ROA of **ANDHRA PAPER** The above table shows that the ROA of Andhra paper company ltd was showing mix trend. In the year 2022-23 the ROA was higher and it was 26.06 % so it is said that company proficiently uses its assets for production as compared to other years.

Chart: 2 ROA of Andhra paper LTD



CORRELATION ANALYSIS

Table no: 5 Correlation Analysis of the Determinants of ROE OF JK Paper ltd

ROE	NP Margin	Assets Turnover	Equity Multiplier
Correlation	1.00	-0.19	0.54

Interpretation:

The above table presents the correlation analysis of ROE of JK **Paper ltd** with its three determinants. From the table of 5 it can also be observed that while NP margin and equity multiplier are positively correlated with ROE, assets turnover is inversely correlated with ROE .Also the highest correlation is between net profit margin and ROE at 100% which says that Operating efficiency is the most contributing factor for the performance of JK Paper ltd.

Table no: 6 Correlation Analysis of the Determinants of ROE OF Andhra Paper ltd

ROE	NP Margin	Assets Turnover	Equity Multiplier
Correlation	1.00	0.37	0.41

Interpretation:

The above table presents the correlation analysis of ROE of **Andhra Paper ltd** with its three determinants. From the table of 6 it can also be observed that while NP margin and Assets turnover and equity multiplier are positively correlated with ROE,.Also the highest correlation is between net profit margin and ROE at 100% which says that Operating efficiency is the most contributing factor for the performance of Andhra Paper ltd.

HYPOTHESE TESTING USING t-TEST

H0: There is no significant difference in Return on Equity by using du Pont model of selected paper companies during study period.

Particular	t calculated value	Table value	Results
ROE	-1.06	1.86	H_0 Accepted

Interpretation:

Here calculated value is – 1.06 and table value was 1.86 so it is conclude that calculated value is less than table value so H_0 is accepted. It is said that there is no significant difference in Return on equity by using du pont model of selected paper companies during study period.

H0: There is no significant difference in Return on Assets by using du pont model of selected paper companies during study period.

Particular	t calculated value	Table value	Results
ROA	-1.03	1.86	H_0 Accepted

Interpretation:

Here calculated value is -1.03 and table value was 1.86 so it is conclude that calculated value is less than table value so H_0 is accepted. It is said that there is no significant difference in Return on Assets by using du Pont model of selected paper companies during study period.

CONCLUSION:

The Andhra paper company return on equity was more than JK Paper companies and also return on assets of Andhra paper ltd was more than the JK Paper ltd during study period. The correlation result of J.K. paper ltd find that J.K. paper ltd have positive correlation with profit margin and equity multiplier and negative correlation with assets turnover. The JK Paper ltd more focuses on operating efficiency. Operating efficiency is the most contributing factor for the performance of JK Paper ltd. The correlation result of Andhra paper ltd find that Andhra paper ltd have positive correlation with all three Determinants of ROE in du Pont model. Here company also focuses on operating efficiency. The hypotheses results show that ROE and ROA have no significance difference during the study period.

LIMITATIONS OF DUPONT ANALYSIS

- The study of DuPont analysis considers only ROE and ROA. It is restricted to these two aspects only.
- This study covers 5 years data so time period is also limitation
- It is comparative study so sample size restricted for study.

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