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Dupont model: An overlooked tool to measure efficiency, effectiveness and financial performance

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Abstract
This paper attempts to indicate comprehensiveness of DuPont analysis as a measure of efficiency, effectiveness and financial performance by comparing it with other financial ratio mainly with Earning per share that measures a single aspect of the firm DuPont analysis measure the performance of the firm using Return on Equity (ROE) which is decomposed into the profit margin, asset turnover, and financial leverage or equity multiplier. As a result, these accounting ratios measure different constructs and, consequently, have different properties. This revealed that the performance of the organization could not be determined solely by profit, earnings per share, or other ratios. Thus, though Earnings per share, mostly reported in the financial reports of many organizations, the comprehensiveness of DuPont analysis, as a measure of performance is overlooked.

Keywords: dupont analysis, efficiency, effectiveness, performance, earning per share

Introduction

The Efficiency, Effectiveness, and Financial Performance

Organizational effectiveness and efficiency are crucial terms in measuring and assessing their performance (Mouzas, 2006) [22]. Organizations' performance can be defined as a combination of efficiency and effectiveness, whether they are profit-making or non-profit.

The terms efficiency and effectiveness describe performance, but, according to Jouadi & Zorgui (2014), efficiency describes optimizing resources in order to produce the best outcomes, that is, minimizing inputs and maximizing output. Conversely, the effectiveness concept emphasizes the yield of factors and the achievement of the goal, without taking into consideration the efficient utilization of resources (Alber *et al*., n.d.).

The terms might be synonymous for managers, but they each have different meanings. In his terminology, Drucker (1977) [11] defined efficiency as "doing things right" while effectiveness refers to "doing the right things." In his definition, efficiency is the ability of an organization to attain the output(s) with the lowest possible level of inputs. It is not a measure of success in the marketplace but a measure of operational excellence in resource utilization. Efficiency is primarily concerned with minimizing costs and with allocating resources to different uses (Achabal *et al*., 1984) [1]. According to Keh *et al*. (2006) [18], a measure of effectiveness evaluates an organization's ability to achieve its predetermined goals and objectives. Effectiveness is determined by how well an organization achieves its goals (Asmild *et al*., 2007) [5]. In sum, the effectiveness of an organization is the extent to which its policy objectives are achieved.

Although efficiency and effectiveness are mutually exclusive components of overall performance measures, they can influence each other. Specifically, efficiency can affect effectiveness or have an impact on effectiveness as well as overall performance (Ozcan, 2008) [23].

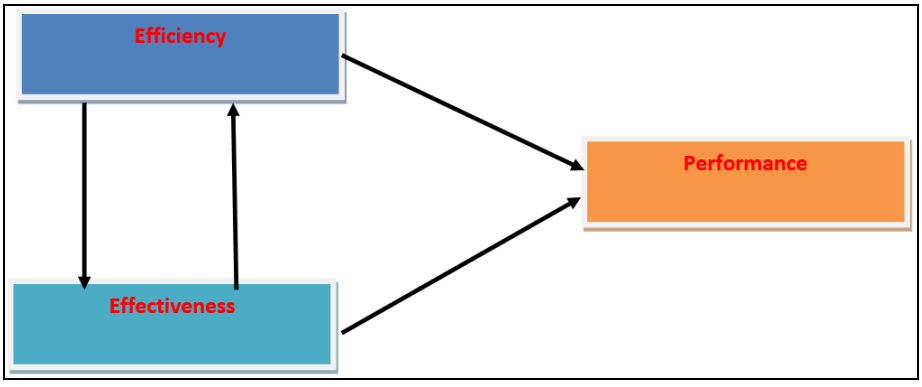

Fig 1: Relation Ship Between Efficiency, Effectiveness and Performance, Mouzas (2006) [22]

Among several methods that have been used to measure efficiency, effectiveness, and financial performance, many organizations, use the FRA (Financial Ratio Analysis) and the DuPont analysis because of their simplicity and ease of use (Arsad *et al*., 2017a) [4].

Financial Ratio Analysis (FRA)

According to Wozniewska (2008) [27], measuring efficiency, effectiveness and financial performance involves comparing ratios between several organizations and calculating numerous accounting ratios to assess the financial soundness of an organizations as well as the performance of its management.

It has been widely recognized in the literature for more than 40 years that financial ratios are widely used by financial analysts, lenders, and researchers. Ratio analysis is used to establish how two variables affect one another, and it is a valuable way for business enterprises to diagnose the financial and operational issues they have (Agala, Jadhav, and Borhade, 2014) [2]. Ratios also reveal areas that need to be investigated further. In order to guide decision-making, managers analyze financial statements and ratios. The analysis and interpretation of financial statements is a useful tool for determining a company's performance and the level of risk associated with that company. For an investor, this is pertinent and relevant information.

There are various ratios used to measure the performance, liquidity, riskiness, and profitability of a business. Among these possible indicators, the literature indicates that the most important measurement of profitability and performance is the one that is based on DuPont analysis. Demmer (2015) [9] shows how changes in profit margin can be used to predict future returns on assets, and Soliman (2008) [20] notes that DuPont components provide valuable insight into a firm's strategy. Sheela and Karthikeyan (2012) [24] in their study on Using DuPont analysis to assess the financial performance concluded that the DuPont analysis is an important tool to measure the operating performance of a firm.

Most developing and developed countries, including Ethiopia and the United States of America, require that only earnings per share (EPS)-related financial information be reported in financial statements, which indicates the dollar amount of earnings attributable to each share of the company. The calculation of a company's earnings per share is straight forward:

Earnings per share = Net income / Number of shares outstanding during reporting period

EPS is expressed in dollars per share (or whatever the reporting currency is).

Companies used the weighted average number of shares outstanding during the reporting period (the number of shares outstanding may change due to buybacks and/or stock offerings during a reporting period).

If the company has realized a net loss, rather than a net profit, the EPS can be negative. But does it mean the company has inefficient operations?

A number of financial ratios, like Earnings per Share, which is disclosed by different companies in their financial reports, incorporate the relationship between two financial figures and measure a single aspect of the business.

Thus, this literature is primarily focused on illustrating the comprehensiveness of DuPont analysis in terms of efficiency, effectiveness, and financial performance by decomposing it into its component parts.

The DuPont Analysis System

In spite of the fact that DuPont analysis can be conducted in two, three, and five ways, this article uses the three-way DuPont model to illustrate the relationship between efficiency, effectiveness, and performance.

A measure of financial performance that is based on a three-way DuPont analysis is return on equity, the components of which are net profit margin, total assets turnover, and equity multiplier (McGowan and Stambaugh, 2012) [21]. It measures Return on Equity (ROE) as a percentage of stockholder earnings relative to all equity invested. In addition, it looks at return on assets. Despite being developed in the early 1900s, this method is still widely used today. The DuPont formula differs from the usual calculation of Return on Equity since it calculates Return on Equity based on profitability (net profit margin), which measures effectiveness, asset utilization (total assets turnover), which measures efficiency, and financial leverage (debtratio). In other words, companies can use DuPont analysis to identify factors that contribute to low returns on equity. Additionally, DuPont emphasizes return on assets, which is calculated by multiplying net profit margin by total assets turnover. A company's return on assets measures how efficiently assets are utilized to generate profit for common stockholders. A company's performance can be ranked using the DuPont analysis. Well-run companies generate a high return on shareholders' investments by having the highest Return on Equity.

Furthermore, it is in the company's interest to maximize profits in order to benefit stockholders and owners. DuPont analysis allows the organization to break down the ROE into profits from sales (net profit margin), asset turnovers (asset turnovers), and leverage (debt) (Arsad *et al*., 2017a) [4].

Return on Equity using DuPont analysis is measured as follow:

DuPont Method ROE	=	**Net Profit Margin**	**X**	**Asset Turnover**	**X**	**Financial Leverage**
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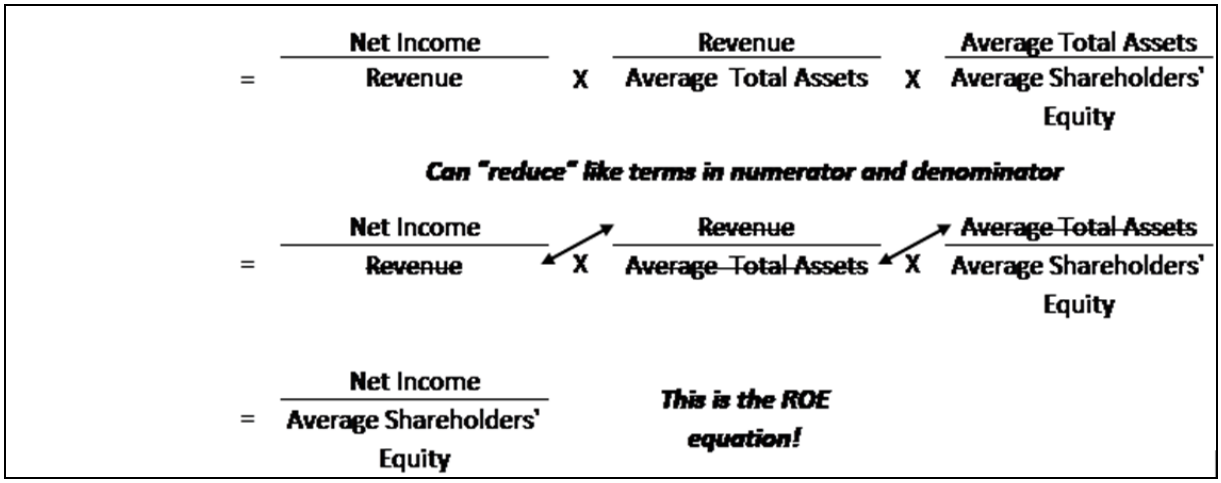

Fig 2

The DuPont method is commonly used to estimate the value of a firm, because it indicates the potential of a firm to improve profitability through more efficient use of its assets, and therefore increase shareholder returns - higher leverage is preferred by investors. Demmer (2015) [9] reports prior literature on the usefulness of DuPont disaggregation for predicting a firm's future profitability, operating income, and stock market returns and concludes that changes in profit margin provide important and relevant data on the firm's future return on assets. Furthermore, his findings indicate that the quality of DuPont components is affected by the firm's expected earnings.

Components of the Three Way DuPont Analysis System

Return on Asset (ROA)

A firm's ROA shows how well its management can generate profits from its assets. By showing the profits earned per birr of assets, the report illustrates how effectively a firm's assets are managed to generate revenues, despite the possibility that it might be skewed due to off-balance-sheet activities. It is probably the most important ratio for comparing the efficiency and operating performance of firms, as it indicates the returns generated from the assets that a firm owns (Tan *et al*., 2012) [26].

According to Hassan, (2016), firm profitability is best measured by ROA since ROA is not distorted by high equity multipliers and ROA is a better indicator of a firm's ability to earn returns on its portfolio of assets.

ROA represents the profit per dollar of assets and, most importantly, it indicates the management's ability to exploit the firm's financial and real investment resources to generate profits. Any firm's ROA depends on the firm's policy decisions as well as on uncontrollable factors such as the economy and government regulations (Hassan, 2016). It measures the firm's ability to generate income by utilizing assets at its disposal. In other words, it shows how efficient the company's resources are in generating income.

Return on Equity (ROE)

ROE is the return to shareholders on their equity. Thus, return on equity reflects a firm's ability to generate profits from its equity (Tan *et al*. 2012) [26]. As per Dietrich *et al*. (2009) [10], firms with a lower leverage ratio (higher equity) report a higher ROA but a lower ROE. However, the ROE does not consider the higher risk associated with higher leverage. Even though ROE is commonly used in different studies, it is not the best measure of profitability (Ghazouani *et al*. 2013) [12].

ROE is a financial ratio that indicates how much profit a company earned as compared to how much shareholder equity was invested or found on the balance sheet. ROE represents the return on shareholders' investments. Businesses that have a high return on equity are more likely to be able to generate cash internally. In other words, the higher the ROE, the more profit a company generates. In addition, Khrawish (2011) explained that ROE is the ratio of Net Income after Taxes divided by Total Equity Capital. It is the rate of return the firm's stockholders earn on their investment. It shows how effectively firm management uses shareholders' funds. Hence, it can be concluded from the above statement that the greater the ROE, the more effectively the management utilizes its capital.

Net Profit Margin

The net profit margin (net profits/sales) is considered to be a more meaningful measure of success representing the profit per dollar sales. Net profit margin measures the percentage of sales being converted into net profit available to shareholders and is considered a measure of effectiveness.

In summary, the DuPont model measures businesses' efficiency, effectiveness, and financial performance based on its various components as indicated below.

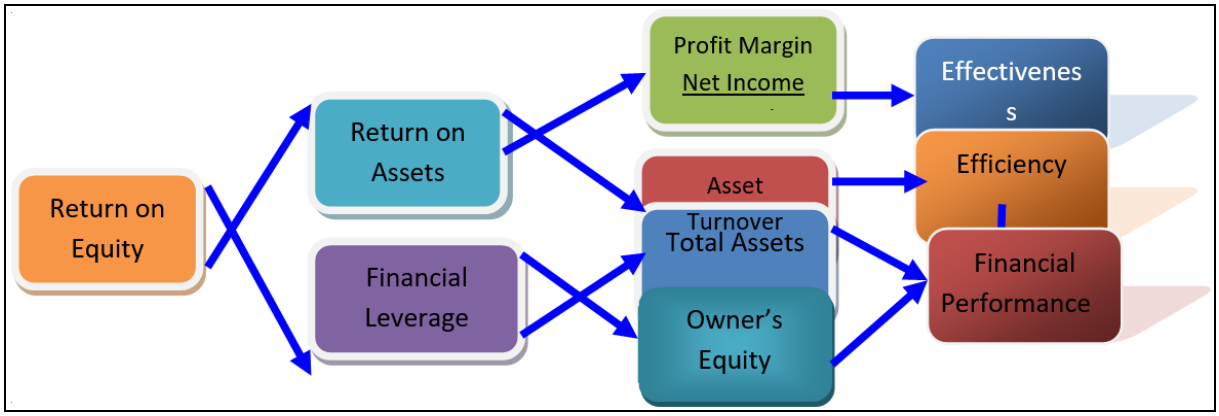

Fig 3: The three ways DuPont Model

Conclusion

The ratio analysis is one of the most commonly used tools in analyzing a business's performance. It provides information about the resources of a company and the impact they have on the business. The DuPont analysis provides a more comprehensive understanding of a firm's efficiency, effectiveness, and financial performance. In DuPont analysis, a common form of financial statement analysis, return on net operating assets is decomposed into two multiplicative components: profit margin and asset turnover, and return on equity is further decomposed into the profit margin, asset turnover, and financial leverage or equity multiplier. As a result, these accounting ratios measure different constructs and, consequently, have different properties. This revealed that the performance of the organization could not be determined solely by profit, earnings per share, or other ratios.

The DuPont analysis is a composite measure that is more comprehensive than the individual ratio measures, such as earnings per share or earnings ratio which only describe a partial aspect of performance. As a result, the expanded DU PONT-ROE model includes supply and demand factors, balance sheet and income state information and measures, efficiency, effectiveness, and financial performance simultaneously.

Thus, DuPont analysis can be used as a policy analysis tool, since it prescribes efficiency, effectiveness, and financial performance of the firm in one go. Consequently, firms should report and disclose ROE computed on the basis of DuPont analysis for different financial information users, such as analysts, shareholders, creditors, prospective investors, regulators, and financial managers in place of Earnings per share, which is mostly reported in the financial reports of many organizations, mainly financial institutions, as a measure of performance.

Contrary to EPS, return on equity is a measure of profitability: It measures how profitably the company is able to put shareholders' equity to work. ROE also reflects financing decision: How much, if at all, did the company leverage its shareholders' equity to achieve its profits? Indeed, a company's assets are typically financed through some combination of equity and debt.

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