

# The Usefulness Of Analytical Procedures, Other Than Ratio And Trend Analysis, For Auditor Decisions


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## ABSTRACT

*The International Standards on Auditing require of the external auditor to perform analytical procedures during audits. Analytical procedures range from simple to advanced, but available literature focuses on ratio and trend analysis for use in audits. This study therefore aims to analyse and compare the objective, advantages and disadvantages of selected analytical procedures other than ratio and trend analysis (Du Pont, Economic Value Added<sup>TM</sup> (EVA), Altman's Z-score and Benford's Law) in an external auditing context by means of a qualitative literature analysis. Findings indicate that further analytical procedures significantly compliment ratio and trend analysis during audits, specifically during going concern evaluations and identifying error and fraud. Du Pont, Altman's Z-score and Benford's Law is found to be of particular value to the auditor, due to its cost benefit. EVA is found to be impractical to utilise by the auditor if not implemented by the entity. The study is an important contribution to the literature on analytical procedures as it is the first of its kind to analyse the objective, advantages and disadvantages of analytical procedures other than ratio and trend analysis in an external auditing context.*

**Keywords:** Analytical Procedures; Auditor Decisions; ISA 520; Ratio and Trend Analysis; Du Pont; Economic Value Added<sup>tm</sup>; Altman; Benford's Law

## 1. INTRODUCTION

 Financial statements are prepared to provide information to its users to assist decision making through financial analysis. Babalola and Abiola (2013) defined financial analysis as a specialty in accounting aimed at formulating a diagnosis and prognosis relative to the situation and financial performance of a company or an organization.

Lovata and Costigan (2002) stated that the principal objective of management is to increase shareholder wealth. This will be the result of appropriate actions taken at the correct time due to proper decisions being made. Financial statement analysis is considered by Babalola and Abiola (2013) to be an important and integral part of business analysis by evaluating available information about an entity's financial situation, its management, its plans and strategies, and its business environment. Over and above the information about a company's current state of affairs that financial analysis provide, Alani and Matarneh (2013) believe that it may provide details about a company's future as well. They displayed a statistically functioning relation between analytical procedures currently in use in practice and the ability to identify early prediction warnings about companies before bankruptcy. Analytical procedures therefore have the potential to provide critical information in order to evaluate past and current performance, as well as to identify forewarnings about an entity in order to take appropriate actions.

Management represents the entity's financial information in its financial statements. The information apparent from the financial statements, are then available to the external auditor (auditor) for evaluation. Auditors interpret financial information of companies in order to fulfil their role: to express an opinion about whether the financial statements as a whole are free from material misstatement, due to fraud or error, as per International Standard on Auditing (ISA) 200 paragraph 11 (SAICA, 2013). Due to the role of an auditor, analytical procedures have been

observed to be particularly useful during audits in the identification of errors, and especially fraud (Green & Calderon, 1994).

ISA 520 (SAICA, 2013) requires of the auditor to make use of analytical procedures during the planning and conclusion phase of the audit, and provides guidance to auditors in employing analytical procedures during the execution phase of the audit.

Fung (2010) explained that analytical procedures' role during planning is to obtain an understanding of the business and its environment, for example financial performance relative to prior years and relevant industries. Significant fluctuations between unaudited results and expected results also help auditors to focus planned procedures on high-risk areas (Glover, Jiambalvo, & Kennedy, 2001). During the execution phase, Fung (2010) found that the nature of analytical procedures often provide evidence for numerous assertions, highlights seemingly unapparent audit issues, and focuses auditors' attention to areas requiring further investigation. He stated that deficiencies in internal control may also become apparent with the execution of analytical procedures, which may cause an auditor to revisit the audit approach.

When nearing the end of the audit, ISA 520 (SAICA, 2013) requires the auditor to perform analytical procedures in order to assist the auditor when forming an overall conclusion on the financial statements in order to assess whether the financial results are in line with the auditor's understanding of the entity.

Analytical procedures have long been used as an appropriate way to produce audit evidence in a cost effective way. Blocher and Patterson Jr. (1996) found that due to competitive market pressures for audit services, auditors continually reconsider the efficiency of audit procedures "while maintaining the overall effectiveness of the audit plan". Originally, analytical procedures were employed to save both audit cost and time, but the focus has since evolved from using these procedures for audit efficiency, to using it to enhance audit effectiveness (Green & Calderon, 1994; Samaha & Hegazy, 2010). Currently, there is a tendency in practice to increase reliance on analytical procedures (Tandy, 2011). Nonetheless, studies have found that auditors are still reluctant to use these procedures, especially amongst non-Big 4 audit firms and auditors in lower ranks and positions (Samaha & Hegazy, 2010), indicating that the lack of confidence in the use of analytical procedures may be due to the auditor's lack of knowledge and experience thereof.

ISA 520 (SAICA, 2013) states that the type of analytical procedures to employ is left to the auditor's professional judgment, and acknowledges that different types provide different levels of assurance. The auditor is therefore expected to select a type of analytical procedure based on the nature of the assertion and the assessed risk of material misstatement, within the definition thereof:

*"evaluations of financial information through analysis of plausible relationships among both financial and non-financial data. Analytical procedures also encompass such investigation as is necessary of identified fluctuations or relationships that are inconsistent with other relevant information or that differ from expected values by a significant amount."*

However, studies have found that accountants still rely on inappropriate analytical procedures to detect errors or fraud, disregarding the proven inefficiency thereof, due to a lack of firm resources to introduce proper analytical procedures (Bierstaker, Brody, & Pacini, 2006). This was specifically found to be true in the case of WorldCom in the early 2000's where major fraud was revealed after going undetected by auditors. Hitzig (2004) explained that the WorldCom fraud remained concealed due to management manipulating figures to normal expectation, where the actual figures varied significantly.

It is submitted that effective analytical procedures will assist the auditor to (1) gain an understanding of an entity and its industry, (2) identify risk areas, (3) gather audit evidence, and (4) substantiate the financial results with the understanding of the entity in order to identify any previously overlooked risks. The auditor can therefore benefit substantially from using analytical procedures (Alani & Matarneh, 2013; Dănescu, Spătăcean, Nistor, & Dănescu, 2010; Holmes & Mergen, 2011). However, several studies also seriously warn against the misuse of analytical

procedures as this may lead to inappropriate conclusions on which to base further action (Bierstaker et al., 2006; Hitzig, 2004; McLean & Coffman, 2004).

One of the reasons for misusing analytical procedures may be the suitability of the analytical procedure applied by the auditor as per ISA520 paragraph 5(a) (SAICA, 2013). Busta and Weinberg (1998) indicated that auditors focus on ratio and trend analysis when conducting analytical procedures. It is submitted that an improved understanding of further analytical procedures available, may lead to application of effective analytical procedures during the audit, thereby enhancing audit quality.

In order to address this, this study was set out in eight sections. Section two provided the problem statement, followed by the objective and the research methodology. The importance and role of analytical procedures have been described in the introductory section, and therefore section five continued to highlight the most common analytical procedures discussed in literature for use in audits, where after these and further analytical procedures are described. Section seven also compared the further analytical procedures' uses, advantages and disadvantages in the auditing context. Finally, concluding remarks, limitations and recommendations of the study were included.

## **2. PROBLEM STATEMENT**

Although auditors widely apply analytical procedures, they do not apply analytical procedures to the full value of the capabilities that can be attributed to decision making. This is due to limited and inappropriate analytical procedures being applied. There is insufficient guidance on different types of analytical procedures to be applied by the auditor. The standard analysis is limited to trend analysis and ratio analysis in auditing decision making, based on financial statements presented to a spectrum of users. It is submitted that the reluctance to make use of further analytical procedures includes inexperience and a lack of knowledge due to limited literature on the subject.

## **3. PURPOSE OF THIS STUDY**

The main purpose of this study will be to provide guidance on further types of analytical procedures, other than ratio and trend analysis, for auditor decision making. This will enable the identification of error and fraud, as well as warning signs for companies heading for problems or predicting the future survival of a company. Therefore, it will be necessary to:

- Identify the most common analytical procedures for auditors discussed in literature
- Identify further analytical procedures that may be employed by the auditor
- Comparing the further analytical procedures' uses, advantages and disadvantages if employed by the auditor

## **4. RESEARCH METHODOLOGY**

The study was largely confined to a qualitative analysis and the scope of additional analytical procedures was limited to Du Pont, Economic Value Added<sup>TM</sup> (EVA) Altman's Z-score and Benford's Law financial analysis methods. The focus on Du Pont, EVA and Altman's Z-score is due to their importance in university syllabuses and are probably the most frequent used structured ratio analysis (Correia, Flynn, Uliana, & Wormald, 2011). Benford's Law is often used to identify accounting fraud (Clippe & Ausloos, 2012).

The sources of this study were publicly available sources on academic commentators' perspectives, peer reviewed journals, as well as the International Standards on Auditing. The literature review was used to analyse the different types of analytical procedures available to the auditor to assist with decision making. The research further included a study of secondary data in order to identify analytical procedures of auditors commonly discussed in literature, and it supported findings of further analytical procedures available to the auditor. The analysis conducted contributes a comparison between the uses, advantages and disadvantages of the different analytical procedures available to the auditor.

## 5. DETERMINING THE COMMON TYPES OF ANALYTICAL PROCEDURES AVAILABLE TO THE AUDITOR

A literature search was conducted, using Google Scholar and other academic databases, of academic articles to verify the types of analytical procedures commonly included in literature. Taking into account the auditor's role, the following articles were identified (Table 1). As is clear from Table 1, most analytical procedure types focused on either trend or ratio analysis.

Out of the applicable articles concerning financial analysis methods commonly employed by the auditor, 91 percent focused on ratio and trend analysis. Ratio and trend analysis will be elucidated in section 6.1. 55 percent of the articles included reasonableness tests along with the ratio and trend analysis. A reasonableness test is where client operating data and relevant external data is used to develop an expectation of a balance or item, in accordance with ISA 520 (Blocher & Patterson Jr., 1996), and is therefore submitted to form part of ratio and trend analysis and will not be detailed separately. It was not until Du Pont, EVA, Altman's Z-score and Benford's Law financial analysis methods were specifically searched for, that articles related to these financial analysis methods, were identified.

These findings are further highlighted in Table 2 where Google Scholar searches were conducted on the different types of analytical procedures available to the auditor for the period after 2000. As is clear from Table 2, most studies focus on either ratio or trend analysis, with substantially less available literature on Du Pont, Altman's Z-score, and Benford's Law. Surprisingly, the EVA search indicated similar numbers than that of ratio and trend analysis. Still, findings of both tables indicate a gap in literature in the variety of financial analysis methods available to the auditor.

**Table 1.** Summary of 11 articles that dealt with analytical procedures associated with auditing.

Analytical Procedures Used in Financial Statement Analysis				
Auditor(s)	Ratio Analysis	Trend Analysis	Reasonableness Test	Other (Specified)
Blocher and Patterson Jr. (1996)	✓	✓	✓	Regression Analysis <sup>1</sup>
Choo, Chua, Ong, and Tan (1997)	✓	✓	-	Visual scanning of data
Colbert (1994)	✓	✓	✓	
Dănescu et al. (2010)	-	-	-	Altman's Z-score
Dittenhofer (2001)	✓	✓	-	Regression Analysis and Least Squares Method <sup>2</sup>
Fung (2010)	✓	✓	✓	
Mejia (2012)	✓	✓	-	
Green and Calderon (1994)	✓	✓	✓	
Pike, Curtis, and Chui (2013)	✓	✓	✓	
Samaha and Hegazy (2010)	✓	✓	-	
Tandy (2011)	✓	✓	✓	
<b>Total</b>	<b>10</b>	<b>10</b>	<b>6</b>	<b>4</b>

Source: Own research

**Table 2.** Results of Google Scholar searches conducted to highlight the most common analytical procedures available to the auditor since 2000.

Wording on Google Scholar Search	"Ratio analysis" and "auditor"	"Trend analysis" and "auditor"	"Reasonableness test" and "auditor"	"Du Pont Analysis" <sup>3</sup> and "auditor"	"Economic Value Added" <sup>TM</sup> and "auditor"	"Altman's Z-score" and "auditor"	"Benford's Law" and "auditor"
Number of Findings	1740	1890	166	28	1880	160	272

Source: Own research.

<sup>1</sup> Not to be detailed separately, as regression analysis is considered another commonly used trend analysis method (Choo et al. 1997).

<sup>2</sup> The Least Squares Method is similar to the regression analysis (Dittenhofer, 2001) and will therefore not be detailed separately.

<sup>3</sup> "Du Pont Analysis" is used instead of "Du Pont" as most searches related to "Du Pont" is on the Du Pont Company.

It is submitted that available literature on analytical procedures available to the auditor focus on ratio and trend analysis, without consideration of other, sometimes more applicable, analytical procedures. The section below will therefore shortly discuss the most common types of analytical procedures available to the auditor: ratio and trend analysis. Further analytical procedures available to the auditor will be briefly discussed thereafter.

## **6. COMMON TYPES OF ANALYTICAL PROCEDURES AVAILABLE TO THE AUDITOR**

Literature indicated ratio and trend analysis as the most common types of analytical procedures in an auditing environment, which is presented in Table 1. The use and role of ratio and trend analysis will therefore be discussed in the following section, as well as its shortcomings.

### **6.1 Ratio and Trend Analysis**

Merriam-Webster (2015) defined a ratio to be “the relationship that exists between the size, number, or amount of two things”. Ratios are typically used to disclose relationships and provide expressive comparisons (Business Dictionary, 2015). Ratio analysis is defined as the systematic use of ratios to determine the strengths and weaknesses, as well as the historic and current financial condition of a company (Sahu & Charan, 2013). Trend analysis is when calculated ratios are compared to that of prior periods in order to assess the progress of a company (Gitman & Zutter, 2011).

Financial ratio analysis assists in providing information on a company’s financial position, the effective use of assets, as well as gearing, which can be used to determine whether the company has improved from the previous years, and also whether a company is robust in relation to a similar company (Monea, 2009). It reveals profitability, liquidity, activity ratios, and financing and debt burden ratios of companies that is of interest to entities’ stakeholders, including management and the auditor, and is considered to be one of the most popular and widely used tools of financial analysis (Babalola & Abiola, 2013).

Gitman and Zutter (2011) found that the most informative approach to ratio analysis is when the cross-sectional analysis (when an entity’s ratios are compared to a similar company in the same industry, e.g. a competitor) is combined with a time-series analysis (which evaluates performance over time). This makes it possible to evaluate the trend in the ratio of an entity in comparison with the trend for the industry.

Potential advantages of ratio and trend analysis if employed by the auditor:

- It is easy to employ and cost effective.
- Information on the calculation and interpretation thereof is widely available (Correia et al., 2011; Drury, 2012; Gitman & Zutter, 2011).

Potential disadvantages of ratio and trend analysis if employed by the auditor:

- Its role is often misunderstood and therefore overestimated, as ratios have been found to be easily manipulated. For example, in order to reduce a defective product ratio, the definition of what a defective product is, can be changed. Therefore, any attempt to influence the numerator or denominator of a ratio, may influence decisions (Holmes & Mergen, 2011).
- It has been found to be ineffective in detecting fraud (Hitzig, 2004).
- It tends to over predict business failures (Poston, Harmon, & Gramlich, 2011).
- McLean and Coffman (2004) also established that a lack of contextual information, may lead to misleading or even destructive ratios.
- It is backward looking.
- It does not provide a holistic view of an entity’s financial health.
- When performing trend analysis and comparing year-on-year bad and worse results, the bad can appear to be good.

Even though ratio and trend analysis have been found useful by the auditor, it is submitted that these ratios provide limited information about only specific financial health indicators of a company. It has to be noted that a ratio analysis in itself provides no additional information, but merely condenses the existing information into index figures. Additional information only becomes evident when the ratios are interpreted. Several ratios need to be considered in aggregate even when purely considering one financial indicator such as liquidity.

Considering the weaknesses of ratio and trend analysis, it is noted that auditors still primarily focus on this method of financial analysis as it is a cost and time effective tool (Samaha & Hegazy, 2010), and due to a lack of knowledge of other methods available (Bierstaker et al., 2006). Therefore, complementary financial analysis methods were evaluated and are briefly discussed below. Some of the methods discussed below incorporates ratio and trend analysis, but provides a more lucid representation of specific financial health indicators.

## **7. FURTHER ANALYTICAL PROCEDURES AVAILABLE TO THE AUDITOR**

It is agreed that ratio and trend analysis are informative tools to the auditor, but they have significant limitations. The following section will therefore discuss some of the most common and reliable complementary financial analysis methods, limited to: (1) Du Pont, (2) EVA, (3) Altman’s Z-score, and (4) Benford’s Law.

### **7.1 Du Pont**

For almost a century, analysts and educators have applied the Du Pont model for financial analysis, as it is considered to be an enduring and elegant model that provides insight into return on equity (ROE) (Little, Little, & Coffee, 2009). It is referred to as structured analysis as several ratios are combined in order to provide an overall picture of a company (Correia et al., 2011; Skae et al., 2012). The Du Pont analysis calculates ROE by encompassing several ratios related to income, activity and capital structure (Correia et al., 2011):

$$\text{ROE} = \text{ROA} \times \text{FLM}$$

Where:

ROA = Return on Assets (Net Profit Margin x Total Asset Turnover), which reflects the entity’s income and activity

FLM = Financial Leverage Multiplier (Total Assets / Ordinary Equity), which reflects the entity’s capital structure

The Du Pont model employs return on equity (ROE) as the main diagnostic tool while categorising it into three parts: (1) operational efficiency, by measuring the profit margin, (2) asset use efficiency, by measuring total asset turnover, and (3) financial leverage, by measuring the equity of financial leverage multiplier (Skae et al., 2012).

The Du Pont model can therefore supply the auditor with valuable information about the financial wellbeing of an entity. Unexpected fluctuations in the model could also signal misstatements in the financial statements due to error or fraud, which could form part of the risk assessment process in order to determine the audit response thereto. A decrease in ROE could also flag profitability and solvency problems, which is useful as a comparison against management’s assessment of the company’s going concern.

Potential advantages of Du Pont if employed by the auditor:

- It does not require extensive experience in computers or in analytical methods, and is therefore easy to implement and use (Laitinen, 1999).
- As it provides a holistic evaluation of a company, it is superior to simple ratios, overcoming the problem of being one dimensional (Kusi, Ansh-Adu, & Agyei, 2015).

Potential disadvantages of Du Pont if employed by the auditor:

- As it purely employs ratios, it can be argued to still be purely backward looking.

Du Pont is a non-complicated method of achieving a broader view of an entity's financial health. It is submitted that it will be cost effective to implement by auditors and may assist with the identification of misstatements. Du Pont may also provide information specific to the going concern ability of the entity. The outcome of the Du Pont analysis can easily be compared to the results of a ratio and trend analysis.

## **7.2 EVA**

The EVA model both maximizes the net present value of a firm and evaluates current year performance and is considered to be a measurement of management performance that better aligns the incentives of management to that of shareholders (Lovata & Costigan, 2002). Studies have shown that EVA is more advanced than ROA and other financial ratios in terms of performance measurement (Ross, Westerfield, & Jaffe, 2009), and therefore enhances the evaluation process (Poll, Booyse, Pienaar, Büchner, & Foot, 2011).

EVA follows from the old concept, known as super profits, where the cost of capital is deducted from reported profits. EVA is simply earnings after capital costs (Ross et al., 2009), and is calculated as follows:

$$\text{EVA} = \text{ATOI} - [\text{WACC} \times (\text{TA} - \text{CL})]$$

Where:

ATOI	=	After-tax Operating Income
WACC	=	Weighted Average Cost of Capital
TA	=	Total Assets
CL	=	Current Liabilities

Correia et al. (2011) stated that managers of large companies such as Coca-Cola and Briggs and Stratton, use the assessed impact of EVA to guide decision making. The formula of EVA does not specifically include financial ratios, but still considers certain financial relationships (income, assets and liabilities) and is therefore somewhat relatable to ratio analysis. It however incorporates the weighted average cost of capital, which common ratio analysis formulas exclude, providing a unique method to evaluate company performance in order to align shareholder and management incentives.

If an entity has implemented EVA as part of decision making, the auditor may use it as a tool to deepen an understanding of the entity and its environment through an in-depth understanding of the entity's strategy. A drop in EVA could highlight inefficient operations leading to a risk to the company's going concern ability, which is notable to the auditor.

Potential advantages of EVA if employed by the auditor:

- The result of applying EVA is stark as it is either positive or negative. This provides a strong motivation for liquidating certain divisions (Ross et al., 2009), providing the auditor with indications of going concern risks.
- EVA provides the opportunity to address problems in the company before insolvency (Palliam, 2006), and it can therefore serve as a method to provide enhanced service by auditors.

Potential disadvantages of EVA if employed by the auditor:

- EVA is costly to implement (Tortella & Brusco, 2003; Van der Poll, Booyse, Pienaar, Büchner, & Foot, 2011) and is not suitable for all organisations and industries (Van der Poll et al., 2011). It will therefore only be cost effective for the auditor if the entity has already implemented EVA.
- EVA is difficult to understand and is therefore misunderstood (Van der Poll et al., 2011).
- EVA is not considered to be superior to simple metrics as its effectiveness, stability, validity and reliability is questioned (Biddle, Bowen, & Wallace, 1998; Palliam, 2006).

Although EVA may be beneficial if the method is already implemented by the entity under audit, it is impractical to implement otherwise, especially as the reliability thereof is questioned. EVA can be used by the auditor as an additional metric to compare to other analytical procedures, especially with regards to the risk assessment process and going concern considerations, but should not carry more weight.

### **7.3 Altman's Z-score**

Many factors contribute to a company's success or failure. The principal factor is the amount of long- and short-term debt employed by an entity to finance its operations, as increased debt leads to increased risk (Skae et al., 2012). Altman developed the best known financial distress model that provides a discriminant function that classified companies as either failed or successful (Correia et al., 2011). Even though it was developed in 1968, it remains a commonly used tool for assessing companies' financial health (Grice & Ingram, 2001). Altman's Z-score is set out below:

$$Z = 1.2X1 + 1.4X2 + 3.3X3 + 0.6X4 + 1.0X5$$

Where:

- $X1$  = Working Capital/Total Assets
- $X2$  = Retained Earnings/Total Assets
- $X3$  = Earnings before Interest and Taxes/Total Assets
- $X4$  = Market Value of Equity/Book Value of Total Liabilities
- $X5$  = Sales/Total Assets

Altman determined that companies with a Z-score above 2.99 were unlikely to fail, a Z-score of lower than 1.81 indicated a likeliness to fail, but the section in between remained uncertain (Correia et al., 2011). Ratio analysis is incorporated into this business failure prediction model.

Altman's Z-score may provide the auditor with an objective tool to evaluate a company's going concern ability, an exercise that depends significantly on professional judgment.

Potential advantages of Altman's Z-score if employed by the auditor:

- Altman's Z-score is more than 80 percent accurate (Zaabi, 2011).
- Altman's Z-score is a standard benchmark to identify financial distress indicators as it is not sensitive to the type of financial distress (Grice & Ingram, 2001) and is therefore also useful in predicting loan default problems (Olson, Delen, & Meng, 2012).
- The model enables the prediction of potential distress of firms, and using it for successive years can highlight the area of deterioration in an entity. It therefore enables management time to address the causes of distress (Zaabi, 2011), enabling the auditor to provide a value added service.



Potential disadvantages of Altman's Z-score if employed by the auditor:

- It does not capture all considerations of corporate solvency (Zaabi, 2011).
- The model is better suited for some industries than others, including non-manufacturing firms and non-public firms (Zaabi, 2011). Different approaches to the model have however led to methods that can be applied to different countries/industries (Bandyopadhyay, 2006).

Altman's Z-score is an accurate method of verifying the auditor's assessment of an entity's going concern ability. It is found particularly useful as it highlights the areas of concern to be addressed by management before insolvency is necessitated. Although there is not a one-size-fits all model, literature indicates a variety of formulas available to best suit a particular industry.

#### **7.4 Benford's Law**

Benford's Law is typically utilised as a test about potential accounting misconduct (Clippe & Ausloos, 2012). Deviations from the expected Benford's Law digit distribution may indicate a higher likelihood of human interaction (Drake & Nigrini, 2000; Henselmann, Scherr, & Ditter, 2013).

These deviations could effectively point the auditor to areas that may be materially misstated due to error or fraud for further investigation, which will be especially useful during the risk assessment process of an audit.

Potential advantages of Benford's Law if employed by the auditor:

- Benford's Law is one of the most efficient and effective manners of detecting fraud (Bierstaker et al., 2006), detecting approximately 68 percent of contaminated data (Busta & Weinberg, 1998).
- Benford's Law is a simple and effective tool for the identification of suspect accounts for further investigation (Durtschi, Hillison, & Pacini, 2004; Nigrini & Mittermaier, 1997).
- Benford's Law is cost effective (Kellerman, 2014).
- The model can be applied to large volumes of data (Kellerman, 2014).
- Simple analytical procedures tend to focus fraud detection on one-off, large amounts, whereas Benford's Law is also effective in detecting small frauds over extended periods, that are hard to detect (Busta & Weinberg, 1998; Kellerman, 2014).
- Benford's Law provides a unique method from which to investigate data as it is independent of the number's relationship to other data (Busta & Weinberg, 1998).
- In contradiction to traditional analytical procedures, Benford's Law is not sensitive to contamination, as it does not consider "the time period of the data, the location of the manipulation" (Busta & Weinberg, 1998).

Potential disadvantages of Benford's Law if employed by the auditor:

- Accounts identified by Benford's Law as non-conforming do not prove the existence of fraud, but merely serve as an indication thereof (Kellerman, 2014). The results should therefore be interpreted with care (Durtschi et al., 2004) and complementary accounting techniques should be considered before concluding whether records are forged (Clippe & Ausloos, 2012).
- The model can only be applied to accounts conforming to Benford's distribution and not, for example, numbers influenced by human thought, or numbers with limits (Durtschi et al., 2004; Kellerman, 2014).
- Benford's Law will also not be able to detect fraud of transactions not recorded, or duplicate transaction information, such as two employees sharing the same address (Durtschi et al., 2004).
- The analysis does not detect all types of fraud (Durtschi et al., 2004).
- Benford's Law is inappropriate for samples as its accuracy increases with the size of the data set (Kellerman, 2014).

Benford’s Law is considered an appropriate tool to identify error or fraud, and incorporates digital analysis in contradiction to financial ratios. Because of its unique analysis procedure, it serves to complement traditional analytical procedures (Busta & Weinberg, 1998). Although it can only be applied in certain circumstances, it remains a cost effective and reasonably accurate method of identifying hard-to-find fraud.

**7.5 Summary of Further Analytical Procedures’ Uses, Advantages and Disadvantages if Employed by the Auditor**

Several further analytical procedures to assist the auditor with decision making were discussed in section seven. The different objectives of these procedures are summarised from the literature review in Table 3. Objectives that management may achieve from these analytical procedures are added, in order to aid the auditor’s understanding of the assertions represented by management in the financial statements.

**Table 3.** Summary of the objective, advantages and disadvantages of further analytical procedures as confined, available to the auditor.

	<b>Du Pont</b>	<b>Economic Value Added™</b>	<b>Altman’s Z-score</b>	<b>Benford’s Law</b>
<b>Objective of procedure</b>	All-inclusive assessment of a company’s financial health	Evaluate shareholders’ wealth	Prediction of a company’s success or failure	Identifies human interaction in financial results
<b>Use for Management</b>	Assessing overall financial health over time	Evaluate management’s performance in relation to shareholders’ incentives	Identifying financial distress indications in order to rectify this	Identifying fraud or error
<b>Use for Auditors</b>	During the risk assessment process and going concern assessment	During the risk assessment process and going concern assessment	Assessing going concern assumption	Identifying fraud or error throughout audit
<b>Potential Advantages for the Auditor if the Procedures are Employed</b>	<ul style="list-style-type: none"> <li>• Easy to implement.</li> <li>• Provides a holistic view of a company.</li> </ul>	<ul style="list-style-type: none"> <li>• Stark in indicating liquidation.</li> <li>• Provides proactive information.</li> </ul>	<ul style="list-style-type: none"> <li>• Very accurate.</li> <li>• Not sensitive to the type of financial distress.</li> <li>• Provides proactive information.</li> </ul>	<ul style="list-style-type: none"> <li>• Very simple and accurate.</li> <li>• Cost effective. Applicable to large data sets.</li> <li>• Able to detect commonly undetected fraud.</li> <li>• Independent of the information’s relationships with other data.</li> <li>• Not easily contaminated.</li> </ul>
<b>Potential Disadvantages for the Auditor if the Procedures are Employed</b>	<ul style="list-style-type: none"> <li>• Backward looking.</li> </ul>	<ul style="list-style-type: none"> <li>• Costly to implement.</li> <li>• Difficult to understand.</li> <li>• May not be highly valid and reliable.</li> </ul>	<ul style="list-style-type: none"> <li>• Does not capture all insolvency factors.</li> <li>• Not applicable to all industries.</li> </ul>	<ul style="list-style-type: none"> <li>• Indicative of fraud, and not conclusive.</li> <li>• Not applicable to non-conforming data sets, or samples.</li> <li>• Cannot detect fraud of unrecorded or duplicate information.</li> <li>• Does not detect all types of fraud.</li> </ul>

It is clear that the further analytical procedures as well as ratio and trend analysis, have different objectives and illustrate different financial health indicators. Several studies indicate that one financial data analysis method only *corroborates* a company's financial health and position and complementary analysis and interpretation is necessary (Clippe & Ausloos, 2012; Poston et al., 2011). It is therefore submitted that a variety of complementary analytical procedures should be used in order to obtain a complete picture of a company's financial health reflected in financial statements. It is also emphasised that deviations from the norm are a mere indication of a *possibility* of a problem, which have to be substantiated with further analysis (Gitman & Zutter, 2011).

It is therefore suggested that suitably complementary analytical procedures should be considered in aggregate, depending on the objective of the auditor, in order to properly interpret a company's financial position and to make relevant decisions based thereon.

## 8. CONCLUSION

The study evaluated the objective, advantages and disadvantages of a variety of analytical procedures during decision making on financial statements by the auditor. Analytical procedures remain a useful tool in order to evaluate past and current company performance, predicting business failures, and identifying errors and fraud in financial statements which assists the auditor in decision making. Even though several literature studies provide guidance on numerous financial analysis methods, it was found that literature regarding analytical procedures available to the auditor was mostly limited to the use of ratio and trend analysis. Further research identified supplemental analytical procedures available to the auditor that would complement ratio and trend analysis. The suggestion to increase the use of these additional analytical procedures is supported by Busta and Weinberg (1998) .

It is therefore suggested that the auditor consider supplementing normal analytical procedures with additional procedures, including Du Pont, EVA, Altman's Z-score and Benford's Law. These analytical procedures may flag areas of potential misstatement in the financial statements during the risk assessment process. Du Pont, Altman's Z-score and Benford's Law is found to be of particular value for the auditor, taking into account the cost benefit thereof. Du Pont and Altman's Z-score may assist the auditor with the evaluation of the entity's going concern ability, whereas Benford's Law promises to signal errors and fraud in the financial statements. EVA is found to be impractical to utilise by the auditor if not implemented by the entity, and its value is questionable.

This study focused on a literature review, and it is submitted that an empirical review may provide a comprehensive view of the level to which auditors make use of different analytical procedures. Further studies may also include under which circumstances these further analytical procedures identified would be useful to the auditor, taking into account the cost benefit thereof.

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