

Empirical identification of drivers of Du Pont Model: The case of Indian manufacturing strata

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ABSTRACT

Du Pont model is a time tested valid and vital tool for managerial control. The model displays how control can be exercised on specific operational divers to improve on the Return on Equity. The objective of the paper is to identify the sector wise most important component among the three component ratios in the Du Pont Model. This enables decision makers to exercise efficient and effective control on the identified key driver to improve the Return on Equity. The study has taken ten sectors associated with the manufacturing dimension of the Indian economy. With the aid of Inter correlation matrix computed from the database which includes four ratios namely Net profit margin, Equity Multiplier, Asset turnover ratio and Return on Equity computed for five years for all the sectors. The study was able to ascertain the existence of varied impact of the component ratios on Return on Equity and the degree of impact. The study is among the foremost to analyse the behavioural pattern of the component ratios with Return on Equity.

Keywords: Financial ratios, Du Pont, Correlation, Indian manufacturing sector

Financial management is not just preparation of financial statements and depicting the numbers to know the competitive advantage rather it includes all the activities aimed at achieving the primordial objective of wealth maximization. Wealth maximization depends on a lot of factors including the profits that the company makes for its shareholders. Being a profitable company and retaining its profits and increasing the same is not an easy task. Profits of the company depends not only of the external factors but more so on the internal decision-making ability of the management. Thus, it is a known fact that wealth creation depends on series of sound decision based on structured basis. Risk avoidance is a prerequisite to achieve profitability and soundness in any organization. It is imperative to have structured basis on which financial management decisions are dependent. Financial statement analysis using ratios is the anchor on the basis of which companies are selected, evaluated and investment strategies are made (Tugas, 2012).

Ratio analysis also draws way to identify the strengths and weaknesses of an organization individually and also in comparison its sectorial peers. Ratios analysis is an easier way to look up the financial health of an organization in a comprehensive and intricate manner. It's more of a matter to pick up the right figures and plug them into a pre-defined formula to get the necessary outcome. As is a known fact that financial statements carry a lot of important information and analysing the same is a lengthy process. It is more efficient

to relate various ingredients of the financial statements and plug it into pre-defined formula to establish a correlation amongst them (Horrigan, 1968; Bhattacharya, 2007).

Numerous methods can be used to calculate metrics using the financial information available from the organizations balance sheet and income statement. One of the metrics used is Return on Equity (ROE). ROE is the profit that a company makes for every rupee that is invested by the shareholders. Higher the ROE of a company, better are the returns that the investors get from the company. From Investors perspective a company that has high ROE is of sound investment. ROE is the outcome of the wealth creation achieved through efficient management of resources of the organization through informed and proper planning, budgeting, control and decision making. Given such awareness, ROE is converted into an expression by DuPont which throws light on other important parameters to measure a company's performance. The parameters are Profitability, Operating efficiency or Asset Utilization and Financial leverage. ROE is therefore broken into below mentioned components: 1. Net profit margin that measures the operating efficiency; 2. Asset Turnover that measure the effective asset utilization; 3. Equity Multiplier that measures the Financial leverage.

Usage of DuPont analysis helps an investor and the management to make sound investment decisions. ROE can be increased either due to increased operating efficiency or due to better utilization of the assets. In both the scenarios it can be implied that its worth investing in the company from the investors perspective, as it can be accounted that the company is making higher margin on its sales or the company is utilising its assets hundred percentage or it could also be a proportion of the both these elements. However, the structure of financial leverage also has its effect on the ROE of the company. In this case it can be implied investors are making better returns on their investments in the company due to the financial structure/ strategy used rather than its operational efficiency.

The study will add further value to the usage of Du Pont in the Indian context by identifying the sector specific ratios that drives ROE.

LITERATURE REVIEW

Financial Analysis is an integral part of the management process for any organization and it is a significant tool for decision making (Isberg, 1998). The scope of Financial analysis includes collection of relevant data, selection, and application of relevant tools for evaluation, interpretation of results and then drawing conclusion. Data can be collected from different sources however the primary source is financial reports of the companies (Drake & Fabozzi, 2012). The main objective of financial statement scrutiny is to verify the firm value, a function of the future growth and profitability of the firm (Ohlson, 1995). Financial statement Analysis serves the outlook of stakeholders. Among several outlooks are that of creditor, investor and management (Fraser and Ormiston, 2004).

For any manager, comprehensive knowledge about the company is essential, financial ratios provide the aforesaid information about an entity's financial position (Muresan & Wolitzer, 2004). Accounting data provided in financial statements become more usable only after being converted into financial ratios (Horrigan, 1965).

The DuPont model is based on ratios. This model was introduced in the early 1900s to evaluate the financial performance of a business (Sheela and Karthikeyan, 2012). Du Pont model was founded by the Du Pont Company in 1919 but the same came into limelight in 1950. The model shows a structural break down of

Return on Equity (ROE) ratio into 3 component ratios which enables management to exercise control over those component ratios which would lead to the improvement of ROE (Bhattacharya, 2007). DuPont shows that rate of return on equity can be calculated as the product of Total asset turnover, equity multiplier and profit margin which helps in depicting relationship between activity, leverage and profitability ratios (Brigham and Houston, 2009)

F. Donaldson Brown was hired by Du Pont Company to analyze the finances of a newly acquired company which was General Motors. F. Donaldson Brown who was also an electrical engineer and had also worked for 4 years in the Treasury Department recognized the mathematical relationship that existed between two financial ratios Net profit margin and Total assets turnover. The product of these ratios gave the output as Return on Assets. This was the initial Du Pont model. (Liesz, 2002). After modification focus was then shifted on increasing ROE from ROA since it integrates debt or leverage as third area of attention, however prior to this focus was on increasing ROA. Due to this modification, DuPont model evolved as a significant tool for analysis and decision making (Collier, McGowan and Muhammad, 2006).

DuPont analysis is an ideal method to assess the market value of a firm, which indicates the leverage of a company for improving the future profitability. This is achieved by efficient utilization of its assets which will ultimately; improve shareholders return as higher leverage if preferable for investors (McGowan and Stambaugh, 2012).

The efficacy of Dupont disaggregation in forecasting the firm's profitability, operating income, and stock market has been well documented in earlier literature Demmer (2015). Dupont model has been considered as the superior model used by financial analysts and managers which can define how well a company works. The model has prime utility for creation of effective long term financial policy as well for making effective financial decision (Brigham, Daves 2014). DuPont analysis is a common and straightforward method for evaluating components that impact a firm's financial performance and has been broadly used in practice since its growth.

Financial statement analysis textbooks usually backed decomposing profitability into asset turnover and profit margin due to their usefulness in company performance analysis (Stickney and Brown, 2006). Using DuPont model financial work of the companies using balance sheet data and income statement data can be estimated. This estimation and assessment helps the managers to recognize the strategies which improves the future work of the companies (Roucan - Kane et al., 2013) The DuPont analysis is frequently used by top financial managers for rating the financial condition of the company in the earlier period, while taking business decisions for the future (Boshkoska & Prisaganec, 2017).

Because DuPont analysis depicts the profit analysis it's values is eminent across the industries (Selling and Stickney, 1989; Nissam and Penman, 2001). The analysis performed with the aid of DuPont models reveals factors of efficiency which has an impact on the investment appeal of companies. From the shareholder's view, healthy ROE was the outcome of various factors such as profitability and efficiency (Rogova, 2014). Due to the aforesaid pervasive applicability across sectors, DuPont is also effective in understanding industry dimensions. The threat of new entrants and competitive factors have been analysed with the help of the model. Huge profit margins attract new entrants into the market place or existing rivals duplicating the new ideas. Also, competition may be less jeopardizing if there exists efficient utilization of assets. Efficient production process makes it difficult to duplicate another firm's ideas as it involves huge cost factors (Soliman, 2008)

The utility of Dupont has spread even into the field of technical analysis. Research has studied the application of DuPont analysis in evaluation of abnormal returns in Romanian market. The study was able to conclude that the components of DuPont represent significant and feasible form of analysing stock's abnormal returns which helps in decision making by market participants (Botika, 2012). Also, as a part of technical analysis, the model has enabled researchers to conclude that investors might not consider the most profitable case to be attractive (Herciu, M., Ogrea, C., & Belascu, L., 2011). The three-component based ROE was further developed by researchers to create the Modified Du Pont model which encompasses five components. This new model maintains the strategic importance of operating and financing decisions on the result i.e. ROE with the aid of five ratios (Liesz, T. J., & Maranville, S. J., 2008).

DuPont analysis has undergone many changes over a period, each change contributed to the betterment of this model, which is more practical and viable.

OBJECTIVE

The study is conducted with the objective of creating add to the existing knowledge with regards to Du Pont model in the Indian context. Du Pont model breaks down ROE into three ratio component, the study would attempt to identify which of the components is more important to each sector of the sample. With the aid of statistical technique, the study would attempt to identify sector wise key driver among the component ratios which influences the Return on Equity the most.

RESEARCH METHODOLOGY

Framework of Variable Selection:

Du Pont model is framed on three financial ratios whose product reveals the most critical ratio i.e. Return on Equity.

Return on Equity = Net Profit Margin \times Asset Turn over ratio \times Equity Multiplier ... (1)

Thus, the variables for the study are limited to the aforementioned financial ratios i.e. Net profit margin, Equity Multiplier, Asset turnover ratio and Return on Equity.

Framework of Sampling:

The study aims at identifying the key driver for the Du Pont model on a sector wise basis for the Industry strata. The study will focus on the companies listed on the Bombay Stock Exchange. The sectors are selected from the sectoral classification provided by Stock Exchange. Thus, a total of ten sectors are included in the study. The study has covered the sectors as displayed in Table 1. From each sector, twenty companies have been selected on a random basis. If the sector has less than twenty companies, then all the companies are selected. The number of companies included in the study on a sector wise basis is displayed in Table 1. The study covers the period from 2011-12 to 2015-16 i.e. five years. Any company which lacks data for any of these years is excluded from the study. The period after 2016 is excluded from the study because of the change in the accounting framework in the country. This measure has been adopted because financial ratios are affected by the inherent limitation of accounting. Thus four ratios are computed for all the companies for a period of five years.

Table 1: List of sectors and companies

Sectors	No. of companies	Sample selected
Automobiles & Auto Components	162	20
Basic Materials	320	20
Consumer Durables	66	20
Fast Moving Consumer Goods	288	20
Hardware Technology & Equipment	41	20
Healthcare	188	20
Telecommunications Equipment	17	17
Textiles, Apparels & Accessories	398	20
Capital Goods	338	20
General Industrials	223	20
Grand Total	2041	197

Source: Author's working using data obtained from www.bseindia.com, accessed at May 10, 2018

Statistical Framework:

Ratios have an inherent limitation of being devoid of normality. The study has not used any statistical tool which required the condition of normality. The objective of the study is to identify which of the three component ratios namely Net profit margin, Equity Multiplier, Asset turnover ratio influences the Return of Equity the most. Thus, Coefficient of correlation has been considered as the optimum statistical tool to fulfil this objective. Stronger the coefficient of correlation higher the influence of the variable. The operational component ratios which have a higher degree of correlation enable the managers to exercise control over the identified operational variable and ensure the desired Return on Equity.

FINDINGS

All four ratios i.e. Net Profit Margin, Equity Multiplier, Asset Turnover and Return on Equity was computed for five years for the sample. Coefficient of correlation was computed between ROE and the other three ratios. The results are displayed in Table No. 2

Table 2: Sector wise coefficient of correlation

Sector name	Net profit Margin	Equity Multiplier	Asset turnover
Automobiles & Auto Components	-0.0975	0.7209	-0.0817
Basic Materials	-0.0061	-0.9567	0.0263
Consumer Durables	-0.2182	-0.8874	-0.0832
Fast Moving Consumer Goods	0.8300	-0.6477	0.0887
Hardware Technology & Equipment	-0.7416	-0.1072	-0.2995
Healthcare	-0.0322	0.6923	-0.1603
Telecommunications Equipment	0.0240	-0.02403	-0.3462
Textiles, Apparels & Accessories	0.7152	-0.1581	0.0127
Capital Goods	-0.1536	-0.7167	0.0336
General Industrials	0.4390	0.3335	-0.0974

Source: Author's findings

The highlighted cells displayed in Table 2, shows the financial ratio which influences the ROE of that specific sector the most. Thus, the decision makers of the respective sectors have to focus on improvement of the respective component ratios in order to improve the ROE.

The results are also testament to the fact that for each sector the driving component in Du Pont is different which is on account of the unique nature of each sector. The fundamental features of each sector are different, the socio economic impact on them is also varied thus analysis of the same three ratios for all the sectors will not be fruitful. This study has confirmed the same by proving existence of varied impact on the ROE.

Net profit margin and Equity Multiplier has the most vital influence on four and five sectors respectively. This implies that though the three component ratios of Du Pont create the ROE their influence on ROE is not the same. Thus, companies of the respective sector have to focus on the key driver of Du Pont model and not the three ratios

The negative sign against few coefficients of correlation indicates an inverse relation, implication being the growth in the component would lead to a deduction in the ROE. Managers of these institutions have to focus on ensuring that the key driver is maintained at a low value.

General Industrials sector and Telecommunication Equipment sector was unable to show any significant key driver that has a high influence over the Return on Equity. Thus, the Return on Equity for these sectors are influenced by variables other than the three component financial ratios.

The importance of each of the component ratio can be understood by the number of sectors they have the ability to influence. The ratio which influences the ROE of majority of the sectors can be claimed to the most important Du Pont driver. The aforesaid vitality can be gauged with the aid of Table 3.

Table 3: Sectorial driver count

Ratio	No. of sectors
Net profit Margin	4
Equity Multiplier	5
Asset turnover	1

Source: Author's findings

Equity Multiplier is the most important component ratio with the ability to drive 50% of the sectors under study. Next to Equity multiplier Net profit margin has been found to be the most important driver influencing the ROE of 40% of sectors. Asset turnover has the lowest impact among the sectors.

CONCLUSION

The study aimed at crafting information by identifying sector specific key component ratio which influences the Return on Equity the most. Using the Indian economy as a landscape, the study attempted to identify the aforesaid key financial ratio amongst the Du Pont ratios. By performing a thorough analysis of the pattern of the component ratios and its impact on the Return on Equity, the study was able to identify the existence of variation in influence of the component ratios on Return on Equity. Thus, among the three component ratios, the effect on Return on Equity is unique to each sector and the study was able to unravel the same. The prominence of each driver is specific to each sector owing to the fundamental differences that persist among them. This study was able to identify that the most important ratio is equity multiplier followed by net profit margin. This study thus was able to assess the power of Du Pont ratios among the different ratios.

The study is limited in terms of the economy selected and the sectors selected within it along with the period of study. The reasons for the uniqueness of the component ratios is left to the future studies. Identification of the socio- economic factors is imperative to identify the reasoning behind the outcome of this study,

Du Pont from the moment of its conceptualization has aided financial managers and decision makers to focus their attention on three key ratios for the improvement of their ROE. This study was able to narrow down for the three ratios, a single ratio which would enable the decision makers to achieve focused efficiency. Decision makers of a company would be able to focus on only the driver ratio and ensure the desired ROE.

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