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Effect of a CEO's age on the financial legitimacy of a Johannesburg Stock Exchange listed organisation

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Effect of a CEO's age on the financial legitimacy of a Johannesburg Stock Exchange listed organisation

A research proposal submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Business Administration

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ABSTRACT

This research report evaluates the effect of CEO age in relation to an organisation's financial legitimacy in respect of 110 Johannesburg Stock Exchange listed organisations for the 2016 period. This quantitative based research report, evaluates an investor's propensity for risk and financial legitimacy through the assessment of variables relating to 1] behavioural science; 2] financial performance and 3] market reaction. Consistent with prior research, it's hypothesised that organisations with older CEOs are less likely to experience financial statement restatements and volatility in the share price.

Contrary to prior American based research, the results of this research infer that the alternative hypothesis holds true i.e. that within a South African listed context, CEO age is statistically insignificant in relation to an organisations financial legitimacy. Results of this research report shows the alternative hypothesis holds true i.e. CEO age is insignificant in relation to financial statement restatements. Furthermore return on assets [variable ROA, P-value <0.05 i.e. 0.0006*] and company age [variable CoAge, P-value <0.05 i.e. 0.0372*] are both significant variables in relation to evaluating the share price volatility in respect of South African based listed organisations. The results therefore affirms that investor confidence is entrenched in an *organisation's financial legitimacy* which is largely dependent on 1] *financial performance* [ROA] and 2] *going concern* [ROA and CoAge].

DECLARATION

I, *Nicole Forbes*, declare that this research report is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

Signed at ……

On the …….. day of …… 20…..

DEDICATION

This report is dedicated to the Almighty in that He awarded me with the strength to see this through.

To my lovely parents, Lesly and Lyneeta Forbes for your constant support and encouragement. Leander Joseph for believing in me and for your constant motivation.

ACKNOWLEDGMENTS

I would like to express the deepest appreciation to Derek Seely, my supervisor, for his patience, commitment, guidance and assistance throughout this journey.

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CHAPTER 1. INTRODUCTION

1.1. Purpose of the study

The purpose of this paper is to assess the impact of a CEO's ability on the financial legitimacy of an organisation, specifically with regard to a CEO's age in relation to quality of financial reporting and the volatility of the share price.

1.2. Context of the study

The key focus of many organisations is to maximise financial returns. This key focus is largely dependent on enlisting the right leadership and skills. Investors are particularly interested in financial returns and it is therefore, imperative that the right individual is enrolled in an attempt to deliver legitimate financial returns. The publication of an unmodified annual financial statement represents the true measure of the organisation's financial legitimacy, in that it signifies the ratification of an organisation's future viability and in return, a CEO's ability. Palazzo and Scherer (2006) agree, stating that financial legitimacy guarantees a company's continued existence and enables access to capital injections i.e. through encouraging investor confidence which ultimately, promotes investor confidence which translates into funding.

Investor confidence stems from having trust in a leader's capabilities i.e. the ability of the CEO to enlist resources and to unlock shareholder value (Arthaud-Day, Certo, Dalton, & Dalton, 2006; Cao, Myers, & Omer, 2012; Palazzo & Scherer, 2006; Pan, Wang, & Weisbach, 2015; Suchman, 1995). In addition, the element of "trust" is multi layered and directly affects investor confidence and in return, affects access to future capital funding (Palazzo & Scherer, 2006; Pan et al., 2015; Suchman, 1995). The element of "trust", through an investor's lens, is entrenched through the audit endorsement of annual financial statements i.e. such endorsement legitimises a company's control procedures; the quality of its

financial reporting, its creditability, and affirms its existence as a going concern which in return, promotes investor confidence as well as future funding (Agrawal & Chadha, 2005; Arthaud-Day et al., 2006; Campbell & Yeung, 2016; Cao et al., 2012; Eilifsen & Messier, 2000; Eisenberg & Macey, 2004; Geiger & Kumas, 2016; Levitt, 2000; Palazzo & Scherer, 2006; Pfeffer & Salancik, 2003; Suchman, 1995).

A financial statement restatement is twofold i.e. either [1] an error, which is an unintentional misrepresentation or [2] an irregularity, which relates to a premeditated decision taken by management which ultimately serves to compromise the legitimacy of financial reports and creates a breakdown in "trust" (Abbott, Parker, & Peters, 2004; Arthaud-Day et al., 2006; Campbell & Yeung, 2016; Doyle, Ge, & McVay, 2007; Eisenberg & Macey, 2004). Per extant literature, largely based on the United States of America [USA] market, irregularities results in a negative impact on the share price movements, due to a breakdown in trust and low confidence in the legitimacy of the financial reports (Campbell & Yeung, 2016; Hennes, Leone, & Miller, 2008). In addition per Ho, Li, Tam, and Zhang (2015) and Arthaud-Day et al. (2006) in the event of such material misstatement, caused by an irregularity, the true intention was to mislead investors, therefore directly promotes distrust, and questions a leader's ability. Callen, Livnat, and Segal (2006) concur, stating that restatements are associated with a "broader managerial problem" i.e. it directly questions management's skills, expertise and ability.

Research further shows that a leader's ability is assessed through their market reputation i.e. one's success and achievements serve as a measure for future performance (Arthaud-Day et al., 2006; Cao et al., 2012). It should further be noted that a CEO's reputation is intertwined with that of a company, as a result restatements may encourage investors to question a leaders' professionalism, competency and indirectly assesses the board's competency, as well as judgement in respect of electing an appropriate leader and could subsequently result in distrust and disinvestment (Arthaud-Day et al., 2006; Cao et al., 2012;

Milbourn, 2003). Reputation is closely linked to accountability and trustworthiness, the key values that are subsequently embedded into corporate structures and creates the basis for corporate policies, procedures, business practices etc.; this in turn, can either strengthen or weaken a company's legitimacy which invariably affects the quality of financial reports (Cao et al., 2012; Ho et al., 2015; Levitt, 2000; Palazzo & Scherer, 2006). Extant research highlights the importance of managing an organisation's appetite for risk, through matching and electing the right leadership i.e. a leadership which will steer a company towards achieving their strategic goals whilst operating within the parameters of their propensity for taking risk in a legitimate manner. Extant research revealed that there is a negative correlation between a CEO's age and an appetite for risk i.e. as a CEO ages, their appetite for engaging in risky and/or uncertain transactions decreases, therefore such CEOs are not incentivised through monetary returns, which is often the basis for promoting restatement of financial restatements, and this in turn, promotes share price stability and dissuades poor corporate governance practices whilst affirming and restoring investor confidence and promoting legitimate financial reporting (Serfling, 2014; Xie, 2015). Per Sutton and Callahan (1987) and Arthaud-Day et al. (2006), an executive's responsibility cannot be divorced from a company's performance, as such, it reiterates that a CEO's reputation weighs heavily upon a company's financial performance which in turn, affects the individual's future employability and subsequently, directly affecting their long term reputation within the labour market (Serfling, 2014; Xie, 2015).

The CEO steers a company towards achieving its strategic goals and unlocking financial rewards. Pan et al. (2015); Pan, Wang, and Weisbach (2016) state that the level of a CEO's competency, is largely dependent on skills, expertise and experiences, which is cumulatively referred to as "ability". It is assumed that once appointed, such individual possess the ability to legitimately unlock investor value i.e. through tapping into their personal wealth of expertise, experiences as well as knowledge which ultimately aids in employing limited resources and unlocking shareholder wealth (Arthaud-Day et al., 2006; Pan et al., 2015). However such

abilities accumulate over time and is largely associated with ageing CEOs, therefore abilities are perceived to be synonymous with well-seasoned and mature CEOs (Huang, Rose-Green, & Lee, 2012; Nana, 2016; Serfling, 2014). Prior research focused predominantly on the American, Chinese and Netherland markets with little or no specific focus or interest in the developing third world countries e.g. South Africa. The assessment of the various developed countries rendered similar findings, i.e. that a positive correlation exists between a CEO's age and the quality of financial statements i.e. a CEO's experience, which accumulates over their career, enhances the quality of financial decisions and legitimises financial reporting which in turn, promotes investor confidence as well as trust (Arthaud-Day et al., 2006; Cao et al., 2012; Huang et al., 2012; Nana, 2016; Palazzo & Scherer, 2006; Pan et al., 2015; Serfling, 2014; Suchman, 1995; Xie, 2015).

This paper therefore aims to contribute to existing research in respect of whether or not CEO age, within a South African listed context, has a positive effect of financial legitimacy and invariably promotes investor confidence. In addition, it also aims to assist in comparing developing and developed countries results, i.e. as to whether or not CEO age impacts financial legitimacy and performance irrespective of a country's financial established state.

1.3. Problem statement

1.3.1 Main problem

Money is a scare and limited resource, the outlay of continuous and new funding is therefore significantly dependent on fostering investor confidence (Arthaud-Day et al., 2006; Cao et al., 2012; Palazzo & Scherer, 2006; Serfling, 2014; Suchman, 1995). Extent research has shown, that at the crux of investor confidence resides financial legitimacy i.e. the ability to unlock shareholder wealth (Arthaud-Day et al., 2006; Cao et al., 2012; Palazzo & Scherer, 2006;

Serfling, 2014; Suchman, 1995). In addition financial legitimacy is unlocked through the appointment of the aging CEO, who has been tasked to 1] safe guard organisational assets; 2] unlock shareholder value and 3] promote investor confidence (Huang et al., 2012; Nana, 2016; Serfling, 2014). The aspect of financial legitimacy is far reaching, significant and affects various key stakeholders e.g. investors [*going concern and continued investment*]; government [*unemployment rates and taxes*]; auditors [*reputational risk*] and policy makers [*the balancing act between legislating, monitoring and good governance principles*]. Financial legitimacy affirms 1] management reliability; 2] investor confidence; 3] financial returns; 4] economic growth and 5] reliability, the key pillars to unlocking shareholder wealth through creating and maintaining an attractive landscape for investors.

1.3.2 Sub-problems

The main problem may further be sub-divided as follows.

The first sub-problem: What impact does the CEO's age have on the quality of financial reporting and in return the financial legitimacy of an organisation?

The second sub-problem: What impact does the CEO's age have on the volatility of the share price and in return the financial legitimacy of an organisation?

1.4. Significance of the study

Good governance practices are key to limiting financial statement restatements and legitimise financial reporting. Per extant research, it is evident that financial statement restatements result in a disequilibrium between investor confidence and the future viability of an organisation (Arthaud-Day et al., 2006; Cao et al., 2012; Palazzo & Scherer, 2006; Serfling, 2014; Suchman, 1995).

Prior research, associated with corporate legitimacy and a CEO's ability, was predominantly focused on the American listed environment e.g. Huang et al.

(2012); the Netherlands e.g. Nana (2016) and China e.g. Xie (2015). This research report adds to existing research by focusing on the South African stock exchange and permits an assessment as to whether or not, similar to research by Huang et al. (2012); Nana (2016) and Xie (2015), a positive correlation exists between a South African CEO's age and the legitimacy of financial reporting. In addition, unlike the USA environment, our Sarbanes Oxley equivalent i.e. King report is not legislated; it follows an 'adopt or explain' principle. This is important since it aids in assessing whether or not legislation is imperative in terms of promoting good governance principles.

In addition, the assessment of the age aspect in relation to quality financial reporting and good governance principles, will aid investors in analysing potential risk exposure by considering a CEO's age as a key indicator when assessing potential or reassessing existing investment decisions.

1.5. Benefits of the study

This research report benefits the following parties:

As per Huang et al. (2012), research in respect of CEO age and financial reporting quality may be of particular interest to annual financial statement endorsers i.e. auditors, and to third party users of such financial statements e.g. potential investors and financial institutions. Huang et al. (2012)'s research further identifies that there are key benefits to assessing CEO age in relation to the legitimacy of financial reporting, i.e. auditors may derive comfort in that older CEOs aid in reducing *audit detection risk*, i.e. the risk that misstatements may not be detected. This in turn, reduces the auditor's risk exposure, since reliance can be placed on residing management which in turn, infers quality financial reports (Huang et al., 2012) in that

- Older CEOs are perceived to aid in decreasing investor risk and in turn promote investor confidence which promotes share price stability (Huang et al., 2012) and

- Aid in identifying potential investment opportunities which appeals to an investor's risk propensity e.g. where the investor is in search of high returns, coupled by high levels of uncertainty and risk, such individual might seek to invest in organisations which are steered by younger versus older CEOs (Huang et al., 2012).

In addition, this research also aids in respect of the following benefits

- Policy makers and regulators (Keay, 2015), in that this empirical evidence could specifically aid in support of the King Code principles becoming legislated.
- Additional insight into the behaviour sciences associated with CEO age and market behaviour [denoted by share price volatility in relation to age] within a South African market. This could ultimately aid in refining recruitment processes, by matching CEOs, based on their age, to the overall organisational strategic objectives e.g. risk profiles of organisations, as well as intrinsic needs of individual CEO.

1.6. Delimitations of the study

This research focuses on JSE listed companies and was limited to a one-year period i.e. 2016, restricting conclusions to a specific period. The sample population is restricted to listed organisations and specifically excludes unlisted organisations. In addition, it should be noted that non-listed organisations' data i.e. financial and non-financial information, is not readily available or accessible, as such, it is perceived to have an inherent limitation of scope and therefore specifically excluded in this study. It was presumed that the sample population which has been limited to one year i.e. 2016, would be representative of CEOs with various age category groupings, as well as industry groupings. In addition, it was assumed that the population would be representative of restated annual financial statements and aid in the assessment of the main problem of this research report. In addition, it was assumed that the financial data i.e. statement

of comprehensive income [Income statement] and statement of financial position [Balance Sheet] was readily accessible, complete and available on the INET-BFA database. It was also assumed that qualitative information was readily available, specifically with reference to CEOs respective ages, where such qualitative information was not readily available, alternative sources were consulted e.g. Bloomberg. It was also assumed that the 2016 sample population would be representative of the various sector listing of the SIC [Standard Industrial Classification]. The assessment of the effect of financial statements restatements on a CEO and the residing auditors' reputation as well as subsequent tenure, was specifically excluded from the scope of this particular research report. The sub-classification of gender in terms of age was also specifically be excluded, since females are very seldom represented at CEO level, as noted in the research done by Faccio, Marchica, and Mura (2016).

The study also specifically excluded the differentiation of restatements i.e. an irregularity versus an errors, and did not explicitly delve into conditions that give rise to annual financial statements restatements, since the view of this paper is that restatements are end results of a breakdown of controls whether poor governance or reporting principles which ultimately results in the submission of poor quality financial reporting, irrespective of conditions which gave rise to such restatements, in short a restatement is indicative of poor quality financial reporting which is hypothesised to have a negative relationship to CEO age.

1.7. Definition of terms

The following definitions are representative abbreviations and accounting terms used in this paper.

Error: A non-irregular misstatement which is attributable to management oversight or omission (Eilifsen & Messier, 2000)

Financial restatement: A correction of errors relating to issued financials (Hendrikse & Hendrikse, 2003; Hennes et al., 2008; PwC, 2015)

Going concern: The ability of a company to operate in the foreseeable future, i.e. the next 12 months. In addition, the term is used to refer to a company that is perceived as being financially viable (Geiger & Kumas, 2016; Hendrikse & Hendrikse, 2003; Hennes et al., 2008).

Irregularity: Intentional misrepresentations to mislead users of financial statements (IRBA, 2009).

Market capitalisation: A share price multiplied by the number of outstanding shares (JSE, 2013).

Organisation: A synonym for a company.

SOX: Sarbanes Oxley Act, regulatory Act used in the USA for all listed organisations.

1.8. Assumptions

The following key assumptions were considered, as well as their respective impact:

- INET BFA and Bloomberg databases are both complete secondary data sources, namely, in respect of disclosing all financial data, listing of financial restatements, respective CEO ages and stock price values.
- The sample population was representative of restatements across various industries and sectors as well as firm sizes.
- The sample population was representative of various age categories of CEO groupings i.e. a representative population consisting of various age categories.
- The sector grouping was readily available in the secondary database.

CHAPTER 2. LITERATURE REVIEW

2.1. Introduction

This chapter presents extant literature related to this research topic. This chapter is structured as follow:

- Section 2.2: Financial statements, their restatements and CEO's age
- Section 2.3: Financial statements, CEO's age and share price volatility
- Section 2.4: Conclusion

2.2. Financial statements, their restatements and their CEO's age

Financial statement quality is attributable to good corporate governance. Quality financial reporting stems from applying appropriate financial practices and policies, it promotes financial legitimacy and deters financial restatements (Cao et al., 2012; Doyle et al., 2007; Huang et al., 2012). Restatements have a negative impact on investor confidence and are denoted through the devaluation in the share price i.e. market response (Arthaud-Day et al., 2006; Cao et al., 2012).

A CEO is appointed by the board; such appointment is dependent on the individual possessing the required skills, competency, having a favourable reputation to steer an organisation to great heights, capabilities of ensuring good financial reporting quality and to unlock shareholder wealth (Milbourn, 2003). A CEO and the executive team is ultimately responsible for the organisational strategies, whilst applying good corporate governance principles and inferring good quality financial reports (Serfling, 2014; Uygur, 2018). Per Cao et al. (2012), financial restatements are the most visible aspect in respect of impaired financial reporting quality.

Investors are focused on the value added aspect, which will stem from business operations and not the financing activities i.e. the true growth potential is denoted through the utility added in terms of revenue generation which is as a result of effective management i.e. the CEO having the ability to unlock wealth by enlisting investor confidence (Penman, 2003). With reference to research performed by Abbott et al. (2004), exponential earnings growth is often accompanied by a breakdown in controls and adversely affects the quality of financial reporting and the legitimacy of financial statements. A CEO is incentivised, based on the performance of the organisation, therefore creating a direct self-interest threat coupled by an advocacy risk i.e. the CEO actively contributes to the input, compilation and finalisation of the annual financial statements, he/she therefore has direct input into the composition of the figures and could be motivated, through incentives linked to performance of an organisation, to misrepresent such financials in an attempt to maximise personal rewards therefore compromising the legitimacy of such financial statements (Huang et al., 2012).

Research shows reporting a higher rate of revenue growth and higher earnings-price ratios is often a precursor to reporting a subsequent financial restatement; such results therefore signals a potential break down in controls, in that substandard and often misrepresented financial statements are issued and such dubious financial statements are issued to reflect higher returns to maximise the utility income earned by the residing CEO (Huang et al., 2012). Financial and managerial research denotes that financial restatements creates uncertainty with regard to trust in the executive leadership's capabilities i.e. their ability to legitimately deliver in respect of the organisational strategic vision and not compromise the integrity as well as legitimacy of producing fair financial statements (Eisenberg & Macey, 2004; Zhang, Bartol, Smith, Pfarrer, & Khanin, 2008).

Accuracy and reliability of financial statements, is imperative to sound fundamental investment decision making (Penman, 2003). The financials serve as the basis for all prospective investment decisions, misrepresented annual

financial statements will invariably mask the true status of an organisation's financial health and in turn, entice investors to enter into injudicious, impulsive and often speculative investments (DeCarlo, 1997; Eisenberg & Macey, 2004; Penman, 2003). Quality financial reporting refers to the aspect of being informative i.e. the ability for investors to extract meaningful quantitative and qualitative information in aid of making informative investment decisions (Penman, 2003). Research shows that where organisations are strongly focused on producing high quality and fair representations of financial affairs, such organisation often have a negative correlation in relation to discretionary accruals, i.e. such organisations have a strong focus on exercising due professional care in respect of estimate computations and is deeply rooted in applying managerial judgement (Cao et al., 2012; Penman, 2003). More recent research by Agrawal and Chadha (2005); Arthaud-Day et al. (2006); Cao et al. (2012); Penman (2003); Serfling (2014) shows that good corporate governance is more likely to be adopted by often older CEOs and will result in fair representation of financial statements. Furthermore, research shows quality financial statements reporting is synonymous with legitimate financial reporting and in return, promotes investor confidence (Arthaud-Day et al., 2006; Cao et al., 2012; Huang et al., 2012; Nana, 2016; Palazzo & Scherer, 2006; Pan et al., 2015; Serfling, 2014; Suchman, 1995; Xie, 2015).

A financial restatement is indicative of poor financial reporting quality, which at a high level is attributable to [1] management oversight; [2] inappropriate judgement e.g. an error or [3] executive leadership having a direct financial interest, which affirms the fact that restatements are directly linked to the calibre of CEO appointees i.e. their abilities and personal drive [be it financial reward or career progression] (Doyle et al., 2007; Eisenhardt, 1989; Huang et al., 2012; Li, Low, & Makhija, 2014; Wan, Zhu, & Chen, 2015; Xie, 2015). Research by Huang et al. (2012) revealed that organisations with older CEOs over lengthy periods have a negative correlation to financial statement restatements. Such negative correlation stems from the implementation and maintenance of good internal control policies/procedures, which are imperative to the existence of the company

as well as issuance of high quality financial reporting, in that it mitigates the potential risk affiliated with errors and/or misappropriations and ultimately, reaffirms investor confidence as well as trust (Doyle et al., 2007).

Research done by Huang et al. (2012) found that there is a positive correlation between CEO age and financial reporting quality, highlighting that quality reporting is key to enlisting investor confidence and invariably decreases the risk of potential share price volatilities. Per the research by Cao et al. (2012), empirical evidence showed that investors respond adversely in respect of restatements, thereby reiterating that restatements underpin a decay in the confidence and trust investors infer in the executive leadership's capabilities. Prior, research has also shown that age has a positive relationship to the element of trust (Zeffane, 2018).

The current economic climate and exponential demands on performance is placing huge pressure on residing CEOs and their abilities, i.e. in terms of financial performance and the creation of sustainable shareholder wealth (Abbott et al., 2004; Nana, 2016). These pressures often promote an operational environment that favours a breakdown in controls, which adversely affects the quality of financial reporting and increases reputational risk, which is often seen as the intrinsic motivator of older CEOs (Cao et al., 2012; Eisenhardt, 1989; Pan et al., 2016; Zhang et al., 2008). The element of reputational risk [i.e. more volatile in respect of aging CEOs] may specifically be linked to [1] the officer at the helm i.e. CEO in terms of his/her career progression and future marketability (Li et al., 2014; Nana, 2016; Serfling, 2014; Xie, 2015); [2] the organisation continuing as a feasible investment (Cao et al., 2012; Eisenberg & Macey, 2004; Nana, 2016; Palazzo & Scherer, 2006) and [3] auditors, in terms of assuring that the annual financial statements fairly present the financial results, as well as the organisation's financial position (Eisenberg & Macey, 2004; Irani, Tate, & Xu, 2015).

An organisation's reputation and financial legitimacy is dependent on its key leader's personal reputation and performance abilities, i.e. the ability of the CEO to legitimately deliver on the strategy whilst enforcing and upholding governing

principles, policies and procedures required for good quality financial reporting (Huang et al., 2012). Per Suchman (1995), the reputation of a CEO is directly associated with that of an organisation and cannot be divorced from each other. Milbourn (2003) further reaffirmed that there is a direct relationship between a CEO's perceived abilities and/or reputation in relation to an organisation's performance, which is, in turn, indicative by movement in the share price. Choosing the right CEO is therefore imperative, since such selection must align the organisation and the individual's objectives. The creditability that is assigned to one's reputation creates a futuristic performance expectation, one which is referred to in literature as *the gaming theory*, i.e. the ability of an individual to play to their individual strengths, deliver on strategic goals whilst in pursuit of intrinsic gain (Cao et al., 2012).

2.2.1 Intrinsic self-fulfilment need

A CEO's reputation is multi-layered; past research had identified various control variables which have been used to analyse the true constituency of one's "reputation" e.g. age; tenure; organisation size; volatility of stock movements during CEO tenure, etc. (Milbourn, 2003). Prior research noted that there is a positive association between financial reporting quality, CEO retention and an organisation's reputation, which is purely motivated through the alignment of a CEO's personal interests, the attraction and retention of investor confidence whilst promotion of future capital investments in a legitimate manner (Cao et al., 2012; Penman, 2003).

Where a CEO has a vested interest i.e. incentive dependent on an organisation's performance, a positive relationship exists between a CEO's reputation and the performance of an organisation (Milbourn, 2003). The work of Milbourn (2003) and Faccio et al. (2016) highlights that in order to gain alignment between the CEO as well as shareholders' objectives, a direct financial association or per the agency theory, a self-interest link needs to be established between the organisation and the residing CEO (Cao et al., 2012; Eisenhardt, 1989; Pan et

al., 2016; Zhang et al., 2008). This will ultimately encourage high financial performance, decision making and reporting. The key to ensuring legitimacy of operations and in turn, financial reporting is therefore closely associated with the *agency theory,* i.e. the alignment of needs as well as objectives between the organisation and the CEO's *intrinsic self-fulfilment needs* e.g. financial reward, career progression, reputational risk, etc., with the ultimate aim of pursuing as well as achieving, an increase in shareholder's wealth through legitimate business practices and decisions (Cao et al., 2012; Eisenhardt, 1989; Pan et al., 2016; Zhang et al., 2008). Prior research focused on the monetary motivational aspect, showing that where a CEO's *intrinsic self-fulfilment need* is predominantly motivated by financial reward, such individual is more likely to be a risk taker and often results in financial statements being restated (Huang et al., 2012; Nana, 2016; Serfling, 2014; Xie, 2015; Zhang et al., 2008).

Where a CEO's incentive is directly dependent on the financial performance of an organisation, such individual, depending on their moral stance, will be more likely to misrepresent financials, thereby compromising the legitimacy and quality of financial reporting in pursuit of personal gain (Arthaud-Day et al., 2006; Zhang et al., 2008). Awarding incentives linked to the performance of the organisation creates a CEO advocacy threat i.e. the CEO will incur a self-fulfilment interest [end motivation being the receipt of financial reward], therefore is more likely to negatively influence the legitimacy of the financial statements in an attempt to reap financial rewards and could ultimately result in financial restatements (Xie, 2015; Zhang et al., 2008). It is imperative to note that legitimate behaviour is not purely dependent on addressing the alignment between organisational and CEO intrinsic self-fulfilment needs, but should also focus on the appointment of the individual with the right abilities (Xie, 2015; Zhang et al., 2008).

Extant research shows that where a CEO may be motivated through monetary rewards, the *prospect theory of self-enrichment* will prevail i.e. research shows that this theory has a negative association with older CEOs (Arthaud-Day et al., 2006; Penman, 2003; Zhang et al., 2008). Alternatively, where an incentive is

linked to the financial performance of an organisation, shareholder wealth is unlocked in a legitimate manner and the *agency theory* will be observed i.e. often associated with older CEOs who seek to drive the alignment between the organisation as well as their *intrinsic self-fulfilment needs* (Cao et al., 2012; Eisenhardt, 1989; Milbourn, 2003; Pan et al., 2016). Individuals become risk takers e.g. through financial statement manipulation and misrepresentations, in an attempt to tip the scale in favour of receiving monetary rewards, by maliciously intending to mislead users of financial statements and ultimately compromising the legitimacy of financial reports (Eisenhardt, 1989; Pan et al., 2015, 2016; Zhang et al., 2008). It is also however important to note, that various variables affect the ultimate decisions taken by a CEO and that such decisions are motivated by a CEO's true inherent value system as well as individual intrinsic rankings e.g. integrity, career path development; reputational risk, personal interest, age, etc.(Zhang et al., 2008).

2.2.2 Path finders versus followers

There is an inherent risk directly associated with decision making i.e. reputational risk exposure which relates to the CEO's intrinsic willingness to enter into risky business decisions which ties back to the agency theory and the alignment between business as well as individual objectives (Eisenhardt, 1989; Pan et al., 2015, 2016; Zhang et al., 2008). This risk may be assessed through the work of Prendergast and Stole (1996) as either relating to a *sunk cost fallacy*, which refers to the unresponsiveness to new information which is often associated with older CEOs since they are more risk averse i.e. *the followers* (Huang et al., 2012; Nana, 2016; Serfling, 2014). The alternative is referred to as the *base rate fallacy,* which relates to an individual being brash, bullish and overconfident when it comes to decision making i.e. *the path finders,* and these CEOs are often younger (Huang et al., 2012; Nana, 2016; Serfling, 2014). Management's investment decisions directly highlight their competency or ability which in turn, affect their reputation and investor's appetite for risk; such decisions could either positively [negatively]

affect investor's confidence through an appreciation [devaluation] of the share price (Prendergast & Stole, 1996).

The business world is riddled with cases of bribery, corruption and malpractices which result in the ethical decay within the professional realm and nullify the legitimacy of financial statements (Eisenberg & Macey, 2004; Wimalasiri, 2001). Wimalasiri (2001) noted that there is however not enough insight into the mechanics of a manager's decision processes, especially as to whether or not decisions are affected by age, and experience as well as capabilities. The key aspect to remember is that management decisions are based on judgements, founded on the individual's characteristics e.g. age, personal aspirations, moral stance, skills, capabilities, reputation and experiences, which in turn make it a very complex process (Cao et al., 2012; Milbourn, 2003; Prendergast & Stole, 1996; Wimalasiri, 2001). Per Nana (2016, p. 2), a "CEO's personal characteristics can impact corporate policies and corporate performance", e.g. age may directly impact the quality of financial decisions and will ultimately affect the legitimacy of financial reporting which in turn, could destroy or create shareholder wealth. The market assumes that with age comes wisdom, competence, a great track record and experience, which often signals a lower risk to existing as well as potential investors, which limits the risk of future uncertainty and instils investor confidence and creates shareholder wealth and share price stability (Li et al., 2014; Milbourn, 2003; Palazzo & Scherer, 2006).

Research revealed that a transaction exists between an organisation and its residing CEO, such transaction is deeply rooted in the individual's [CEO's] intrinsic motivational aspect, for example, whether he/she has a long term focus and swims with the stream, in which case they would follow a *Market Learning Model* which entails gradual progress through well calculated risk taking measures (Scharfstein & Stein, 1990; Xie, 2015). Alternatively, they would choose to make their mark as well as take on risk, as such will resort to the *Managerial Signalling Model i.e. the path finder approach* (Prendergast & Stole, 1996; Xie, 2015). In essence, extant research therefore reveals that it is the

individual's i.e. CEOs, *true internal drive*, which an organisation needs to identity and address to ensure alignment of strategic and personal goals in an ultimate attempt to create shareholder wealth. The *Market Learning Model* (Scharfstein & Stein, 1990; Xie, 2015), is quite dominant in older CEOs; they seek comfort in the idea of accumulating tenure [due to their current limited marketability and the looming career expiration date which is driven by their age] and will often adopt a more conservative decision making approach in an attempt to "survive" within the assigned role i.e. *the follower approach* is observed (Nana, 2016; Pan et al., 2015; Scharfstein & Stein, 1990; Serfling, 2014; Xie, 2015). These individuals mimic the behaviour of the accepted norms, in an attempt to deflect the harsh judgement regarding the assessment of their abilities (Scharfstein & Stein, 1990).

Li et al. (2014) stated that both models however, create an organisational risk, since the objectives of the individual CEO might be driven by *intrinsic self-fulfilment needs* and not specifically around their assigned fiduciary duty i.e. to create shareholder wealth in a legitimate manner. This in turn, reverts to the agent-principal theory (Milbourn, 2003; Wan et al., 2015), i.e. where there is alignment in terms of enlisting intrinsic motivation and commitment from the residing CEO, i.e. through a combination of monetary as well as career progression, and the strategic objectives of an organisation.

The market judges the CEO's abilities based on two aspects, as per Scharfstein and Stein (1990), [1] return on investment i.e. monetary terms and [2] assessment of investment behaviour versus other managers. Both aspects are of importance, but where an individual has chosen to follow the masses i.e. *The Market Learning* or *follower* approach, this signals "smartness" which is a key signal for enhancing investor trust, especially where the predecessor's performance created utility returns and share price stability (Pan et al., 2016). However, per recent research, there are currently split views i.e. younger CEOs are more risk averse, since they want to retain their marketability and ensure career progress in the future i.e. agency theory impact based on the *Market Learning Model* (Li et al., 2014; Scharfstein & Stein, 1990; Wan et al., 2015; Xie, 2015). The alternative show that

younger CEO's are more pro-risk takers, based on the *Managerial Signalling Model* (Huang et al., 2012; Li et al., 2014; Nana, 2016; Prendergast & Stole, 1996; Serfling, 2014; Yim, 2013). These two models were assessed within a South African context to evaluate as to whether or not younger CEOs within South Africa adopted a *Market Learning Model* (Li et al., 2014; Scharfstein & Stein, 1990; Wan et al., 2015; Xie, 2015), as per the older CEO generation, or alternatively a *Managerial Signalling Model* (Huang et al., 2012; Li et al., 2014; Nana, 2016; Prendergast & Stole, 1996; Serfling, 2014; Yim, 2013). Per the latest research by Nana (2016) within an American context, with reference to the work of Hambrick and Mason (1984), younger CEO's are more likely to be pro risk takers in that they are pursuing opportunities to create a name for themselves. These individuals are often accompanied by fresh insight into business operations and they are highly self-motivated as well as driven to create positive change as well as contributions, as such, greater volatility in the share price is due to a higher propensity for taking risks, directly tying back to the *Managerial Signalling Model* (Prendergast & Stole, 1996).

2.3. Financial statements, CEO's age and share price volatility

Due to the increase in the complexity of organisational structures, transactions and financial reporting framework requirements, organisations call to be led by multi-skilled, competent and experienced individuals, these qualities are often associated with more seasoned i.e. aged CEOs (Aier, Comprix, Gunlock, & Lee, 2005; Nana, 2016; Serfling, 2014). As cited by Aier et al. (2005) and Hennes et al. (2008), research by Palmrose, Richardson, and Scholz (2004) shows that financial restatements attract a negative market response and results in share price volatility.

CEOs and CFOs are jointly responsible for the legitimacy and quality of financial statement reporting (Aier et al., 2005; Serfling, 2014). Serfling (2014), concluded that where the CEO and the second in command i.e. CFO are both well in their

years, their combined wisdom of financial business acumen and expertise serves as a positive reinforcement which in turn, legitimises financial reporting and discourages volatility within the share price. Therefore a strong financial business acumen, accompanied by experience [denoted by age and prior employment experience], is imperative to ensuring good quality financial reporting (Aier et al., 2005).

As highlighted by Cao et al. (2012), there is a contractual relationship between a CEO and an organisation. A CEO in essence, sells his/her *reputation* i.e. collection of skills, expertise and goodwill within the labour market, in return for compensation, which ties into the agency theory aspect in that a contractual arrangement is created by resorting to address the organisational strategic needs as well as the CEO's *intrinsic self-fulfilment needs* (Cao et al., 2012; Milbourn, 2003; Pan et al., 2015). Prior research had shown that within the American market, an older CEO's *intrinsic self-fulfilment needs* is more entrenched in risk averse investment decisions, which leads to improved financial quality reporting, i.e. less judgement and estimates applied, and it ultimately creates share price stability and legitimate financial reporting (Huang et al., 2012; Serfling, 2014). There is a predisposition associated with older CEOs , i.e. they are more knowledgeable and possess the necessary skills to propel any organisation to great heights, which is depicted by the share price stability and low levels of financial statement restatements being reported, as evident by research by Nana (2016) and Serfling (2014).

It should be noted that an organisation's performance is directly associated with a CEO's abilities and skills, which directly affects the individual's [CEO's] reputation within the labour market, potential for personal utility earnings growth and/or career progression (Zhang et al., 2008). A CEO's personal moral stance will influence their decision making, in that an individual with a high moral stance, often associated with older CEOs, will uphold their fiduciary duty in respect of practising good corporate governance, delivering high quality financial reports and in return, affirming the legitimacy of an organisation's financial stance (Nana,

2016; Penman, 2003; Zhang et al., 2008). An organisation's performance is therefore seen as a direct result of its leadership's effective decision making capabilities, which is derived over time as a result of CEO experience, exposure and the ability to generate incremental value (Nana, 2016; Zhang et al., 2008).

A great deal of reliance is placed on a CEO's ability, which is inferred through his/her reputation, which in turn, will prompt a more favourable engagement in favour of the contractee [CEO] in order to retain such services and minimise the inherent business risk of uncertainty i.e. the agent-principal theory is therefore observed (Milbourn, 2003; Wan et al., 2015; Xie, 2015). Research done by Wan et al. (2015) states that agency risk increases as a CEO reaches the mandatory retirement age, due to the residing CEO's looming tenure expiration date i.e. a decrease in the CEO's reputational risk exposure since future employability becomes non-marketable. Wan et al. (2015) concluded that investment confidence declines immediately before the residing CEO reaches retirement age, however not to a statically negative effect.

However, due to improved health care and increased quality of life, individual's life expectancies have steadily increased over the years and as such, individuals are retiring at a later stage (Cervellati & Sunde, 2013; Olsen & Gill, 2017). Similar to the Chinese labour market (Xie, 2015), the legislated retirement age within South Africa is 60 years, i.e. case law ("R E Kutuma, M M Monyama, N S Nkadimeng vs Limpopo Legislature," 2014), however due to the labour market demand, organisations often extend their retirement age to beyond 60 years of age and it is therefore not uncommon for CEOs to retire later than this. CEO's retirement age is in effect creating a direct influence of exasperating agency risk (Xie, 2015). Prior research has proven that there are three driving forces behind reducing agency risk and increasing shareholder value i.e. [1] *monetary rewards* i.e. incentivises based on CEO's performance (Milbourn, 2003); [2] *intrinsic rewards* i.e. career path progression (Li et al., 2014; Wan et al., 2015) and [3] assigning accountability for one's actions (Huang et al., 2012).

The future is uncertain, as such, the share price builds an element of uncertainty into evaluations, this is directly dependent on the assessment of the organisation's financial stability, residing CEO's capabilities and the management of the agency risk (Milbourn, 2003; Nana, 2016; Serfling, 2014; Xie, 2015; Zhang et al., 2008). Therefore, a change in this critical balance will result in the share price responding to such uncertainties, resulting in share price volatility and low investor confidence. In essence, the greater the element of uncertainty, signalled through a CEO's perceived abilities/performance e.g. poor reputation, tenure as well as quality of financial reporting, the lower investor confidence and in return, resulting in share price volatility (Li et al., 2014; Milbourn, 2003; Palazzo & Scherer, 2006).

Extant research reviewed in this research report has indicated a negative correlation between CEO age and share price volatility (Milbourn, 2003; Nana, 2016; Serfling, 2014; Zhang et al., 2008). Therefore, it is hypothesised that a negative correlation exists between CEO age and share price volatility. In addition, extant research shows that older CEOs' appetite for taking risk is indicative through [1] lower operating leverage and [2] lower financial leverage which in return, will have a negative correlation to share price volatility i.e. organisations with older CEOs are less likely to experience volatility in their share price (Li et al., 2014; Mansi & Reeb, 2002; Nana, 2016; Serfling, 2014).

- *Operating leverage* has a positive relation to the volatility of the share price, in that as investments in operations increase, an expectation is created for higher returns which in turn, cause a positive reaction in terms of share price volatility, since it is signalling growth which is yet again closely associated with CEOs who are much younger (Aboody, Levi, & Weiss, 2014; Nana, 2016; Prendergast & Stole, 1996).
- Nana (2016) and Cassell, Huang, Sanchez, and Stuart (2012)'s research revealed that a high level of *financial leverage* is indicative of an organisation being risky in that it is unable to fund its operations through its normal ordinary course of business operations, therefore signalling

> "uncertainty", this in turn, will have a negative impact on the share price; the research proved a negative relation exists between CEO age and such transactions. It is expected that a negative correlation will exist between an older CEO, financial leverage and share price volatility.

In addition, Serfling (2014)'s research revealed that market sentiments, representative by share price movements, is dependent on the assessment between matching a CEO's age to an organisation's risk profile i.e. a bullish organisation should enlist a younger CEO and a more conservative strategic organisation should enlist a more seasoned CEO. This will in turn, ensure alignment between strategic goals of the organisation and sourcing the right leadership to drive organisational strategies with a legitimate agenda. The work done by Serfling (2014) therefore infers that a CEO's age is a direct measure of an organisations propensity for taking risk which in effect, affects the share price, but such movement in the share price is hugely dependent on market sentiments as well as investors' propensity to taking risk. As stated by Serfling (2014), prior research focused on the assessment of matching organisations with the right leadership i.e. the evaluation of a CEO based on [1] age and propensity for taking risk; [2] financial leverage preferences ; [3] the ability to reinstate the legitimacy of an organisation and [4] to acquire desired skills /resources.

Extant research used the volatility of the share price as a measurement tool for organisational risk profiling i.e. the greater the volatility of the share price, the greater affiliated risk which is associated with the employment of younger CEOs (Cao et al., 2012; Eisenberg & Macey, 2004; Nana, 2016; Penman, 2003; Serfling, 2014). Share price volatility is indicative of an organisation's appetite for risk i.e. the greater the risk, the more volatile the share price would be due to high levels of uncertainties and greater expectations for return, a key motivator for nullifying legitimate financial business practices and reporting. Per Nana (2016), volatility in the share price is a measure used to assess investors' appetite for risk i.e. volatility in the share price is indicative of an organisation having an appetite for risk, as such, more likely to employ younger, energetic and bullish CEOs.

Volatility is a measure of the movement in the share price, similar to the work of Nana (2016) and Serfling (2014), this research report hypothesise that the share price of an organisation will be less volatile where an older CEO is employed.

Research by Pan et al. (2016) identified that each CEO undergoes what is referred to as a CEO investment cycle, this cycle spans their respective tenure period. CEOs who follow a *Market Learning Model* (Scharfstein & Stein, 1990; Xie, 2015) tend to practise disinvestment during the early stages of their tenure and slowly embark on risky or more bullish investments towards the later part of such tenure period with minimal movements in terms of share price volatilities (Pan et al., 2016). Alternatively, those who follow the *Managerial Signalling Model* i.e. often associated with younger CEOs (Prendergast & Stole, 1996; Xie, 2015), will immediately start with high levels of investments, risk takings and will slowly taper off over the period of their employment, these individuals are driven by high risk associated with high potential returns, as such greater levels of share price volatility (Pan et al., 2016).

The motive between invest and disinvest is therefore directly associated with the individual CEO's personal drivers or objectives i.e. to make a quick impact -often younger CEOs [*Managerial Signalling Model*], or alternatively gradually take well calculated risk - often older CEOs [*Market Learning Model]* (Pan et al., 2016; Prendergast & Stole, 1996; Scharfstein & Stein, 1990; Xie, 2015). It should be noted that the research conducted by Pan et al. (2016) also concluded that investments decrease as a CEO ages which is in line with the research performed by Huang et al. (2012); Li et al. (2014); Nana (2016); Serfling (2014); Yim (2013). A CEO's ability, which has a strong association with a CEO's age, has a negative correlation with the volatility of the share price i.e. greater [lower] levels of confidence in a CEO's ability, the lower [greater] levels of volatility in the share price (Huang et al., 2012; Pan et al., 2015; Serfling, 2014). The assessment of a management's ability occurs over time and it stems from an individual's age [inferred by skills, level of competency and experience] as well as ability to unlock value and the organisational strategic vision (Pan et al., 2015).

Information about an organisation has a direct effect on the share price, all is dependent on utility added in terms of the value that such information will aid to generate e.g. mergers will signal growth, as well as expansion which would most often result in a share price appreciation if the market perceives it as being a sound investment (Pan et al., 2015). Throughout extant research, it is reiterated that market response is shaped through *perception* i.e. regarding a CEO's capabilities [it is inferred that age equates to wisdom as well as business knowhow], track record, returns on investments, riskiness of investment decisions, etc. (Huang et al., 2012; Pan et al., 2015; Serfling, 2014). Extant research had shown higher stock volatility infers higher risk, which is normally associated with high levels of R&D investments and market leverage (Pan et al., 2015).

Operating leverage has a direct association with increasing the risk profile of an organisation and per extant research, such investments are often associated with younger CEOs (Aboody et al., 2014; Huang et al., 2012; Serfling, 2014). High share price volatility is closely associated with high levels of operating leverage investments (Aboody et al., 2014). As cited by Sundaram and Yermack (2007), with reference to the earlier research by Jensen and Meckling (1976), a vested interest through actual ownership enlists a far greater moral commitment amongst the leadership of an organisation since it creates a deep rooted interest.

In summary, high risk investments exposes an organisation to a bankruptcy risk which negatively affects an organisation's future viability, creates volatility in the share price and is referred to as the agency cost to debt, as per Cassell et al. (2012). The work by Yim (2013) states that interest alignment between shareholders, organisation and the CEO's *intrinsic self-fulfilment needs*, is key to unlocking investor wealth, managing the bankruptcy risk may lead to the CEO's age becoming irrelevant i.e. when the "price" of reward meets the CEO's intrinsic key requirements.

2.4. Conclusion to literature review

Good quality financial statements are imperative for sound investment decision making. The quality of financial reporting and avoidance of financial statement restatements are inferred through managing the following key aspects [1] good corporate governance; [2] appointing leadership with the necessary competence and [3] managing the agency risk (Cao et al., 2012; Huang et al., 2012; Milbourn, 2003; Nana, 2016; Serfling, 2014). It is imperative to align the CEO's *intrinsic self-fulfilment needs*, whether career focused or monetary based, with the strategic objectives of an organisation; it in turn promotes commitment and creates a vested interest (Prendergast & Stole, 1996; Scharfstein & Stein, 1990).

There is divided views concerning the impact of CEO age on the share price volatility, in that younger CEOs are more risk averse, which is similar to their older counterparts (Li et al., 2014; Wan et al., 2015; Xie, 2015) and alternatively, younger CEO's are more pro-risk takers (Huang et al., 2012; Li et al., 2014; Nana, 2016; Serfling, 2014; Yim, 2013); the view of this paper and as hypothesised, is the later. In essence, an organisation should align the CEO's aspirations and goals with the strategic goals of an organisation; this will reduce the agency risk, address the inherent individual objectives, will promote commitment and in turn, reduce uncertainty and ultimately improve the legitimacy of financial decisions taken, as well as improve the quality of financial reporting (Yim, 2013). Share price volatility is as a result of *uncertainty,* which stems from various aspects, for example, low confidence in respect of leadership's capabilities which is largely signalled through restatement of financial statements, low levels of trust in such leadership abilities, uncertainty regarding the future viability of an organisation, etc. (Cao et al., 2012; Milbourn, 2003; Serfling, 2014).

The literature, based predominantly on the American market, therefore denotes that unlocking shareholder wealth is dependent on employing the well-seasoned [aged CEO], reputable key individual, legitimately practicing good corporate governance, aligning individual goals with the organisation's goals and managing one's organisational risk in an attempt to minimise uncertainties, which will

improve the quality of financial reporting and in return, assist in reducing the volatility in the share price.

The hypothesis adopted for this paper can be summarised as follows:

H_1: South African organisations are less likely to have financial restatements, where older CEOs are contracted.

$H_{\emptyset 1}$: CEO age in relation to South African listed originations, is statistically insignificant in terms of financial restatements.

H_2: South African organisations are less likely to experience volatility in their share price, where older CEOs are contracted.

$H_{\emptyset 2}$: CEO age in relation to South African listed originations, is statistically insignificant in terms of share price performance.

CHAPTER 3. RESEARCH METHODOLOGY

3.1. Introduction

Huang et al. (2012)'s research focused on the CEO's age in relation to financial reporting quality and share price volatility, however based on the American market (Huang et al., 2012; Nana, 2016; Serfling, 2014). This report specifically focused on the overall listed environment, within a South African context; it is similarly hypothesised that within a local front, organisations with older CEOs are less likely to have financial statement restatements and that such organisations would less likely experience volatility in terms of their share price. The objective of this study was to assess South African listed organisations, CEO age, financial statement restatements and the volatility of the share price. This research aimed to assist investors in making beneficial and informed investment decisions. The current chapter documents the methods and methodologies specifically described in chapter 1.

This chapter is structured as follows: section 3.2 presents the research methodology and design; section 3.3 population and sample size; section 3.4 data and data sources; section 3.5 outlines the limitations of the study and section 3.6 validity and reliability.

3.2. Research methodology and design

This research report is based on prior empirical methodologies conducted by Huang et al. (2012); Nana (2016) and Serfling (2014) respectively. This paper therefore adopted and modified prior research papers' quantitative regression analysis models in an attempt to assess correlations between CEO age and the [1] quality of financial reporting based on Huang et al. (2012) model and [2] volatility of the share price, based on the work of Nana (2016) and Serfling (2014).

Financial restatements were used as a basis for evaluating whether or not CEO age has an effect on the quality financial reporting i.e. error or misstatement, were considered as a breakdown in the quality of financial reporting and therefore seen to hinder financial legitimacy of an organisation (Aier et al., 2005; Arthaud-Day et al., 2006; Campbell & Yeung, 2016). The statistical analysis per this research report is twofold i.e. 1] the significance of the *individual variables* in relation to the validity of the respective model's *Null hypothesis [H_0]* and 2] the *combined analysis* of variables in relation to the respective model's *Null hypothesis [H_0]*. The significance of the respective variables of model 1 and 2, was assessed independently using ANOVA analysis in relation to 1] financial statement restatements and 2] share price volatility. Quantitative regression analysis models were used to assess the relationship between CEO's age and related variables [all respective model variables], *as defined in model 1 and 2*, in relation to model 1: *financial statement restatements* and model 2: *share price volatility* (Aier et al., 2005; Arthaud-Day et al., 2006). The results of the respective quantitative regression analysis models in turn, affirmed or disproved the main hypothesis i.e. as to whether or not CEO age affects the financial legitimacy of an organisation.

Similar to research by Cao et al. (2012), Huang et al. (2012); Nana (2016) and Serfling (2014), this report assessed legitimacy of financial statements through the assessment of [1] financial or economic indicators e.g. leverage effect; profitability ratios; etc.; [2] financing activities e.g. debt or equity etc. and [3] characteristic of leadership e.g. CEO age and tenure. However, as noted by Cao et al. (2012), such variables were often evaluated in isolation.

This research report is similar to Huang et al. (2012), but focused on identifying and evaluating variables specifically ring fenced to [1] CEO age; [2] market valuation of an organisation and [3] impact of financial restatement restatements, which are predicted to be key in the assessment of an organisation's financial legitimacy. The aim of this paper is to assess the effect of CEO age in relation to quality of financial reporting and the impact on the share price, therefore directly

tying back to the main problem as stated in Chapter 1 i.e. whether or not CEO age affects financial legitimacy of organisations.

3.2.1 The restate model

Financial statement restatements are identified as being the end product of poor financial reporting quality (Huang et al., 2012). The *restate* model i.e. model 1, used financial restatements as a proxy for poor financial quality. Per the literature review, the use of financial statement restatements as a proxy for poor financial reporting is a commonly applied approach e.g. Arthaud-Day et al. (2006); Cao et al. (2012) and Plumlee and Yohn (2010), and therefore appeared logically sound when applied in this paper.

This report is therefore modelled on the following abridged regression analysis based on the work of Huang et al. (2012).

$$RESTATE = B_0 + B_1 AGE + B_2 TENURE + B_3 LnMVE + B_4 MB + \epsilon$$

[Model -1]

Where the variables are defined as follow:
RESTATE = 1 if an organisation had reported a financial restatement otherwise 0;
AGE = is the CEO's age in the selected year of assessment;
TENURE = CEO tenure in years;
LnMVE = natural log of the organisation's price per share at financial year-end multiplied by the number of outstanding shares measured in millions of rand;
MB = market value of the shares [current share value] divided by the book value of the shares [financial share value];

This report specifically focused on the South African listed environment and hypothesised similar to Huang et al. (2012)'s research, that older CEOs are less likely to have financial statement restatements due to being more risk averse and

less likely to enter into highly uncertain business decisions (Li et al., 2014; Wan et al., 2015; Xie, 2015).

The key variables as per model 1:

Age: This report, in accordance with prior research by Huang et al. (2012), predicted that older CEOs are less likely to experience financial reporting restatements. In addition, the model predicted a *negative correlation* between CEO age and financial statement restatements.

TENURE was included to account for the impact of experience within the calculation, contrary to the initial model, experience was viewed as an enhancement of investor trust i.e. longevity of employment creates insight into business operations and promotes better business decisions, i.e. in accordance with the *Market Learning Model*, older CEOs invest more time in calculated decisions towards the later part of their employment (Scharfstein & Stein, 1990; Xie, 2015). Work by Cao et al. (2012); Penman (2003) also stated that longevity enhanced investor confidence, as such, low levels of share price volatility, since the element of trust is cultivated and attended to. Tenure is the result of the difference in years between the CEO start/appointment date and the 31st of December 2016. Where start dates are not readily available, such data points were excluded to ensure overall validity and fair representation of results in relation to the full population. This model predicted a *negative correlation* between CEO tenure and financial statement restatements i.e. tenure was seen to be synonymous with business insight and knowledge gained, resulting in good business practices.

LnMVE, is a natural log used as a measure to control for organisational size and *MB* is used to account for organisational growth; this in turn, is used as a basis for drawing comparisons across various sectors within a sample population (Huang et al., 2012). Market value and share price was

chosen as variables since their performance is directly dependent on the organisations' performance and ultimately, affects market sentiment/investor confidence and serves as the key driver for promoting/dissuading misstatement of financial statements i.e. the key contributor in terms of legitimate financial reporting (Aier et al., 2005; Cao et al., 2012; Huang et al., 2012; Penman, 2003; Serfling, 2014). This model therefore predicted a *positive correlation* between financial statement restatements versus MB and LnMVE respectively.

Overall, a financial statement restatement, signals a breakdown in controls and/or deviation from good corporate governance practices (Huang et al., 2012; Penman, 2003; Serfling, 2014).

3.2.2 The volatility model

The second regression model, investigates the correlation between CEO age and share price volatility.

$$Volatility = B_0 + B_1 AGE + B_2 TENURE + B_3 LnMVE + B_4 MB + B_5 ROA + B_6 Growth + B_7 Fin + B_8 EPR + B_9 COAGE + B_{10} OpLev + B_{11} D/E + B_{12} D/A + \varepsilon$$

[Model-2]

Where:

VOLATILITY = 1 if an organisation had reported volatility in their share price otherwise 0;

ROA = return on total assets (Huang et al., 2012);

Growth = sales growth percentage change financial year on year (Huang et al., 2012);

Fin= additional capital raised in respect of long term debt and equity i.e. 2014 compared to 2016 (Huang et al., 2012);

EPR = defined as earnings price ratio i.e. income from continuing operations divided by market capitalisation at the end of the year (Huang et al., 2012);

COAGE = organisation's age (Huang et al., 2012; Nana, 2016);

OpLev= operating income divided by sales (Nana, 2016; Serfling, 2014);

D/E = Debt divided by equity (Nana, 2016; Serfling, 2014) and

D/A = Debt divided by assets (Nana, 2016; Serfling, 2014).

Model 2 was based on the research performed by Nana (2016) and Serfling (2014), in respect of share price volatility and the variables associated with such movement. The key variables are [1] operating leverage; [2] book leverage defined as debt to equity and [3] book leverage or debt to assets ratio (Nana, 2016; Serfling, 2014). In addition, the model includes base control variables as per Huang et al. (2012), i.e. *MB, Growth* and *EPR* to represent an organisation's growth, which are indicative of any market pressures. As per Huang et al. (2012), these variables are included since high multiples of growth in earnings as well as book value could signal potential for misrepresentations due to performance pressures and demands.

<u>The key variables as per model 2:</u>

ROA, defined as the income before extraordinary items divided by the total book value of assets, assesses how well the organisation is utilising their resources in an attempt to generate utility income (Huang et al., 2012; Nana, 2016). This model predicts a *positive correlation* between share price volatility and ROA i.e. a greater ratio will result in investor confidence.

Fin component is included to aid in assessment of external funding raised in respect of issuing long-term debt and equity, since it creates a motive to manipulate financial earnings (Huang et al., 2012). Similar to ROA, this model predicts a *positive correlation* between share price volatility and *Fin*.

EPR is the net earnings due to ordinary shareholders i.e. a true reflection of an organisation's performance (Van de Wouw, 2016). This model therefore predicts a *positive correlation* between share price volatility and EPR.

COAGE is included as a measure to include the effect of long-term existence, to evaluate the impact of internal controls and good reporting quality on the volatility of the share price (Huang et al., 2012). *COAGE* is defined as the number of years in existence i.e. post organisation's IPO [Initial Public Offer], the longer an organisation's existence, the less volatility in the market i.e. it has proven to be a going concern (Nana, 2016). Therefore this model predicts a *positive correlation* between share price volatility and COAGE.

Operating leverage, is predicted to have a positive relation to the volatility of the share price and a higher leverage is expected in organisations which are managed by younger CEOs and will in turn, have a positive correlation in respect of the share price volatility [i.e. share price movement] (Aboody et al., 2014; Nana, 2016). This model therefore predicts a *positive correlation* between share price volatility and Operating leverage.

The two models in this research report combine CEO age [significant independent variable], quality of financial reporting and volatility of the share price through the assessment of key components which aid in affecting share price volatility and potential restatements.

3.3. Population and sample

The population is defined as the total JSE listed organisations extracted from the INET-BFA database. The year 2016 was identified as the pre-determined year of assessment, since the availability of CEO age, tenure and prior financial data is more current and readily available. The population consisted of all current

organisations per the INER-BFA database, organisations which were listed post December 2016 and organisations which were delisted up to 2016, were specifically excluded to ensure that the total sample population is representative of all actively listed organisations across various sectors up to December 2016. Organisations with no specific listing date were specifically excluded since the IPO [Initial public offer] date, which served as a basis for calculating the organisation's period of existence, could not be calculated. In addition, financial institutions, as defined by the JSE codes, are specifically excluded from the sample population in accordance with prior research methodology, for example, Huang et al. (2012); Serfling (2014) and Nana (2016). In addition, where organisations were repeated, such organisations were specifically excluded since inclusion would inflate the actual sample size and duplicate findings. Incomplete data sets were specifically excluded to ensure a complete representation of the sample population across all key variables.

Table 1 depicts a breakdown of the sample population. The sample base is used for the assessment of financial statement restatements and the share price volatility over a one year period i.e. 2016. The sample appears reasonable since the South African market is much smaller than the prior studied market i.e. USA in comparison to size. In addition, the sample is representative of the full listed database of the JSE as at 2016, which incorporates various sectors, financial year ends as well as organisations of various sizes which is therefore truly representative of the JSE full database of listed organisations. Per research done by Nana (2016) in respect of the relationship of CEO age and stock volatility i.e. Euronext market based research, the report was also limited to one year i.e. 2014, which had a total sample of 106 organisations, therefore the 110 sample size [as per Table 1 below] for JSE listed entities appears reasonable. In addition, Table 2 depicts the spread of the sample across the various industry groupings and is representative of the full JSE listed population. Of the 110 sample, 31 firms reported restatements in 2016, which pertained to 2016 as well as prior years. The mining industry grouping reported the most restatements contrary to the research which was conducted by Huang et al. (2012), i.e. within an American

market, mining had the lowest frequency of reported restatements. However, it should be noted that in this report, no differentiation is currently made between error and misstatements which is contrary to prior research, therefore not allowing a true comparison between the local and international markets at a granular base.

Table 1: Sample Selection

	Total Population as per INET - BFA JSE total listing extract	3 399
Less:	Organisations delisted up to 2016	-773
		2 626
Less:	Organisations with no listing date	-630
		1 996
Less:	Financial Institutions	-1 325
		671
Less:	Duplicate organisations on JSE	-119
		552
Less:	Missing data - Incomplete data source	-442
	Final sample to assess in terms of restatements and volatility	**110**

Table 2: Sample Selection grouped per nature Industry type

Classification	No restatement	Restatement	Grand Total
Chemicals	2	0	**2**
Computers	3	2	**5**
Durable Manufacturing	4	4	**8**
Food & Drinks	7	4	**11**
Healthcare	6	0	**6**
Mining and Construction	22	4	**26**
Real estate	12	4	**16**
Retail	3	0	**3**
Services	4	3	**7**
Telecommunications	3	1	**4**
Textiles and Printing	3	0	**3**
Transportation & Packaging	4	5	**9**
Travel & Entertainment	6	4	**10**
	79	**31**	**110**

3.4. Data and data sources

The INET-BFA and Bloomberg databases, both secondary data sources, were used in order to extract the sample population as well as variables directly associated with model 1 and 2 as defined in section 3.2 above. Data regarding financial statement information, as well as share price information is readily available from the INET-BFA database and CEO age is readily available from the Bloomberg database. Data in relation to financial statement restatements are extracted from the INET BFA database through the use of the following word searches – 'restatement' and 'restate', similar to the work of Watson and Rossouw (2012).

Where the categorisation relating listed organisations' sectors were not available, such information was extracted from the JSE website and matched back to INET-BFA information, based on the JSE organisation specific code.

3.5. Limitations of the study

Per Cram, Karan, and Stuart (2007), control over a sample is only obtained through adjusting for factors such as company's size and sector location, however the greater the control, the more specific the result. The two models used in this research report controlled for elements [1] organisations actively listed as at 31 December 2016, [2] financial year ends occurring in 2016 and [3] sector allocations, therefore was very limited in segmenting the total population (Cram et al., 2007; Huang et al., 2012).

Reliability of the two models could have been increased significantly if a greater sample size had been used i.e. it would increase external validity since it would be more accurate, limit variable variations and more representative of a larger population spread over various years (Nana, 2016). An increased sample size would result in increased validity, accuracy and would provide a fairer representation of the total population (Nana, 2016). The total sample selection was 110 organisations, for a one year period, which would have only captured

anomalies and best practices for organisations actively listed as at the end of 2016. In addition, an extended period would have created insight into patterns e.g. introduction of new laws/regulations; good practices; revised business principles, etc. In addition, such a broader spectrum would aid in validating the models' robustness.

3.6. Validity and reliability

Appendix 2 depicts the analysis and results in respect of the assessment of the variables of the models and whether or not the derived models are robust, valid and reliable. In addition, the assistance of an independent statistician was enlisted to assist with the modelling and ultimately, the review of the two models adopted in this research report. This section depicts an overall assessment of the validity and reliability of model 1 and model 2's variables in relation to the main and sub-problems.

3.6.1 Validity

Overall validity, per prior research, is defined as the extent to which the model actually measures or supports the theoretical rationales in relation to the appropriateness of interpretations and deductions based on test scores or results (Heale & Twycross, 2015; Messick, 1989; Winter, 2000). Validity was further considered in respect of 1) content validity and 2) external validity as per below.

3.6.1.1. Content validity

Prior research, depicts *content validity* as a measure of how well the test measures the hypothesis it intends to evaluate (Heale & Twycross, 2015). Per this research report, the full JSE main board listing for 2016 was considered as the initial population, inclusive of various CEOs as well as their respective ages, representative of both restating and non-restating organisations as well as the organisation's respective financial performances [link to share price volatility]. The overall population was

therefore inclusive of legitimate and illegitimate financial reporting organisations, the basis for assessing the link between CEO's age and the effect on an organisation's financial legitimacy.

3.6.1.2. External validity

External validity relates to the ability of performance (Heale & Twycross, 2015; Winter, 2000). The research was mimicked on prior research and used similar models, within the context of the American and Netherlands markets, therefore the proposed models appears reasonable to be used and external validity is therefore inferred (Huang et al., 2012; Nana, 2016; Serfling, 2014).

3.6.1.3. Predictive validity

This validity builds on "predictive" results i.e. the past correlations e.g. prior research would infer similar results for future studies (Heale & Twycross, 2015). In addition, predictive validity was built into this research report i.e. contrast results of this report against potential expected co-efficient, based on prior research (Huang et al., 2012; Nana, 2016; Serfling, 2014) to evaluate the validity of the result or alternatively seek validation from prior research which reported the alternative; refer to Chapter 5 for a detailed analysis and documentation.

3.6.2 Reliability

Reliability is inferred when results are stable and consistent when re-performed, furthermore consistency promotes validity due to re-performance yielding similar results (Heale & Twycross, 2015). This research report specifically focused on the element of internal reliability, in relation to assessing the equal split between what was being measured and what was not (Heale & Twycross, 2015). Per Chapter 4 results, an analysis of a split case was done between 1) restatement

versus non-restatement and 2) share price volatility versus non-volatility, for the respective variables in each model. The aim was to assess whether or not the variables pertaining to the respective sub-groupings were homogeneous [requirement for reliability] or heterogeneous. The respective variables were analysed to assess their internal consistencies in respect of model 1 and 2 (Heale & Twycross, 2015); refer to chapter 4 for the detailed analysis and discussion.

CHAPTER 4. PRESENTATION OF RESULTS

4.1. Introduction

ANOVA analysis was conducted to determine whether or not the inferred assumptions have a significant effect on the validity of the *Null hypothesis [H_0]*. This section further analyses whether or not there was statistically, a significant variance between the means of Model [1] and [2] sub-groupings i.e. restatement versus non-restatement [model 1] and volatility versus stability in share prices [model 2] respectively. Each of the two models were broken up into sub-populations/groupings to control for potential *Type I errors* i.e. inaccurately concluding on the significance of the effect of the independent variable on the overall model (Glass, Peckham, & Sanders, 1972; O'brien, 1979). The results were further validated through the performance of additional tests and the overall key objective was to determine whether or not the *Null hypothesis [H_0]* holds true i.e. that no statistical significance exists between the sub-grouped samples (Glass et al., 1972).

4.2. Results pertaining to model 1

The sample population in model 1 is represented of two distinct groupings i.e. restatements and non-restatements. Per model 1, as below, it was hypothesised that the following variables infer restatements.

$$RESTATE = B_0 + B_1 AGE + B_2 TENURE + B_3 LnMVE + B_4 MB + \epsilon$$

[Model -1]

4.2.1 CEO age in relation to restatements

$\underline{H_0}$*:* There is no significant variance between CEO's age per sub-groupings of restatement versus non-restating organisations

4.2.1.1. Variable and differences

The one way descriptive ANOVA results depict a *slightly higher mean* in relation to non-restate organisations [52.48] versus restating organisations [52.00]. Per the one-way restatement grouping graph [refer to figure 1 below] there is a close proximity between the restatement and non-restatement diamond formation, the width of the diamond's formation also represents a greater sample in respect of restating organisations versus non-restating organisations. In addition, figure 1, shows the standard error for non-restatements [0.78%] versus restating organisations [1.24%], therefore very little deviation from the respective means. The R-squared, in table 4, depicts a total fit of 0.000997 i.e. the result is closer placed to zero than to one (HR Statistics Pty Ltd, 2016) and therefore signals that CEO age does not depict a significant relationship to restatements equation as a whole.

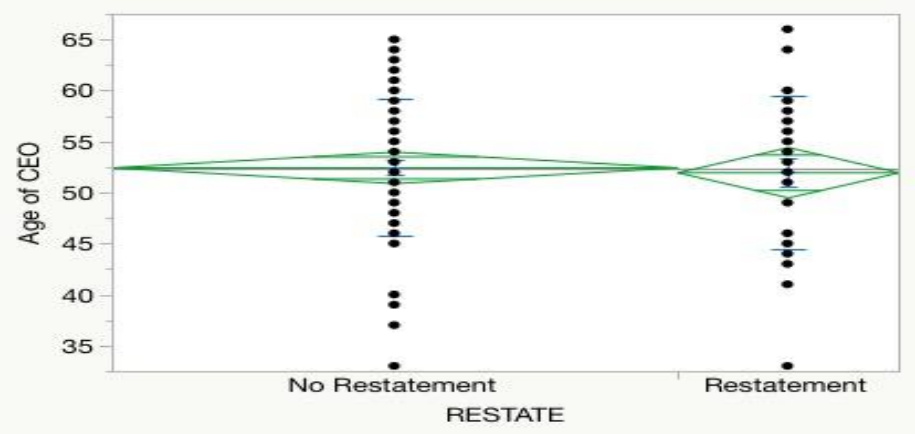


Figure 1: ANOVA restatement grouping

Table 3: Means of ANOVA grouping

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
No Restatement	79	52.481	0.778	50.939	54.023
Restatement	31	52	1.2419	49.538	54.462

Table 4: Summary of fit analysis

Rsquare	0.000997
Adj Rsquare	-0.00825
Root Mean Square Error	6.914639
Mean of Response	52.34545
Observations [or Sum Wgts]	110

4.2.1.2. Variable versus equality

The variance analysis plot [refer to figure 2] depicts that there was no significant variance between the standard deviations of CEO ages in association with restating [6.66, refer to table 5] and non-restating [7.54, refer to table 5] organisations, i.e. in both instance, the standard deviation is closely aligned to the restatement line, therefore affirms that there is no real variance in the sample groupings.

Figure 2: Variance analysis in terms of equal distribution



Table 5: Means and standard deviations

Level	Count	Std Dev	MeanAbsDif to Mean	MeanAbsDif to Median
No Restatement	79	6.659985	5.31229	5.253165
Restatement	31	7.536577	6.193548	6.16129

4.2.1.3. Variable versus nature

Five tests were run in order to assess the homogeneity in relation to CEO age and financial statement restatements. Per table 6, the P-values in all five instances were greater than 0.05 and infers that there was no significant difference between CEO age and financial statement restatements in terms of the sample sub-groupings. The Wilcox test resulted in a P-value >0.05 [0.75], therefore indicative that there was no statistical significance in terms of CEO age in relation to restatement and non-restatement organisations.

Table 6: Homogeneity analysis results

Test	F Ratio	DFNum	DFDen	P-value
O'Brien[.5]	0.724	1	108	0.3967
Brown-Forsythe	1.0666	1	108	0.304
Levene	1.07	1	108	0.3033
Bartlett	0.6777	1	.	0.4104
F Test 2-sided	1.2806	30	78	0.3848

Table 7: Wilcox/Kruskal-Wallis Test (Rank sums)

Level	Count	Score Sum	Expected Score	Score Mean	(!!! INVALID CITATION !!! ())/Std0
No Restatement	79	4431.5	4384.5	56.0949	0.309
Restatement	31	1673.5	1720.5	53.9839	-0.309

ChiSquare	DF	Prob>ChiSq
0.0978	1	0.7545

4.2.1.4. Conclusion

In respect of CEO age and financial statement restatements, the H_0, therefore holds true i.e. no significant variance between CEO ages in respect of restatements.

4.2.2 CEO tenure in relation to restatements

H_0: There is no significant variance between CEOs tenure per sub-groupings of restatement versus non-restating organisations

4.2.2.1. Variable and differences

Two rows were excluded i.e. CEOs who were founders, since tenure would be significantly higher and would impact on the validity of the results.

The means [refer to figure 3], per the ANOVA analysis in respect of CEO tenure, is not significantly different for restatement i.e. 1.72 years and no-restatements i.e. 1.49 years. In addition, the standard error, similar to CEO age versus restatements as per section 4.2.1 above, depicts a close proximity to the sub-sample's means grouping i.e. restatement organisations [0.22%] and non-restatement organisations [0.14%]. Table 9 depicts a total fit of 0.007, signalling that CEO tenure is not a significant variable in terms of the restatement prediction i.e. model [1].

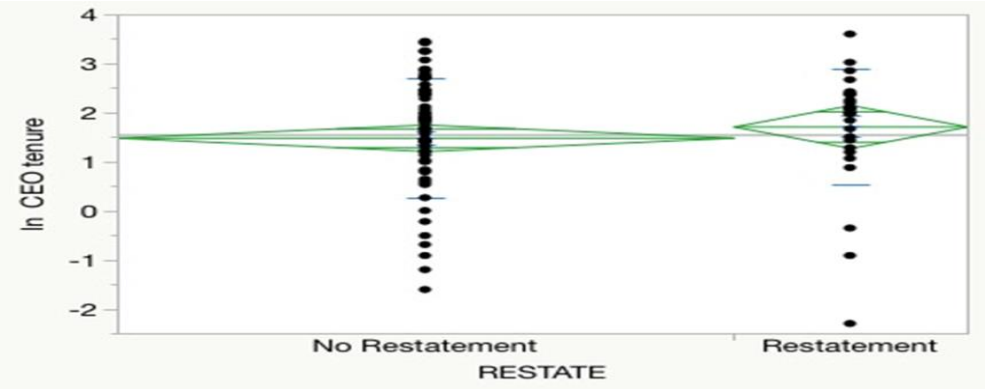


Figure 3: ANOVA restatement grouping

Table 8: Means of ANOVA grouping

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
No Restatement	79	1.48667	0.13611	1.2169	1.7565
Restatement	30	1.71612	0.22087	1.2783	2.154

Table 9: Summary of fit analysis

Rsquare	0.007257
Adj Rsquare	-0.00202
Root Mean Square Error	1.209771
Mean of Response	1.549823
Observations [or Sum Wgts]	109

4.2.2.2. Variable versus equality

Figure 4 depicts that standard deviations and means absolute difference to means for restating organisations [1.18, 0.82] and non-restating organisations [1.22, 0.94], is closely aligned to the standard deviation of the full sample i.e. 1.55 years of tenure. Therefore, there is no significant variance in the sub-grouping of the sample i.e. restating organisations versus non-restating organisations.



Figure 4: Variance analysis in terms of equal distribution

Table 10: Means and standard deviations

Level	Count	Std Dev	MeanAbsDif to Mean	MeanAbsDif to Median
No Restatement	79	1.220038	0.9385733	0.9129431
Restatement	30	1.181713	0.8158045	0.7496618

4.2.2.3. Variable versus nature

Table 11 depicts the results of the various homogeneity tests. The results depict P-values greater than 0.05. There is therefore no significant difference between CEO tenure and financial statement restatements. The Wilcox test P-value, reported as >0.05 [0.27], therefore, indicative that CEO tenure is not a significant variable in terms of assessing restate and non-restate organisations.

Table 11: Homogeneity analysis results

Test	F Ratio	DFNum	DFDen	P-value
O'Brien[.5]	0.027	1	107	0.8702
Brown-Forsythe	0.737	1	107	0.3925
Levene	0.523	1	107	0.4711
Bartlett	0.042	1	.	0.8374
F Test 2-sided	1.066	78	29	0.8742

Table 12: Wilcox/Kruskal-Wallis Test (Rank sums)

Level	Count	Score Sum	Expected Score	Score Mean	(Mean-Mean0)/Std0
No Restatement	79	4183	4345	52.9494	-1.096
Restatement	30	1812	1650	60.4	1.096

ChiSquare	DF	Prob>ChiSq
1.2084	1	0.2717

4.2.2.4. Conclusion

In respect of CEO tenure and financial statement restatements, the H_0 therefore holds true i.e. no significant variance between CEO tenure and financial restatements.

4.2.3 Market value of shares in relation to restatements

H_0: There is no significant variance between market value of shares as per sub-groupings of restatement versus non-restating organisations

4.2.3.1. Variable and differences

Two rows were excluded i.e. where market values were significantly higher than the mean of the population sub-grouping in order to ensure validity of results.

The means in respect of market value of shares depicts that restating organisations [i.e. 13.65, refer to table 13] are not materially different than that of non-restating organisations [i.e. 14.80 refer to table 13]. The R-squared [0.0345, as per table 14] depicts that the variable is not a significant component in the regression model i.e. only 3% of the variable is explained by regression model [1].

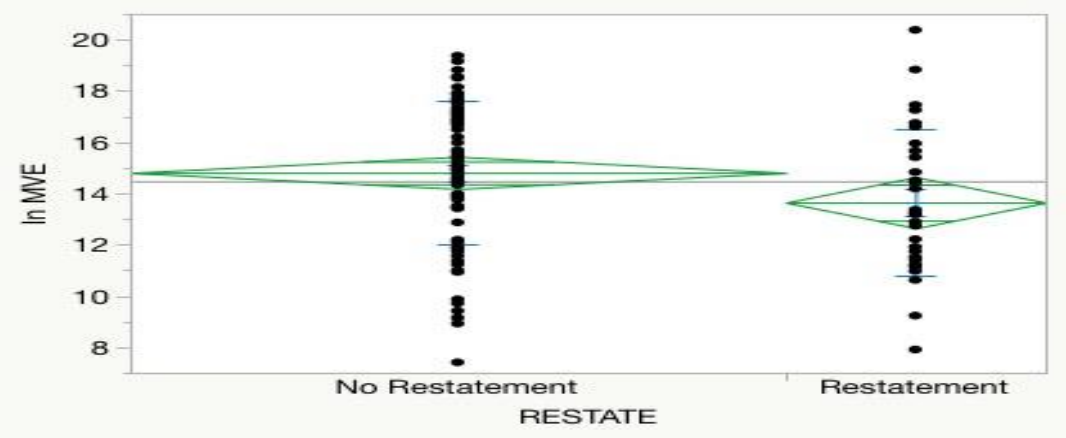


Figure 5: ANOVA restatement grouping

Table 13: Means of ANOVA grouping

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
No Restatement	78	14.8083	0.31682	14.18	15.436
Restatement	31	13.6459	0.50255	12.65	14.642

Table 14: Summary of fit analysis

Rsquare	0.034543
Adj Rsquare	0.02552
Root Mean Square Error	2.798062
Mean of Response	14.47769
Observations [or Sum Wgts]	109

4.2.3.2. Variable versus equality

Figure 6 depicts that standard deviations and means of absolute difference for restating organisations [2.84, 2.30 as per table 15] and non-restating organisations [2.78, 2.28 mill as per table 15], is closely aligned to the standard deviation of the full sample i.e. 2.8 for market share value. Therefore, there is no significant variance in the sub-grouping of the sample i.e. restating organisations versus non-restating organisations and indicative that the two sub-groupings are indeed equal in variance.



Figure 6: Variance analysis in terms of equal distribution

Table 15: Means and standard deviations

Level	Count	Std Dev	MeanAbsDif to Mean	MeanAbsDif to Median
No Restatement	78	2.78218	2.281167	2.2574
Restatement	31	2.838418	2.297014	2.265253

4.2.3.3. Variable versus nature

Table 16, the Levene test resulted in a P-value greater than 0.01 [p=0.96] which denotes that there is equal variance at a 99% confidence level. The Wilcox test P-value, reported as <0.05 [0.025 refer to table 17], therefore indicative that market value of shares is a significant variable in terms of assessing restatement and non-restatement organisations.

Table 16: Homogeneity analysis results

Test	F Ratio	DFNum	DFDen	P-value
O'Brien[.5]	0.0221	1	107	0.882
Brown-Forsythe	0.0005	1	107	0.9823
Levene	0.0022	1	107	0.9625
Bartlett	0.0172	1	.	0.8957
F Test 2-sided	1.0408	30	77	0.8604

Table 17: Wilcox/Kruskal-Wallis Test (Rank sums)

Level	Count	Score Sum	Expected Score	Score Mean	(Mean-Mean0)/Std0
No Restatement	78	4624	4290	59.2821	2.24
Restatement	31	1371	1705	44.2258	-2.24

ChiSquare	DF	Prob>ChiSq
5.033	1	0.0249*

4.2.3.4. Conclusion

The market value of shares has a direct influence on the restatement model, indicative of results as per the Wilcox/Kruskal-Wallis test in table 16. In addition, the H_0 holds true i.e. no significant variance between market value of share variables and financial restatements.

4.2.4 Market to book value ratio in relation to restatements

H_0: There is no significant variance between the markets to book value, as per sub-groupings of restatement, versus non-restating organisations.

4.2.4.1. Variable and differences

Two rows were excluded in order to ensure validity of results is not impaired through the inclusion of major outliers.

The results of ANOVA analysis depicts that the means and standard deviations of the market to book value ratios for restatement [-3.26; 0.68 as per table 18] and non-restatement [-3.54; 0.49 as per table 18] organisations are not statistically significantly different. Per table 19, an R-squared of 0.0497 depicts that the data fit regression model on average by 5%, indicative of no real relationship between market to book value and restatements.



Figure 7: ANOVA restatement grouping

Table 18: Means of ANOVA grouping

Level	Number	Mean	Std Dev	Std Err Mean	Lower 95%	Upper 95%
No Restatement	79	-3.5394	0.489103	0.05503	-3.649	-3.43
Restatement	31	-3.2626	0.682729	0.12262	-3.513	-3.012

Table 19: Summary of fit analysis

Rsquare	0.04967
Adj Rsquare	0.040871
Root Mean Square Error	0.549772
Mean of Response	-3.46139
Observations [or Sum Wgts]	110

4.2.4.2. Variable versus equality

Figure 8, depicts that standard deviations and means of absolute difference for restating organisations [0.49, 0.35] versus non-restating organisations [0.48, 0.36] are statistically different as indicated in table 20.

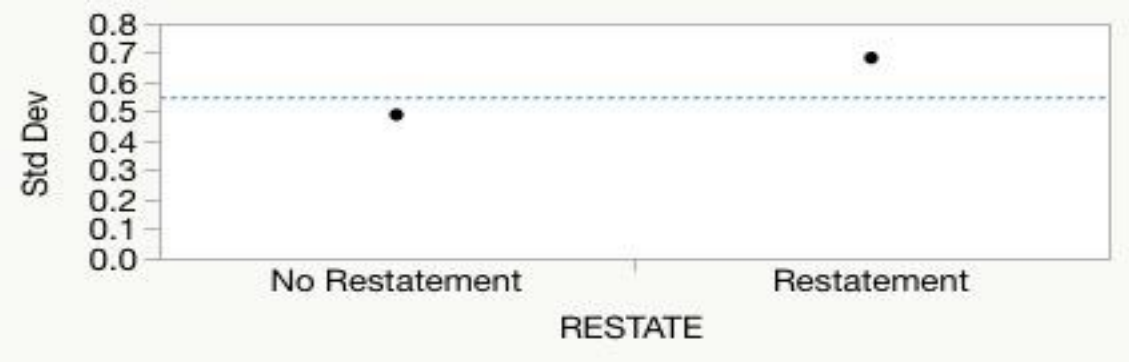


Figure 8: Variance analysis in terms of equal distribution

Table 20: Means and standard deviations

Level	Count	Std Dev	MeanAbsDif to Mean	MeanAbsDif to Median
No Restatement	79	0.489103	0.357154	0.3542441
Restatement	31	0.682729	0.529186	0.5055745

4.2.4.3. Variable versus nature

Per table 21, the Levene test resulted in a P-value less than 0.05 [p=0.0256] which signals unequal variance at a 95% confidence level. Similar for the Barlette and F2 sided tests, which resulted in a P-value < 0.05. Therefore the three tests rejects the H_0 and introduce a potential Type I error (Glass et al., 1972). The more robust Welsch test does not assume that variances are equal and specifically addresses the Type I error (Glass et al., 1972). Per table 22, the results of the Welsch test depicts a low P-value i.e. 0.0456, therefore affirming that the variances between the means are statistically unequal which aligns with the results of Levene, Barlette and F2 sided tests results, therefore voiding the H_0. In addition, the F-ratio is far greater than 1 which confirms that the H_0 is void and therefore the normal distribution curve does not hold true (Glass et al., 1972; HR Statistics Pty Ltd, 2016; O'brien, 1979). The Wilcox test was considered, due to it not requiring a normal distribution, the P-value was reported as <0.05 [0.0484], therefore indicative that market to book value of shares is a statistically significant variable in terms of model [1]. In addition, the Kruskal-Wallis test confirms the results of the Welch test i.e. P-value of 0.0480 [<0.05], therefore indicating a significant statistical variance in terms of market to book value.

Table 21: Homogeneity analysis results

Test	F Ratio	DFNum	DFDen	P-value
O'Brien[.5]	3.6192	1	108	0.0598
Brown-Forsythe	3.2902	1	108	0.0725
Levene	5.1251	1	108	0.0256*
Bartlett	5.1816	1	.	0.0228*
F Test 2-sided	1.9485	30	78	0.0201*

Table 22: Welch test

F Ratio	DFNum	DFDen	Prob > F
4.2422	1	42.635	0.0456*

Table 23: Wilcox/Kruskal-Wallis Test (Rank sums)

Level	Count	Score Sum	Expected Score	Score Mean	(Mean-Mean0)/Std0
No Restatement	79	4101	4384.5	51.9114	-1.974
Restatement	31	2004	1720.5	64.6452	1.974

ChiSquare	DF	Prob>ChiSq
3.9087	1	0.0480*

4.2.4.4. Conclusion

The market value to book ratio has a significant influence on the restatement model, indicative of results as per the Wilcox/Kruskal-Wallis test in table 23. In addition, the H_0 is void i.e. the variances in the two sub-groupings [i.e. restatement versus non-restatement organisations] are unequal.

4.3. Results pertaining to model 2

Model 2's sample population is represented by volatility and non-volatility in the share price. Per model 2, as below, it was hypothesised that the following variables infers share price volatility.

$$Volatility = B_0 + B_1 AGE + B_2 TENURE + B_3 LnMVE + B_4 MB + B_5 ROA + B_6 Growth + B_7 Fin + B_8 EPR + B_9 COAGE + B_{10} OpLev + B_{11\ D}/E + B_{12\ D}/A + \in$$

[Model-2]

4.3.1 ROA in relation to share price volatility

H_0: There is no significant variance between the ROA in relation to share price volatility versus non-volatility.

4.3.1.1. Variable and differences

The scatter plot [figure 9] represents a differentiation in terms of data spread as well as being indicative of means varying. In addition, the graph depicts major outliers in both the volatility versus non-volatility of data spread. The ANOVA analysis results further depicts the means and standard errors of non-price volatility [11.31, 1.13 as per table 21] and price volatility [-1.03; 2.43 as per table 21] therefore signalling that organisations are significantly different within the two sub-classifications. Per table 25, an R-squared of 0.1750 depicting that the data fit regression model varies on average by 17.49%, indicative of no real definitive relationship between ROA and price volatility.

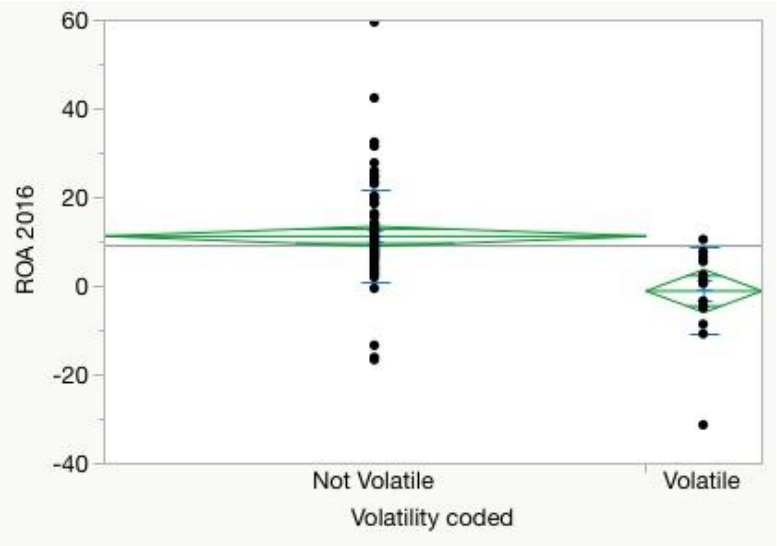


Figure 9: ANOVA restatement grouping

Table 24: Means of ANOVA grouping

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
Not Volatile	84	11.313	1.1257	9.08	13.547
Volatile	18	-1.028	2.4319	-5.853	3.796

Table 25: Summary of fit analysis

Rsquare	0.174986
Adj Rsquare	0.166736
Root Mean Square Error	10.31758
Mean of Response	9.135392
Observations [or Sum Wgts]	102

4.3.1.2. Variable versus equality

Figure 10, depicts that standard deviations and means in terms of ROA split into price and non-price volatility appears to be statistically different. In addition, table 26 depicts that there is statistically a slight variance between means as well as

standard deviation of price volatility [6.85, 9.57] and non-price volatility [6.74, 10.44] in respect of the ROA variable.

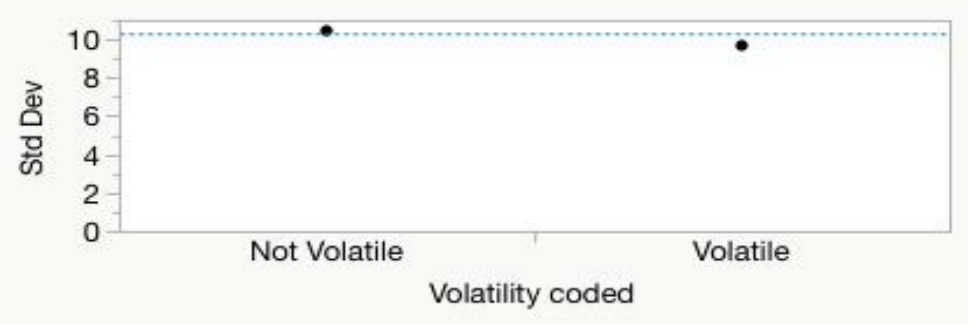


Figure 10: Variance analysis in terms of equal distribution

Table 26: Means and standard deviations

Level	Count	Std Dev	MeanAbsDif to Mean	MeanAbsDif to Median
Not Volatile	84	10.44357	6.731508	6.507381
Volatile	18	9.67894	6.85463	6.479444

4.3.1.3. Variable versus nature

Table 27, represents alternative tests and all P-values are > 0.05 which signals that the variances are not equal i.e. heterogeneity exits within the sub-groupings. The Welsh test, as per table 28, depicts a P-value of <0.05 [i.e. <0.0001], therefore affirming that the variances between two sub-groupings have statistically unequal means. In addition, the Kruskal-Wallis test revealed a P-value of <0.05, therefore indicating a significant statistical relationship to the model in terms of ROA between the two sub-groupings of the volatility model.

Table 27: Homogeneity analysis results

Test	F Ratio	DFNum	DFDen	P-value
O'Brien[.5]	0.0402	1	100	0.8416
Brown-Forsythe	0.0002	1	100	0.9895
Levene	0.0037	1	100	0.9513
Bartlett	0.1546	1	.	0.6942
F Test 2-sided	1.1642	83	17	0.7555

Table 28: Welch test

F Ratio	DFNum	DFDen	Prob > F
23.4226	1	26.206	<.0001*

Table 29: Wilcox/Kruskal-Wallis Test (Rank sums)

Level	Count	Score Sum	Expected Score	Score Mean	(Mean-Mean0)/Std0
Not Volatile	84	4887	4326	58.1786	4.92
Volatile	18	366	927	20.3333	-4.92

ChiSquare	DF	Prob>ChiSq
24.2513	1	<.0001*

4.3.1.4. Conclusion

The ROA has a significant influence on model 2, indicative of results as per the Wilcox/Kruskal-Wallis test in table 29 and the Welch test in table 28. In addition, the H_0 is void i.e. the variances in the two sub-groupings [i.e. volatility versus non-price volatility organisations] are unequal and therefore affirms the alternative hypothesis [H_2] i.e. ROA influences share price volatility.

4.3.2 Earnings growth % in relation to share price volatility

H_0: There is no significant variance between the earnings growth % in relation to share price volatility and non- share price volatility.

4.3.2.1. Variable and differences

Per figure 11 below, the diagrammatic representation of the two sub-groupings depicts a variance in respect of the means of the sub-groupings i.e. the mean of non-share price volatility [centred] is higher than that of share price volatility [below the centre]. Per the statistical results [table 30], the means and standard errors of the two sub-grouping i.e. volatility of share price [-0.63, 0.57] and non-volatile share price [0.24, 0.26] are statistically different and infers the two sub-

groupings are not equal. The results, per table 31, depicts an R-squared of 0.019, closer positioned to zero than one, as such shows no significant relationship to the model as a whole (HR Statistics Pty Ltd, 2016).

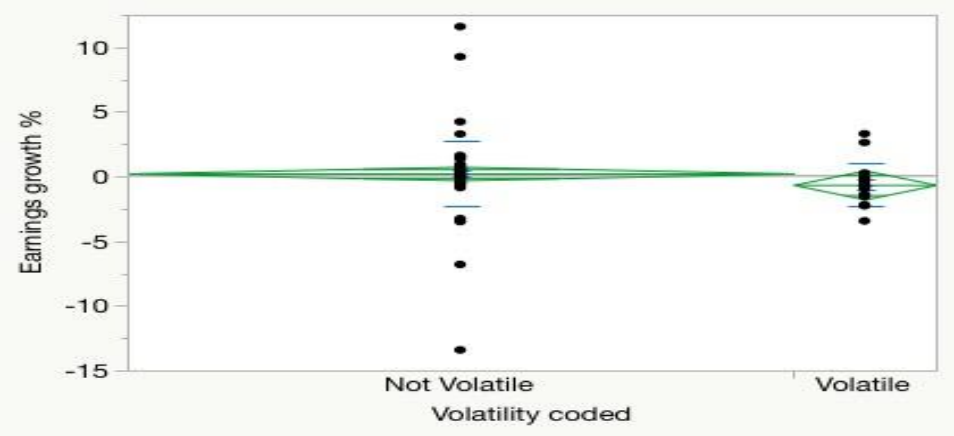


Figure 11: ANOVA restatement grouping

Table 30: Means of ANOVA grouping

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
Not Volatile	84	0.2431	0.26174	-0.276	0.76238
Volatile	18	-0.63889	0.56542	-1.761	0.48288

Table 31: Summary of fit analysis

Rsquare	0.019645
Adj Rsquare	0.009841
Root Mean Square Error	2.398866
Mean of Response	0.087451
Observations [or Sum Wgts]	102

4.3.2.2. Variable versus equality

Figure 12, clearly depicts a significant variance in the standard deviations. In addition, it is graphically presenting that the two sub-grouping i.e. volatility in the share price and non-volatility in the share price is statistically different, i.e. heterogeneity exists. Per table 32, the standard deviation varies significantly i.e. share price volatility [1.6] and non-share price volatility [2.53] in respect of the earnings growth variable.

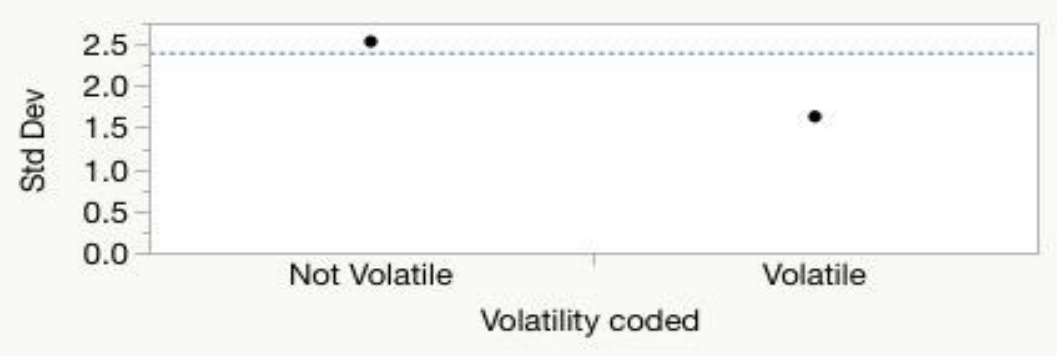


Figure 12: Variance analysis in terms of equal distribution

Table 32: Means and standard deviations

Level	Count	Std Dev	MeanAbsDif to Mean	MeanAbsDif to Median
Not Volatile	84	2.527721	1.018464	1.013095
Volatile	18	1.629464	1.109136	1.097778

4.3.2.3. Variable versus nature

Table 33, shows that the O'Brien, Brown-Forsyth and Bartlett tests resulted in P-values >0.05, indicative of the two sub-groupings being equal. However, the Bartlett and F Test 2-sided resulted in P-values <0.05, confirming what was noted and documented in section [i] and [ii] above i.e. the data in the sub-grouping are not equal. Therefore, affirming a potential Type I error and requires additional analysis (Glass et al., 1972). The extended Welch test revealed a P-value >0.05 and affirms that the two sub-groupings are statistically equal. The Kruskal-Wallis

test revealed a P-value of <0.05, therefore indicating a significant statistical relationship in terms of earning growth % and model 2.

Table 33: Homogeneity analysis results

Test	F Ratio	DFNum	DFDen	P-value
O'Brien[.5]	0.3409	1	100	0.5606
Brown-Forsythe	0.0227	1	100	0.8805
Levene	0.0261	1	100	0.8719
Bartlett	4.3751	1	.	0.0365*
F Test 2-sided	2.4064	83	17	0.0438*

Table 34: Welch test

F Ratio	DFNum	DFDen	Prob > F
3.4794	1	37.036	0.0701

Table 35: Wilcox/Kruskal-Wallis Test (Rank sums)

Level	Count	Score Sum	Expected Score	Score Mean	(Mean-Mean0)/Std0
Not Volatile	84	4746	4326	56.5	3.683
Volatile	18	507	927	28.1667	-3.683

ChiSquare	DF	Prob>ChiSq
13.5945	1	0.0002*

4.3.2.4. Conclusion

The earnings growth % analysis has indicated that the *Null hypothesis* [H_0] holds true i.e. the variances in the two sub-groupings [i.e. volatility versus non-price volatility organisations] are equal i.e. earnings growth does not influences share price volatility.

4.3.3 Return on Capital Employed [ROCE] in relation to share price volatility

H_0: There is no significant variance between the ROCE in relation to share price volatility versus non-volatility.

4.3.3.1. Variable and differences

The scatter plot [figure 13] depicts a variance between the means of the two sub-grouped populations in relation to ROCE. In addition, per table 36, the standard errors [non-volatility: 0.57, volatility: 1.24] and means [non-volatility: 0.14, volatility: -3.14], is indicative that the two sub-groupings are unequal. The overall ANOVA one-way summary fit analysis, depicts an R-squared of 0.054 [table 37], i.e. depicting that the data fit the model by 5.40 % (HR Statistics Pty Ltd, 2016).

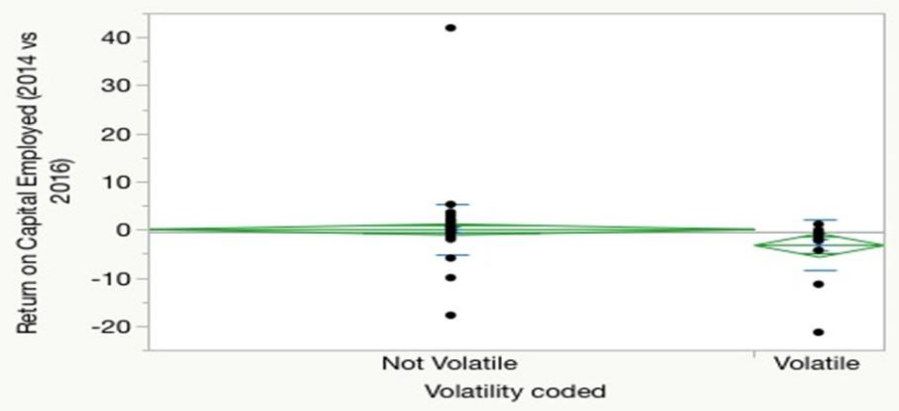


Figure 13: ANOVA restatement grouping

Table 36: Means of ANOVA grouping

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
Not Volatile	84	0.1423	0.5726	-0.994	1.278
Volatile	18	-3.1406	1.2369	-5.595	-0.686

Table 37: Summary of fit analysis

Rsquare	0.054826
Adj Rsquare	0.045374
Root Mean Square Error	5.247907
Mean of Response	-0.43706
Observations [or Sum Wgts]	102

4.3.3.2. Variable versus equality

Figure 14, depicts that there is no significant variance in the standard deviations and the means of the two sub-groupings. Table 38 confirms the initial analysis of figure 14 through statistically reporting standard deviations of 5.24 [no volatility in the share price] and 5.26 [volatility in the share price]. Table 38 also depicts a mean of 1.48 [no volatility in the share price] and 3.19 [volatility in the share price], which is not significantly different and as such, signalling that the two populations are equal.

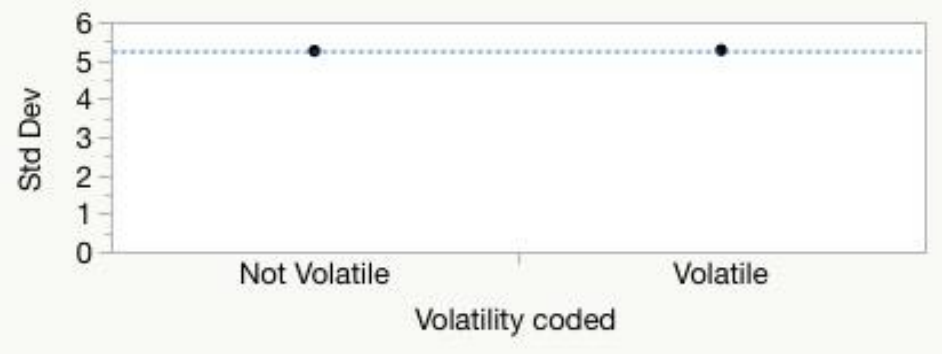


Figure 14: Variance analysis in terms of equal distribution

Table 38: Means and standard deviations

Level	Count	Std Dev	MeanAbsDif to Mean	MeanAbsDif to Median
Not Volatile	84	5.244222	1.479368	1.4125
Volatile	18	5.265859	3.191975	2.527222

4.3.3.3. Variable versus nature

Table 39 depicts that all P-values >0.05 indicative of the two sub-groupings are indeed equal. Wilcox test [table 40] resulted in a P-value <0.05 [0.0001*], therefore indicative that there is a significant statistical relationship in terms of ROCE in relation to volatility of the share price and non-volatility in the share price, as such, the variable is significant to the model.

Table 39: Homogeneity analysis results

Test	F Ratio	DFNum	DFDen	P-value
O'Brien[.5]	0	1	100	0.9962
Brown-Forsythe	0.7238	1	100	0.3969
Levene	1.8216	1	100	0.1802
Bartlett	0.0005	1	.	0.9827
F Test 2-sided	1.0083	17	83	0.9164

Table 40: Wilcox/Kruskal-Wallis Test (Rank sums)

Level	Count	Score Sum	Expected Score	Score Mean	(Mean-Mean0)/Std0
Not Volatile	84	4891.5	4326	58.2321	4.96
Volatile	18	361.5	927	20.0833	-4.96

ChiSquare	DF	Prob>ChiSq
24.6449	1	<.0001*

4.3.3.4. Conclusion

The ROCE analysis has indicated H_0 holds true i.e. the variances in the two sub-groupings [i.e. volatility versus non-price volatility organisations] are equal.

4.3.4 Earnings / Share [EPR] in relation to share price volatility

H_0: There is no significant variance between the EPR in relation to share price volatility and non- share price volatility.

4.3.4.1. Variable and differences

Per figure 15 below, the diagrammatic representation shows that the two sub-groupings appears to be different. Table 41 depicts means of 410.24 [non-price volatility] and 212.42 [share price volatility], indicative of two sub-populations not being equal.

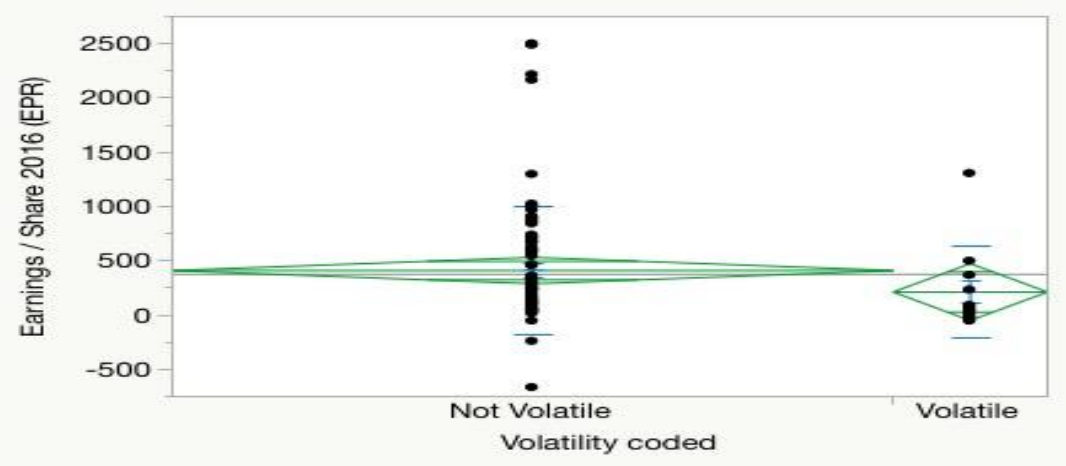


Figure 15: ANOVA restatement grouping

Table 41: Means of ANOVA grouping

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
Not Volatile	84	410.243	61.14	289	531.53
Volatile	18	212.419	132.07	-49.6	474.44

Table 42: Summary of fit analysis

Rsquare	0.018142
Adj Rsquare	0.008324
Root Mean Square Error	560.3151
Mean of Response	375.3328
Observations [or Sum Wgts]	102

4.3.4.2. Variable versus equality

Figure 16, confirms that there is a significant variance in the standard deviations and the means of the two sub-groupings. Table 43 depicts a standard deviations of 584.54 [no volatility in the share price] and 422.52 [volatility in the share price] thereby confirming that the sub-populations are not equal.

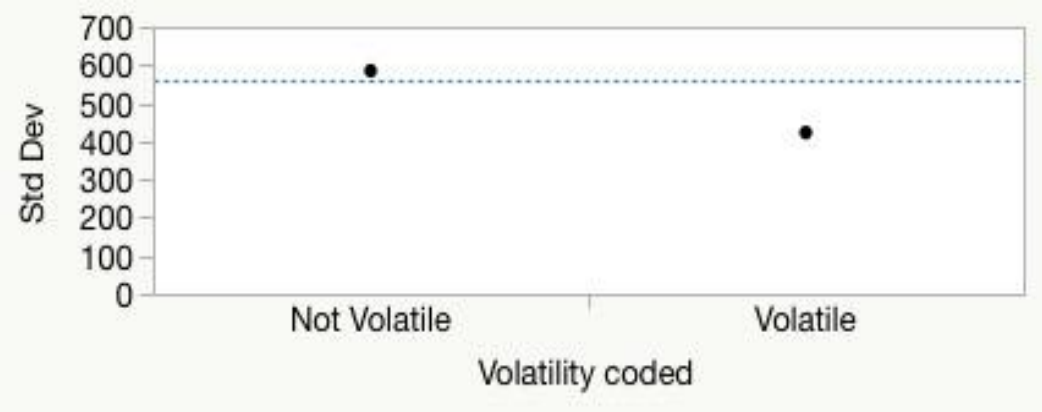


Figure 16: Variance analysis in terms of equal distribution

Table 43: Means and standard deviations

Level	Count	Std Dev	MeanAbsDif to Mean	MeanAbsDif to Median
Not Volatile	84	584.5412	410.7563	363.0568
Volatile	18	422.539	291.9295	226.7444

4.3.4.3. Variable versus nature

Per the results of the various test analysis, summarised in Table 44, all P-values >0.05 which is indicative that the two sub-groupings are equal. To prevent Type I error from being observed, the Wilcox test [table 45] was run and it resulted in a P-value <0.05 [0.0070*], therefore indicative that there is significant statistical relationship in terms of EPR in relation to volatility of the share price and non-volatility in the share price.

Table 44: Homogeneity analysis results

Test	F Ratio	DFNum	DFDen	P-value
O'Brien[.5]	0.5904	1	100	0.4441
Brown-Forsythe	1.1307	1	100	0.2902
Levene	1.3341	1	100	0.2508
Bartlett	2.5179	1	.	0.1126
F Test 2-sided	1.9138	83	17	0.1312

Table 45: Wilcox/Kruskal-Wallis Test (Rank sums)

Level	Count	Score Sum	Expected Score	Score Mean	(Mean-Mean0)/Std0
Not Volatile	84	4633	4326	55.1548	2.69
Volatile	18	620	927	34.4444	-2.69

ChiSquare	DF	Prob>ChiSq
7.2623	1	0.0070*

4.3.4.4. Conclusion

EPR statistical analysis had confirmed that the H_0 is void i.e. the variances in the two sub-groupings [i.e. volatility versus non-price volatility organisations] are not equal.

4.3.5 Age of Firm in relation to share price volatility

H_0: There is no significant variance between the existence of organisations i.e. age of firm, in relation to share price volatility and non- share price volatility.

4.3.5.1. Variable and differences

Figure 17, graphically depicts that the means and standard errors of the sub-groupings pertaining to age of firm in relation to share price volatility are different. In addition, there are a few outliers i.e. four data points which are adversely affecting the results. Per table 46, the means [28.93, 10.94] and standard errors

[2.22, 4.81] are indeed statistically different. Table 47 depicts an R-squared of 0.02 i.e. depicting an insignificant relation to the model.

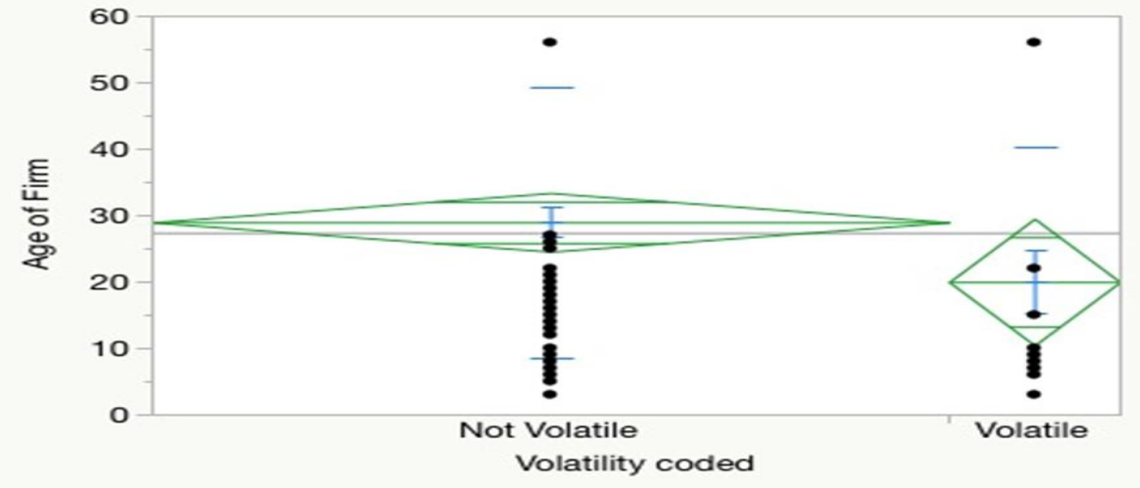


Figure 17: ANOVA restatement grouping

Table 46: Means of ANOVA grouping

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
Not Volatile	84	28.9286	2.2244	24.515	33.342
Volatile	18	19.9444	4.8052	10.411	29.478

Table 47: Summary of fit analysis

Rsquare	0.027982
Adj Rsquare	0.018262
Root Mean Square Error	20.38689
Mean of Response	27.34314
Observations [or Sum Wgts]	102

4.3.5.2. Variable versus equality

Figure 18, depicts an insignificant variance in the standard deviations and means of the two sub-groupings. In addition, Table 48 affirms the diagrammatic representation i.e. standard deviations of 20.40 [no volatility in the share price] and 20.30 [volatility in the share price] thereby signalling that the sub-populations are equal.

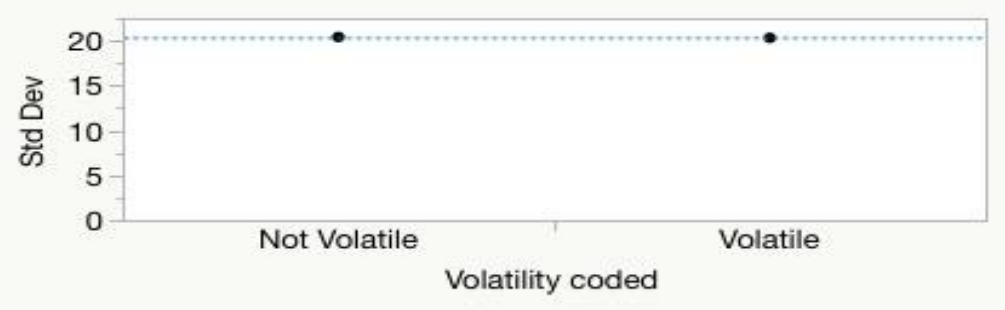


Figure 18: Variance analysis in terms of equal distribution

Table 48: Means and standard deviations

Level	Count	Std Dev	MeanAbsDif to Mean	MeanAbsDif to Median
Not Volatile	84	20.40304	18.69218	16.78571
Volatile	18	20.30784	16.25309	12.94444

4.3.5.3. Variable versus nature

The various test analysis, summarised in Table 49, depicts that all P-values are >0.05 indicative that the two sub-groupings are equal. However there is a potential for a Type I error (Glass et al., 1972) to occur, as such, the Wilcox test [table 50] was run. The test resulted in a P-value <0.05 [0.0162*], therefore there is a significant statistical relationship in terms of the volatility of the share price, non-volatility in the share price in terms of age of firms.

Table 49: Homogeneity analysis results

Test	F Ratio	DFNum	DFDen	P-value
O'Brien[.5]	0.0019	1	100	0.9653
Brown-Forsythe	0.9066	1	100	0.3433
Levene	1.1824	1	100	0.2795
Bartlett	0.0006	1	.	0.9804
F Test 2-sided	1.0094	83	17	1

Table 50: Wilcox/Kruskal-Wallis Test (Rank sums)

Level	Count	Score Sum	Expected Score	Score Mean	(Mean-Mean0)/Std0
Not Volatile	84	4595	4326	54.7024	2.4
Volatile	18	658	927	36.5556	-2.4

ChiSquare	DF	Prob>ChiSq
5.7803	1	0.0162*

4.3.5.4. Conclusion

The H_0 holds true i.e. the variances in the two sub-groupings [i.e. volatility versus non-price volatility organisations] are equal. In addition, the variances have a significant statistical relationship between the two sub-groupings.

4.3.6 Operating Profit Margin % in relation to share price volatility

H_0: There is no statistical variance between the operating profit margin %, in relation to share price volatility and non- share price volatility.

4.3.6.1. Variable and differences

Figure 19, graphically depicts that the means and standard errors of the sub-groupings are different. In addition, the sub-populations contain major outliers and create distorted means and standard deviations. Table 51 affirmed the graphical representation of figure 19 i.e. means [20.999, -6.80] and standard errors [4.65, 10.08] are indeed statistically different. The ANOVA analysis depicts

an R-squared of 0.06 i.e. depicting that Operating Profit Margin %, has an insignificant relationship with the model.

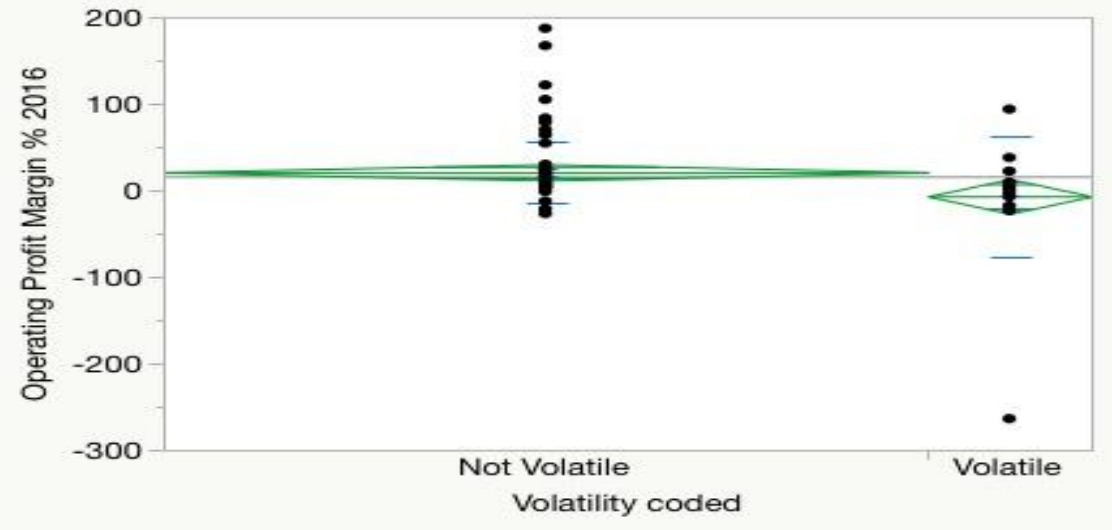


Figure 19: ANOVA restatement grouping

Table 51: Means of ANOVA grouping

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
Not Volatile	84	20.999	4.665	11.74	30.254
Volatile	18	-6.795	10.077	-26.79	13.198

Table 52: Summary of fit analysis

Rsquare	0.058953
Adj Rsquare	0.049543
Root Mean Square Error	42.75472
Mean of Response	16.09451
Observations [or Sum Wgts]	102

4.3.6.2. Variable versus equality

Figure 20 confirms the analysis above i.e. the two sub-groupings are statistically different. Table 53 results shows that the absolute means are different [21.11, 33.08] and nullifies the H_0.

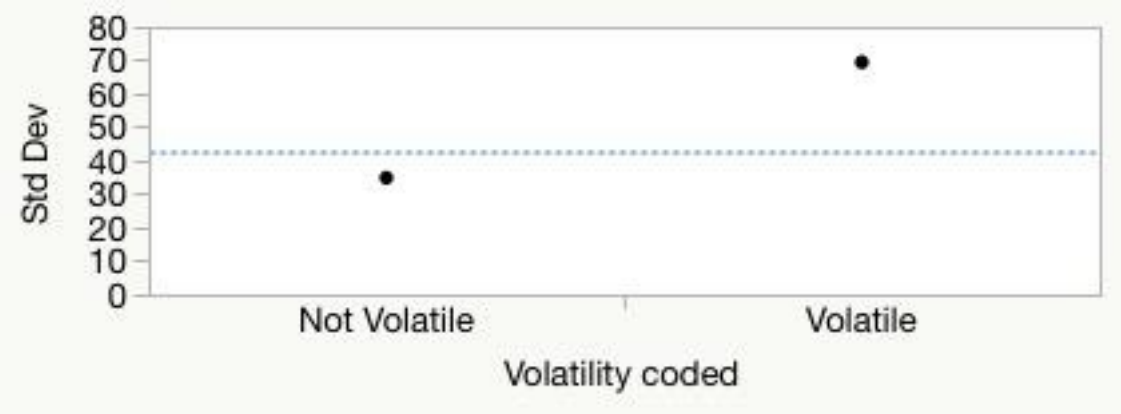


Figure 20: Variance analysis in terms of equal distribution

Table 53: Means and standard deviations

Level	Count	Std Dev	MeanAbsDif to Mean	MeanAbsDif to Median
Not Volatile	84	34.8604	21.11979	17.47821
Volatile	18	69.42242	33.08278	30.98611

4.3.6.3. Variable versus nature

The various test analysis, summarised in Table 54, depicts that all P-values are >0.05 indicative that the two sub-groupings are equal. However, there is a potential Type I error (Glass et al., 1972). The Wilcox/Kruskal-Wallis Test addresses this potential Type I error, and results show a P-value of 0.0096, therefore there is a significant relationship between Operating Profit Margin % and model 2.

Table 54: Homogeneity analysis results

Test	F Ratio	DFNum	DFDen	P-value
O'Brien[.5]	3.0772	1	100	0.0825
Brown-Forsythe	1.7879	1	100	0.1842
Levene	1.6887	1	100	0.1968
Bartlett	17.0583	1	.	<.0001*
F Test 2-sided	3.9658	17	83	<.0001*

Table 55: Wilcox/Kruskal-Wallis Test (Rank sums)

Level Table	Count	Score Sum	Expected Score	Score Mean	(Mean-Mean0)/Std0
Not Volatile	84	4621	4326	55.0119	2.585
Volatile	18	632	927	35.1111	-2.585

ChiSquare	DF	Prob>ChiSq
6.7057	1	0.0096*

4.3.6.4. Conclusion

The H_0 is void, i.e. the variances, means and standard errors, within the two sub-groupings [i.e. volatility versus non-price volatility organisations] are unequal. In addition, the variances have a significant statistical relationship between the two sub-groupings.

4.3.7 Debt / Assets [D/A] in relation to share price volatility

H_0: There is no statistical variance between D/A in relation to share price volatility and non- share price volatility.

4.3.7.1. Variable and differences

Figure 21, graphically depicts that the means and standard errors of the sub-groupings do not appear to be statistically different. This is confirmed with the ANOVA analysis results, table 56 i.e. mean of and deviations [0.49, 0.41] and

standard errors [0.03, 0.06]. In addition, the sub-populations contain major outliers and create distortion in the final statistical results. The R-square per table 57 is reflecting that the variable only fits the model by 2%.

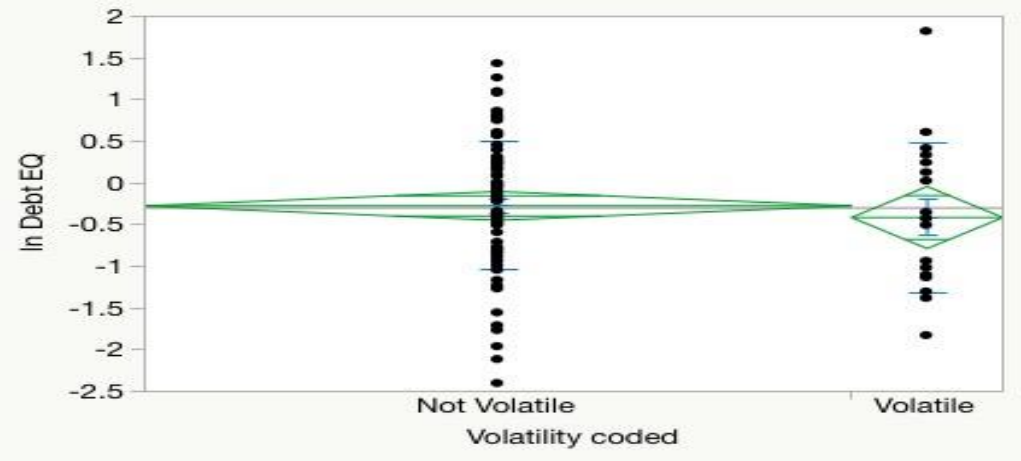


Figure 21: ANOVA restatement grouping

Table 56: Means of ANOVA grouping

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
Not Volatile	84	0.495238	0.02573	0.44419	0.54629
Volatile	18	0.408333	0.05558	0.29806	0.51861

Table 57: Summary of fit analysis

Rsquare	0.019735
Adj Rsquare	0.009932
Root Mean Square Error	0.235817
Mean of Response	0.479902
Observations [or Sum Wgts]	102

4.3.7.2. Variables versus equality

Figure 22, however, graphically depicts that there is a variance between the two sub-grouping and the results of testing whether or not the variance are equal i.e. table 58 depicts that the means and standard deviations are not significantly different, therefore the sub-groupings are statistically equal. Therefore, validating the null hypothesis [H_0].

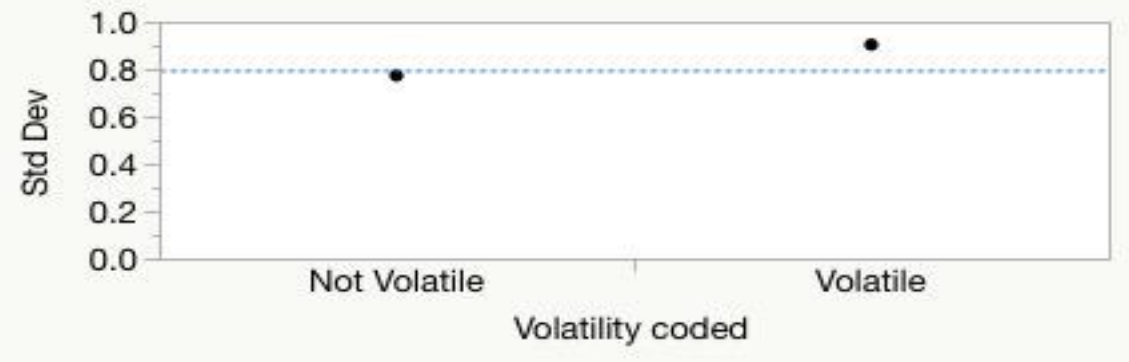


Figure 22: Variance analysis in terms of equal distribution

Table 58: Means and standard deviations

Level	Count	Std Dev	MeanAbsDif to Mean	MeanAbsDif to Median
Not Volatile	84	0.240984	0.1875397	0.185
Volatile	18	0.208757	0.1762963	0.1761111

4.3.7.3. Variable versus nature

The variable test analysis, summarised in Table 59, depicts that all P-values are >0.05, indicative that the two sub-groupings are equal, which is in contradiction to earlier analysis. The results' of the Wilcox/Kruskal-Wallis test, shows a P-value of >0.05, therefore no significant relationship between D/A and model 2.

Table 59: Homogeneity analysis results

Test	F Ratio	DFNum	DFDen	P-value
O'Brien[.5]	0.3194	1	100	0.5732
Brown-Forsythe	0.0517	1	100	0.8206
Levene	0.0915	1	100	0.7629
Bartlett	0.5347	1	.	0.4646
F Test 2-sided	1.3326	83	17	0.5153

Table 60: Wilcox/Kruskal-Wallis Test (Rank sums)

Level	Count	Score Sum	Expected Score	Score Mean	(Mean-Mean0)/Std0
Not Volatile	84	4471.5	4326	53.2321	1.273
Volatile	18	781.5	927	43.4167	-1.273

ChiSquare	DF	Prob>ChiSq
1.6321	1	0.2014

4.3.7.4. Conclusion

The H_0 holds true i.e. the variances, means and standard errors, within the two sub-groupings [i.e. volatility versus non-price volatility organisations] are equal. In addition, the variances do not have a significant statistical relationship between the two sub-groupings.

CHAPTER 5. DISCUSSION OF THE RESULTS

5.1. Introduction

This paper is based on two null hypotheses defined as, [H_1] older CEOs are less likely to have financial restatements and [H_2] older CEOs are less likely to experience share price volatility within a South African listed environment. The period sample population was limited to 2016 due the availability of CEO age, tenure and prior financial data availability. Two models were derived from prior empirical methodologies conducted by Huang et al. (2012); Nana (2016) and Serfling (2014) respectively. This chapter specifically focuses on the analysis of the results pertaining to the two logistic models in relation to the respective hypotheses.

5.2. Discussion Model 1: Organisations with older CEOs are less likely to have financial restatements [H_1], *alternatively* CEO age is statistically insignificant in terms of financial restatements [H_{a1}] within a South African context.

$$RESTATE = B_0 + B_1 AGE + B_2 TENURE + B_3 LnMVE + B_4 MB + \epsilon$$

[Model -1]

Where the variables are defined as follow:

RESTATE = 1 if an organisation had reported a financial restatement otherwise 0;

AGE = is the CEO's age in the selected year of assessment;

TENURE = CEO tenure in years;

LnMVE = natural log of the organisation's price per share at financial year-end multiplied by the number of outstanding shares measured in millions of rand;

MB = market value of the shares [current share value] divided by the book value of the shares [financial share value];

5.2.1 Model 1: ANOVA summary of variables analysed.

The overall analysis of the respective variables, refer to *Chapter 4.2*, may be summarised as per table 61. The initial ANOVA one-way analysis of the pre-identified variables has signalled that the market to book value [1] voids the H_0, [2] depicts significant variances between means and standard deviations and [3] displays that sub-grouping variances are unequal. In addition, only the market values of shares and market value to book value ratio displayed a significant relationship in terms of the regression analysis assessment. For CEO Age, CEO tenure and Market value of shares displayed [1] the H_0 holds true i.e. there is a significant variance between the variables of sub-groupings, [2] no significant variance between means as well as standard deviations and variances in sub-groupings are equal.

Table 61: Variance analysis in terms of equal distribution

	CEO Age	CEO tenure	Market value of shares	Market to book value ratio
H_0 hold true	Yes	Yes	Yes	No
No significant variance between means and standard deviations	Yes	Yes	Yes	No
Variances in sub-groupings are equal	Yes	Yes	Yes	No
Variable fits regression model	No	No	Yes	Yes

5.2.2 Overall Evaluation: Model 1

The below LogWorth table [Figure 23], depicts that the four identified variables i.e. [1] market to book value per share [tMB]; [2] Market value of shares [tMVE]; [3] Age of CEOs and [4] CEO tenure in relation to *H_1: Organisations with older CEOs are less likely to have financial restatements.*

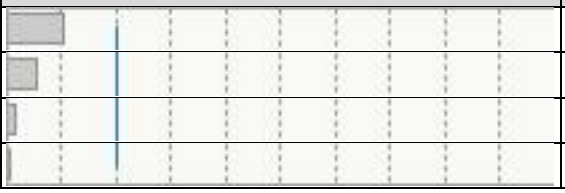
Source	LogWorth		PValue
tMB	1.025		0.09430
tMVE	0.551		0.28104
Age of CEO	0.153		0.70344
tCEOtenure	0.055		0.88116

Figure 23: Overall LogWorth results of Model 1

In addition, the overall results of the model are summarised in *table 5.2.1.2*: *Likelihood Ratio analysis* and 5*.2.1.3: Fit-Analysis* per below. The *Likelihood Ratio analysis [Table 63]* of the overall model resulted in a P-value of > 0.05 [0.22] and therefore depicts an insignificant statistical association in relation to the variables and the outcome of model 1, at a confidence level of 95% (HR Statistics Pty Ltd, 2015). The results of the *Fit analysis [Table: 64]* depict an unadjusted R-square of 0.043 i.e. model 1 only explains 4.29% in respect of hypothesis 1: *Organisations with older CEOs are less likely to have financial restatements* i.e. no real correlation due to R-square being closely situated to zero (HR Statistics Pty Ltd, 2015).

Table 62: Likelihood Ratio Analysis

Model	-LogLikelihood	DF	ChiSquare	Prob>ChiSq
Difference	2.842775	4	5.68555	0.2239
Full	63.483228			
Reduced	66.326003			

Table 63: Fit Analysis

RSquare	0.0429
AICc	137.543
BIC	150.469
Observations (or Sum Wgts)	10

5.2.2.1. Overall results

Overall *figure 23,* depicts the significance of the identified variables in relation to Model 1. Per the results, in *figure 23*, all variables resulted in LogWorths below the "statistical significance indicators" of 2, as well as P-values >0.05, therefore variables are not statically significant and the H_0 may not be rejected (HR Statistics Pty Ltd, 2015). The respective LogWorth and P-value results are as follow, tMB [1.025, 0.09]; tMVE [0.551, 0.28]; Age of CEO [0.153, 0.70] and tCEOtenure [0.055, 0.88]. The only result which is closely situated to the LogWorth's point of significance is the tMB [1.025] variable. In addition, the P-value of the tMB variable i.e. at 0.09, is not materially different from the P-value significance indicator i.e. P-values < 0.05 (HR Statistics Pty Ltd, 2015).

5.2.2.2. Comparison to prior research

Model 1 was based on the research conducted by Huang et al. (2012), which particularly focused on the American market whereas this report specifically focused on the South African listed environment. In contrast to the findings in this research report, Huang et al. (2012)'s results showed that CEO's age and tMVE are significant variables in terms of predicting financial statement restatements i.e. their P-values were <0.05. In addition, the results of this research report shows that tMB is more significant [i.e. p<0.05] than other variables within model 1 in terms of predicting financial statement restatements i.e. at a P-value of 0.09.

The variance in results largely stems from the characteristics of South African versus the American market i.e. South Africa is classified as a developing market; it is classified in a higher risk category; local organisations are not governed by the Sarbanes Oxley [i.e. stringent qualitative measures to ensure qualitative reporting, unless duly listed] and the market size is significantly smaller in comparison to America. In addition, the final sample for this report was 110 versus 2402 as per Huang et al. (2012)'s research, therefore more persuasive evidence in the latter due to a larger sample size. This research report was ring fenced to one year i.e. 2016, whereas Huang et al. (2012) covered a period from

2005-2008. It should be noted that one year was selected to prevent results from being duplicated and in turn placing over-reliance on conclusions derived. In addition, the South African listed environment sample depicted a far less fully diverse/representative CEO age distribution i.e. more aged CEOs, which is in contrast to prior research conducted within the listed American market context (Huang et al., 2012).

5.2.3 Overall Goodness to fit analysis: Model 1

The goodness to fit test result's depicts that the P-value is >0.05 [i.e. 0.071], table 65, and therefore affirms that the relationship between model 1 and the defined variables appear reasonable however there is not enough evidence to conclude lack *of fit,* based on the current sample size (PennState, 2018).

Table 64: Goodness to fit analysis

Source	DF	-LogLikelihood	ChiSquare
Lack Of Fit	105	63.483228	126.9665
Saturated	109	0	**Prob>ChiSq**
Fitted	4	63.483228	0.0712

5.2.4 Overall variable analysis of Model 1

Per *table 66,* Model 1 may be summarised as follow

0.5350 + 0.0132*Age of CEO - 0.0510*tCEOtenure + 0.8752*tMVE - 3.229*tMB

Table 65: Parameter estimates per Tobin's Q

Term	Estimate	Std Error	ChiSquare	Prob>ChiSq	Lower 95%	Upper 95%
Intercept	0.53504	3.0140836	0.03	0.8591	-5.224371	6.9331204
Age of CEO	0.01321	0.0346583	0.15	0.7031	-0.05561	0.0814493
tCEOtenure	-0.05101	0.3412373	0.02	0.8812	-0.725643	0.622611
tMVE	0.87516	0.8109249	1.16	0.2805	-0.727322	2.4901875
tMB	-3.22887	2.080829	2.41	0.1207	-8.268213	0.5443203

Table 66: Summary of expected co-efficient

	Prediction as per Huang et al. [2012] research	Results per Huang et al. [2012]	Co-Efficient per Model 1
Age of CEO	-	-	+
tCEOtenure	+	+	-
tMVE	+	-	+
tMB	+	-	-

5.2.4.1. Overall results

Per table 66 results, the P-values of the various variables are all > 0.05 at a confidence level of 95 % i.e. Age of CEO [0.70]; tCEO tenure [0.88]; tMVE [0.28] and tMB [0.12]. Based on the results of the P-value, all variables appear statistical insignificant in relation to model 1.

5.2.4.2. Comparison to prior research

Per the following summary of the comparisons between Huang et al. (2012) and model 1's final result i.e.

a. tMB co-efficient sign has an inverse relationship i.e. variable has a negative relationship in relation to the overall financial statement restatement per model 1. The results of model 1 and research by Huang et al. (2012) is therefore aligned, however it contradicts prior research e.g. Abbott et al. (2004), which resulted in a positive co-efficient between tMB and financial statement restatements.

b. Age of CEO; tCEOtenure and tMVE has a positive relationship in respect of results from a South African market versus American market.

CEO Age: Results from table 66 indicates that as a CEO ages, the likeliness of financial restatements increases; as such, a decrease in the quality or legitimacy of financial reporting. This is in contravention with expectations, as well as research conducted by Huang et al. (2012). The results are indicative of the current economic environment within this evolving third world, which results in market demands for huge organisational performance and bottom line deliverables to compensate for the high risk levels (Abbott et al., 2004; Nana, 2016). Prior research had shown that within the American market, an older CEO is more risk averse when it comes to investment decisions, which leads to improved financial quality reporting, i.e. less judgement and estimates applied (Huang et al., 2012; Serfling, 2014). Per the literature review in chapter 2 of this research report, Huang et al. (2012); Nana (2016) and Serfling (2014)'s research revealed that a bullish organisation should enlist a younger CEO who will assist in unlocking shareholder value, however, based on the results within a South African context [1], there is a positive correlation with CEO age and financial statement restatements and [2] a positive correlation to an organisation's price per share at financial year-end multiplied by the number of outstanding shares and financial statement restatements. The assessment of the South African market however differs from its American counterpart, in that that older CEOs appear to adopt the *Managerial Signalling Model* i.e. more prone to risky business decisions which results in high returns as compensation for risky business deals (Prendergast & Stole, 1996; Xie, 2015). Therefore, based on the results of this research report, South African older CEOs tend to swim against the stream, in an attempt to deliver on key performance i.e. the positive correlation between CEO age and financial restatements.

It is imperative to note, as per Chapter 2, high returns is often a signal of potential break down in controls, i.e. misrepresentation of financial statements (Huang et al., 2012). In addition, the CEO's intrinsic drive e.g. financial reward, retention, career progression, reputational risk, labour market expiration stamp, etc., seems to be the key differentiator between the local and American

aging CEOs (Cao et al., 2012; Eisenhardt, 1989; Pan et al., 2016; Zhang et al., 2008), in that South African CEOs are intrinsically motivated by different factors to their American counterparts e.g. low economic growth and high unemployment could potentially serve as a key motivator for older CEOs to gravitate towards more risky business decisions in order to survive.

CEO tenure: The results in this report denote that the longer a CEO resides within the organisation, the more likely financial statement restatements would occur, this report is therefore not aligned with the work performed by Huang et al. (2012), i.e. that within an American based market, CEO tenure has a negative correlation to financial statement restatements. However, as per the literature review, research by Cao et al. (2012) and Penman (2003) affirms the results of this report i.e. in that there is a positive association between financial restatements i.e. poor quality financial reporting, and CEO retention/tenure.

tMVE: The results in this report denote a positive correlation between the organisation's price per share at financial year-end multiplied by the number of outstanding shares. The results vary in relation to research within the American market i.e. negative correlation (Huang et al., 2012). Prior research focused on poor quality financial statements, which were reported to be rooted in the CEO's intrinsic self-fulfilment need i.e. a need predominantly motivated by financial reward; as such, risky business decisions were embarked upon to result in higher returns (Huang et al., 2012; Nana, 2016; Xie, 2015; Zhang et al., 2008). However, this research report did not focus on intrinsic financial rewards and similar deductions cannot be inferred.

5.2.5 Final derived Model 1

Based on analysis of results per the above sections i.e. 5.2.1 to 5.2.3, the overall model was reduced to one variance i.e. tMB. The *Likelihood Ratio analysis* and *Fit-Analysis* per below. The *Likelihood Ratio analysis [Table: 68]* depicts a P-

value of < 0.05 [0.0382*] and therefore tMB has a significant association with the outcome of model 1 at a confidence level of 95%. However, the *Fit analysis [Table: 68]* depicts an unadjusted R-square of 0.0324 i.e. model 1 only explains 3.24%, therefore no real correlation, R-square is closely situated to zero, indicative of a weak fit as such not significantly persuasive (HR Statistics Pty Ltd, 2015).

Table 67: Likelihood Ratio

Model	-LogLikelihood	DF	ChiSquare	Prob>ChiSq
Difference	2.147947	1	4.295894	0.0382*
Full	64.178056			
Reduced	66.326003			

Table 68: Fit analysis

RSquare (U)	0.0324
AICc	132.468
BIC	137.757
Observations (or Sum Wgts)	110

The *Goodness to fit analysis* [Table: 70], depicts Chi-square > 0.05 i.e. 0.452 and the *likelihood to fit* ratio [Table: 68] a P-value < 0.05 i.e. 0.0382*. Therefore, indicative that tMB has a significant relationship to financial statement restatements. The graphical representation of the ROC [Receiver Operating Characteristics] i.e. Figure: 24, depicts a AUC [area under curve] of 61.46%, therefore tMB is not effective (i.e. < 70%) in terms separating a sample in relation to H_1 into sub-groupings i.e. restatement versus non-restatement even though it's a statistical significant variable in relation to model 1 (Fawcett, 2006). The above is potentially attributable to sample size i.e. a greater sample size would increase reliability.

Table 69: Goodness to fit

Source	DF	-LogLikelihood	ChiSquare
Lack Of Fit	14	6.984884	13.96977
Saturated	15	57.193171	**Prob>ChiSq**
Fitted	1	64.178056	0.452

Table 70: Likelihood to fit

Source	Nparm	DF	L-R ChiSquare	Prob>ChiSq
tMB	1	1	4.29589405	0.0382*

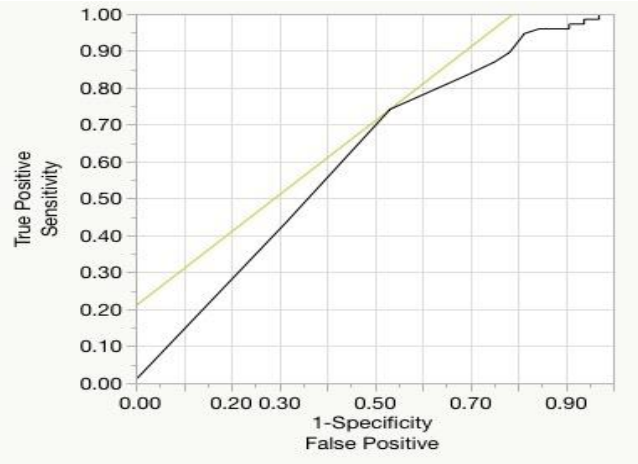


Figure 24: ROC [Receiver Operating Characteristics]

AUC
0.61458

5.3. Discussion Model 2: Organisations with older CEOs are less likely to experience share price volatility [H_2], *alternatively* CEO age is statistically insignificant in terms of share price volatility [H_{a2}] within a South African context.

$$Volatility = B_0 + B_1 AGE + B_2 TENURE + B_3 LnMVE + B_4 MB + B_5 ROA + B_6 Growth + B_7 Fin + B_8 EPR + B_9 COAGE + B_{10} OpLev + B_{11} D/E + B_{12} D/A + \in$$

[Model-2]

Where the variables are defined as:

VOLATILITY = 1 if an organisation had reported volatility in their share price otherwise 0;

ROA = return on total assets (Huang et al., 2012);

Growth = sales growth percentage change financial year on year (Huang et al., 2012);

Fin= additional capital raised in respect of long term debt and equity i.e. 2014 compared to 2016 (Huang et al., 2012);

EPR = defined as earnings price ratio i.e. income from continuing operations divided by market capitalization at the end of the year (Huang et al., 2012);

COAGE = organisation's age (Huang et al., 2012; Nana, 2016);

OpLev= operating income divided by sales (Nana, 2016; Serfling, 2014);

D/E = Debt divided by equity (Nana, 2016; Serfling, 2014) and

D/A = Debt divided by assets (Nana, 2016; Serfling, 2014).

5.3.1 Model 2: ANOVA summary of variables analysed.

Table 62 summarises the analysis of the respective variables, refer to *Chapter 4.3*. The one-way ANOVA analysis depicts that the H_0 holds true for [1] ROCE,

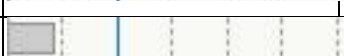
[2] Age of firm and [3] Debt/Assets. In addition, there are no significant variances as well as unequal sub-groupings for the following variables i.e. [1] Earnings growth %, [2] ROCE, [3] Age of firm, and [4] Debt/Assets. The individual analysis of model 2's variables also revealed that per table 62, all variables except Debt/Asserts fit the regression model 2.

Table 71: Variance analysis in terms of equal distribution

	ROA	Earnings growth %	ROCE [Return on Capital Employed]	Earnings /Share [EPR]	Age of firm	Operating Profit Margin %	Debt/Asset [D/A]
H_0 hold true	No	Yes	Yes	No	Yes	No	Yes
No significant variance between means and standard deviations	No	Yes	Yes	No	Yes	No	Yes
Variances in sub-groupings are equal	No	Yes	Yes	No	Yes	No	Yes
Variable fits regression model	Yes	Yes	Yes	Yes	Yes	Yes	No

5.3.2 Overall Evaluation: Model 2

Figure 25, depicts the variables in relation *H_2: Organisations with older CEOs are less likely to experience volatility in their share price.* The model is built on model 1, however includes eight additional variables i.e. [1] Return on assets [ROA]; [2] Age of firm [COAGE]; [3] Return on capital employed [Fin]; [4] Earnings growth [Growth]; [5] Debt to assets [D/E]; [6] Debt to EQ [D/E]; [7] Operating Profit Margin % [OpLev] and [8] Earnings per share [EPR].

Source	LogWorth		PValue
ROA 2016	1.911		0.01229
Age of Firm	1.372		0.04244
Return on Capital Employed (2014 vs 2016)	0.878		0.13245

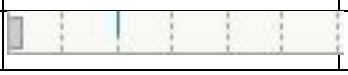
Source	LogWorth		PValue
Earnings growth %	0.658		0.21970
Debt / Assets Avg 2016	0.641		0.22878
ln Debt EQ	0.624		0.23781
Operating Profit Margin % 2016	0.477		0.33354
Earnings / Share 2016 (EPR)	0.254		0.55714

Figure 25: Overall LogWorth results of Model 2

The overall results pertaining to model 2, are summarised in *table 72*: *Likelihood Ratio analysis* and 5*.3.1.3: Fit-Analysis*. Table: 73 depicts that the model has an overall P-value of < 0.05 [i.e. 0.015*] and therefore depicts that the variables chosen have a significant association with the overall model at a confidence level of 95% (HR Statistics Pty Ltd, 2015).

Table 72: Likelihood Ratio Analysis

Model	-LogLikelihood	DF	ChiSquare	Prob>ChiSq
Difference	12.511546	8	25.02309	0.0015*
Full	36.732588			
Reduced	49.244134			

The *Fit analysis [Table: 73]* depicts an unadjusted R-square of 0.2541 i.e. the variables are explained 25.41% in terms of model 2, therefore no real significant correlation (HR Statistics Pty Ltd, 2015).

Table 73: Fit Analysis

RSquare (U)	0.2541
AICc	93.4007
BIC	115.178
Observations (or Sum Wgts)	103

5.3.2.1. Overall results

Figure 25, depicts six variables in relation to Model 2 which resulted in P-values>0.05 i.e. [1] Return on capital employed [Fin = 0.1325]; [2] Earnings

growth [Growth = 0.2197]; [3] Debt to assets [D/E = 0.2288]; [4] Debt to EQ [D/E = 0.2378]; [5] Operating Profit Margin % [OpLev = 0.3335] and [6] Earnings per share [EPR = 0.5571], therefore these variables are not statically significant and the null hypothesis [H_0] may not be rejected (HR Statistics Pty Ltd, 2015). However the variables [1] Return on assets [ROA = 0.0123] and [2] Age of firm [COAGE = 0.0424] resulted in P-values <0.05, indicative that these two variables are statistically significant in relation to model 2 (HR Statistics Pty Ltd, 2015).

5.3.2.2. Comparison to prior research

Results of model 2 depict that ROA and COAGE are both significant variables [i.e. P-values <0.05] in relation to depicting share price volatility and that sales growth is an insignificant [i.e. P-values >0.05] variable; this is similar to the findings of Nana (2016). Serfling (2014)'s research varied in that sales growth and D/E were both significant variables in terms of share price volatility analysis within an American market, unlike this research report which resulted in P-values>0.05 i.e. sales growth at 0.2197and D/E at 0.2288, indicative that these two variables are not significant to the share price volatility model within a South Africa listed market context.

5.3.3 Overall Goodness to fit analysis: Model 2

The overall goodness to fit test results of model 2, depict a P-value that is significantly greater than >0.05 i.e. 0.9422, as per table 74 and therefore depicts an overall good fit (HR Statistics Pty Ltd, 2015).

Table 74: Goodness to fit analysis

Source	DF	-LogLikelihood	ChiSquare
Lack Of Fit	94	36.732588	73.46518
Saturated	102	0	**Prob>ChiSq**
Fitted	8	36.732588	0.9422

5.3.4 Overall variable analysis of Model 2

Per *table 75,* Model 2 may be summarised as follows

Model 2 = -3.044 + 0.1063*ROA - 0.0864*Growth + 0.0993*FIN + 0.0004*EPR + 0.0313*COAGE + 0.0087*OpLev + 5.5174*D/A – 1.3585*D/E

Table 75: Parameter estimates per Tobin's Q

Term	Estimate	Std Error	ChiSquare	Prob>ChiSq	Lower 95%	Upper 95%
Intercept	-3.044253	2.8777528	1.12	0.2901	-9.5720604	1.5488576
ROA 2016	0.1062565	0.0474954	5.01	0.0253*	0.0212006	0.2098694
Earnings growth %	-0.0863964	0.0909515	0.9	0.3422	-0.324228	0.0390976
Return on Capital Employed (2014 vs 2016)	0.0993102	0.0929578	1.14	0.2854	-0.0226947	0.3363457
Earnings / Share 2016 (EPR)	0.0003642	0.000661	0.3	0.5817	-0.0007288	0.0020176
Age of Firm	0.031386	0.0166484	3.55	0.0594	0.0010118	0.0674114
Operating Profit Margin % 2016	0.008651	0.0104241	0.69	0.4066	-0.0068675	0.0356409
Debt / Assets Avg 2016	5.5173543	5.2601274	1.1	0.2942	-2.7091946	17.494274
ln Debt EQ	-1.3585117	1.2901398	1.11	0.2923	-4.2630937	0.7403037

Table 76: Summary of expected co-efficient

	Prediction as per Serfling (2014)	Prediction as per Nana (2016)	Prediction for this report	Results per model 2
ROA 2016	-	-	-	+
Age of Firm	-	-	-	+
Return on Capital Employed (2014 vs 2016)	n/a	n/a	-	+
Earnings growth %	+	+	+	-
Debt / Assets Avg 2016	+	+	+	+
ln Debt EQ	n/a	+	+	-
Operating Profit Margin % 2016	n/a	+	+	+
Earnings / Share 2016 (EPR)	+	n/a	+	+

5.3.4.1. Overall results

Table 75 depicts that the various variables for model 2's P-values are all > 0.05 at a confidence level of 95 % i.e. Growth [0.3422]; Fin [0.2854]; EPR [0.5817]; COAGE [0.0594]; OpLev [0.4066]; D/E [0.2942] and D/E [0.2923]. Only ROA depicted a P-value <0.05 i.e. 0.253*, therefore, the variable is statistically significant in relation to model 2. In addition, COAGE at a P-value of 0.0594 is closely situated to the point of statistical *significance* in relation to P-value analysis i.e. < 0.05 point.

5.3.4.2. Comparison to prior research

The following depicts a comparison between the prior research of Nana (2016) and Serfling (2014) in relation to the key variables pertaining to model 2, i.e.

a. D/A, EPR and OpLev variables resulted in a positive relationship between the individual variables and model 2. The results of these three variables are similar to prior research i.e. co-efficients have a positive association with share price volatility (Nana, 2016; Serfling, 2014).

   D/A: The results of the variable was consistent with expectations and prior research i.e. a positive relationship in that a higher D/A ratio will result in greater cash outflows [higher interest payments], depleting the bottom line [lower marginal income contributions] and in return, the result is share price volatility (Nana, 2016).

   EPR: A positive relationship was expected to exist between the volatility model [model 2] and the EPR variable i.e. the greater the returns per share the more attractive shares would become and this would stimulate market trade (Nana, 2016).

   OpLev: This variable was included to assess the impact of profitability [directly under the control and management of the CEO through strategic

business decisions] in relation to overall share price volatility. Based on prior research in respect of share price volatility, a positive relationship is expected between the variable and share price volatility i.e. “as operating leverage increases (decreases), both the overall and systematic volatility of the stock's return increases (decreases)” (Nana, 2016, p. 3). The results therefore infers that stock volatility is directly affected by the results of OpLev e.g. if a firm generates higher OpLev percentage, it will stimulate market participation and would invariably result in share trade (Nana, 2016). Per prior research, higher OpLev is indicative of CEOs opting for riskier business strategies and as such, investors would expect higher returns (Nana, 2016).

b. ROA, COAGE and FIN were expected to have a negative relationship in relation to model 2 i.e. volatility of the share price. However, the results, based on the South African market, resulted in a negative relationship for the variables listed above and therefore deviate from expectations as well as prior research (Nana, 2016; Serfling, 2014).

ROA: The variable is statistically significant, i.e. P-value < 0.05, P-value of 0.0253* [refer to table 75 above]. There is a positive relationship between model 2 and the variable i.e. operating profit divided by the book value of the assets, serves as a signal for investor confidence and financial legitimacy i.e. the greater the ROA, the greater investor confidence, since investors are utilising available resources in an attempt to maximise returns (Arthaud-Day et al., 2006).The variable ROA’s results is however, in contrast to the results of prior research (Nana, 2016; Serfling, 2014). In addition, the results therefore infer that within a South African context, the market responds positively [less share price volatility] in respect of greater ROA, if the variable is analysed in isolation. Therefore, it may be deduced that within a South African market, the market *rewards* embrace the *Market Learning Model* i.e. well calculated strategic decision making with incremental returns (Scharfstein & Stein, 1990; Xie, 2015).

COAGE: The results of model 2 in respect of COAGE varied from prior research i.e. a positive relationship was observed (Nana, 2016; Serfling, 2014). In addition, the results therefore affirm that the share price volatility is often associated with longer in existence firms, within a South African market. The results therefore implies that a firm's going concern hinges on legitimate strategic business decisions in an attempt to retain relevance, profitability and attractiveness within the investor market (Palazzo & Scherer, 2006; Pan et al., 2015; Suchman, 1995).

FIN: This is the additional capital raised in respect of long term debt and equity. A negative relationship is expected to exist between the variable and model 2 i.e. the greater volatility will result in disinvestment due to lower investor confidence (Arthaud-Day et al., 2006; Cao et al., 2012; Palazzo & Scherer, 2006; Pan et al., 2015; Suchman, 1995). However, the results pertaining to this reported variable resulted in a positive relationship between the variable and share price volatility model i.e. greater investments via debt and equity is often associated with greater share price volatility and vice versa. Through the assessment of the variable in isolation in terms of model 2, the results therefore infer that within a South African context, stock volatility is closely associated with investor confidence i.e. volume trading of stock [buy or sell] directly affects price stability and infers greater risk as such investors expect a greater return (Nana, 2016)

5.3.5 Final derived Model 2

The analysis performed of model 2's identified variables i.e. refer to section 5.3.1 to 5.3.3 above, the key variable based on a statistical significance evaluation analysis i.e. P-value <0.05, may be reduced to ROA [0.0253*] at a confidence level of 95%. However, the COAGE variable falls just outside the statistical significance parameters, at a P-value of 0.0594. In addition, the model was further reduced to the two identified variables i.e. ROA and COAGE. The new derived

model 2 resulted in a *Likelihood ratio [Table77]* which depicts a P-value < 0.05 i.e. <0.001*. The P-value derived in model 2 therefore, is indicative that both variable [ROA and COAGE] are statistically significant in respect of share price volatility predictions at a confidence level of 95%. In addition, the *Fit analysis [Table: 78]* depicts an unadjusted R-square of 0.2054 i.e. model 2 is explained 20.54% by COAGE and ROA (HR Statistics Pty Ltd, 2015). .

Table 77: Likelihood Ratio

Model	-LogLikelihood	DF	ChiSquare	Prob>ChiSq
Difference	10.15594	2	20.31189	<.0001*
Full	39.29101			
Reduced	49.44696			

Table 78: Fit analysis

RSquare (U)	0.2054
AICc	84.822
BIC	92.515
Observations (or Sum Wgts)	104

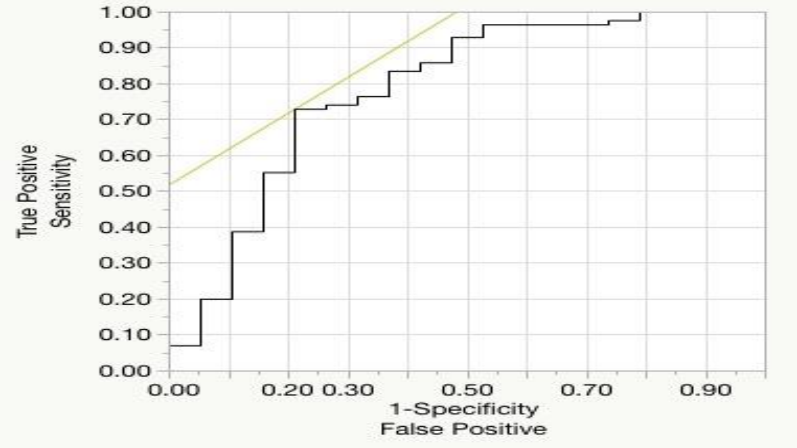
The *Goodness to fit analysis* [Table: 79], depicts Chi-square > 0.05 i.e. 0.952 and the *likelihood to fit* ratio [Table: 80] a P-values <0.05 i.e. ROA [<0.0001*] and COAGE [0.0241], indicative that both variables are statistically significant in relation to model 2. Figure 26 depicts a AUC [area under curve] of 78.45%, therefore the variables i.e. ROA and COAGE are effective (i.e. > 70%) in terms of separating a sample in relation to H2 into sub-groupings i.e. volatility versus non-volatility (Fawcett, 2006).

Table 79: Goodness to fit

Source	DF	-LogLikelihood	ChiSquare
Lack Of Fit	101	39.291012	78.58202
Saturated	103	0	**Prob>ChiSq**
Fitted	2	39.291012	0.952

Table 80: Likelihood to fit

Source	Nparm	DF	L-R ChiSquare	Prob>ChiSq
ROA 2016	1	1	17.639954	<.0001*
Age of Firm	1	1	5.0890456	0.0241*



AUC
0.78452

Figure 26: Likelihood to fit

5.4. Overall conclusion

Based on the analysis in section 5.2 and 5.3, the final model for 1] Restatement and 2] Volatility may be summarised as follows

Model 1 = 3.4537

Per section 5.2.5, the *Likelihood Ratio analysis [Table: 68]* depicts a P-value of < 0.05 [0.0382*] however, attention should be drawn to the *Fit analysis [Table: 68]* in that the variable rendered an unadjusted R-square of 0.0324 i.e. tMB only infers a 3.24% overall explanation in relation to model 1, therefore the variable

depicts a weak fit. This is evident in the overall model analysis, in that variable tMB resulted in P-Value >0.05 [0.0701], therefore statistically insignificant in relation to model 1. In addition the alternative hypothesis holds true i.e. CEO age is statistically insignificant in terms of financial restatements [H_{a1}] within a South African context.

Term	Estimate	Std Error	ChiSquare	Prob>ChiSq	Lower 95%	Upper 95%
Intercept	3.4536669	1.433483	5.8	0.0160*	0.9810237	6.7268179
tMB	-4.0755355	2.250427	3.28	0.0701	-9.243174	-0.2045969

Model 2 =

-0.1183 + 0.1266*ROA + 0.0326*COAGE

COAGE and ROA were identified as key variables in the assessment of share price volatility. Therefore the alternative hypothesis holds true i.e. CEO age is statistically insignificant in terms of share price volatility [H_{a2}] within a South African context, however variables COAGE and ROA have a statistical significance in relation to the evaluation of share price volatility.

Term	Estimate	Std Error	ChiSquare	Prob>ChiSq	Lower 95%	Upper 95%
Intercept	-0.1182751	0.532202	0.05	0.8241	-1.2032714	0.9093168
ROA 2016	0.1266048	0.036872	11.79	0.0006*	0.0610652	0.206781
Age of Firm	0.0326223	0.01566	4.34	0.0372*	0.0040432	0.0664617

CHAPTER 6. CONCLUSIONS & RECOMMENDATIONS

6.1. Introduction

This research report was built on the evaluation and assessment of a CEO's ability on the financial legitimacy of listed South African based organisations. Per Chapter 2 [the literature review section], CEO ability was synonymised with age i.e. older CEOs were hypothesised to be more cautious and would enter into well calculated strategic decisions to promote financial legitimacy and in turn, the going concern of an organisation. Financial legitimacy equates to organisations, the less likeliness of financial restatements [H_1] and in return, the promotion of share price stability [H_2].

This report hypothesised that within a South African context *H_1:* Organisations with older CEOs are less likely to have financial restatements, *alternatively $H_{\not 1}$:* CEO age is statistically insignificant in terms of financial restatements and *H_2:* Organisations with older CEOs are less likely to experience volatility in their share price, *alternatively [$H_{\not 2}$]* CEO age is statistically insignificant in terms of share price performance. This section summarises the conclusions of two statistical models [refer to section 6.2]; provides recommendation for future similar studies [refer to section 6.3] and provides suggested related topics for future research.

6.2. Conclusions of the study

The following sub-sections summarise the conclusions in respect of financial restatement [*model 1:* section 6.2.1] and share price volatility [*model 2: section* 6.2.2].

6.2.1 Model 1: Organisations with older CEOs are less likely to have financial restatements

Table 81 summarises the statistical significance evaluation of the key variables in respect of model 1 versus prior research (Huang et al., 2012) i.e.

i. **CEO age** is not a statistically significant variable in relation to predicting financial legitimacy i.e. the likeliness of financial statements being restated within a South African context which is in contrast to prior research (Huang et al., 2012). It is therefore suggested, based on the results of this research report, that within a South African context, it is the alignment between intrinsic individual goals and the strategic view of an organisation that ultimately affects the financial legitimacy of an organisation i.e. CEO age is negligible in terms of predicting financial legitimacy (Xie, 2015; Zhang et al., 2008). In addition, based on the co-efficient results in Chapter 5, a positive relationship exists between CEO Age and the financial statement restatement model i.e. older CEOs are associated with high financial legitimacy risk. The major driver in the variance between the two markets i.e. South African versus American, is due to the current profile of residing South African CEOs i.e. 50% of the samples residing CEOs, are aged between 47.75 and 57.25 which is representative of a rather aged population with a few lower age bracket outliers [refer to results in Appendix 2, section 1.1.1]. Due to the current age distribution associated within a South African context i.e. more aged CEOs, CEO age serves as a contributor and not an inhibitor in terms of financial statement restatements. The results could also be attributable to a smaller sample size i.e. for this report, the sample was 110 versus 2402 as per Huang et al. (2012).

ii. **CEO tenure,** the results of model 1 was aligned with prior research, in that CEO tenure is not a statistically significant variable in relation to financial statement restatements (Huang et al., 2012).

iii. **tMVE** is not statistically significant based on the results of model 1. However, prior research resulted in a negative co-efficient and the variable being identified as a statistically significant in relation to the financial restatement model (Huang et al., 2012). The variable measures the impact of an organisation's price per share at financial year-end multiplied by the number of outstanding shares. Prior research included a three year time frame which captured the frequency of trade as well as volatility of the share price over a longer period (Huang et al., 2012). In addition, the results of the distribution analysis of the tMVE variable [refer to results in Appendix 2, section 1.1.3] denotes a limited spread, as such, not significant in terms of differentiation.

iv. **tMB** is not significantly significant in relation to model 1. This is in line with prior research (Huang et al., 2012). In addition the tMB has a negative relationship in relation to financial statement restatements i.e. the higher the market value of the shares divided by the book value of the shares, the less likely financial statement restatements would occur. However, this is in contrast to prior research, in that a greater return is indicative of a potential future financial statement restatements i.e. potential financial statement misrepresentation by management in an attempt to maximise returns (Huang et al., 2012; Milbourn, 2003; Palazzo & Scherer, 2006). Furthermore the results of section 5.2.5, i.e. the Likelihood Ratio analysis [Table: 68] depicts a P-value of < 0.05 [0.0382*] however the Fit analysis [Table: 68] depicts an unadjusted R-square of 0.0324. Therefore tMB is depicts a *weak fit* in relation to model 1, potentially attributable to the small sample size (Fawcett, 2006). Even though a weak fit exists between tMB and model 1, the results of model 1 is indicative that high tMB infers investor confidence and dissuades misrepresentation of financial statements within a South African context due to the inverse relationship (Eisenberg & Macey, 2004; Zhang et al., 2008).

Table 81: Statistical significance summary

	Variable significance per Huang et al. (2012) i.e. Model : Surprise	Variable significance per Model 1
Age of CEO	Significant	Insignificant
tCEOtenure	Insignificant	Insignificant
tMVE	***Significant***	Insignificant
tMB	Insignificant	Insignificant *(weak fit)*

The analysis of the variables, based on prior research by Huang et al. (2012), resulted in no statistically significant variable being identified in relation to model 1. The overall model therefor affirms the alternative hypothesis [H_{a1}] i.e. CEO age in relation to South African listed originations, is statistically insignificant in terms of financial restatements. In addition the results infer that tMB is statistically significant in relation to restatements [refer to section 5.2.5, P-value 0.0382*] if evaluated on its own, however not in relation to the whole model 1 due to the weak fit.

Model 1=	3.4537

6.2.2 Model 2: Organisations with older CEOs are less likely to experience volatility in their share price

Per the restatement model i.e. refer to section 6.2.1 model 1 as per above, no clear variable had been identified in relation to financial statement restatements. Table 82, model 2, summarises the statistical significance of the identified variables in relation to share price volatility.

i. **ROA** is a statistically significant variable [P-value of <.0001*] in relation to model 2. Per Chapter 5, table 76, the variables have a negative correlation to model 2 i.e. the higher the ROA ratio, the lower share price volatility

which is in contrast to research conducted by Nana (2016) and Serfling (2014). As per the literature review, investor trust is obtained through the executive leadership's capabilities i.e. legitimately delivering strategic organisational goals and in return, creating returns which ultimately demotes share price volatility (Eisenberg & Macey, 2004; Zhang et al., 2008).

ii. **COAGE** variable is statistically significant in relation to model 2 i.e. a P-value of 0.0241* at a confidence level of 95%. In addition, Chapter 5 revealed a positive correlation between COAGE and share price volatility. It therefore infers that with time, existing companies often enter into risky deals which could either result in significant returns or major losses, which furthermore stimulate market response in relation to organisational reported results e.g. a high ROA will infer great confidence in the residing executive team and would result in positive share trading (Eisenberg & Macey, 2004; Zhang et al., 2008). Prior research showed that long existent firms are expected to experience less share price volatility (Nana, 2016). Organisations are currently operating within very dynamic market conditions, especially veteran firms with constant pressures to reinvent themselves in an attempt to remain relevant; such demands are often accompanied with high risk transactions which require large initial capital outlays and in return, investors expect greater returns. The combination 1] risky business decisions and 2] investor expectations, creates huge performance pressures, creating share price volatility (Cao et al., 2012; Eisenberg & Macey, 2004; Nana, 2016; Penman, 2003; Serfling, 2014).

iii. **FIN, Growth, D/A, D/E, OpLev** and **EPR** are all statistically insignificant variables in relation to model 2. Model 2 differed from prior research in that D/A and D/E were identified as significant variables in relation to the prediction of share price volatility (Nana, 2016; Serfling, 2014). Based on the results, the South African listed market's share price volatility is largely dependent on 1] employment of existing resources i.e. a positive

relationship in respect of variable ROA and 2] market share price in relation to existing book value i.e. a negative relationship in relation to tMB. In summary, a higher ROA would result in share price volatility [positive relationship] and a buyers' market would be favoured. tMB has a negative association with the share price volatility e.g. a decrease in tMB would potentially signal a restatement and would negatively affect the share price due to investor confidence being negatively influenced Huang et al. (2012); Eisenberg and Macey (2004) and Zhang et al. (2008). The results affirms the alternative hypothesis [H_{a2}] i.e. CEO age in relation to South African listed originations, is statistically insignificant in terms of share price volatility.

Model 2, refer to equation below, is therefore a combination of [1] restatement of financial statement analysis i.e. ***[3.4537 - 4.0755*tMB]*** and [2] variables directly attributable to share price volatility i.e. - 0.1183 + 0.1266*ROA + 0.0326*COAGE.

Model 2 = **[3.4537]** - 0.1183 + 0.1266*ROA + 0.0326*COAGE

Table 82: Statistical significance summary

	Variable significance per Serfling (2014)	Variable significance per Nana (2016)	Variable significance per Model 2
ROA 2016	Significant	Insignificant	***Significant***
Age of Firm	Significant	Significant	***Significant***
Return on Capital Employed (2014 vs 2016)	n/a	n/a	Insignificant
Earnings growth %	Significant	Insignificant	Insignificant
Debt / Assets Avg 2016	Significant	Significant	Insignificant
ln Debt EQ	n/a	Significant	Insignificant
Operating Profit Margin % 2016	n/a	Insignificant	Insignificant
Earnings / Share 2016 (EPR)	Significant	n/a	Insignificant

In addition, out of the variables identified to influence share price volatility [refer to table 82 above], only COAGE [0.0241*] and ROA [<.0001*] are statistically significant in relation to model 2 at a confidence level of 95%. Model 2 has identified key variables as per prior research conducted by Nana (2016) and Serfling (2014).

6.3. Recommendations

Key stakeholders were identified in Chapter 1. The following denotes the various stakeholders and the contributions added in respect of this research report.

6.3.1.1. Auditors

As per results from the analysis of the variables in respect of model 1 i.e. *Organisations with older CEOs are less likely to have financial restatements,* it was concluded that within a South African listed environment, there's no clearly identified variable that significantly predicts financial legitimacy in respect of financial statement restatements. However per section 5.2.5, tMB was statistically significant [0.0382*] in relation to financial restatements when assessed in isolation, however the variable only infers a 3.24% overall fit in

relation to model 1 as a whole. The assessment of the variable in isolation, depicts an inverse relationship between the variable and financial statement restatements i.e. the higher [lower] the tMB in relation to the prior year, the less likely [more likely] financial statements would be restated. In addition, the variable could aid in the up-front assessment of the organisational landscape and could serve as an indicator for increasing or decreasing auditors' detection risk in relation to potential financial restatement analysis i.e. *higher* year–on-year tMB indicative of *lower* financial restatement possibilities, therefore lower detection risk and lower year-on-year tMB indicative of higher financial restatement possibilities, therefore increased detection risk (Eisenberg & Macey, 2004; Zhang et al., 2008). In addition, a higher year-on-year tMB is potentially indicative of increased managerial judgement and estimates, creating an increase in share price volatility [i.e. the negative correlation as reported in the results of this report] and therefore indicative of an increased audit detection risk upon assessment of the organisation's financial statements (Huang et al., 2012; Serfling, 2014). However overall results of model 1, refer to section 5.2.5 depicts affirms that variable tMB is statistically insignificant in relation to full model 1, i.e. results depict a P-value >0.05 [0.071].

6.3.1.2. Investors

A high tMB; an ageing firm [COAGE] and year-on-year increase in ROA, may be used by investors to assess an organisation's risk propensity e.g. a company that is long in existence [denoted by COAGE] and adopting a more aggressive/risky approach, requires higher returns [denoted by increase year-on-year ROA and tMB], in essence the higher the three variables, the more pro-risk an organisation, as such, the greater the share price volatility, based on the evaluation of the variable in isolation. The results show that CEO age, within a South African context, is irrelevant in the assessment of investor confidence, therefore the alternative hypothesis holds true i.e. CEO age does not have a statistical significance in relation to financial statement restatements and share price volatility. The results of this research report shows that COAGE and ROA are the

only key variables in respect of matching investor's requirements e.g. high returns which are coupled by high levels of stock volatility (Huang et al., 2012).

6.3.1.3. Policy makers

The results denote that one variable [tMB i.e. P-value of 0.0382*, refer to section 5.2.5] was identified as significant in relation to the prediction of financial reporting legitimacy, when assessed in isolation. However tMB is statistically insignificant [P-vale of 0.072] when, it may be inferred that tMB should be a key focus area in terms of assessment of managerial estimates and judgements i.e. policy makers could potentially focus on the roll out best practices, specifically focused on ROA, in an attempt to aid in the mitigation, prevention and avoidance of errors as well as misstatements.

6.3.1.4. Behavioural science: CEO age and market behaviour

The results denoted that within a South African market, a CEO's age has no significant bearing in relation to an organisation's performance i.e. the organisation's key strategy governs the CEO's behaviour and not his/her age, therefore affirming the alternative hypothesis in that CEO does not statistically affect financial legitimacy of a South African listed organisation. In addition, per the results of this report, CEO age dispersion is not statistically significantly different amongst JSE listed organisations; as such, no clear age differentiation was identifiable per the sample selection. Therefore, no behavioural contributions were inferred from the results of this research report in relation to an organisation's risk appetite, financial legitimacy and CEO age within a South African listed context.

6.4. Suggestions for further research

Per the literature review, investor confidence hinges on CEO ability which ultimately unlocks investor trust (Arthaud-Day et al., 2006; Cao et al., 2012; Palazzo & Scherer, 2006; Pan et al., 2015; Suchman, 1995). Trust is built over a period of time, as such, future research could focus on the CEO retention period and the subsequent effect on the volatility of the share price during such period i.e. analysis of the movement of the share price over the duration of CEO retention. Potential assessment could be whether or not ability is inferred through book knowledge, i.e. a closer look at share price performance versus CEO credentials. Founder managed organisations were also represented within the sample population, an analysis of the founders credentials could also aid in the prediction of an organisation's future viability i.e. as to whether organisations founded by individuals with business qualifications are more likely to succeed and could aid in making investor decision.

In addition to trust, "intrinsic motivational" alignment between residing CEO objectives i.e. monetary rewards and business strategy, was also identified as being imperative to an organisation's performance. The literature review made mention of "intrinsic" value drivers of residing CEOs i.e. monetary rewards could be assessed against performance of an organisation and in turn, against the legitimacy of financial reporting within a South African context (Cao et al., 2012; Eisenhardt, 1989; Pan et al., 2016; Zhang et al., 2008).

APPENDIX 1

Consistency matrix

To assess the effect of a CEO's ability on the financial legitimacy of an organisation.					
Sub-problem	**Literature Review**	**Hypotheses**	**Source of data**	**Type of data**	**Analysis**
The first sub-problem: *What impact does the CEOs age have on the quality of financial reporting?*	Huang et al. (2012); Milbourn (2003); Serfling (2014); Penman (2003); Eisenberg and Macey (2004); Zhang et al. (2008)	H1: Organisations with older CEOs are less likely to have financial restatements.	Data extracted from the INET BFA and Bloomberg database.	Continuous data, specifically ratio data.	Model 1: Regression analysis - Quantitative technique using regression model.
The second sub-problem: *What impact does the CEOs age have on the volatility of the share price?*	Huang et al. (2012); Milbourn (2003); Serfling (2014); Penman (2003); Xie (2015) Nana (2016) Pan et al. (2015)	H2: Organisations with older CEOs are less likely to experience volatility in their share price.	Data extracted from the INET BFA and Bloomberg database.	Continuous data, specifically ratios.	Model 2: Regression analysis - Quantitative technique using regression model.

APPENDIX 2

Validity and reliability of variables

Part A: Model 1 – Restatement analysis

The restatement analysis was based on Model [1], as denoted below.

$$RESTATE = B_0 + B_1 AGE + B_2 TENURE + B_3 LnMVE + B_4 MB + \epsilon$$

[Model -1]

Where the variables are defined as follow:

RESTATE = 1 if an organisation had reported a financial restatement otherwise 0;

AGE = is the CEO's age in the selected year of assessment;

TENURE = CEO tenure in years;

LnMVE = natural log of the organisation's price per share at financial year-end multiplied by the number of outstanding shares measured in millions of rand;

MB = market value of the shares [current share value] divided by the book value of the shares [financial share value];

The full sample size, i.e. 110 data points, was assessed for fair distribution, reliability and validity prior to conducting detailed statistical analysis. Refer to points 1.1.1 to 1.1.4 for a detailed preliminary analysis and assessment on the key variables of Model [1]. This section documents the assessment of the key identified variables in relation to validity and reliability.

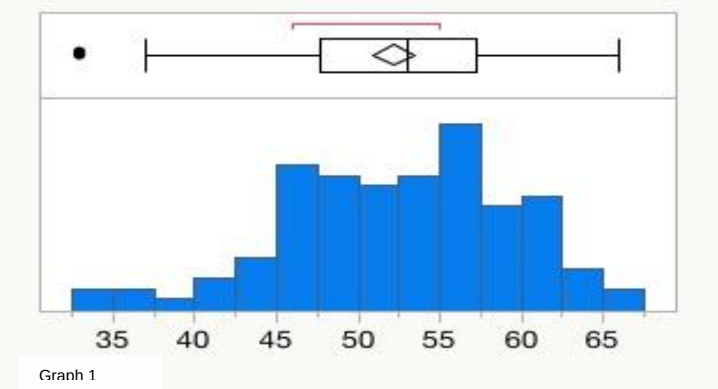
CEO age distribution [Age]

Graph 1 is representative of a total sample of 110 JSE listed organisations, the central point of the age distribution is 53 years and the mean is 52.2 years. Per Nana (2016)'s research report [*focus being stock volatility, a sample size of 106 in respect of the Brussel's stock exchange*], the average age of residing CEOs

was reported as 57.30 years. In addition, in Huang et al. (2012) [*focus being financial restatements, a sample size of 238 in respect of the American stock exchange*], the average age of residing CEOs was reported as 53.20 and a median age of 53 years. The South African JSE results pertaining to the 110 sample selections therefore appears reasonable due to [1] sample size and [2] market size in comparison to both Brussels (Nana, 2016) and the American (Huang et al., 2012) market based research, as well as the age distribution within the sample selection.

Per the histogram below, a slight off-centred normal distribution is noted in respect of CEO age distribution i.e. a skewness of -0.44 and a peak of -0.01. In addition, 50% of the CEO age range resides between the ages of 47.75 and 57.25, which depicts that the sample is representative of the more seasoned CEO i.e. middle aged (53-58 years) and the later of the young CEO age grouping i.e. 29-52 years, as per age category grouping used in research performed by Nana (2016). In addition, 2/3 of the sample i.e. 73 sample points in total, is expected to reside between the age range of 45.28 and 59.11, which falls within the range of research results reported by Nana (2016) i.e. 49.75 and 64.85 years as well as Huang et al. (2012) i.e. 46.75 and 59.68 years. The sample is therefore fully representative of overall age distribution.

i. Age distribution



Graph 1

ii. Statistics summary for graph 1

100.00%	maximum	66
75.00%	quartile	57.25
50.00%	median	53
25.00%	quartile	47.75
0.00%	minimum	33

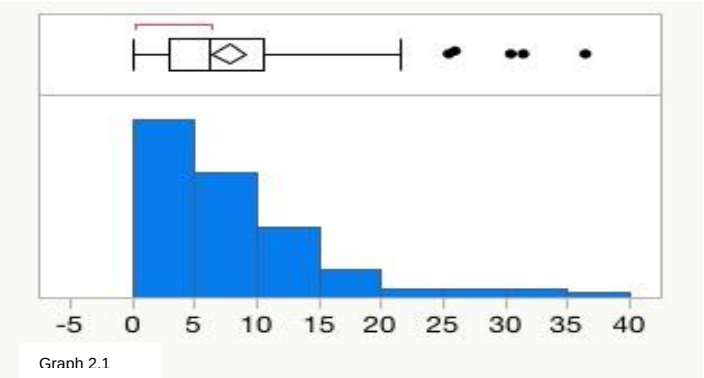
iii. Quantiles for graph 1

Mean	52.2
Std Dev	6.9133563
Std Err Mean	0.6591627
Upper 95% Mean	53.506439
Lower 95% Mean	50.893561
N	110
Skewness	-0.442257
Kurtosis	-0.014483

CEO Tenure distribution [Tenure]

The tenure distribution curve [graph 2.1] currently represents a log normal distribution, with an average retention/tenure of 7.75 years in comparison to American based research i.e. 6.54 years (Huang et al., 2012). The box graph falls outside the normal distribution parameters i.e. 1.75 for skewness, the norm being depicted as between +/-1 (Jondeau & Rockinger, 2003) and a kurtosis of 3.79 whereas the norm is between +/- 3 (DeCarlo, 1997). Graph 2.1's distribution therefore depicts asymmetrical behaviour i.e. uneven spread of data and therefore indicative of a heteroscedasticity (DeCarlo, 1997). In addition, the median [6.25] varies quite significantly from the mean [7.75], indicative of abnormal distribution.

i. Tenure distribution



Graph 2.1

ii. Quantiles for graph 2.1

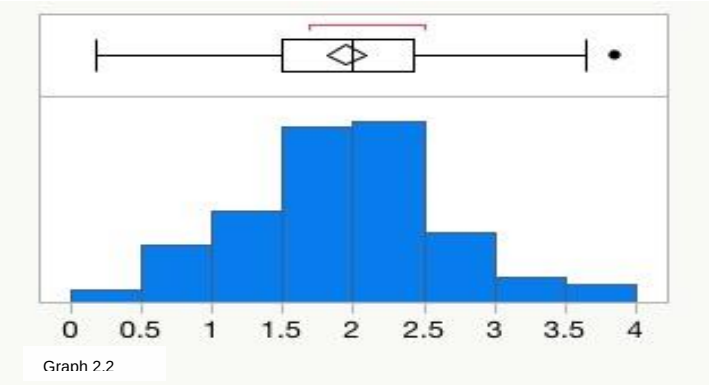
100.00%	maximum	36.5
75.00%	quartile	10.525
50.00%	median	6.25
25.00%	quartile	2.875
0.00%	minimum	0

iii. Statistics summary for graph

Mean	7.7527273
Std Dev	6.9505027
Std Err Mean	0.6627044
Upper 95% Mean	9.0661859
Lower 95% Mean	6.4392686
N	110
Skewness	1.7485748
Kurtosis	3.7864625

The heteroscedasticity concern is therefore addressed through normalising the distribution by using Box-Cox transformation, refer to graph 2.2 below. The transformation resulted in a greater fit in terms of a normalised distribution i.e. a skewness of 0.02 and a kurtosis of 0.04.

i. Tenure distribution transformed using Box-Cox transformation



Graph 2.2

iii. Quantiles for graph 2.2

100.00%	maximum	3.85393546
75.00%	quartile	2.41817148
50.00%	median	1.98935426
25.00%	quartile	1.48779504
0.00%	minimum	0.17782794

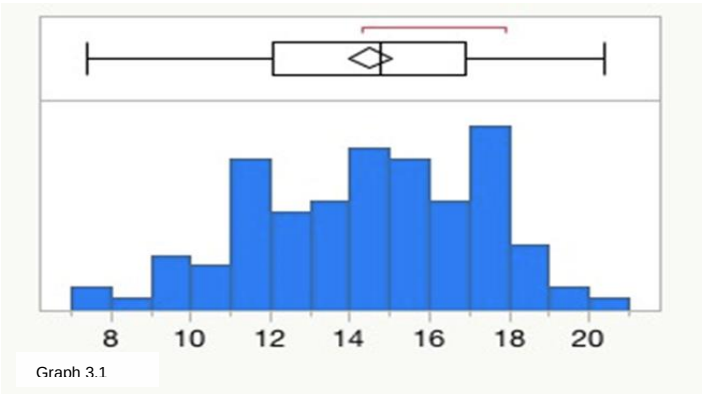
ii. Statistics summary for graph 2.2

Mean	1.9507273
Std Dev	0.7302428
Std Err Mean	0.0696259
Upper 95% Mean	2.0887236
Lower 95% Mean	1.812731
N	110
Skewness	0.02164
Kurtosis	0.0436326

Organisation's market value [LnMVE]

Per graph 3.1, the natural log was used to transform MVE to obtain distribution more representative of a normal curve due to the large variances between the various organisations' market value results which is similar to the research performed by Huang et al. (2012), therefore validating the adopted approach. Per the tables below, it resulted in a mean of 14.49 and the median of 14.78. Huang et al. (2012)'s [*focus being financial restatements*] research had recoded a mean of 21.19 and a median of 21.02, the variance is attributable to a smaller sample size i.e. 110 versus 238, therefore a more limited spread. The distribution of 110 sample variables i.e. LnMVE, deviates from the normal distribution curve i.e. a skewness of -0.28 and a kurtosis -0.64 with a box graph slightly skewed towards the right.

i. LnMVE [natural log of the organisation's share price]



Graph 3.1

ii. Quantiles for graph 3.1

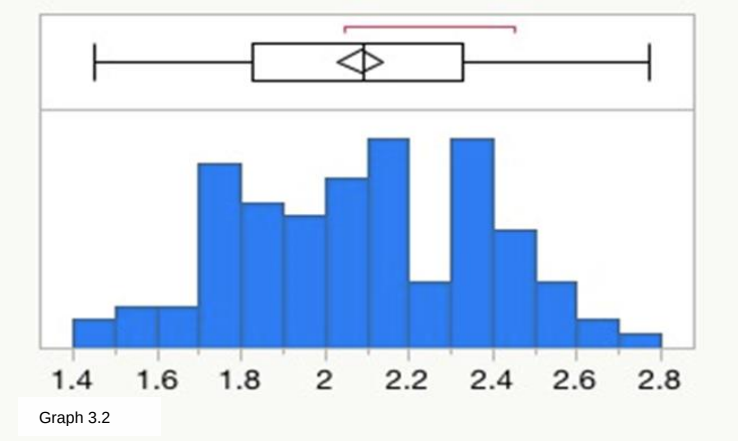
100.00%	maximum	20.37848569
75.00%	quartile	16.91650027
50.00%	median	14.77881421
25.00%	quartile	12.08673159
0.00%	minimum	7.406716802

iii. Statistics summary for graph 3.1

Mean	14.488185
Std Dev	2.8299036
Std Err Mean	0.2698207
Upper 95% Mean	15.022961
Lower 95% Mean	13.953409
N	110
Skewness	-0.284494
Kurtosis	-0.638134

However, due to the skewness, kurtosis and spread not being fully representative of a normal distribution graph, the data was further transformed using Box-Cox transformation (DeCarlo, 1997). Per graph transformed data i.e. graph 3.2, a skewness of -0.02 and a kurtosis of -0.76 is now observed with a more centred data spread [representative of the box graph 3.2] (DeCarlo, 1997).

i. tMVE [transformation of the organisation's share price]



Graph 3.2

ii. Quantiles for graph 3.2

100.00%	maximum	2.7702132
75.00%	quartile	2.329899221
50.00%	median	2.093723801
25.00%	quartile	1.830037735
0.00%	minimum	1.448220904

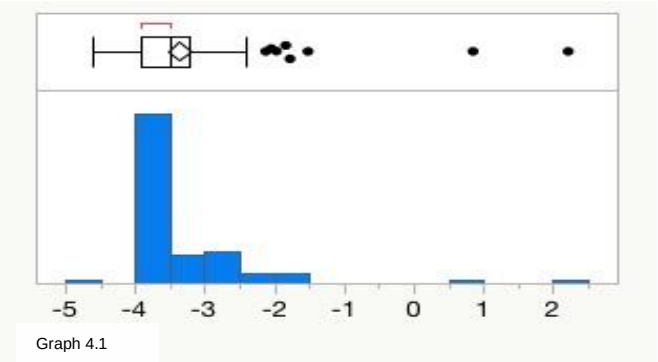
iii. Statistics summary for graph 3.2

Mean	2.0837885
Std Dev	0.2892909
Std Err Mean	0.0275828
Upper 95% Mean	2.1384567
Lower 95% Mean	2.0291203
N	110
Skewness	-0.021264
Kurtosis	-0.764163

Market value divided by book value [MB]

Similar to the treatment of the organisation's market value, the MB was transformed using the natural log, due to the significant distribution of results, in order to obtain a more normalised distribution curve. Per graph 4.1., the transformation of the MB data does not fully conform to the normal distribution curve, i.e. it is depicting a log normal distribution curve with a skewness of 3.67 [norm +/- 1] (Jondeau & Rockinger, 2003) and a kurtosis of 18.73 [norm +/- 3] (DeCarlo, 1997). The sample depicted high levels of negative share price movements which was contrary to the results of the research of Huang et al. (2012) [*focus being financial restatements*]. Per prior research, emerging markets like South Africa, often depict a positive skewness and greater speculative investments which contribute to greater share price volatility (Wen & Yang, 2009). The work performed by Wen and Yang (2009) therefore validates the results of the distribution analysis i.e. a positive kurtosis and high volatility [in respect of speculative investment decisions].

i. LnMB [log of the organisation's market value divided by book value]



Graph 4.1

ii. Quintiles graph 4.1

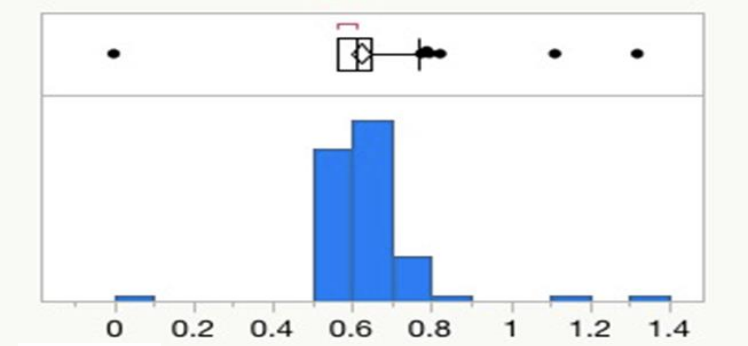
100.00%	maximum	2.219203484
75.00%	quartile	-3.21887583
50.00%	median	-3.5065579
25.00%	quartile	-3.91202301
0.00%	minimum	-4.60517019

ii. Statistics Summary graph 4.1

Mean	-3.362315
Std Dev	0.876599
Std Err Mean	0.08358
Upper 95% Mean	-3.196662
Lower 95% Mean	-3.527969
N	110
Skewness	3.673617
Kurtosis	18.73365

The data was further transformed using Box-Cox transformation in an attempt to normalise the distribution and spread of data, refer to graph 4.2 below. The further transformed data still does not depict a normal distribution i.e. a kurtosis of 19.42 and a skewness of 1.36, as such, the MV does not conform to a normal distribution.

i. tMB [transformation of the organisation's market value divided by book



Graph 4.2

ii. Quintiles graph 4.2

100.00%	maximum	1.31951533
75.00%	quartile	0.64511948
50.00%	median	0.61323756
25.00%	quartile	0.56234133
0.00%	minimum	0

iii. Statistics Summary graph 4.2

Mean	0.622316
Std Dev	0.117969
Std Err Mean	0.011248
Upper 95% Mean	0.644609
Lower 95% Mean	0.600023
N	110
Skewness	1.36425
Kurtosis	19.4159

Part B: Model 2 – Volatility analysis

The volatility analysis was based on Model [2], as denoted below.

$$Volatility = B_0 + B_1 AGE + B_2 TENURE + B_3 LnMVE + B_4 MB + B_5 ROA + B_6 Growth + B_7 Fin + B_8 EPR + B_9 COAGE + B_{10} OpLev + B_{11} D/E + B_{12} D/A + \varepsilon$$

[Model-2]

Where:

VOLATILITY = 1 if an organisation had reported volatility in their share price otherwise 0;

ROA = return on total assets (Huang et al., 2012);

Growth = sales growth percentage change financial year on year (Huang et al., 2012);

Fin= additional capital raised in respect of long term debt and equity i.e. 2014 compared to 2016 (Huang et al., 2012);

EPR = defined as earnings price ratio i.e. income from continuing operations divided by market capitalization at the end of the year (Huang et al., 2012);

COAGE = organisation's age (Huang et al., 2012; Nana, 2016);

OpLev= operating income divided by sales (Nana, 2016; Serfling, 2014);

D/E = Debt divided by equity (Nana, 2016; Serfling, 2014) and

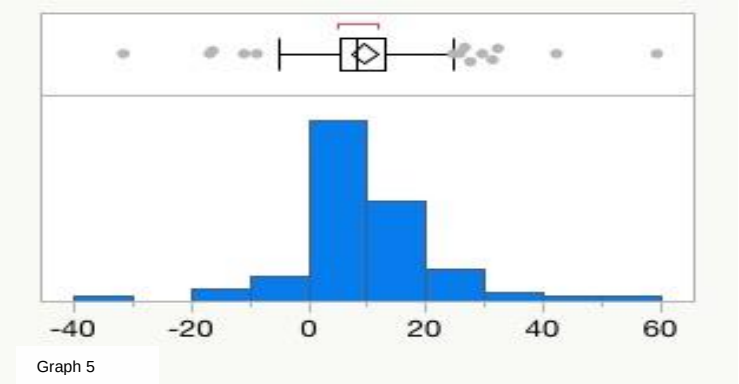
D/A = Debt divided by assets (Nana, 2016; Serfling, 2014).

CEO age, tenures, LNMVE and MB was addressed under Model [1] i.e. the variables represent "restatement" that is hypothesised to have a direct impact on the volatility of the share price. Model [2] had additional data points excluded, due to insufficient information, resulting in an average of 106 overall samples for evaluation.

Return on Assets [ROA]

The histogram, as per graph 5, depicts a kurtosis of 4.98 [a high peaked graph due to greater data points residing between 0 and 10 compared to the remainder of the sample population] and a skewness of 0.60. It should be noted that the data was depicted in percentages and not in decimal points, contrary to Huang et al. (2012). The spread falls within the normal skewness parameters i.e. +/- 1 (Wen & Yang, 2009).

i. ROA



Graph 5

ii. Quintiles graph 5

100.00%	maximum	59.44
75.00%	quartile	12.9975
50.00%	median	8.31
25.00%	quartile	5.2925
0.00%	minimum	-31.42

iii. Statistics Summary graph 5

Mean	9.471981
Std Dev	11.24514
Std Err Mean	1.092224
Upper 95% Mean	11.63766
Lower 95% Mean	7.306302
N	106
Skewness	0.60069
Kurtosis	4.984253

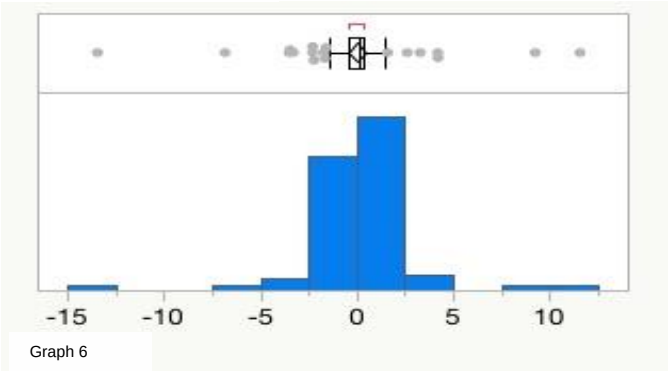
Per graph 5, the median was 8.31 % and the mean 9.47%, which was slightly higher than the research conducted by Huang et al. (2012) i.e. 5% and 5.5% respectively. The results therefore are indicative of the JSE organisation's performance in terms of asset resources rendering a higher return. The conclusion ties in with the prior research i.e. emerging markets are more speculative in nature and as such, show greater volatility in terms of performance (Wen & Yang, 2009)

Earnings growth % [Growth]

The histogram, as per graph 6, shows a distribution with a kurtosis [16.69] exceeding the normal distribution parameters of +/- 3 (DeCarlo, 1997), therefore the data does not fit the normal distribution criteria. The sample is however representative of earnings data relating to organisations undergoing growths and

declensions, it is therefore representative of the overall sample population (Huang et al., 2012; Serfling, 2014; Wen & Yang, 2009).

i. Earnings growth



Graph 6

ii. Quintiles graph

100.00%	maximum	11.59
75.00%	quartile	0.385
50.00%	median	0.1
25.00%	quartile	-0.385
0.00%	minimum	-13.42

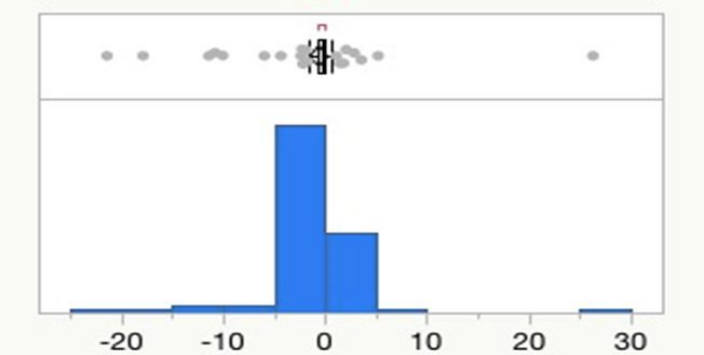
iii. Statistics Summary graph 6

Mean	-0.007143
Std Dev	2.370452
Std Err Mean	0.231332
Upper 95% Mean	0.451598
Lower 95% Mean	-0.465884
N	105
Skewness	-0.236559
Kurtosis	16.69025

Return on Capital employed between 2014 to 2016 [FIN]

The overall distribution fits the normal distribution curve parameters in terms of a skewness of 0.36, however, it should be noted that one extreme outlier was excluded in the sample population which resulted in a mean of -0.67 and a median 0.32. Per Wen and Yang (2009), emerging markets e.g. South Africa, are most likely to have a positive skewness speculative investment decisions [high risk] being taken. Therefore, the current distribution graph i.e. graph 7 per below is in line with prior studies.

i. Return on Capital Employed



Graph 7

ii. Quintiles graph 7

100.00%	maximum	26.31
75.00%	quartile	0.0575
`50.00%	median	-0.315
25.00%	quartile	-0.6275
0.00%	minimum	-21.35

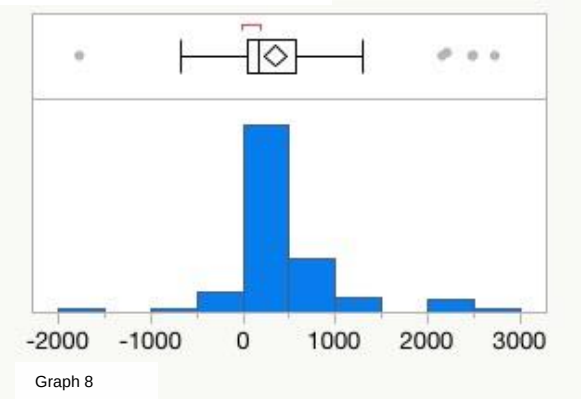
iii. Statistics Summary graph 7

Mean	-0.66934
Std Dev	4.280127
Std Err Mean	0.415723
Upper 95% Mean	0.154962
Lower 95% Mean	-1.493641
N	106
Skewness	0.358473
Kurtosis	21.93669

Earnings / Share 2016 [EPR]

EPR data does not depict a normal distribution curve i.e. a kurtosis of 4.85 and a skewness of 2.17. From the initial distribution analysis, the population is representative of the full JSE listed database, as such, small, medium and large organisations are included in the sample population, resulting in abnormal distribution. The observation is in line with prior studies i.e. emerging markets are more speculative in nature, as such, far greater volatility and a positive skewness is expected in its data distribution in relation to performance in comparison to developed markets like America (DeCarlo, 1997).

i. Earnings per share



Graph 8

ii. Quintiles graph 8

100.00%	maximum	2730
75.00%	quartile	576.0825
50.00%	median	160.55
25.00%	quartile	38.55
0.00%	minimum	-1764.32

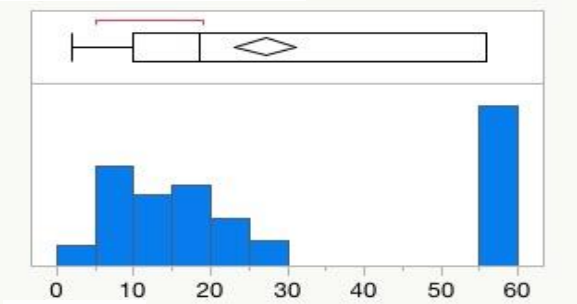
iii. Statistics Summary graph 8

Mean	355.3173
Std Dev	608.9202
Std Err Mean	59.14356
Upper 95% Mean	472.588
Lower 95% Mean	238.0465
N	106
Skewness	1.566649
Kurtosis	5.778997

Age of Firm [CoAge]

The age distribution of organisations depict an abnormal distribution curve i.e. a kurtosis of -1.45 and a skewness of 0.57 (DeCarlo, 1997; Wen & Yang, 2009). The population is inclusive of CEOs who are founders, a few outliers were included in the sample between the age brackets of 55 to 60 years. The age distribution of the companies listed on the JSE versus the American listed environment i.e. per the work of Huang et al. (2012, p. 9), show a *mean* co-age of 27.21 years versus a 42.28 years and a *median* age of 18.50 years versus 26.50 years, which is indicative of more developed markets [e.g. American] having companies which are longer established and in existence, which appears in line with expectations.

i. Age of company



Graph 9

iii. Quintiles graph 9

100.00%	maximum	56
75.00%	quartile	56
50.00%	median	18.5
25.00%	quartile	10
0.00%	minimum	2

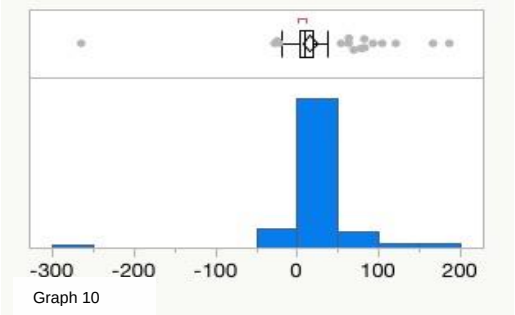
ii. Statistics Summary graph 9

Mean	27.216981
Std Dev	20.5908
Std Err Mean	1.9999553
Upper 95% Mean	31.182523
Lower 95% Mean	23.251439
N	106
Skewness	0.5677791
Kurtosis	-1.451507

Operating Profit Margin % 2016 [OPLev]

The operating profit margin percentage depicts an abnormal distribution i.e. a kurtosis of 19.74 and a skewness of -1.24 (DeCarlo, 1997; Wen & Yang, 2009). The bulk of the distribution occurs around the 50 to 100% mark with the odd outlier between -250 and -300 per cent [indicative of a negative return for shareholders based on company's performance year to date]. The data does not conform to a normal distribution.

i. Operating Profit Margin %



Graph 10

iii. Quintiles graph 10

100.00%	maximum	187.04
75.00%	quartile	19.62
50.00%	median	9.255
25.00%	quartile	3.41
0.00%	minimum	-263.95

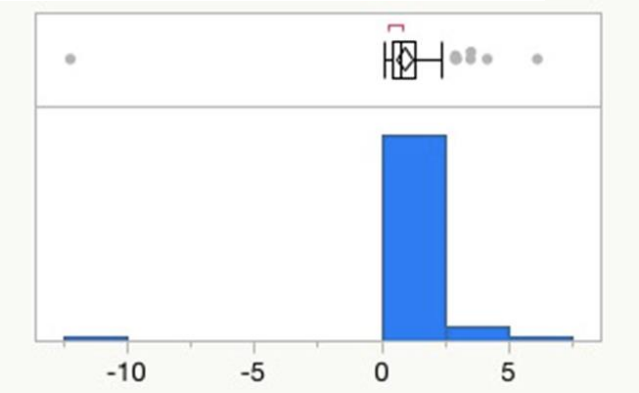
ii. Statistics Summary graph 10

Mean	16.018396
Std Dev	43.12768
Std Err Mean	4.1889306
Upper 95% Mean	24.324272
Lower 95% Mean	7.7125206
N	106
Skewness	-1.240899
Kurtosis	19.73992

Debt / EQ 2016 [D/E]

The debt to equity ratios for the sample of 106 organisations resulted in an abnormal distribution i.e. a kurtosis 45.48 of and a skewness of -4.87 as a result of major outliers in the sample section. The data was subsequently transformed using natural logs as per graph 12 below, to control for the organisation's appetite for risk which is in line with prior research (Nana, 2016).

i. Debt/EQ 2016



Graph 11

ii. Quintiles for graph 11

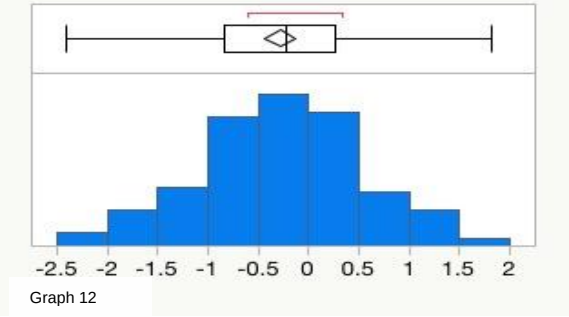
100.00%	maximum	6.15
75.00%	quartile	1.2925
50.00%	median	0.755
25.00%	quartile	0.425
0.00%	minimum	-12.22

iii. Statistic Summary for graph 11

Mean	0.9113208
Std Dev	1.5898009
Std Err Mean	0.1544151
Upper 95% Mean	1.2174974
Lower 95% Mean	0.6051441
N	106
Skewness	-4.871326
Kurtosis	45.482449

The natural log of debt to equity ratio for the full sample of 2016 resulted in a normal distribution i.e. a kurtosis -0.01 of and a skewness of -0.08.

i. Ln Debt/EQ 2016



Graph 12

ii. Quintiles for graph 12

100.00%	maximum	1.816452082
75.00%	quartile	0.258503241
50.00%	median	-0.22314355
25.00%	quartile	-0.83247531
0.00%	minimum	-2.40794561

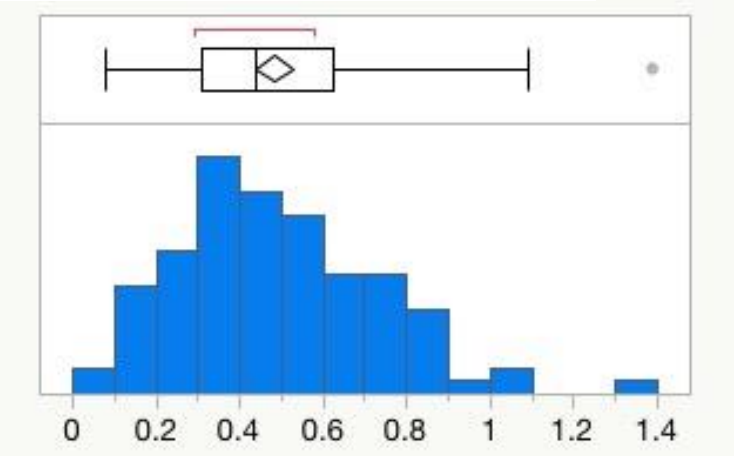
iii. Statistic Summary for graph 12

Mean	-0.282836
Std Dev	0.8114429
Std Err Mean	0.0791887
Upper 95% Mean	-0.125802
Lower 95% Mean	-0.43987
N	105
Skewness	-0.075779
Kurtosis	-0.012007

Debt / Assets Avg 2016 [D/A]

The debt to asset per the sample selection depicts a normal distribution i.e. a kurtosis 0.98 of and a skewness of 0.81.

i. Debt / Asset



Graph 13

ii. Quintiles for graph 13

100.00%	maximum	1.39
75.00%	quartile	0.6225
50.00%	median	0.44
25.00%	quartile	0.3075
0.00%	minimum	0.08

iii. Statistics Summary for graph 13

Mean	0.484434
Std Dev	0.2396707
Std Err Mean	0.0232789
Upper 95% Mean	0.5305917
Lower 95% Mean	0.4382762
N	106
Skewness	0.8121493
Kurtosis	0.9812579

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