

A THEORETICAL SURVEY OF ALTERNATE MEASURES OF PROFITABILITY VERSUS DUPONT MODEL

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Abstract

Firms are an integral part of modern day economic system. They have become drivers of growth in most of the countries. How efficiently can they utilize resources (including finance) determines how rapidly and smoothly can the economies grow. Profit and profitability are the barometers of financial performance of a firm. Profit maximization has been deemed to be the pivotal goal of firms. This is now true for public sector units as well. In this paper the author has conducted a detailed theoretical survey of alternate measures of profitability. Pros and cons of using various profit ratios have been discussed. Similarly, return on equity (ROE) and economic value added (EVA) have also been discussed at length. All these measures are then critically compared to DuPont model (three and five step) and it is concluded that the latter is far superior and carries high application value for a variety of reasons.

Key Words - Profitability, Ratio Analysis, Economic Value Added, Return on Equity, DuPont Model

INTRODUCTION

Profit maximisation is now generally acceptable goal of any enterprise irrespective of its ownership. Private firms are accountable to their shareholders as well as their creditors. Without generation of adequate surplus, they will fail in their accountability. Economics and Finance literature has accepted rate of return or profitability as a vital indicator to gauge efficiency / financial health of the firm.

This makes it imperative to discuss the measurement of *profit and profitability*. Profit is a measure of the company's efficiency and effectiveness (Pandey).

OBJECTIVE

The main objective of this paper is to conduct a study of various measures of profitability and compare them versus DuPont model in their pros and cons. The study also aims at conducting a brief review of the application of DuPont model by different researchers and evaluates the results obtained.

LITERATURE REVIEW

Isberg (1998) has established a strong case for using DuPont ratio as a very useful tool in financial statement analysis for variety of reasons. The author has suggested the use of DuPont ratio in the process of company analysis which generally begins with qualitative inquiries of policies and strategies, creating a context for investigation. Subsequently goals and objectives of a company are defined which provides a basis for interpreting the results. The author has theoretically analysed various ratios making up DuPont analysis. At the same time the author frankly highlights various limitations of DuPont ratio.

Doorasamy (2016) has conducted detailed analysis of all financial ratios with reference to the selected three companies to assess their financial performance. This paper is illustrative of how one can apply the DuPont analysis to get an excellent idea of how a company is performing and the sources of financial troubles. This in turns helps investors in taking correct decisions. By applying various financial ratios the author recommended which company is worth investing.

Almazari (2012) has given an excellent theoretical introduction to the need for using DuPont model in performance analysis of banks. The author has presented a model for the financial analysis of a bank based on DuPont system of financial analysis.

Liesz (2002) showed how a relatively complex financial analysis can be made simple and also useful by using the modified DuPont model of ratio analysis. Through his elegant theoretical analysis he laid down various choices before the firm to improve Return on Equity. Further he demonstrated the usefulness of DuPont model in financial strategy formulation. The evolution of Return on Assets into simple DuPont model into modified five step DuPont Model has been succinctly and elaborately described by the author.

Blumenthal (1998) has analysed that the consensual view among the academics and managers is that DuPont system helps companies to visualize the critical blocks in Return on Assets and Return on Investments. Proponents of EVA have pointed to several limitations inherent in DuPont model. The biggest benefit of the expandable DuPont model is its flexibility which can enable finance executives to combine Return on Investment with measures that do incorporate growth prospects.

Soliman (2008) has concluded that DuPont analysis is a useful tool of financial statement analysis as it is based on sound theory and is related to operational aspects of the firm.

At the very outset, Liesz & Maranville (2008) quoted past research to drive home the point that lack of financial control leads to business failures. Then they elegantly discussed ratio analysis and its usefulness in measuring profits of firms. Through critical review of more than a dozen contemporary textbooks from the fields of Small Business Management, Entrepreneurship and Entrepreneurial Finance, they established the fact that the topic of DuPont analysis largely remains ignored. After tracing the development of DuPont model (original, modified and “really” modified versions), authors carried out DuPont analysis of Herrera and Company. Through it they have explained the in depth use of DuPont model useful for strategic decision making. They concluded that high utility of DuPont model requires that this topic be included in all the relevant books in the areas of finance, management and entrepreneurship.

ALTERNATE MEASURES OF PROFITABILITY

(A) Profit

Textbook formula of *profit* as the difference between selling price and cost price (or the difference between Total Revenue and Total Cost) is not much helpful as it measures profit in an absolute manner and gives no idea of the relative strength or capacity of firm in context of its assets or sales, etc. To remove this lacuna one has to rely on profitability measures. Trade creditors, lenders of short term and long term debt, investors and the management itself is interested in the company's profitability for a variety of reasons.

(B) Economic Value Added (EVA)

Economic Value Added (EVA) is yet another measure of profit. What is known as abnormal or monetary profit in economics, the equivalent of it is known as Economic Value Added in accountancy and finance. The concept of EVA was introduced by Joel Stern and G. Bennett Stewart III of the New York consulting firm Stern Stewart and Co. in the late 1980s. EVA is residual income of the company that is the value remaining after the company's stock holders and all the other providers of capital have been paid for. In terms of formula,

$$\text{EVA} = (\text{Actual return} - \text{Required return}) * \text{Invested capital}$$

Advantages of EVA

EVA a very important management tool for taking correct investment decisions. It is also helpful in addressing principal-agent problem by linking performance of managers to EVA.

Disadvantage of EVA

The biggest disadvantage of EVA is that it is an absolute measure (and hence less revealing about true performance of the company) and is based on accounting numbers (which may be manipulated thereby giving wrong figures of profit performance).

(C) Profit Ratios

Profitability refers to the efficiency with which a company is utilizing its capital to generate profits. At a very primary level, profitability can be measured by using ratio analysis. *Ratio analysis* is a very useful method to establish a relevant financial relationship between components of financial statements. It is quite possible that two companies may have earned the same amount of profit in a year but until and unless the profit is related to sales or assets, it is not possible to conclude which of them is more profitable. The “return on” illustrates the relationship between profits and the investment needed to generate those profits (Liesz & Maranville). Popularly used profit ratios are:

1. Gross Profit Ratio

The gross profit margin reflects the efficiency with which the management produces each unit of product. It measures operational efficiency of both purchase and sales department. It shows relationship between gross profit and sales which are always expressed in terms of percentage. This ratio can be expressed as:

$$\text{Gross Profit ratio} = \frac{\text{Gross Profit}}{\text{Sales}} * 100$$

2. Expense Ratio

It establishes a relationship between each item of expenses and net sales. It measures the operating efficiency of the business in terms of percentage. This ratio can be expressed as:

$$\text{Expense ratio} = \frac{\text{Each item of expenses}}{\text{Net Sales}} * 100$$

3. Operating Expense Ratio

This ratio measures the operational as well as financial management efficiency – especially during inflationary period. This ratio can be expressed as:

$$\text{Operating Expense ratio} = \frac{\text{Operating expense}}{\text{Sales}} * 100$$

(Note:- Here operating expense includes Cost of Goods sold, Office & Administration expense and Selling expense).

4. Net Profit ratio

The net profit margin establishes relationship between net profit and sales & points out management's efficiency in manufacturing, administration and selling its products. The formula of net profit ratio for evaluating operating performance is computed as:

$$\text{Net Profit ratio} = \frac{\text{Net profit (Profit after taxes)}}{\text{Sales}} * 100$$

5. Return on Capital Employed

Return on Capital Employed (ROCE) reveals the overall efficiency or total profitability of business or otherwise with which the firm is operating. ROCE is the multiple of product profitability and capital turnover. It establishes a relationship between the Total Capital Employed (Proprietor's Fund + Loan Capital) and Net profit or Net Operating Profit as the case may be in the terms of percentage. This ratio can be expressed as:

$$\text{ROCE} = \frac{\text{Profit}}{\text{Capital Employed}} * 100$$

ADVANTAGES OF RATIO ANALYSIS

1. Ratio analysis is much better measure of efficiency of firm as it is a relative concept in comparison to profit which was an absolute measure. It gives fairly a good idea of profit in context of some important aspect of firm's functioning. Ratios show important relationship between a firm's resources and its financial flows (Leisz & Maranville)
2. Ratio analysis helps in forecasting various events based on past trends of different variables relevant to a firm.
3. Ratio analysis is helpful to the management in policy making. It is helpful in taking investment decisions as ratios can measure both solvency and profitability of the firm.
4. It is useful in communicating to various stakeholders about the developments within a firm across a period of time.

DISADVANTAGES OF RATIO ANALYSIS-

The biggest limitation of these ratios taken in isolation is that they do not give a meaningful idea of the inter-relationship between various factors determining or influencing profit of a firm. In fact, various ratios are interrelated.

1. Yet another limitation of ratio analysis is that it is one dimensional and does not show a holistic picture of the financial health of a business and it is also said to be backward looking as it is computed based on past financial records.
2. It gives only the direction in which the selected ratio moves but not the number which is more important for a firm in reporting and decision making.
3. Ratio analysis is based on the assumption that various factors affecting the firm's business remains the same during the period under consideration.
4. Ratio analysis is useful only if all the firms adopt uniform accounting practices for meaningful comparison.

5. Ratio analysis can be considered only as a starting point to understand the dynamics behind profitability. More rigorous analysis demands moving beyond it.
6. Ratios may make the comparative study complicated and misleading on account of changes in price level (Chakrabarti).
7. Ratios are misleading if the data that they contain are inaccurate or incorrect and if they are manipulated.

(D) Return on Equity

Return on Equity (ROE) is considered as the best metric to analyze the profitability of business (Burns D C, Sale T J and Stephan J A). Return on Equity provides a correct starting point in evaluating the performance of a business. ROE measures the efficiency in the use of shareholders' funds (Narayanswamy). Therefore it is more watched after by investors. ROE indicates the rate at which owner wealth is increased (Isberg S C). The firm has to earn reasonable income for its owners- shareholders in the case of a company. It is, thus, imperative to calculate ROE (or shareholder's funds) to ascertain whether shareholders' expectations are being met (Pandey). ROE on Equity reveals how much profit a company earned in comparison to the total amount of shareholder equity found on the balance-sheet. A business that has a high ROE is more likely to be one that is capable of generating cash internally. For the most part, the higher the company's ROE compared to its industry the better.

Return on Equity (ROE) is a much better measure of profitability when compared with Profit Margin and Return on Assets because it is possible to expand Return on Equity (ROE) into three other key ratios – Profit Margin, Asset Turnover and Equity Multiplier. This is done using the DuPont model which delves deeper taking into account the components of Return on Equity giving meaningful insights into operations, profitability and leverage of a firm. By establishing meaningful interrelationships among various financial ratios, the DuPont Model lends credibility to both the ratio analysis and Return on Equity. This is the logic behind the selection of DuPont Model as a technique to evaluate the performance of firms.

DUPONT MODEL – A BRIEF INTRODUCTION TO DUPONT ANALYSIS

Every business is interested in knowing how well it is running. For this, there are various profitability measures. Academics and analyst have long been searching for measures which are not very technical and at the same time are also very insightful. Simplicity can come at the cost of losing important insights. DuPont method is a reasonable compromise between the two. It is not very simple as textbook formula of profit but at the same time it is not highly technical that men in business, analysts, investors and other related parties with some basic understanding of finance and accounts cannot understand.

Three important functions of business are – Operations, Investment and Financing. Of these three, operations functions involves day-to-day decisions known as tactical decisions whereas investing and financing decisions known as strategic decisions have long term implications. Profits can be earned or lost from any of these functions. These three functions can be tied together to identify areas where profit is earned or lost (Patel B). DuPont model is a method of analysis which does this.

The DuPont model was created in 1919 by a finance executive at E .I. du Pont de Nemours & Co. DuPont analysis is a technique that can be used to analyze the profitability of a company using traditional performance management tools. Till 1970, an important goal of financial management was maximizing Return on Assets. But after 1970s, the generally accepted goal of financial management became maximization of shareholder's wealth and therefore the focus shifted from Return on Assets to ROE. This was responsible for the induction of leverage in addition to profitability and efficiency in evaluating financial performance of firms.

DuPont Pyramid is a technique to decompose different drivers of Return on Equity. DuPont Pyramid consists of three formulas explained here under:

(a) Profit Margin / Return on Sales / Net Profit Ratio formula

= $\frac{\text{Net Profit}}{\text{Sales}}$

- Net Profit = Gross Profit (Sales – Cost Of Goods Sold)
- (-) Office and administrative expenses
- (-) Selling and distribution expenses
- (-) Income tax

Profit Margin shows operating efficiency.

(b) Asset Turnover ratio / Capital Turnover ratio / Asset use Efficiency Ratio

= $\frac{\text{Sales or Revenue}}{\text{Assets}}$

- Assets = Fixed assets (+) Current assets

OR

- Shareholder equity or Net worth
- (+) long term funds

(+) current liabilities

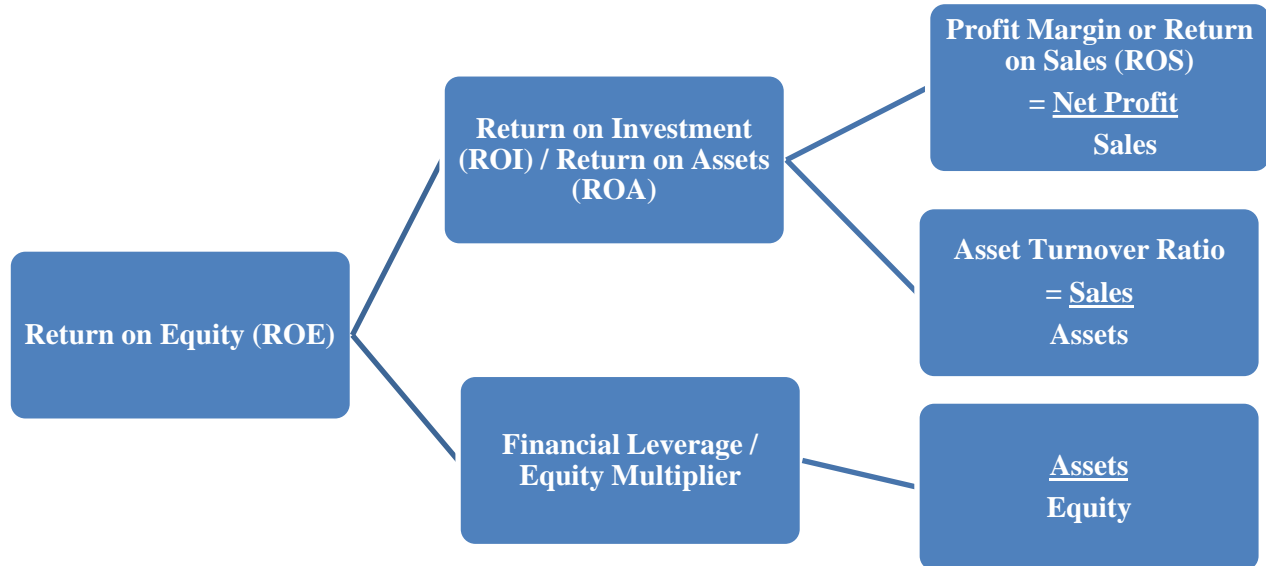
Asset Turnover ratio shows how efficiently the business is utilizing the assets which it has.

(c) Financial Leverage / Equity Multiplier

$$= \frac{\text{Assets}}{\text{Equity}}$$

Financial Leverage shows how financially leverage the business is.

Return on Equity is the product of Return on Investment / Return on Assets and Equity Multiplier. The following chart meaningfully captures interrelationship between all these ratios:



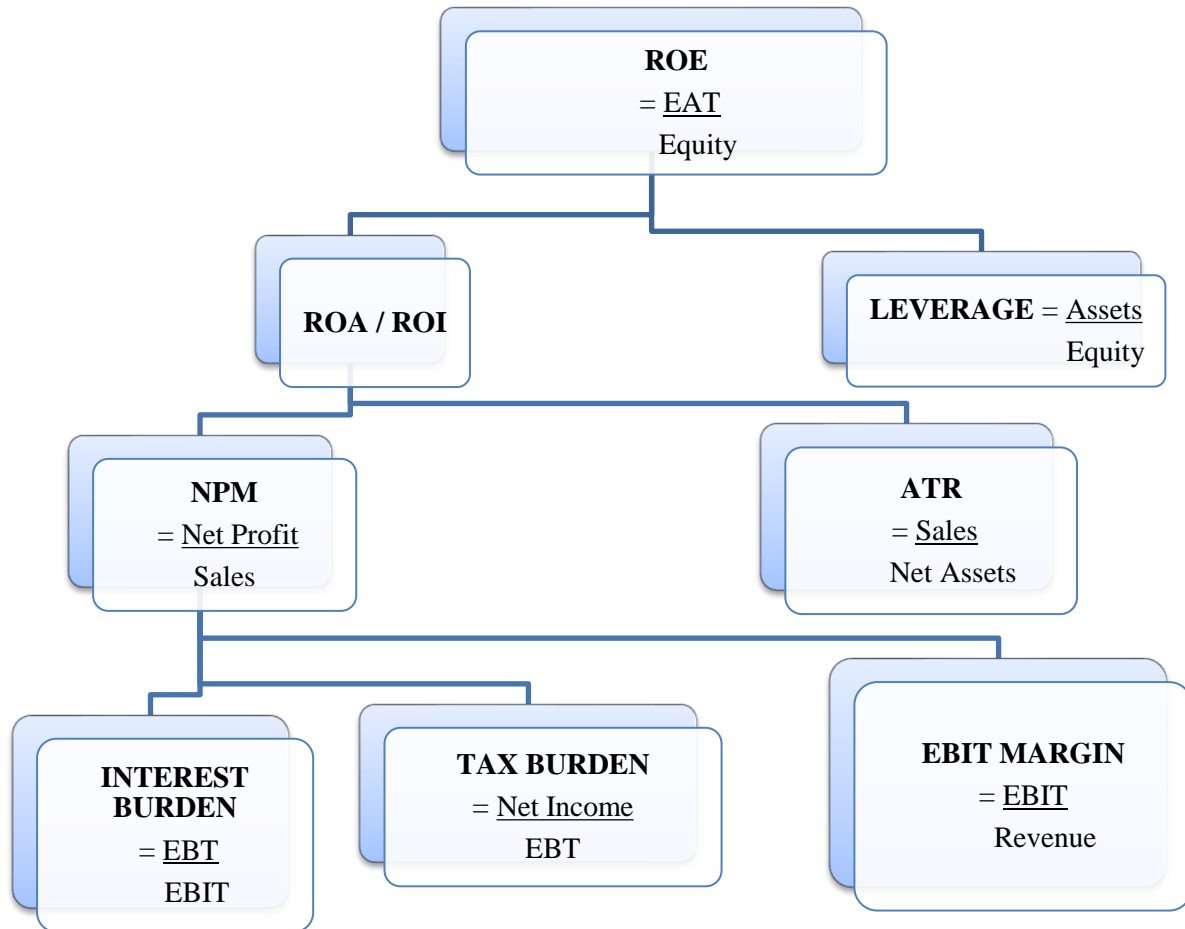
As is evident from the chart given above, the DuPont system of financial analysis clearly brings out the effect of Profit Margin and Asset Turnover on the Return on Assets (Narayanswamy).

“Really” Modified DuPont Model

In 1999, Hawawini & Viallet modified the DuPont model of 1970 to develop five step DuPont Model which considers five different ratios that are combined in such a way so as to give Return on Equity when multiplied. These five ratios are:

1. Operating Profit Margin = $\frac{\text{Earnings before Interest and Taxes (EBIT)}}{\text{Sales}}$
2. Capital Turnover = $\frac{\text{Sales}}{\text{Invested Capital}}$
3. Financial Cost ratio = $\frac{\text{Earnings before Tax (EBT)}}{\text{Earnings before Interest and Taxes (EBIT)}}$
4. Financial Structure ratio = $\frac{\text{Invested Capital}}{\text{Equity}}$
5. Tax Effect ratio = $\frac{\text{Earnings after Taxes (EAT)}}{\text{Earnings before Tax (EBT)}}$

The first two ratios in five step DuPont model capture firm’s operating decisions (which involve the acquisition and disposal of fixed assets and management of the firm’s operating assets and operating liabilities). The third and fourth ratio captures firm’s financing decision (related to the mix of debt and equity used to fund the firm’s operating decisions). The fifth ratio captures the incidence of business taxation.



Combining these five ratios, we get ROE as shown below:-

$$\text{ROE} = \left[\left(\frac{\text{EBIT}}{\text{Sales}} \right) \times \left(\frac{\text{Sales}}{\text{Invested Capital}} \right) \times \left(\frac{\text{EBT}}{\text{EBIT}} \right) \times \left(\frac{\text{Invested Capital}}{\text{Equity}} \right) \times \left(\frac{\text{EAT}}{\text{EBT}} \right) \right]$$

$$\text{ROE} = \text{EAT}/\text{Equity}$$

ADVANTAGES OF DUPONT MODEL

1. DuPont model is not only useful for assessing the efficiency of businesses but also for devising strategies for bottom line improvement (Leisz).
2. The simple DuPont model in its current form is a very powerful tool that connects firms' income statement and its balance-sheet which helps in devising easy-to-understand strategies for improving firms Return on Equity.
3. The advent of management science in a big way since 1960s made it imperative for the businesses to base their decisions taking into account their strength and weaknesses to improve overall performance of the organizations. As a part and parcel of this, microscopic financial statement analysis is considered to be of critical importance for improving the quality of decision making. DuPont model is a tool which makes such analysis possible.
4. The DuPont model allows for the identification of strategic management decisions and areas of focus while demonstrating the importance of managing the entire business system (Dodge).
5. Critical and strategic decisions like transferring management and ownership cannot be taken without considering financial performance of the firm under discussion. It is here that DuPont model comes as a great help.
6. Due to multiplicative nature of DuPont model, researchers show that the model is linear in logs and create a seemingly unrelated regression (SUR) model to demonstrate how different factors influence each ratio (Dodge).
7. A pertinent problem faced by modern joint stock companies is the one of principal-agent problem. This problem arises due to the divorce between the owners and the managers. Many methods have been devised by thinkers in the areas of management to resolve the conflict between the interest of owners and managers. A common thread emanating from most of the solutions is to link the remuneration of managers

- to the performance of the company which is measured in terms of profitability over a period of time and across the industry. It is here that DuPont model can come as handy tool to resolve the problem.
8. Financial statements reveal significant areas of strengths and weaknesses which can be captured by DuPont model and used by analysts as a compass in guiding the decision making process.
 9. DuPont model requires only a few simple calculations. It does not employ any complicated mathematical calculations.

LIMITATIONS OF DUPONT MODEL

1. DuPont analysis need not always give a very accurate result about company's performance because it completely depends on accounting data available from a company's financial statement and there is no guarantee that this data is pure. It can be manipulated as well. Over the last two decades, frauds perpetrated across big corporations throughout the world. Go on to prove the fact that even the audited reports with 'true and fair' certificate may be as good as they can be.
2. There may be problems with the DuPont decomposition which are not revealed easily. For example, decrease in one ratio may be compensated by more than proportionate increase in one ratio leading to increase in Return on Equity. But such a trend may not auger well for the company. In no way can DuPont study be a replacement for detailed comprehensive analysis. It only provides an excellent snapshot and can be a very useful starting point for analyzing profit performance of a company.
3. DuPont model does not include the cost of capital. Ignoring the opportunity cost of the deployed capital tantamount to decision making based on uncompleted information and this may be highly misleading. Contemporary business decision makers can ignore this only at the risk of taking the company the brink of insolvency.
4. The original DuPont Analysis fails to insulate the Return on Assets ratio from the effects of financing decisions.
5. DuPont Analysis is unable to locate the sources of profitability in its fullest. Directly it has no way to account for international economic factors determining the change in the trend and the magnitude of Return on Equity. Many external factors have a bearing in the functioning and profitability of firms. DuPont Analysis cannot capture these external factors.
6. A very popular framework used to understand and predict profitability of a firm is industry analysis. DuPont method does not consider any such analysis. Even top bottom approach (macro-industry-firm) used to judge the performance of particular firm remains neglected.
7. DuPont method is not at all useful for important finance functions of risk analysis and impact analysis. For these functions, one has to rely on other tools and techniques.
8. DuPont method cannot be used for predicting the future or tracing costs.
9. DuPont model lacks the means to include increasingly intangible assets in its return calculations.
10. It is quite possible that without improvement in fundamentals of business the return on investment can be increased and hence DuPont model can at times give misleading insights.

CONCLUSIONS & SUGGESTIONS

Despite its multiple limitations, DuPont method remains a very important tool to analyze the dynamics underlying profitability of firms. Although a very powerful tool, it remains neglected in the textbooks of accountancy and financial management. It only gets a cursory treatment. The research scholar is strongly of the opinion that it should be included in a full-fledged manner so that the learners can appreciate the managerial decision aspect underlying it.

SIGNIFICANCE OR CONTRIBUTION OF THE STUDY

The study has compared DuPont Model vis-à-vis other measures of profitability and has established the supremacy of the former based on a number of parameters of evaluation.

REFERENCES

- [1] Almazari A A (2012). Financial Performance Analysis of the Jordanian Arab Bank by Using the DuPont System of Financial Analysis. *International Journal of Economics and Finance*, 4(4),86-94. Retrieved from <https://pdfs.semanticscholar.org/b2fe/63fd021f06dfce1b965422537bbf3d5d07fb.pdf>
- [2] Banerjee B (2010). Accounting Ratios and Financial Statement Analysis. In *Fundamentals of Financial Management* (pp. 441-449) New Delhi, India, PHI Learning Private Limited.
- [3] Basu B K (2012). Accounting Ratios Analysis and Interpretation of Financial Statements. In *Lectures on Management Accountancy: Principles, System, and Practice* (pp. 599-603) Kolkatta, India, New Central Book Agency (P) Ltd.

- [4] Blumenthal, R. G. (1998). 'Tis the gift to be simple: Why the 80 year old DuPont model still has fans. *CFO Magazine, January, 1998*, 1-3. Retrieved from <https://www.cfo.com/banking-capital-markets/1998/01/tis-the-gift-to-be-simple-dupont/>
- [5] Chakrabarti A K (2012). Ratio Analysis. In *Cost and Management Accountancy* (pp. 1040-1041, 1047-1049) Kolkatta, India, Central Education Enterprises (P) Ltd.
- [6] David, C., Burns, J., Sale, T., & Stephan, J. A. (2008). A Better Way to Gauge Profitability: Systematic ratio analysis using the advanced DuPont model. *Journal of Accountancy, August 2008*. Retrieved from <https://www.journalofaccountancy.com/issues/2008/aug/abetterwaytogaugeprofitability.html>
- [7] Dodge, L. E. (2017). A DuPont Model Approach to Financial Management: A Case Study of Veterinary Practices. Colorado State University, Colorado, US. Retrieved from https://mountainscholar.org/bitstream/handle/10217/185727/Dodge_colostate_0053N_14547.pdf?sequence=1
- [8] Doorasamy M (2016). Using DuPont analysis to assess the financial performance of the top 3 JSE listed companies in the food industry. *Investment Management and Financial Innovations, 13*(2), 29-44. doi:10.21511/imfi.13(2).2016.04
- [9] Friedl G and Deuschinger L (2008). A Note on Economic Value Added. Retrieved from https://www.controlling.wi.tum.de/fileadmin/w00bel/www/controlling/Lehre/Vorlesungsunterlagen/S17/VBM/Friedl_Deuschinger_2008_-Note_on_EVA_081124.pdf
- [10] Isberg S C. (1998). Financial analysis with the DuPont ratio: A Useful Compass', *Credit and Financial Management Review*, Second Quarter, 1-4. Retrieved from
- [11] <https://ininet.org/financial-analysis-with-the-dupont-ratio-a-useful-compass-by-s.html>Jain
- [12] Liesz, T. (2002). Really modified Du Pont analysis: Five ways to improve return on equity. *Proceedings of the SBIDA Conference*. Retrieved from <http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.610.5026>
- [13] Liesz, T., & Maranville S. J. (2008). Ratio analysis featuring the DuPont Method: An overlooked topic in the finance module of Small Business Management and Entrepreneurship courses. *Small Business Institute Journal 1:17-34*, 18-34. Retrieved from <https://www.sbij.org/index.php/SBIJ/article/view/46/22>
- [14] Narayanaswamy R (2014). Analysing Financial Statements: Statement of Profit And Loss and Balance-Sheet. In *Financial Accounting: A Managerial Perspective* (pp. 493-496) Delhi, India, PHI Learning Private Limited.
- [15] Pandey, I M (2015). Financial Statement Analysis. In *Financial Management* (pp. 600-601). New Delhi, India. Vikas Publishing House Private Limited.
- [16] Patel B (2014). Financial Statement Analysis. *Fundamentals of Financial Management* (pp. 88-90) New Delhi, India. Vikas Publishing House Private Limited.
- [17] Soliman, M. T. (2008). The Use of DuPont Analysis by Market Participants. *The Accounting Review, 83*(3), 823-853. Retrieved from <https://pdfs.semanticscholar.org/63cc/1f839ad7056bdfe2ffd7e15ef80eba53add3.pdf>